**ATTACHMENT 5**
**Drainage Report**

# Preliminary Hydrology Report for:

NCTD Oceanside Transit Center
235 Tremont St.
Oceanside, California 92054

**Report Date:**

July 19, 2024

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# 1.0 PURPOSE

The purpose of this report is to prepare preliminary hydrologic calculations for the proposed land development of the mixed used transit-oriented project at 235 S. Tremont Street, Oceanside, CA 92054, herein referred to as the "Site". This report is prepared at the request of the client (Toll Brothers Apartment Living) as a component of the submittal application for the proposed Vesting Tentative Map and Development Plan.

This preliminary study examines drainage characteristics and patterns of the onsite and offsite watersheds in regard to distribution and management of storm water run-off. The study investigates the watershed for two scenarios: (1) pre-project condition which analyzes the property in its' current state and (2) post-project condition which analyzes the watershed with the proposed design and infrastructure improvements.

The following items were completed for the purpose of this study and in accordance with applicable agency requirements:

- Delineation of existing tributary areas to each concentrated flow line intersecting the project boundaries.
- Delineation of the proposed tributary areas to each concentrated flow line intersecting the project boundaries in compliance with Agency standards.
- Determination of the 25 and 100-year storm peak runoff using the Agency criteria for existing and developed conditions. The determination of storm peak runoff will be based on a site plan approved by the client.
- Conduct preliminary volumetric storage calculations (using criteria from the San Diego Hydrology Manual Section 6-1) to attenuate discharge so as not to exceed capacity of the downstream conveyance system. The project is exempt from hydromodification requirements (i.e. increased discharge from pre-project to post-project conditions).
- Provide a preliminary analysis of the type, locations, and size of the proposed mainline (backbone) drainage facilities, underground detention facilities, and downstream offsite municipal storm drain infrastructure.
- Coordinate proposed storm drain facilities with proposed Best Management Practice (BMP) devices as shown in corresponding Storm Water Quality Management Plan report.

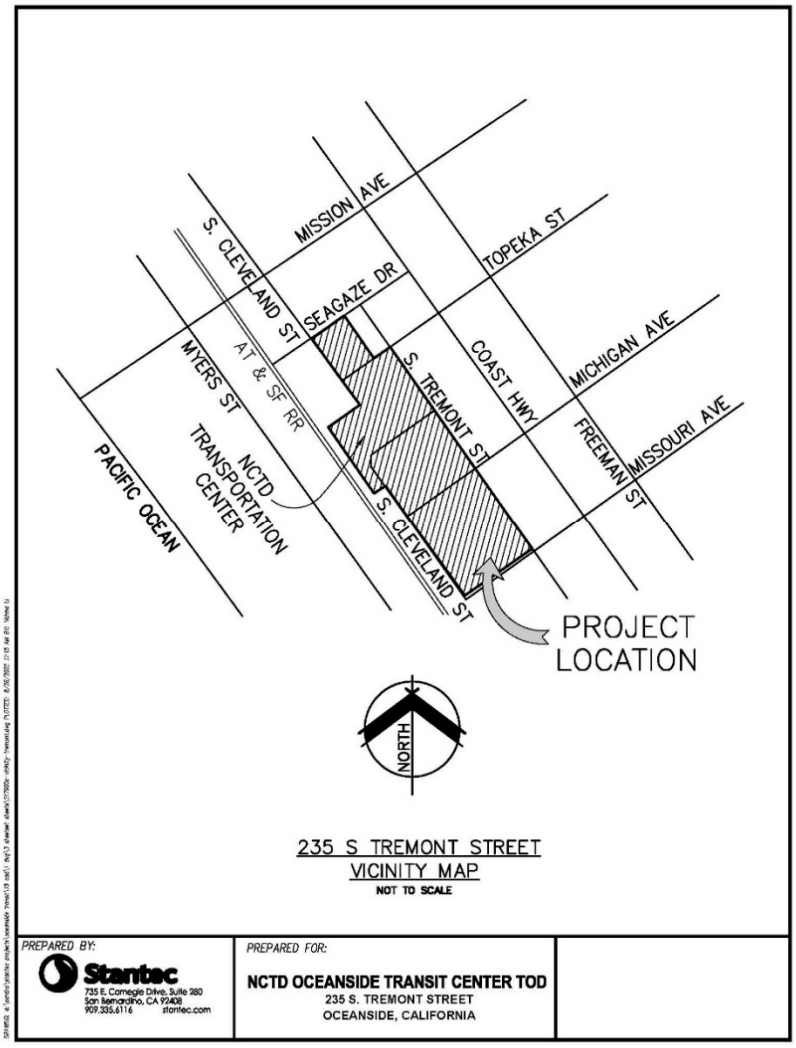
# 2.0 PROJECT DESCRIPTION

The site, located at 235 South Tremont Street, consists of approximately 10.2 acres located in Oceanside, California and is enclosed within South Tremont Street, Missouri Avenue, AT&SF Railway, and Seagaze Drive. See **Figure 1** below. The site will be developed as a transit-oriented development (TOD) with a mixed-use program generally consisting of approximately 547 residential apartment units with associated indoor and outdoor amenities, a boutique hotel

with amenities, a 50,000 square feet (SF) office building for the new NCTD headquarters location, 4,000 SF replacement intermodal transportation center for train and bus travelers, a 12 bus exterior transfer center, approximately 22,000 SF of retail store front, and parking structures on each block to accommodate the needs of the proposed land use mix.

Upon review of the National Flood Hazard Layer, it was determined that the Site is not within a Federal Emergency Management Agency (FEMA) regulated Special Flood Hazard Area (SFHA) such that flooding does not occur during the 1% (100-year) or 0.2% (500-year) annual chance flood event. See A**ppendix VIII** for FEMA map.

**Figure 1 – Vicinity Map**



# 3.0 HYDROLOGIC ANALYSIS

This hydrologic study utilizes the Rational Method (RM) approach from the 2016 HydroWin software, Advanced Engineering Software (AES). AES's HydroWin software package is preferred by the San Diego County to perform hydrologic analysis as the software is pre-installed with RM parameters that reference the 2003 San Diego County Hydrology Manual, herein referred to as the "2003 Hydrology Manual" (County, 2003 San Diego County hydrology Manual, 2003). The RM methodology and parameters are discussed in detail in the sub-sections below.

## 3.1 METHODOLOGY

### 3.1.1 Rational Method

Following the set standards in the 2003 Hydrology Manual, the Rational Method was chosen for this hydrologic analysis due to two factors: (1) its reliable success in estimating surface discharges in applicable dense urban drainage systems and (2) recommended approach for drainage areas less than 1 square mile (total tributary area = 48.5 acres or 0.08 square miles). This empirical equation estimates peak runoff during specified storm events for small urban and rural watersheds and is a function of drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (Tc). Time of concentration is a function of the longest flow length and hydraulic velocities from street, pipe, channel/ditch, or a combination of all three. The formula is expressed as:

$$Q = CIA$$

Where 'Q' is the peak discharge (cubic feet per second [cfs]), 'C' is the runoff coefficient (unitless), 'I' is the average rainfall intensity (inches per hour), and 'A' is the drainage area contributing to the design location (acres). A minimum of 5 minutes is used for the Tc. See **Section 3.2.3** and **Appendix V** for additional information.

To convey the post-project storm volumes and discharges, the site was analyzed for two storm events (25-year, 6-hour and 100-year, 6-hour events) as required by local ordinance.

### 3.1.2 Detention Volume Calculation

The detention volume calculations are based on criteria outlined in the 2003 Hydrology Manual (Section 6-1), so that the central tributary discharge offsite for the 100-year, 6-hour storm event does not exceed the existing peak flows at the point of connection with the existing 15-inch RCP. The underground detention basin volumes are determined using the AES Flood Routing application that allows for a storm inflow hydrograph to be routed through a detention basin with an outlet control structure.

## 3.2 SITE CHARACTERISTICS

Localized onsite runoff for existing and proposed development conditions concentrate at three locations: (1) northerly end of the property at the intersection of Seagaze Drive and S.

Cleveland Street, (2) a culvert located to the west underneath the AT&SF railway that discharges directly onto S. Myers Street through a curb outlet, and (3) southerly end of the property at the intersection of Missouri Avenue and S. Cleveland Street through a curb outlet. Under pre-project and post-project conditions, runoff generally flows east to west towards the railroad tracks and to each outlet location (i.e. concentration points). The proposed storm drain design includes a new underground pipe network with catch basins throughout the Site. Underground detention basins are also proposed to attenuate discharges so as not worsen the drainage conditions with the existing facility under the railway and discharge point into Myers Street.

### 3.2.1 Watersheds and Sub-Watersheds

#### 3.2.1.1 Existing Conditions

Onsite sub-watersheds for the existing conditions were delineated following field surveyed ground points and photogrammetric base-maps that show distinct topographic features (low-points, ridgelines, etc.), right-of-way (ROW) boundaries, and roadway crowns. Watersheds for the proposed conditions were derived from the proposed site-grading plan and architectural layouts. The offsite watersheds were derived using 2014 United States Geological Survey (USGS) LiDAR, Digital Elevation Models (DEM), alongside algorithms from the ArcGIS Hydro tools suite. Offsite runoff originates from several drainage basins located east of South Tremont Street.

For existing conditions, the site is modeled as six watersheds. See Existing Condition Hydrology Map in **Appendix II**. Watersheds A, B, C, D, E, F, and G have total watershed areas of 4.9, 1.5, 21.6. 4.5, 7.1, 5.9 and 3.0 acres, respectively. Flows in A, B and C watersheds travel southeast to northwest towards existing storm drain systems in S. Cleveland Street and Seagaze Drive. A portion of watershed D drains to a detention basin comprised of double 36” RCP. The system continues downstream combining with other flows from watershed D until it connects with a 15-inch RCP below the railroad tracks that discharges onto S. Myers Street via a sidewalk underdrain. Watershed G is an offsite area located west of the railroad that flows in a westerly direction as surface flow until it discharges into South Myers Street. Flow in South Myers Street travels south until it combines with flows from the sidewalk underdrain conveying flow from watershed D. The flow paths in watersheds E and F drain to the south and outlet onto S. Cleveland Street at Missouri Avenue as surface flow via a sidewalk underdrain.

#### 3.2.1.2 Proposed Conditions

**Onsite watersheds**

The proposed drainage design maintains the three prominent onsite watersheds (A, B, and C) that outlet at the same discharge points as the existing conditions: (1) one located on the northerly end of the project at the intersection of Seagaze Drive and S. Cleveland Street (watershed A), (2) a 15-inch RCP below the railroad tracks that outlets onto S. Myers Street (watershed B) via a sidewalk underdrain, and (3) the other on the southerly end of the project at the intersection of Missouri Avenue and S. Cleveland Street (watershed C) to a proposed offsite storm drain extension that will connect to the existing storm drain at the intersection of

Cleveland Street and Wisconsin Avenue. See Proposed Condition Hydrology Map in **Appendix II**. Watershed A, B, and C have total areas of 6.9, 5.0, and 34.0 acres, respectively.

Furthermore, the watersheds were divided into sub-watersheds that isolate individual flow paths following proposed grading plans, distinct topographic features, and backbone storm-drain layout. It was assumed that runoff from rooftop buildings would drain equally from the center in opposite directions (i.e. a 50/50 split following the rooftop centerline would flow in opposite directions). Sub-watershed A1 flows follow an existing path from south to north towards Seagaze Drive, while A2 drains north from an existing parking structure into an existing storm drain system that eventually confluences with A1 near the intersection of S. Cleveland Street and Seagaze Drive. Watershed B was divided into two sub-watersheds (B1 and B2) that discharges into two proposed underground detention basins located just east of the existing railroad tracks. Basin outlet pipes will connect to a proposed public storm drain that ultimately connects with the existing 15-inch storm drain under the railroad. Watershed C was split into two sub-watersheds (C1 and C2) that follow similar flow paths from north to south towards the intersection of Missouri Avenue and S. Cleveland Street. C1 and C2 is captured by the proposed onsite and offsite storm drain system that includes an extension that connects to the existing storm drain at the intersection of Cleveland Street and Wisconsin Avenue.

**Offsite watersheds**

Sub-watersheds located east of S. Tremont Street and south of Missouri Avenue are considered offsite drainage. See **Table 1** below for summary of onsite and offsite watershed areas.

**Table 1 – Summary of Sub-Watershed Areas**

| | Watershed | Sub-Watershed | Area (Ac) | Total Area (Ac) | Watershed Type |
|---|---|---|---|---|---|
| Existing | A | A1 | 0.3 | 4.9 | Offsite |
| | | A2 | 1.3 | | Offsite |
| | | A3 | 3.4 | | Offsite/Onsite |
| | B | B1 | 0.8 | 1.5 | Offsite |
| | | B2 | 0.7 | | Offsite |
| | | B3 | 0.1 | | Offsite |
| | C | C1 | 0.4 | 21.6 | Onsite |
| | | C3-1 | 3.1 | | Offsite |
| | | C3-2 | 2.4 | | Offsite |
| | | C4-1 | 0.8 | | Offsite |
| | | C5-1 | 3.4 | | Offsite |
| | | C5-2 | 2.4 | | Offsite |
| | | C6-1 | 0.7 | | Offsite |
| | | C7-1 | 1.1 | | Offsite |
| | | C7-2 | 1.7 | | Offsite |
| | | C7-3 | 1.7 | | Offsite |
| | | C8-1 | 2.6 | | Offsite |
| | | C8-2 | 1.3 | | Offsite |
| | D | D1 | 0.2 | 4.5 | Offsite |
| | | D2 | 0.5 | | Onsite |
| | | D3 | 0.9 | | Onsite |

| | | | | | |
|---|---|---|---|---|---|
| | | D4 | 0.3 | | Onsite |
| | | D5 | 0.6 | | Onsite |
| | | D6 | 1.3 | | Onsite |
| | | D7 | 0.2 | | Offsite |
| | | D8 | 0.4 | | Onsite |
| | E | E1 | 0.5 | 7.1 | Offsite |
| | | E2 | 2.4 | | Offsite |
| | | E3 | 0.4 | | Onsite |
| | | E4 | 1.7 | | Onsite |
| | | E5 | 1.7 | | Onsite |
| | | E6 | 0.4 | | Onsite |
| | F | F1 | 0.4 | 5.9 | Offsite |
| | | F2 | 1.4 | | Offsite |
| | | F3 | 1.5 | | Offsite |
| | | F4 | 0.5 | | Onsite |
| | | F5 | 1.4 | | Onsite |
| | | F6 | 0.4 | | Onsite |
| | | F7 | 0.4 | | Offsite |
| | G | G1 | 0.3 | 3.0 | Offsite |
| | | G2 | 0.6 | | Offsite |
| | | G3 | 2.1 | | Offsite |
| **SUM OF ALL WATERSHEDS** | | | | **48.5** | |
| Proposed | **A** | A1-1 | 0.3 | 6.9 | Offsite |
| | | A1-2 | 1.3 | | Offsite |
| | | A1-3 | 2.0 | | Onsite |
| | | A1-4 | 1.5 | | Onsite |
| | | A2-1 | 0.8 | | Offsite |
| | | A2-2 | 0.1 | | Offsite |
| | | A2-3 | 0.7 | | Offsite |
| | | A3 | 0.4 | | Onsite |
| | **B** | B1-1 | 0.2 | 5.0 | Offsite |
| | | B1-2 | 0.5 | | Onsite |
| | | B1-3 | 0.1 | | Onsite |
| | | B1-4 | 0.6 | | Onsite |
| | | B1-5 | 0.9 | | Onsite |
| | | B2-1 | 1.7 | | Onsite |
| | | B2-2 | 0.5 | | Onsite |
| | | B2-3 | 0.7 | | Onsite |
| | | | | | |
| | **C** | C1-1 | 0.5 | 34.0 | Offsite |
| | | C1-2 | 2.5 | | Offsite |
| | | C1-3 | 0.3 | | Onsite |
| | | C1-4 | 0.6 | | Onsite |
| | | C1-5 | 0.5 | | Onsite |
| | | C1-6 | 2.6 | | Onsite |
| | | C1-7 | 0.2 | | Onsite |
| | | C2-1 | 0.4 | | Offsite |
| | | C2-2 | 1.4 | | Offsite |
| | | C2-3 | 1.5 | | Offsite |

| | | | | | |
|---|---|---|---|---|---|
| | | C2-4 | 1.7 | | Onsite |
| | | C4-1 | 0.4 | | Offsite |
| | | C4-2 | 0.8 | | Offsite |
| | | C3-1 | 3.1 | | Offsite |
| | | C3-2 | 2.4 | | Offsite |
| | | C5-1 | 3.4 | | Offsite |
| | | C5-2 | 2.4 | | Offsite |
| | | C6-1 | 0.7 | | Offsite |
| | | C7-1 | 1.7 | | Offsite |
| | | C7-2 | 2.8 | | Offsite |
| | | C8-1 | 0.2 | | Offsite |
| | | C8-2 | 2.6 | | Offsite |
| | | C8-3 | 1.3 | | Offsite |
| | **G** | G-1 | 0.3 | 3.0 | Offsite |
| | | G-2 | 0.6 | | Offsite |
| | | G-3 | 2.1 | | Offsite |
| **SUM OF ALL WATERSHEDS** | | | | **48.5** | |

### 3.2.2 Soils and Topography

The Site has an underlying soils classification of Hydrological Group "A" as indicated by the United Stated Department of Agriculture (USDA) web soil survey database. See **Appendix VII** for USDA soils report. In the existing condition, the Site is comprised of asphalt parking lots, office buildings, and sparse vegetation characterized by low runoff potential and high infiltration rates when thoroughly wet (USDA).

Topographic information for the Site was obtained from two sources:

- 2014 USGS San Diego CA QL2 LIDAR
- Field surveys and photogrammetric methods conducted by Robert J. Lung & Associates on April 2nd, 2021

Horizontal and vertical references are relative to the North American Datum of 1983 (NAD83) State Planes California Zone 6 and North American Vertical Datum of 1988 (NAVD88), respectively.

The watershed sits at a maximum elevation of 70 feet near S. Coast Highway to the east with a decreasing slope towards the west at an elevation of 47.5 feet near the intersection of S. Cleveland Street and Missouri Avenue.

### 3.2.3 Rainfall and Climatic Data

Rainfall (precipitation) data expressed as rainfall intensity for a duration equal to the Tc for a specific storm duration was acquired from NOAA Atlas 14, a statistical database with precipitation frequency estimates for the 1-year to 1000-year average recurrence intervals. See **Appendix V** for rainfall data sheets. Rainfall intensities, in inches per hour, of 2.02 and 2.60 for the 6-hour duration were used for the 25-year and 100-year storm events, respectively.

### 3.2.4 Land Use

The Site was delineated based on two classifications: impervious and pervious. Impervious areas include streets, sidewalks and building rooftops. In the existing condition, a majority of the site is impervious (i.e. areas where zero ground infiltration occurs) making up 85% of the total project area and the remaining 15% pervious surfaces.

Based on this impervious to pervious analysis for the existing conditions, a "Neighborhood Commercial" classification was identified from Table 3-1 of the 2003 San Diego Hydrology Manual to closely resemble our hydrologic land cover condition. See **Table 2** below. Neighborhood Commercial represents an 80% imperviousness and runoff coefficients of 0.76 for HSC/G A soil conditions.

Much of the impervious features identified in the proposed design will be characterized as buildings (office space, residential uses, etc.), parking structures, roadways, and sidewalks. Landscape planting is planned within residential building amenities and dispersed throughout the site along pedestrian walkways and streets. County element classifications, specified in **Table 2** below, for the onsite proposed development area range from "Office Professional/Commercial" to "General Industrial". This represents impervious values from 90% to 95% with runoff coefficients of 0.83 to 0.87, respectively. The increase in impervious percentage and runoff coefficients is attributed to the reduction in pervious land cover in the proposed condition.

**Table 2 – Runoff Coefficients (2003 Hydrology Manual)**

San Diego County Hydrology Manual
Date: June 2003

Section: 3
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**Table 3-1**
**RUNOFF COEFFICIENTS FOR URBAN AREAS**

| Land Use | | Runoff Coefficient "C" | | | | |
|---|---|---|---|---|---|---|
| | | | Soil Type | | | |
| NRCS Elements | County Elements | % IMPER. | A | B | C | D |
| Undisturbed Natural Terrain (Natural) | Permanent Open Space | 0* | 0.20 | 0.25 | 0.30 | 0.35 |
| Low Density Residential (LDR) | Residential, 1.0 DU/A or less | 10 | 0.27 | 0.32 | 0.36 | 0.41 |
| Low Density Residential (LDR) | Residential, 2.0 DU/A or less | 20 | 0.34 | 0.38 | 0.42 | 0.46 |
| Low Density Residential (LDR) | Residential, 2.9 DU/A or less | 25 | 0.38 | 0.41 | 0.45 | 0.49 |
| Medium Density Residential (MDR) | Residential, 4.3 DU/A or less | 30 | 0.41 | 0.45 | 0.48 | 0.52 |
| Medium Density Residential (MDR) | Residential, 7.3 DU/A or less | 40 | 0.48 | 0.51 | 0.54 | 0.57 |
| Medium Density Residential (MDR) | Residential, 10.9 DU/A or less | 45 | 0.52 | 0.54 | 0.57 | 0.60 |
| Medium Density Residential (MDR) | Residential, 14.5 DU/A or less | 50 | 0.55 | 0.58 | 0.60 | 0.63 |
| High Density Residential (HDR) | Residential, 24.0 DU/A or less | 65 | 0.66 | 0.67 | 0.69 | 0.71 |
| High Density Residential (HDR) | Residential, 43.0 DU/A or less | 80 | 0.76 | 0.77 | 0.78 | 0.79 |
| Commercial/Industrial (N. Com) | Neighborhood Commercial | 80 | 0.76 | 0.77 | 0.78 | 0.79 |
| Commercial/Industrial (G. Com) | General Commercial | 85 | 0.80 | 0.80 | 0.81 | 0.82 |
| Commercial/Industrial (O.P. Com) | Office Professional/Commercial | 90 | 0.83 | 0.84 | 0.84 | 0.85 |
| Commercial/Industrial (Limited I.) | Limited Industrial | 90 | 0.83 | 0.84 | 0.84 | 0.85 |
| Commercial/Industrial (General I.) | General Industrial | 95 | 0.87 | 0.87 | 0.87 | 0.87 |

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

### 3.2.5 Proposed Backbone Storm Drain and Detention Basin Layout

Three disconnected mainline storm-drain systems (one for each watershed) are proposed to help convey surface runoff to three existing outlet locations as described in the previous sub-sections. A storm drain pipe is proposed along S. Cleveland Street, perpendicular to the street corridor, located within watershed A of the project area. This system will convey runoff produced from sub-watershed A1, as discussed in the above sub-section, to the existing northern storm-drain systems.

Watershed B proposes a storm drain system that runs parallel to the Topeka Street alignment from the upstream offsite watershed along S. Tremont Street to the point of connection with the upstream end of the existing 15-inch reinforced concrete pipe (RCP) under the railroad. A second mainline storm drain under South Cleveland Street between Topeka Street and Michigan Avenue connects to the same point of connection with the existing 15-inch RCP. A separate private storm drain system will convey all areas outside of the public right-of-way and discharge flows to two underground detention basins. One of the underground detention basins (DB1) is located north of the proposed office building. The second underground detention basin (DB2) is located south of the proposed office building. Both detention basins will connect to the proposed storm drain facilities described previously. There is a flow constraint with the existing storm drain due to the undersized 15-inch RCP culvert with a maximum capacity of 8.0 cfs. Detention basins are required to attenuate the 100-year storm event so as not to worsen the drainage condition with the existing 15-inch RCP. See **Appendix IV** for calculations. The underground detention basins are closed systems as it was determined by geotechnical engineer that infiltration is not feasible due to bluff failure concerns downstream of the project. See project's Storm Water Quality Management Plan for additional details. See also **Appendix VI** for copy of geotechnical study and **Appendix IX** for hydraulic calculations and map to show inundation limits for both the existing and proposed conditions. The exhibit also shows overland flow paths.

Watershed C proposes a storm drain system that conveys runoff from S. Tremont Street, Michigan Avenue, and the proposed transit station located on the southerly end of the project. A secondary storm drain system intercepts runoff north of S. Cleveland Street along Missouri Avenue. Both systems combine with one another at the intersection of Missouri Avenue and S. Cleveland Street and continues south under S. Cleveland Street through a proposed storm drain extension. The extension eventually connects with the existing storm drain system located in the intersection of S. Cleveland Street and Wisconsin Avenue.

Proposed pipe slopes and invert elevations for the preliminary storm drain layout were derived based on the following assumptions: (1) depth approximately 6 feet below top of finish grade and (2) pipe slopes following the existing ground topography. Pipe sizes and slopes are restricted as a result of the street slope which is approximately 0.3% in South Cleveland Street. See **Appendix IX** for WSPG hydraulic calculations to determine the capacity of the proposed storm drain extension.

### 3.2.6 Alternate Drainage Configuration

As requested by the City engineering staff, an assessment was completed to determine how much of the central tributary can be diverted to the north towards Seagaze Drive into a new CIP

storm drain system to be designed and constructed by the City's Public Works Department. The alternate drainage assessment assumes a 24-inch pipe at a slope of 0.5% extending further into the central tributary. The assessment for this alternate drainage configuration includes an analysis of the area in the central tributary that is physically able to drain to the extended storm drain system in South Cleveland Street. A portion of the central tributary is too low in elevation and is physically unable to connect to the extended storm drain in South Cleveland Street. It is our understanding that detention to attenuate peak flows to the storm drain connection at South Cleveland Street and Seagaze Drive will not be required. Further, we understand hydraulic modeling is being completed by the City's design consultant working on the CIP storm drain project and is therefore not a part of this assessment. As requested by the City engineering staff, Stantec has only completed a hydrologic analysis of the area that can potentially be diverted to the South Cleveland Street and Seagaze Drive intersection. See **Appendix X** for Central Tributary Diversion Exhibit and rational method calculations. It is estimated that 3.7 acres could be diverted which results in the total peak flow rates of 27.9 cfs, 33.2 cfs, and 36.3 cfs for the 25-year, 50-year, and 100-year storms, respectively.

## 3.3 RESULTS

The post-project peak runoff flow rates are observed to be equal and lower than the pre-project conditions. Generally, it is common for time of concentrations to reduce during urbanization; thus, increasing surface runoff. However, due to an increase in the quantity of stormwater conveyance infrastructures (i.e. storm drain pipes) as displayed in the proposed storm drain layout and gentle pipe slopes, time of concentrations have increased resulting in an attenuation of peak flows. See **Table 3 and 4** below for a summary and comparison of time of concentrations and peak flow rates.

Discharge differential between pre-project and post-project conditions for watershed A were relatively the same such that mitigation is not required.

As discussed in the above sections, watershed C will discharge to a proposed storm drain pipe under S. Cleveland Street that extends from the project to the existing storm drain system at the intersection of S. Cleveland Street and Wisconsin Avenue. The project does not increase peak flows to the existing system as shown in the summary tables below. See **Appendix III** for rational method calculations.

**Table 3 – Summary of Existing and Proposed Condition Time of Concentrations**

| TIME OF CONCENTRATION (TC) - EXISTING VS PROPOSED (25-YEAR) | | | |
|---|---|---|---|
| TRIBUTARY | EXISTING TC (MIN) | PROPOSED TC (MIN) | TC DIFFERENCE (MIN) |
| 1 | 7.4 | 7.8 | 0.4 |
| 2 | 4.4 | 7.9 | 3.5 |
| 3 | 17.3 | 16.1 | -1.2 |

| TIME OF CONCENTRATION (TC) - EXISTING VS PROPOSED (100-YEAR) | | | |
|---|---|---|---|
| TRIBUTARY | EXISTING TC (MIN) | PROPOSED TC (MIN) | TC DIFFERENCE (MIN) |
| 1 | 7.1 | 7.5 | 0.4 |
| 2 | 4.3 | 7.7 | 3.4 |
| 3 | 16.5 | 15.5 | -1.0 |

**Table 4 – Summary of Existing and Proposed Condition Peak Flow Rates**

| PRELIMINARY PEAK RUNOFF FLOW RATES - EXISTING VS PROPOSED (25-YEAR) | | | |
|---|---|---|---|
| TRIBUTARY | EXISTING Q (CFS) | PROPOSED Q (CFS) | Q DIFFERENCE (CFS) |
| 1 | 24.0 | 23.8 | -0.2 |
| 2 | 9.5 | 8.4 | -1.1 |
| 3 | 76.3 | 74.7 | -1.6 |

| PRELIMINARY PEAK RUNOFF FLOW RATES - EXISTING VS PROPOSED (100-YEAR) | | | |
|---|---|---|---|
| TRIBUTARY | EXISTING Q (CFS) | PROPOSED Q (CFS) | Q DIFFERENCE (CFS) |
| 1 | 31.6 | 31.3 | -0.3 |
| 2 | 12.1 | 10.7 | -1.4 |
| 3 | 99.7 | 98.2 | -1.5 |

# 4.0 SUMMARY AND CONCLUSIONS

This preliminary report is intended for planning purposes in preparation of Vesting Tentative Map and Development Plan. With construction of the proposed drainage system and underground storage basins, adequate flood protection will be provided for a 25-year and 100-year storm event.

Low Impact Development (LID) BMPs and treatment control BMPs are also incorporated into the drainage design and is discussed in more detail in the SWQMP report. LID principles will be implemented to recreate natural flow characteristics and promote natural movement of storm water run-off. The underground detention basins are closed systems and will not be used for infiltration. The basins are designed without dead storage.

Increases in peak runoff from the pre-project conditions in watershed A were not observed and, as such, mitigation efforts are not required.

Reducing the peak flows from watershed B so as worsen the conditions with the existing 15-inch RCP constraint, will be accomplished with the use of the two proposed underground detention basins fitted with outlet control structures. Hydrologic analyses indicate that the proposed project flows for the 25-year and 100-year storm events are lower than the existing condition.

Peak flows from watershed C will discharge offsite via a proposed storm drain extension in S. Cleveland Street that extends from the project to the intersection of S. Cleveland Street and Wisconsin Avenue. Hydrologic analyses indicate that the proposed project flows for the 25-year and 100-year storm events are lower than the existing condition.

The hydraulic and volumetric storage calculations included in this report are completed for planning purposes. All storm-drain pipes, slot drains, drainage inlets, and detention basin sizing shall be value engineered in the final engineering phase based on the required design storm as described in the 2003 San Diego County Hydrology Manual.

# 5.0 REFERENCES


County, S. D. (2003). *2003 San Diego County hydrology Manual.* Retrieved from https://www.sandiegocounty.gov/content/dam/sdc/dpw/FLOOD_CONTROL/floodcontroldocuments/hydro-hydrologymanual.pdf

County, S. D. (2014). *San Diego County Hydraulic Manual.* Oceanside: San Diego County.

USDA. (n.d.). *Updated Hydrologic Soils Group (HSG).* Retrieved from https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download/?cid=stelprdb1262857&ext=pdf

# 6.0 APPENDICES

## I. VESTING TENTATIVE MAP AND DEVELOPMENT PLAN

## II. EXISTING AND PROPOSED CONDITION HYDROLOGY MAPS

## III. HYDROLOGIC CALCULATIONS

## IV. DETENTION CALCULATIONS

a) Rathydro Hydrographs

b) Stage-Storage-Discharge Calculations

c) Existing Detention (Double 36” RCP)

d) Proposed Detention Basin 1 (Double 3’x12’ Contech Con/Span)

e) Proposed Detention Basin 2 (Triple 3’x12’ Contech Con/Span)

## V. NOAA RAINFALL DATA

## VI. GEOTECHNICAL STUDY

## VII. NRCS SOILS REPORT

## VIII. FEMA FIRMETTE

## IX. WSPG ANALYSIS

a) Existing Condition - Central Tributary Connection with 15” RCP

b) Proposed Condition - Central Tributary Connection with 15” RCP

c) Proposed Condition - South Cleveland Street Storm Drain Extension

d) Inundation Assessment and Exhibit

## X. CENTRAL TRIBUTARY DIVERSION HYDROLOGY & EXHIBIT

# I. VESTING TENTATIVE MAP AND DEVELOPMENT PLAN

# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN

## NCTD OCEANSIDE TRANSIT CENTER, 235 SOUTH TREMONT STREET
## CITY OF OCEANSIDE, CALIFORNIA

## GENERAL NOTES:

| | | |
|---|---|---|
| 1. | TOTAL AREA: | GROSS: 438,912 SF (10.06 ACRES) |
| 2. | EXISTING ZONING: | D-5, D-14, OP, PUT, R-3, D-5 |
| 3. | PROPOSED ZONING: | D-1 |
| 4. | NUMBER OF EXISTING PARCELS: | 8 |
| 5. | FEMA FLOOD INSURANCE RATE MAP NO.: | 06073C0734J eff. 12/20/2019, ZONE X, WITH BFE ZONE AE, AO, AH, VE, AR |
| 6. | CONTOUR INTERVAL: | 1 FT |
| 7. | MAX. SLOPE GRADIENT: | 10% MAX |
| 8. | PERCENT OF PROJECT IN STREETS: | 19.20% (1.93 ACRES) |
| 9. | AMOUNT OF GRADING: | 286,000 CY CUT; 1,000 CY FILL |
| 10. | ASSESSORS PARCEL NUMBERS: | SEE SHEET C9 |

## DESIGN NOTES:

1. ALL STREET DESIGN SHALL CONFORM TO THE CITY OF OCEANSIDE DESIGN STANDARDS AS REQUIRED BY THE CITY ENGINEER.
2. EASEMENTS SHALL BE PROVIDED, REMOVED OR RELOCATED AS REQUIRED BY THE CITY ENGINEER.
3. ALL PROPOSED UTILITIES SHALL BE UNDERGROUNDED AND EASEMENTS PROVIDED.
4. GEOTECHNICAL INVESTIGATION PREPARED BY: NOVA
5. THE DEVELOPER SHALL INSTALL STREET LIGHTS PER THE CITY OF OCEANSIDE ENGINEERING DEPARTMENT TRAFFIC DIVISION, THE STREET LIGHT DESIGN MANUAL AND THE CITY OF OCEANSIDE STANDARD DRAWING NO. M-4. STREET LIGHT LOCATIONS MAY VARY IN FINAL DESIGN.
6. ALL RETAINING WALLS IN EXCESS OF 4 FEET SHALL BE PLANTABLE.
7. ALL PROPOSED SEWER IS PUBLIC AND SHALL BE INSTALLED PER CITY OF OCEANSIDE STANDARDS.
8. ALL PROPOSED WATER IS PUBLIC AND SHALL BE INSTALLED PER CITY OF OCEANSIDE STANDARDS.
9. FINISH GRADES ARE APPROXIMATE AND SUBJECT TO CHANGE IN FINAL DESIGN, AS ALLOWED PER SUBSTANTIAL CONFORMITY.
10. ALL FUTURE DRIVEWAYS AND GEOMETRIC DESIGN SHALL BE DESIGNED IN COMPLIANCE WITH THE CITY OF OCEANSIDE ENGINEERS DESIGN STANDARDS.

## BENCHMARK:

NATIONAL GEODETIC SURVEY DX3234, STAMPED PIER NO 2 1933

ELEVATION 28.65' (NAVD88)

AT THE END OF THE PIER EXTENDING WEST FROM THE WEST END OF THIRD STREET, APPROXIMATELY 420' WEST OF THE CENTER LINE OF PACIFIC STREET, SET IN THE TOP OF THE SOUTH CONCRETE CURBING ON THE PIER, 25.9' EAST OF THE STATION MARK

## BASIS OF BEARINGS:

THE BASIS OF COORDINATES FOR THIS SURVEY IS THE CALIFORNIA COORDINATE SYSTEM (CCS83) ZONE VI, NAD 83 (2011.00 EPOCH), AS PER RECORD OF SURVEY 21787, FILED 8/21/2014 BY RBF CONSULTING, AS DETERMINED BY THE FOLLOWING CONTROL STATIONS:

3002 (DSME), 3004 (P474), 3005 (P478), 3006 (SBCC), 1004, 1005, 1006 AND 2102 (DX3432)

## TOPOGRAPHY SOURCE:

THIS SURVEY IS BASED UPON AERIAL PHOTOGRAPHY FLOWN ON APRIL 2, 2021 BY R.J. LUNG AND ASSOCIATES.

## LEGAL DESCRIPTION:

SEE SHEET C9

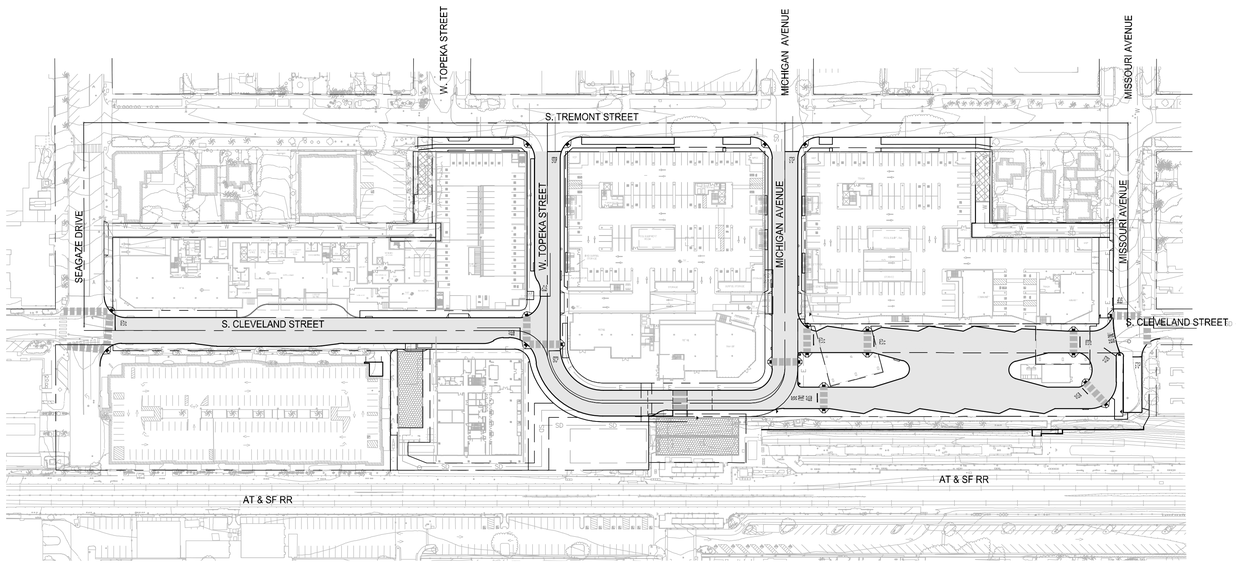
## EASEMENTS:

SEE SHEET C10

## SITE DATA:

1. SETBACKS:
   - BACKYARD: NONE
   - FRONT YARD: NONE
   - SIDE YARD: NONE
2. LANDSCAPE COVERAGE: 43,891 SF

| LOT # | DESCRIPTION | AREA (ACRES) |
|---|---|---|
| 1 | HOTEL | 1.10 |
| 2 | PARKING STRUCTURE | 0.72 |
| 3 | RESIDENTIAL MIXED USE | 2.03 |
| 4 | RESIDENTIAL | 1.85 |
| 5 | NCTD BUS STATION (PUBLIC ACCESS) | 1.37 |
| 6 | NCTD TRAIN PLATFORM PLAZA (PUBLIC ACCESS) | 0.31 |
| 7 | NCTD OFFICE | 0.71 |
| TOTAL | | 8.09 |
| PUBLIC R.O.W. | | 2.06 |
| SUBTOTAL SUBDIVISION BOUNDARY | | 10.15 |
| LOT 8 | CITY OF OCEANSIDE PARKING STRUCTURE | 1.84 |
| TRACT MAP PROJECT AREA | | 12.00 |

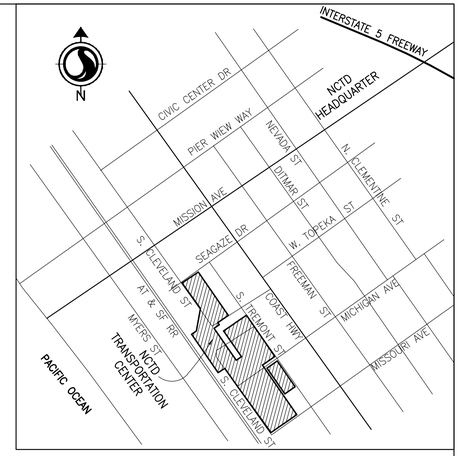



LOCATION MAP

GRAPHIC SCALE

100 0 50 100 200 400

( IN FEET )
1 inch = 100 ft.




VINCINITY MAP

NOT TO SCALE

## OWNER:

NORTH SAN DIEGO COUNTY TRANSIT DEVELOPMENT BOARD, AS TO TRACTS I, III AND PARCEL 2 OF TRACT II.
NORTH SAN DIEGO COUNTY TRANSIT BOARD, AS TO PARCEL 1 OF TRACT II.

## DEVELOPER:

TOLL BROTHERS APARTMENT LIVING
MICHAEL MCCANN
23422 MILL CREEK DRIVE, SUITE 105
LAGUNA HILLS, CA 92653
(949) 370-8155

## CIVIL ENGINEER:

STANTEC
EDWARD DAWSON GROVE
801 SOUTH FIGUEROA STREET, #300
LOS ANGELES, CA 90017-3007
TED.GROVE@STANTEC.COM

08.23.24

EDWARD DAWSON GROVE RCE 61374 DATE

REGISTERED PROFESSIONAL ENGINEER EDWARD DAWSON GROVE No. C61374 STATE OF CALIFORNIA

## ARCHITECT:

CALLISONRTKL INC
333 SOUTH HOPE STREET, SUITE C-200
LOS ANGELES, CA 90034

## GEOTECHNICAL:

NOVA SERVICES
4373 VIEWRIDGE AVENUE, SUITE B
SAN DIEGO, CA 92123

## SHEET INDEX:


SHEET C1 - TITLE SHEET
SHEET C2 - SITE SECTIONS AND DETAILS
SHEET C3 - SITE SECTIONS AND DETAILS
SHEET C4 - MASTER TECHNICAL SITE PLAN
SHEET C5 - VESTING TENTATIVE TRACT MAP
SHEET C6 - PRELIMINARY GRADING & DRAINAGE
SHEET C7 - LID BMP FEATURES
SHEET C8 - LID BMP FEATURES
SHEET C9 - PRELIMINARY WET UTILITIES
SHEET C10 - S. CLEVELAND ST. PRELIMINARY STORM DRAIN
SHEET C11 - FIRE ACCESS CIRCULATION PLAN
SHEET C12 - ENCUMBRANCE MAP
SHEET C13 - ENCUMBRANCE MAP


## LEGEND:

- BOUNDARY LINE
- CENTER LINE
- CURB AND GUTTER
- PROP. DRIVEWAY
- EXIST. CONTOUR (54)
- PROP. CONTOUR (54)
- EASEMENT LINE
- PROP. RETAINING WALL
- EXIST. SEWER (SS)
- EXIST. WATER (W)
- EXIST. STORM DRAIN (SD)
- EXIST. GAS (G)
- EXIST. OVERHEAD POWER (E(OH))
- PROP. SEWER (SS)
- PROP. WATER (W)
- PROP. STORM DRAIN (SD)
- PROP. GAS (G)
- EXIST. FIRE HYDRANT
- PROP. FIRE HYDRANT
- EXIST. SUBDIVISION BOUNDARY
- FH FIRE HYDRANT
- MH MANHOLE
- PA LANDSCAPE PLANTERS
- PAE PUBLIC ACCESS EASEMENT
- TURF BLOCK BOMANITE GRASSCRETE
- UNDERGROUND WATER QUALITY BMP CHAMBERS
- PROP. ADA RAMP

DEVELOPMENT PLAN - D22-00016
TENTATIVE MAP - T22-00006
GENERAL PLAN AMENDMENT - GPA22-00002
REGULAR COASTAL PERMIT - RC22-00011

PREPARED BY:

Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
## TITLE SHEET
## NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C1 OF C13

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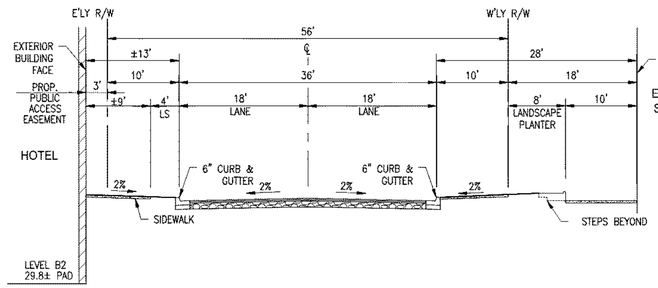


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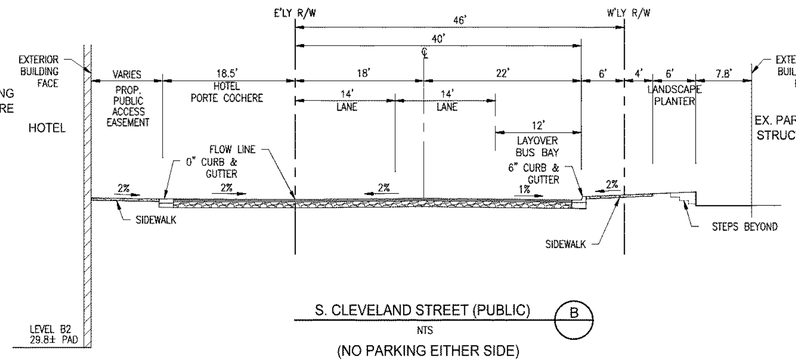


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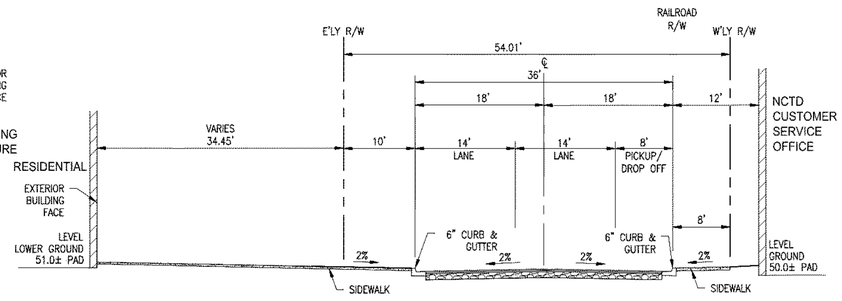


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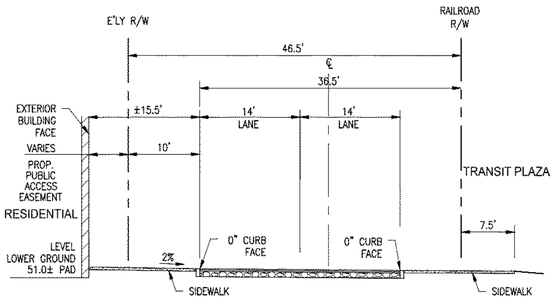


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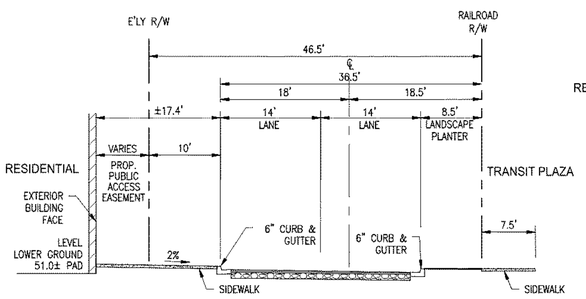


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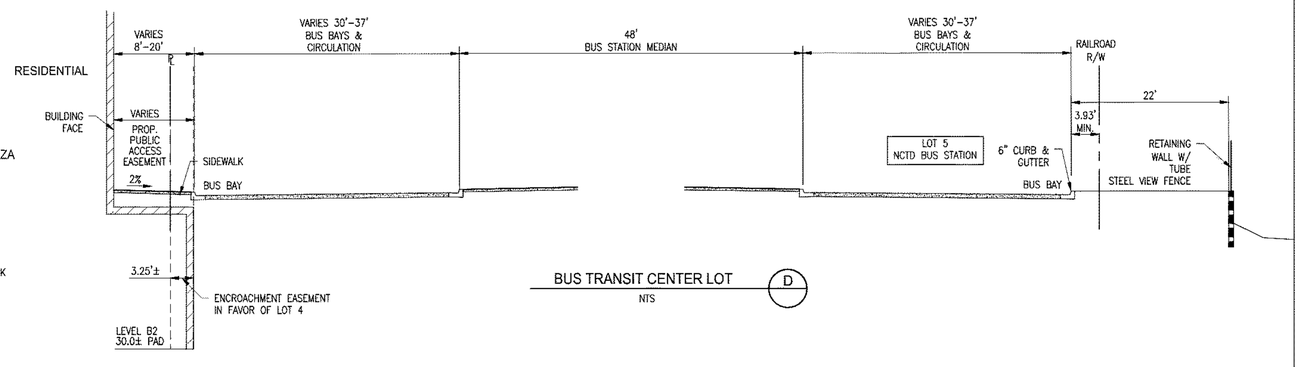


BUS TRANSIT CENTER LOT D

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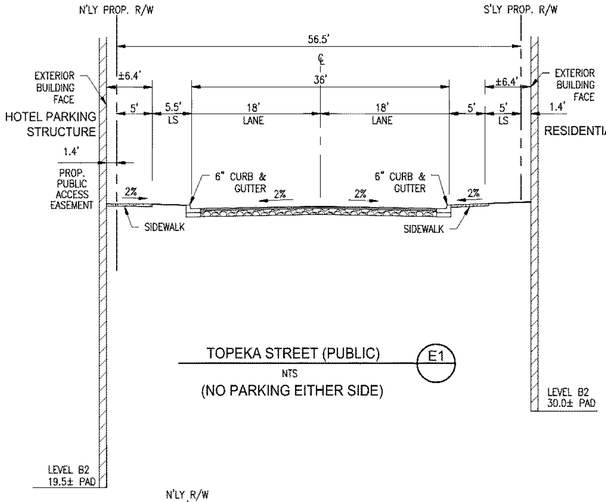


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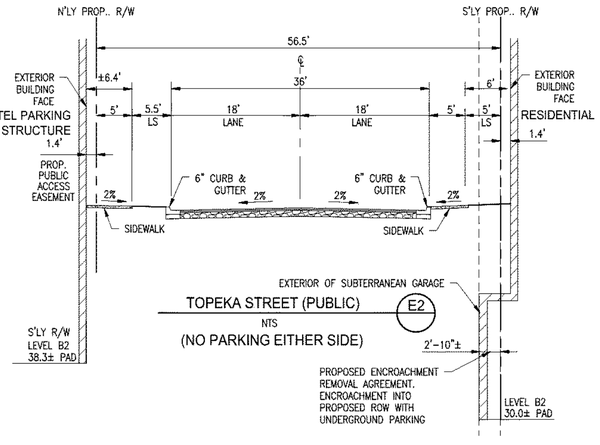


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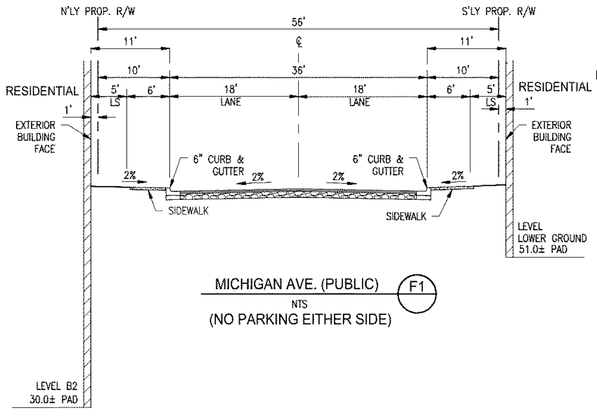


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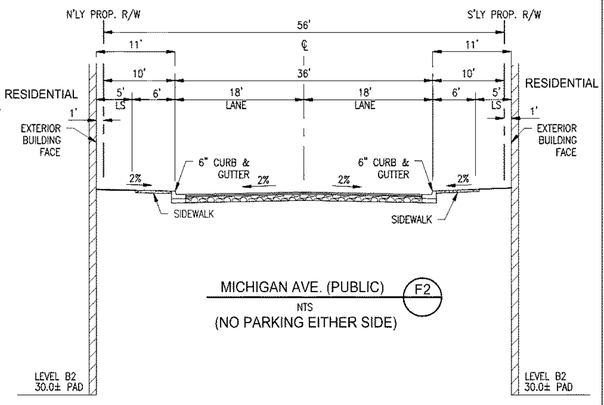


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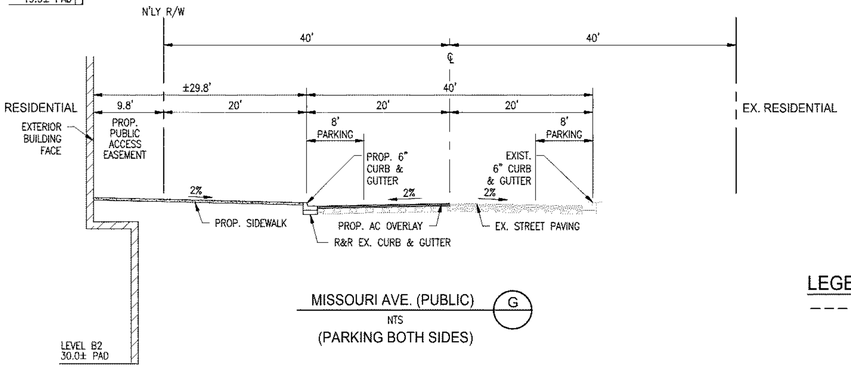


MISSOURI AVE. (PUBLIC) G

NTS

(PARKING BOTH SIDES)

LEGEND:

EASEMENT LINE

PREPARED BY:

Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
# SITE SECTIONS AND DETAILS
## NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C2 OF C13

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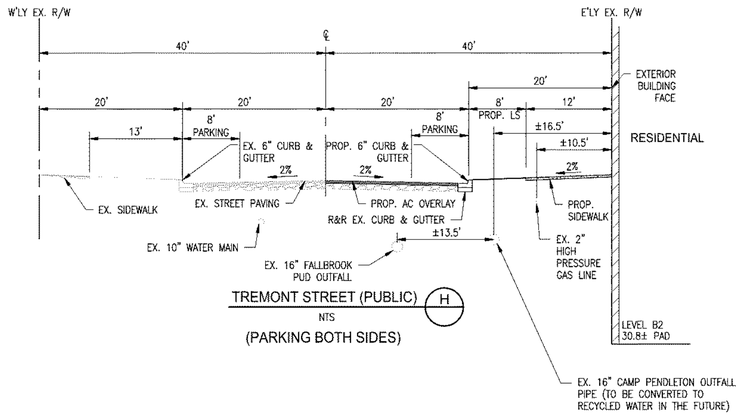


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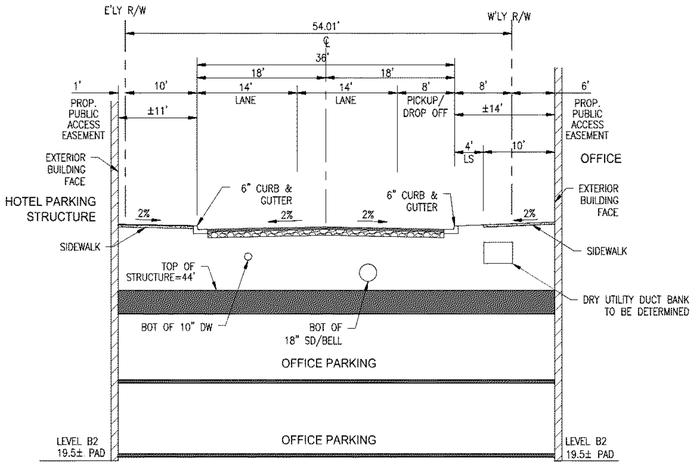


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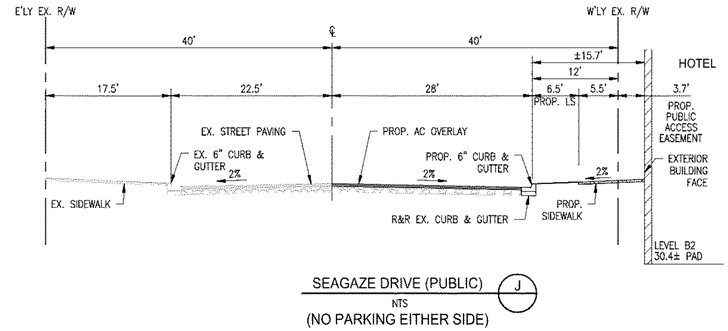


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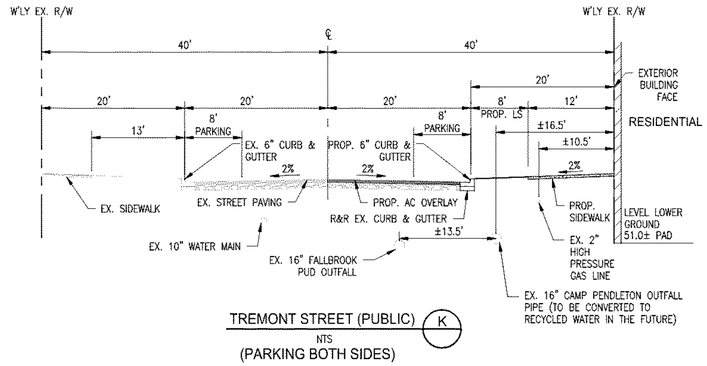


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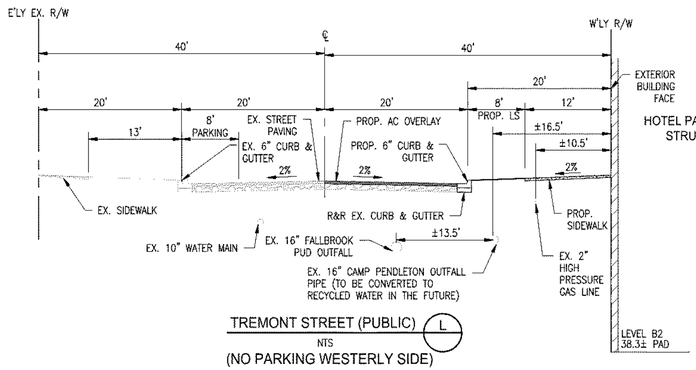


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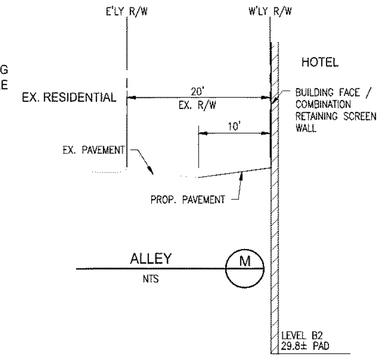


ALLEY M
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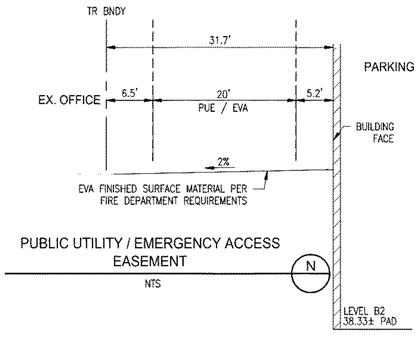


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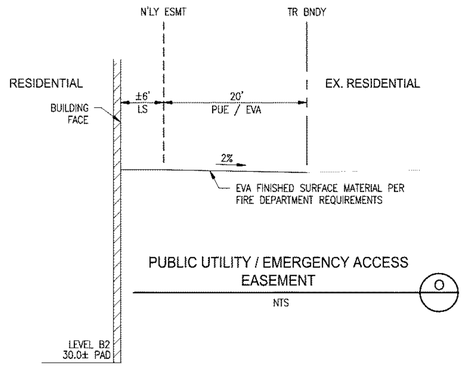


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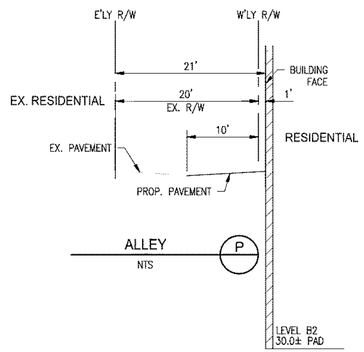


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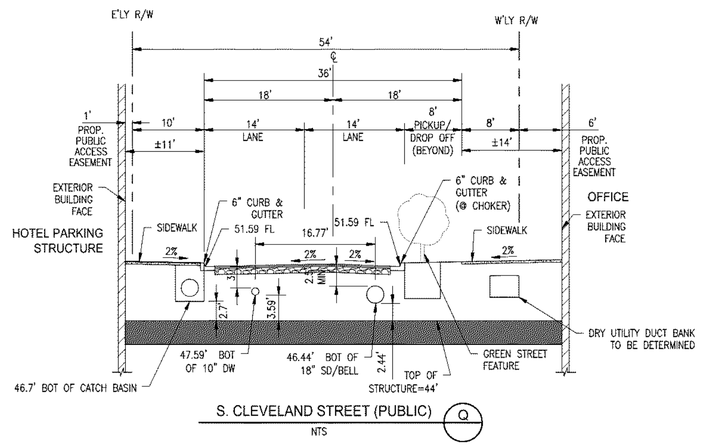


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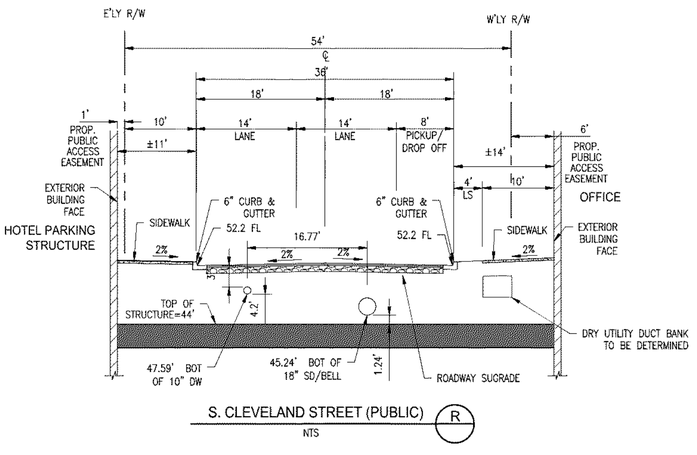


S. CLEVELAND STREET (PUBLIC) R
NTS

LEGEND:

EASEMENT LINE

PREPARED BY:
Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
# SITE SECTIONS AND DETAILS
## NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C3 OF C13

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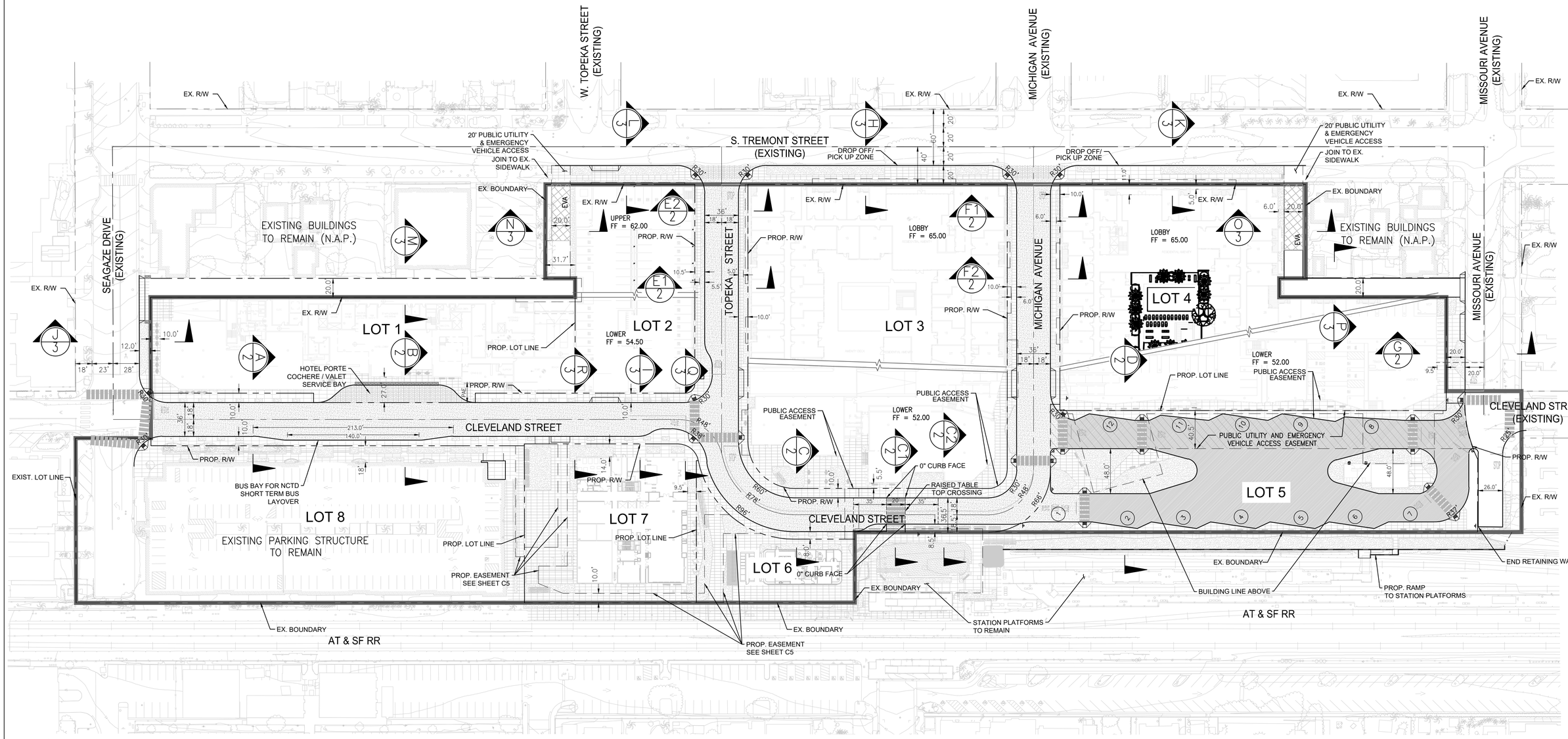


## LEGEND:

- R/W/ BOUNDARY LINE
- CENTER LINE
- CURB AND GUTTER
- PROP. DRIVEWAY
- EXIST. CONTOUR
- PROP. CONTOUR
- EASEMENT LINE
- PROP. RETAINING WALL
- EXIST. SEWER
- EXIST. WATER
- EXIST. STORM DRAIN
- EXIST. GAS
- EXIST. OVERHEAD POWER
- PROP. SEWER
- PROP. WATER
- PROP. PUBLIC STORM DRAIN
- PROP. RECYCLE WATER
- PROP. GAS
- PEDESTRIAN CROSSING
- PROP. ADA RAMP
- EXIST. FIRE HYDRANT
- PROP. PUBLIC FIRE HYDRANT
- PROJECT BOUNDARY
- PAE — PUBLIC ACCESS EASEMENT
- FH — FIRE HYDRANT
- FIRE DEPARTMENT APPROVED EVA FINISHED SURFACE
- BUS TRANSFER PARKING STALL NUMBER

GRAPHIC SCALE

50 0 25 50 100 200

( IN FEET )
1 inch = 50 ft.

PREPARED BY:
Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
# MASTER TECHNICAL SITE PLAN
## NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C4 OF C13

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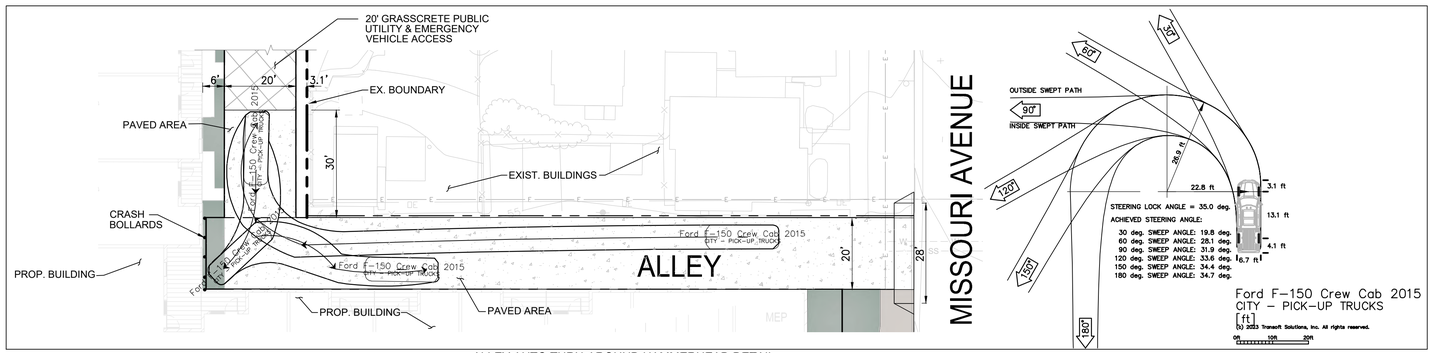
EX. R/W
EX. 10" WATER MAIN
EX. 16" FALLBROOK PUD OUTFALL
PROP. DRIVEWAY
PUBLIC UTILITY/ EVA ACCESS
W. TOPEKA STREET
EX. OVERHEAD POWER LINE
S. TREMONT STREET
DROP OFF / PICKUP ZONE
EX. 2" HIGH PRESSURE GAS LINE
MICHIGAN AVENUE
MISSOURI AVENUE
EX. 8" WATER MAIN
EX. 10" SEWER LINE
EX. 16" CAMP PENDLETON OUTFALL
EX. BOUNDARY
EXISTING BUILDINGS TO REMAIN (N.A.P.)
EX. 6" VCP SEWER LINE
EX. 6" WATER MAIN
ALLEY
SEAGAZE DRIVE
PUBLIC ACCESS EASEMENT
LOT 1
LOT 2
LOWER FF = 54.50
UPPER FF = 62.00
PROP. R/W
PROP. 15"SD
TOPEKA STREET
PROP. LOT LINE
PROP. DRIVEWAY
PROP. 12"SD
CLEVELAND STREET
4" DEPRESSED UTILITY CURB
PROP. 24"SD
PROP. 18"SD
PLANTER (TYP.)
EXIST. LOT LINE
LOT 8
EXISTING PARKING STRUCTURE TO REMAIN
LOT 7
PRIVATE SD CROSSING ROW
PROP. 15" SD
LOT 6
LOT 3
LOBBY FF = 65.00
PROP. FH
PROP. 18"SD
LOWER FF = 52.00
LOT 4
SEE ALLEY AUTO TURN-AROUND HAMMERHEAD DETAIL HEREON
"WALK BICYCLES AT TRANSIT CENTER" & "DO NOT ENTER" SIGNS
PROP. 30"SD
LOT 5
"DO NOT ENTER" SIGN
"WALK BICYCLES AT TRANSIT CENTER" SIGN
FOR CHAMBERS MAINTENANCE
PROJECT BOUNDARY
EX. FH TO BE RELOCATED
EX. 8" SEWER LINE
AT & SF RR

## LEGEND:

- R/W/ BOUNDARY LINE
- CENTER LINE
- CURB AND GUTTER
- PROP. DRIVEWAY
- EXIST. CONTOUR
- PROP. CONTOUR
- EASEMENT LINE
- PROP. RETAINING WALL
- EXIST. SEWER
- EXIST. WATER
- EXIST. STORM DRAIN
- EXIST. GAS
- EXIST. OVERHEAD POWER
- PROP. SEWER
- PROP. WATER
- PROP. PUBLIC STORM DRAIN
- PROP. RECYCLE WATER
- PROP. GAS
- EXIST. FIRE HYDRANT
- PROP. PUBLIC FIRE HYDRANT
- PROJECT BOUNDARY
- PA — LANDSCAPE PLANTERS
- PAE — PUBLIC ACCESS EASEMENT
- FH — FIRE HYDRANT
- PRIVATE UNDERGROUND PEAK REDUCTOIN DETENTION CHAMBER




ALLEY AUTO TURN-AROUND HAMMERHEAD DETAIL
SCALE: 1"=20'

## PROPOSED EASEMENTS

1. PUBLIC UTILITY AND EMERGENCY VEHICLE ACCESS
2. ENCROACHMENT EASEMENT IN FAVOR OF LOT 4
3. PUBLIC UTILITY EASEMENT
4. PUBLIC ACCESS EASEMENT
4. PROPOSED ENCROACHMENT REMOVAL AGREEMENT

GRAPHIC SCALE
50 0 25 50 100 200
( IN FEET )
1 inch = 50 ft.

SEE ENCUMBRANCE MAP SHEET C12 FOR EXISTING EASEMENTS AND RIGHT OF WAY TO BE QUITCLAIMED, OR ABANDONED

PREPARED BY:
Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN

## NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET

CITY OF OCEANSIDE, CALIFORNIA

SHEET C5 OF C13

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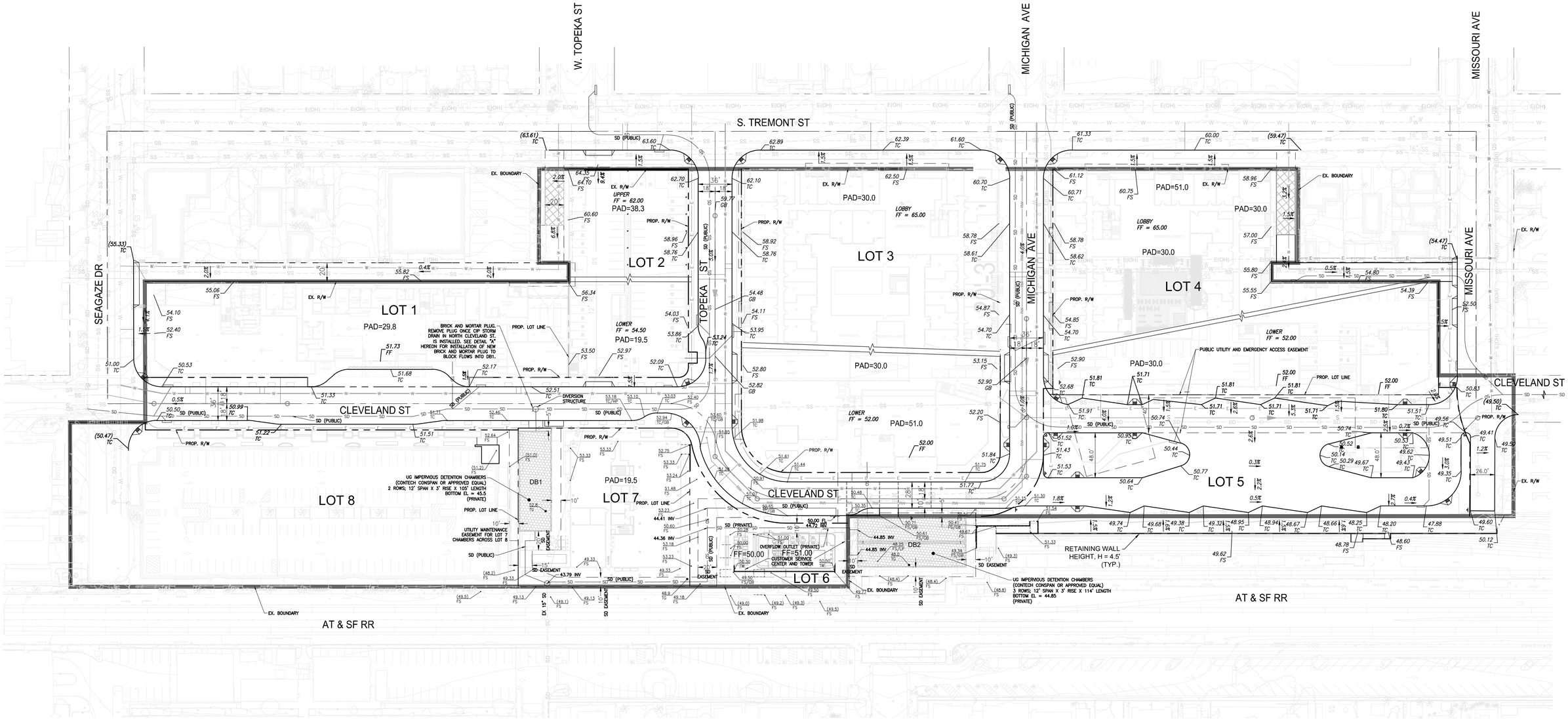
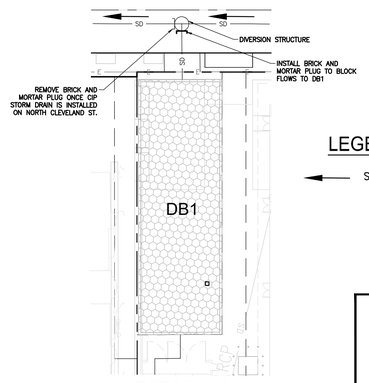



GRADING NOTES:

1. TOTAL AMOUNT OF CUT: 247,000 CY; TOTAL AMOUNT OF FILL: 700 CY
2. RETAINING WALLS: LENGTH: 800 LF; MAX HEIGHT: 7 FT
3. VOLUMES ARE CALCULATED TO ESTIMATED BOTTOM OF FOUNDATION FLOOR FOR BUILDINGS AND SUBGRADE FOR ROAD/HARDSCAPES

## LEGEND:

| | |
|---|---|
| R/W/ BOUNDARY LINE | PROP. SEWER |
| CENTER LINE | PROP. WATER |
| CURB AND GUTTER | PROP. PUBLIC STORM DRAIN |
| PROP. DRIVEWAY | PROP. RECYCLE WATER |
| EXIST. CONTOUR | PROP. GAS |
| PROP. CONTOUR | EXIST. FIRE HYDRANT |
| EASEMENT LINE | PROP. PUBLIC FIRE HYDRANT |
| PROP. RETAINING WALL | PROJECT BOUNDARY |
| EXIST. SEWER | PUBLIC ACCESS EASEMENT (PAE) |
| EXIST. WATER | FIRE HYDRANT (FH) |
| EXIST. STORM DRAIN | PRIVATE UNDERGROUND PEAK REDUCTION DETENTION CHAMBERS |
| EXIST. GAS | ESTIMATED LOWEST LEVEL PAD ELEVATION TO BE DETERMINED WITH FINAL CONSTRUCTION DRAWINGS (PAD=29.8) |
| EXIST. OVERHEAD POWER | |




DETAIL "A"
NTS

## LEGEND:

SD FLOW DIRECTION

GRAPHIC SCALE

50 0 25 50 100 200

( IN FEET )
1 inch = 50 ft.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# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
# PRELIMINARY GRADING & DRAINAGE
## NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C6 OF C13


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LEGEND:

IN–GROUND BIOFILTRATION PLANTER (PRIVATE)

RAISED BIOFILTRATION PLANTER (PRIVATE)

BIOFILTRATION PROPRIETARY UNIT (PRIVATE)

TREE WELLS (PUBLIC)

PROJECT BOUNDARY

APN:XXXXXX

W. TOPEKA STREET

S. TREMONT STREET

TOPEKA STREET

SEAGAZE DRIVE

CLEVELAND STREET

CLEVELAND STREET

APN: 147-273-01

APN: 147-273-02

APN: 147-273-03

APN: 147-273-04

APN: 147-273-05

APN: 147-273-06

A2 A3 A4 A5 A6 A7 A8 A9 A10 D1 D2 D3 D4 D5 D6 D7 D8 D11 B1 B2 B3 B4 B6

AT & SF RR

MATCHLINE - SEE SHEET C8

GRAPHIC SCALE

40 0 20 40 80 160

( IN FEET )

1 inch = 40 ft.

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# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
# LID BMP FEATURES
## NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C7 OF C13

DRAWING: u:\2042217900\drawing\sheet_files\217900c--1022lm.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian

MATCHLINE - SEE SHEET C7

MICHIGAN AVENUE

MISSOURI AVENUE

APN: 150-046-11

APN: 150-046-10

APN: 150-046-09

APN: 150-182-13

CLEVELAND STREET

TYSON STREET

AT & SF RR

B5 C1 C2 C3 C4 C5 C6 C7 C8 C9 (TYP.) C10 C11 D9 D10

LEGEND:

IN-GROUND BIOFILTRATION PLANTER (PRIVATE)

RAISED BIOFILTRATION PLANTER (PRIVATE)

BIOFILTRATION PROPRIETARY UNIT (PRIVATE)

TREE WELLS (PUBLIC)

PROJECT BOUNDARY

GRAPHIC SCALE

40 0 20 40 80 160

( IN FEET )

1 inch = 40 ft

PREPARED BY:

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# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
# LID BMP FEATURES
## NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C8 OF C13

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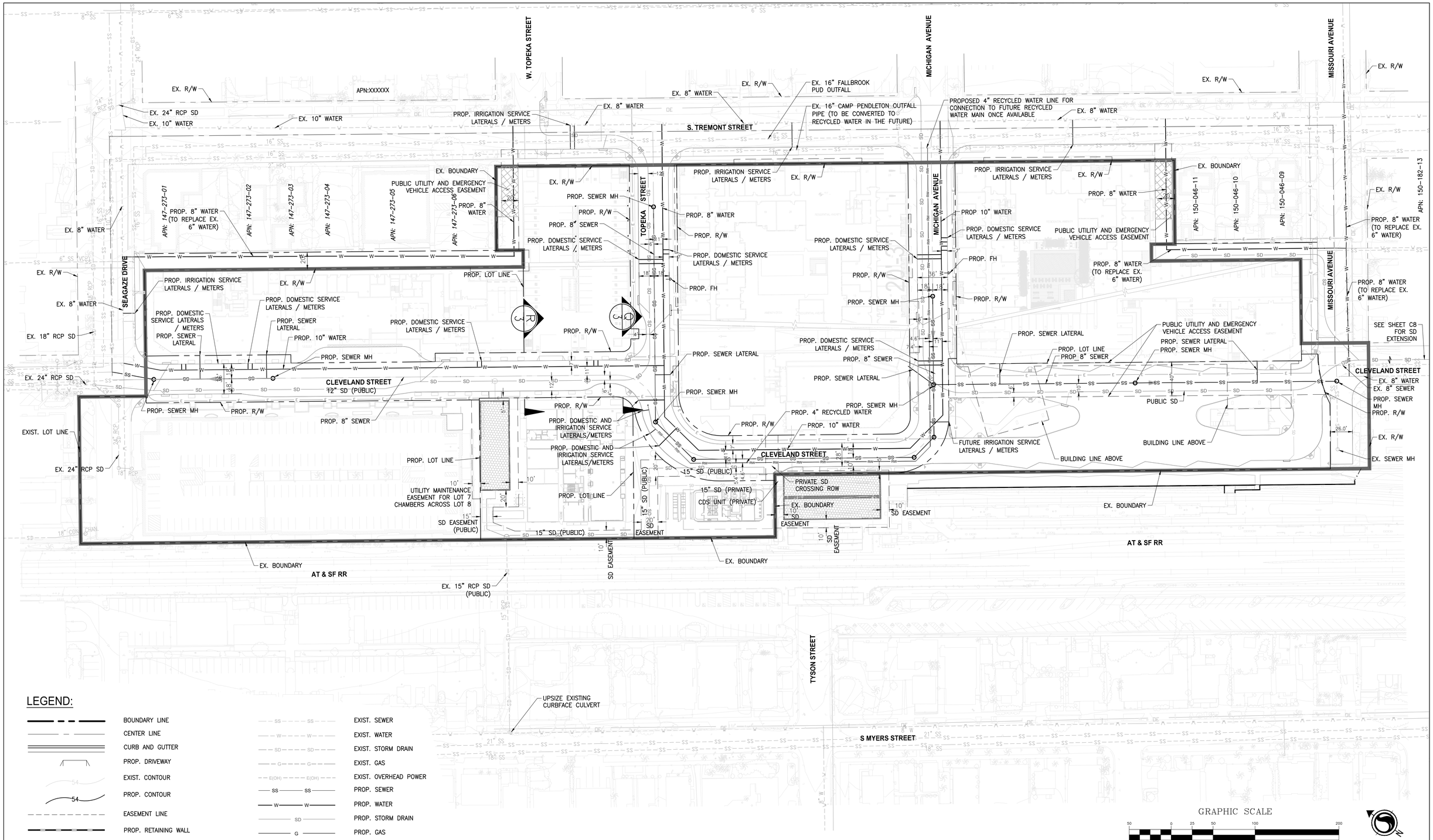


## LEGEND:

| | |
|---|---|
| | BOUNDARY LINE |
| | CENTER LINE |
| | CURB AND GUTTER |
| | PROP. DRIVEWAY |
| 54 | EXIST. CONTOUR |
| 54 | PROP. CONTOUR |
| | EASEMENT LINE |
| | PROP. RETAINING WALL |
| | SIGHT VISIBILITY LINES |
| | EXIST. FIRE HYDRANT |
| | PROP. PUBLIC FIRE HYDRANT |
| | EXIST. SUBDIVISION BOUNDARY |
| PAE | PUBLIC ACCESS EASEMENT |
| FH | FIRE HYDRANT |
| MH | MANHOLE |
| SS | EXIST. SEWER |
| W | EXIST. WATER |
| SD | EXIST. STORM DRAIN |
| G | EXIST. GAS |
| E(OH) | EXIST. OVERHEAD POWER |
| SS | PROP. SEWER |
| W | PROP. WATER |
| SD | PROP. STORM DRAIN |
| G | PROP. GAS |
| RW | PROP. RECYCLED WATER |
| E | PROP. ELEC. |
| | PEDESTRIAN CROSSING |
| | PROP. ADA RAMP |
| | TURF BLOCK BOMANITE GRASSCRETE |
| | PRIVATE UNDERGROUND PEAK REDUCTION DETENTION CHAMBERS |

GRAPHIC SCALE

50 0 25 50 100 200

( IN FEET )
1 inch = 50 ft.


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# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
# PRELIMINARY WET UTILITIES
## NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C9 OF C13


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TREMONT AVE.

MISSOURI AVENUE

WASHINGTON AVE.

MINNESOTA AVE.

WISCONSIN AVE.

S. CLEVELAND STREET

AT & SF RAILWAY

PROP. STORM DRAIN

S=0.003

(50)

26.0'

## LEGEND:

| | |
|---|---|
| 54 | EXIST. CONTOUR |
| SS SS | EXIST. SEWER |
| W W | EXIST. WATER |
| SD SD | EXIST. STORM DRAIN |
| G G | EXIST. GAS |
| E(OH) E(OH) | EXIST. OVERHEAD POWER |
| SS SS | PROP. SEWER |
| W W | PROP. WATER |
| SD | PROP. STORM DRAIN |
| G | PROP. GAS |
| RW RW | PROP. RECYCLED WATER |
| E | PROP. ELEC. |

GRAPHIC SCALE

50 0 25 50 100 200

( IN FEET )

1 inch = 50 ft.


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# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
# S. CLEVELAND ST. PRELIMINARY STORM DRAIN
## NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C10 OF C13


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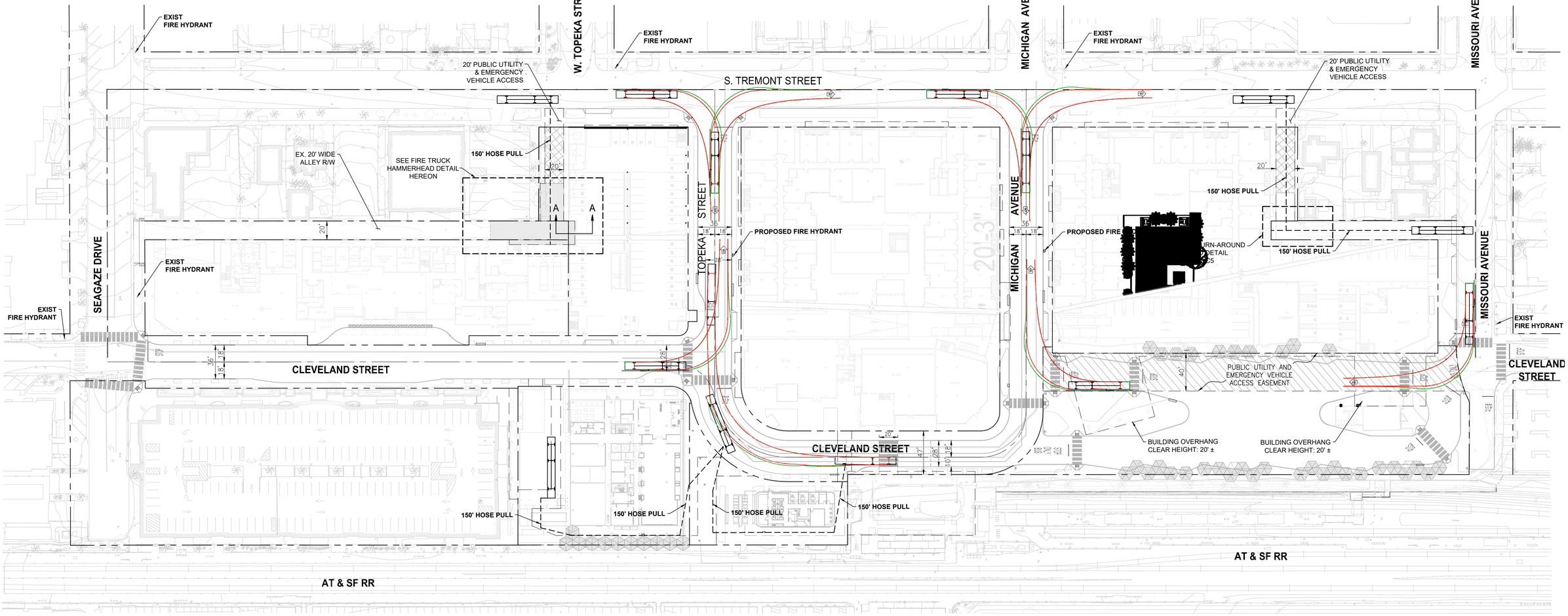
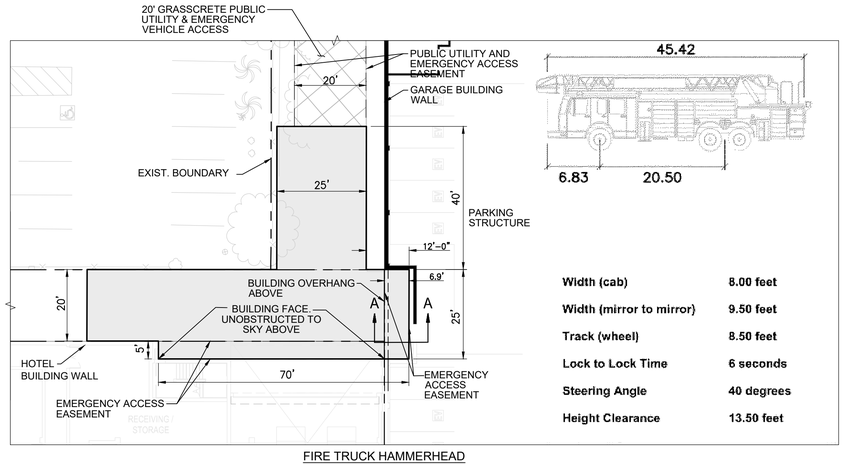



## LEGEND:

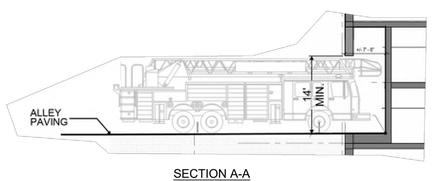
- R/W/ BOUNDARY LINE
- CENTER LINE
- CURB AND GUTTER
- PROP. DRIVEWAY
- EXIST. CONTOUR
- PROP. CONTOUR
- EASEMENT LINE
- PROP. RETAINING WALL
- EXIST. SEWER
- EXIST. WATER
- EXIST. STORM DRAIN
- EXIST. GAS
- EXIST. OVERHEAD POWER
- PROP. SEWER
- PROP. WATER
- PROP. PUBLIC STORM DRAIN
- PROP. GAS
- EXIST. FIRE HYDRANT
- PROP. PUBLIC FIRE HYDRANT
- PROJECT BOUNDARY
- PAE — PUBLIC ACCESS EASEMENT
- FH — FIRE HYDRANT
- TURF BLOCK BOMANITE GRASSCRETE




FIRE TRUCK HAMMERHEAD
SCALE: 1"=20'




| | |
|---|---|
| **Width (cab)** | **8.00 feet** |
| **Width (mirror to mirror)** | **9.50 feet** |
| **Track (wheel)** | **8.50 feet** |
| **Lock to Lock Time** | **6 seconds** |
| **Steering Angle** | **40 degrees** |
| **Height Clearance** | **13.50 feet** |

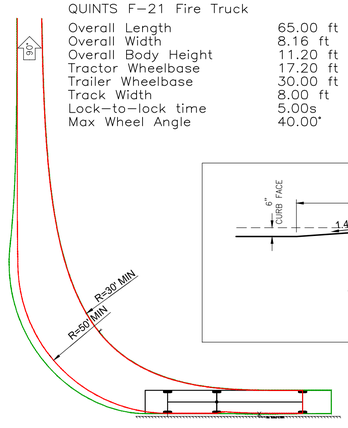



SECTION A-A

DESIGN VEHICLE

QUINTS F-21 Fire Truck

| | |
|---|---|
| Overall Length | 65.00 ft |
| Overall Width | 8.16 ft |
| Overall Body Height | 11.20 ft |
| Tractor Wheelbase | 17.20 ft |
| Trailer Wheelbase | 30.00 ft |
| Track Width | 8.00 ft |
| Lock-to-lock time | 5.00s |
| Max Wheel Angle | 40.00° |




90° TURNING TEMPLATE

## FIRE ACCESS NOTES

- -A MINIMUM VERTICAL CLEARANCE OF 13 FEET AND 6 INCHES SHALL BE PROVIDED AND MAINTAINED.
- -ACCESS ROADWAYS SHALL BE PROVIDED WITH A 50 FOOT OUTSIDE AND 30 FOOT INSIDE TURNING RADIUS.
- -THE GRADE FOR FIRE ACCESS ROADWAYS SHALL NOT EXCEED 12%.
- -ALL FIRE DEPARTMENT ACCESS ROADWAYS SHALL BE PAINTED/STRIPED AS FIRE LANES.
- -EACH FDC SHALL BE LOCATED WITHIN 40' OF A HYDRANT AND BE LOCATED ON THE SAME SIDE OF THE STREET.

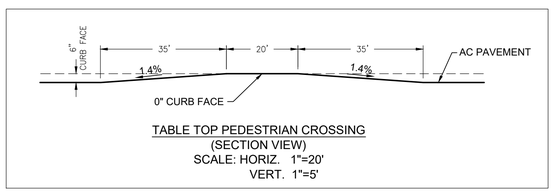
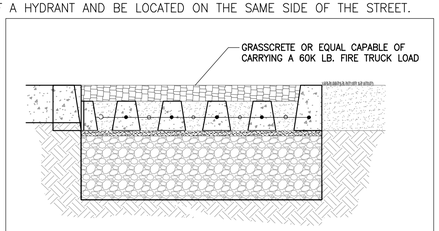



TABLE TOP PEDESTRIAN CROSSING
(SECTION VIEW)
SCALE: HORIZ. 1"=20'
VERT. 1"=5'




TURF BLOCK- BOMANITE GRASSCRETE
N.T.S.

GRAPHIC SCALE

50 0 25 50 100 200

( IN FEET )
1 inch = 50 ft.

PREPARED BY:
Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
# FIRE ACCESS CIRCULATION PLAN
## NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET
C11
OF
C13

DRAWING: u:\2242217900\drawing\sheet_files\2179006-1008tm.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian

# TITLE DIGEST

TITLE ITEMS REFERRED TO HEREON ARE BASED ON INFORMATION CONTAINED IN FIRST AMERICAN TITLE COMPANY PRELIMINARY REPORT NO. NHSC-6555761, DATED MARCH 30, 2021.

THE FOLLOWING DIGEST OF TITLE ITEMS HAS BEEN PREPARED FOR THE CONVENIENCE OF THE USER. FOR FULL PARTICULARS, PLEASE REFER TO THOSE DOCUMENTS REFERENCED THEREIN.

PLOTTABLE EASEMENTS OF RECORD ARE INDICATED HEREON AND REFER TO THE CORRESPONDING ITEM NUMBER IN THE REFERENCED REPORT.

## VESTING INTEREST

THE ESTATE OR INTEREST IN THE LAND DESCRIBED IN THIS REPORT IS:

A FEE.

## LEGAL DESCRIPTION

THE LAND REFERRED TO IN THIS REPORT IS SITUATED IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

TRACT I: (147-350-24-00 AND 147-350-25-00)

PARCEL 1:

LOTS 9 THROUGH 16, BLOCK 7, OCEANSIDE, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 344, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, JULY 1, 1885, LOT 9, BLOCK 7, BRYAN'S ADDITION, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

PARCEL 2:

ALL OF BLOCK 8 OF BRYAN'S ADDITION, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

TOGETHER WITH THOSE PORTIONS OF CLEVELAND STREET AND MICHIGAN AVENUE VACATED BY DOCUMENT RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-0164097 WHICH WOULD REVERT TO SAID LAND BY OPERATION OF LAW.

PARCEL 3:

FRACTIONAL LOT 8 IN BLOCK 9 OF BRYAN'S ADDITION TO OCEANSIDE, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

TOGETHER WITH THE NORTHERLY 20 FEET OF TOPEKA STREET AS VACATED AND CLOSED TO PUBLIC USE, LYING SOUTHEASTERLY OF AND ADJACENT TO SAID LOT.

PARCEL 4:

LOTS 1, 2, 3, 4 AND 5 IN BLOCK 10 OF BRYAN'S ADDITION, IN THE CITY OF OCEANSIDE, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

ALSO THAT PORTION OF TOPEKA STREET LYING WESTERLY FROM CLEVELAND STREET AND NORTH OF AND ADJACENT TO SAID LOT 1, BLOCK 10, WHICH SAID PORTION OF TOPEKA STREETS WAS CLOSED TO PUBLIC USE BY RESOLUTION NO. 915, IN THE CITY COUNCIL OF THE CITY OF OCEANSIDE, CALIFORNIA.

ALSO TOGETHER WITH THOSE PORTIONS OF CLEVELAND STREET AND TYSON STREET VACATED BY DOCUMENT RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-0164097 OF OFFICIAL RECORDS WHICH WOULD REVERT TO SAID LAND BY OPERATION OF LAW.

## LEGAL DESCRIPTION (CONTINUED)

PARCEL 5:

THAT PORTION OF A TRACT OF LAND COMMONLY KNOWN AS THE DEPOT GROUNDS IN OCEANSIDE, TOGETHER WITH THAT CERTAIN 200.00 FOOT RIGHT-OF-WAY OF THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY LYING SOUTHEASTERLY OF SAID DEPOT GROUNDS, ALL IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 313, BY H.P VINCENT, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, JULY 19,
1886, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST WESTERLY CORNER OF LOT 16, BLOCK 7 OF OCEANSIDE, ACCORDING TO MAP THEREOF NO. 344, FILED IN SAID COUNTY RECORDER'S OFFICE ON JULY 1, 1885; THENCE SOUTHEASTERLY ALONG THE SOUTHWESTERLY LINE OF SAID BLOCK 7 AND ITS SOUTHEASTERLY PROLONGATION 443.70 FEET, MORE OR LESS TO THE MOST EASTERLY CORNER OF SAID DEPOT GROUNDS; THENCE SOUTHWESTERLY ALONG THE SOUTHEASTERLY LINE OF SAID DEPOT GROUNDS, 150.00 FEET TO THE NORTHEASTERLY RIGHT-OF-WAY LINE OF THE ATCHISON, TOPEKA AND SANTA FE RAILROAD BEING ALSO THE NORTHWESTERLY PROLONGATION OF THE SOUTHWESTERLY LINE OF BLOCK 10 OF BRYAN'S ADDITION TO OCEANSIDE AS SHOWN ON MAP THEREOF NO. 219, FILED IN SAID COUNTY RECORDER'S OFFICE ON MARCH 10, 1887; THENCE SOUTHEASTERLY ALONG SAID PROLONGATION AND SAID SOUTHWESTERLY LINE TO THE MOST SOUTHERLY CORNER OF LOT 5 IN SAID BLOCK 10; THENCE SOUTHWESTERLY ALONG THE SOUTHWESTERLY PROLONGATION OF THE SOUTHEASTERLY LINE OF SAID LOT 5, A DISTANCE OF 75.00 FEET; THENCE NORTHWESTERLY ALONG A LINE THAT IS PARALLEL WITH AND 75.00 FEET SOUTHWESTERLY OF SAID SOUTHWESTERLY LINE OF BLOCK 10 OF BRYAN'S ADDITION, MAP NO. 219, A DISTANCE OF 371.70 FEET; THENCE AT RIGHT ANGLES, NORTHEASTERLY 47.00 FEET; THENCE ALONG A LINE THAT BEARS LEFT 45°00'00" FROM THE NORTHEASTERLY PROLONGATION OF THE LAST MENTIONED LINE, 181.02 FEET TO A POINT ON A LINE THAT IS PARALLEL WITH AND 50.00 FEET SOUTHWESTERLY OF THE SOUTHWESTERLY LINE OF SAID BLOCK 7 OF OCEANSIDE, MAP NO. 344; THENCE ALONG SAID PARALLEL LINE, NORTHWESTERLY TO A POINT ON THE SOUTHWESTERLY PROLONGATION OF THE NORTHWESTERLY LINE OF SAID LOT 16, BLOCK 7 OF MAP NO. 344; THENCE NORTHEASTERLY

TRACT II:

PARCEL 1: (APN 150-046-17-00)

LOTS 1, 2, 3, 4 AND 5 IN BLOCK 12 OF BRYAN'S ADDITION, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

PARCEL 2: (APN 150-046-01-00 THROUGH 150-046-08-00)

LOTS 9 THROUGH 16 INCLUSIVE, IN BLOCK 12 OF BRYAN'S ADDITION, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY MARCH 10, 1887.

EXCEPTING THEREFROM, ALL OIL, GAS AND OTHER HYDROCARBON SUBSTANCES IN AND UNDER ALL OF THE ABOVE DESCRIBED REAL PROPERTY, BUT WITHOUT ANY RIGHT TO PENETRATE, USE OR DISTURB THE SURFACE OF SAID PROPERTY OR ANY PORTION OF SAID PROPERTY WITHIN FIVE HUNDRED FEET (500') OF THE SURFACE THEREOF.

TOGETHER WITH PORTIONS OF CLEVELAND STREET AND MICHIGAN AVENUE VACATED BY DOCUMENT RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-0164097 OF OFFICIAL RECORDS WHICH WOULD REVERT TO SAID LAND BY OPERATION OF LAW.

TRACT III:

PARCEL 1: (APN 150-043-01-00 THROUGH 150-043-04-00)

ALL OF LOTS 7 AND 8 IN BLOCK 10 AND 11 OF LOTS 1, 2, 3 AND 4 IN BLOCK 11, ALL BEING BYRON'S ADDITION TO OCEANSIDE, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887, TOGETHER WITH THAT PORTION OF MICHIGAN AVENUE (80.00 FEET WIDE) LYING ADJACENT TO AND BETWEEN SAID BLOCKS AS VACATED AND CLOSED TO PUBLIC USE ON DECEMBER 23, 1931 BY RESOLUTION NO. 633 OF THE CITY COUNCIL OF
THE CITY OF OCEANSIDE.

PREPARED BY:
Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

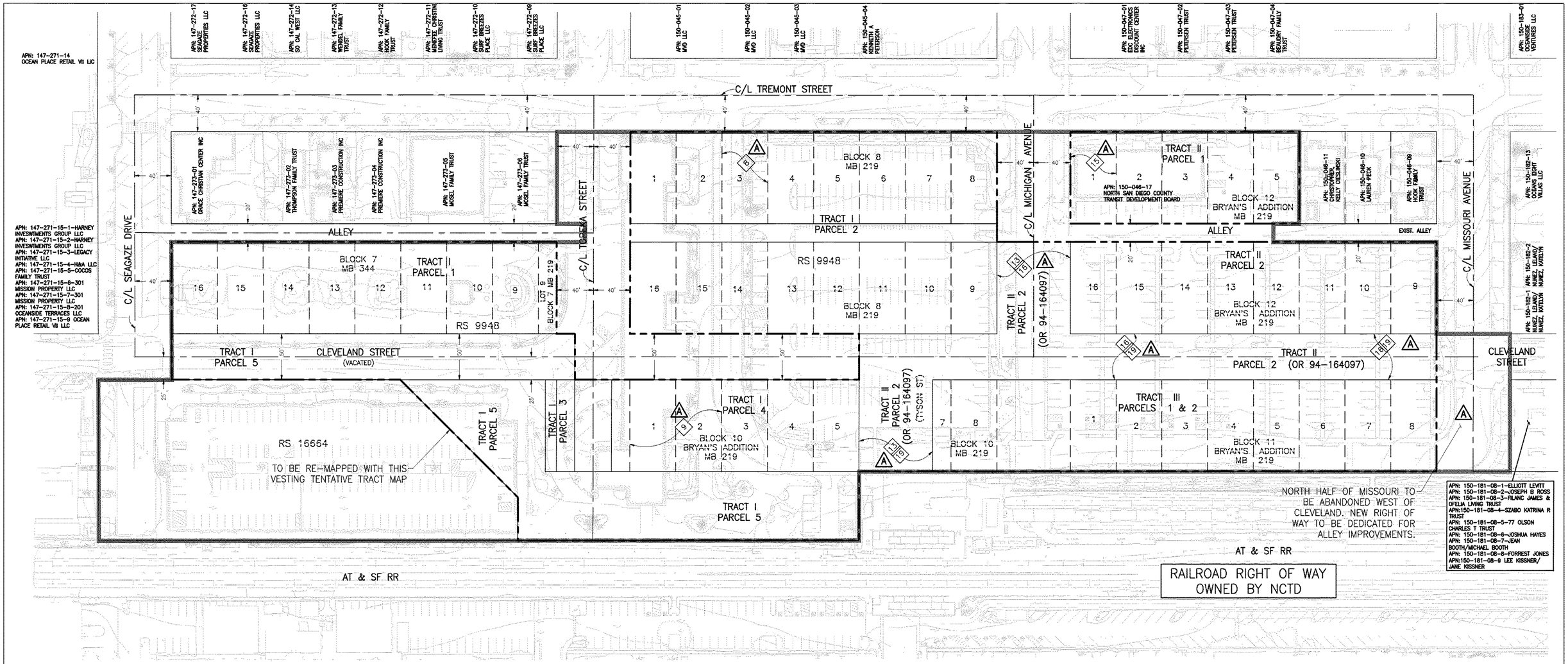
# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN ENCUMBRANCE MAP

## NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET

CITY OF OCEANSIDE, CALIFORNIA



DRAWING: u:\2142217900\drawing\sheet_files\217900c-1009sm.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian




## EXCEPTIONS

THE FOLLOWING MATTERS AFFECT TRACT I:

A 4 AN EASEMENT TO THE CITY OF OCEANSIDE FOR HIGHWAY PURPOSES RECORDED JUNE 29, 1922 IN BOOK 751, PAGE 282, DEEDS. (LOCATION OF THE EASEMENT IS INDETERMINATE FROM RECORD INFORMATION)

A 5 RESOLUTION NO. 2507 TO CHANGE STREET NAME TO TRANSIT STREET RECORDED MARCH 22, 1956 IN BOOK 6028, PAGE 360, OFFICIAL RECORDS.

A 6 THE FACT THAT THE LAND LIES WITHIN THE BOUNDARIES OF THE DOWNTOWN REDEVELOPMENT PROJECT AREA, AS DISCLOSED BY THE DOCUMENT RECORDED NOVEMBER 21, 1975 AS INSTRUMENT NO. 75-328187, OFFICIAL RECORDS. A MODIFICATION DOCUMENT RECORDED AUGUST 12, 1982 AS INSTRUMENT NO. 82-0248561, OFFICIAL RECORDS.

A 7 COVENANTS, CONDITIONS AND RESTRICTIONS IN A GRANT DEED RECORDED MAY 8, 1981 AS INSTRUMENT NO. 81-0142429, OFFICIAL RECORDS.

A 8 AN EASEMENT TO SAN DIEGO GAS AND ELECTRIC COMPANY FOR AN UNDERGROUND ELECTRICAL SYSTEM RECORDED FEBRUARY 16, 1983 AS INSTRUMENT NO. 83-050385, OFFICIAL RECORDS. (AFFECTS LOT 3, BLOCK 8, BRYAN'S ADDITION. EXACT LOCATION IS INDETERMINATE FROM RECORD INFORMATION)

A 9 A "MEMORANDUM OF LEASE" RECORDED MARCH 23, 1984 AS INSTRUMENT NO. 84-107078, OFFICIAL RECORDS. (AFFECTS LOTS 1 & 2, BLOCK 10, BRYAN'S ADDITION).

A 10 AN ORDER FOR POSSESSION, CASE NO. N18999, RECORDED AUGUST 2, 1984 AS INSTRUMENT NO. 84-294906, OFFICIAL RECORDS.

A 11 THE EFFECT OF RECORD OF SURVEY NO. 9948.

## EXCEPTIONS (CONTINUED)

A 12 RESERVATIONS FROM RESOLUTION NO. 85-67 OVER PORTIONS OF VACATED TYSON STREET RECORDED MAY 31, 1985 AS INSTRUMENT NO. 85-193545, OFFICIAL RECORDS. (PORTION OVER AT & SF RR).

A 13 RESERVATION OF PUBLIC UTILITY EASEMENTS FROM RESOLUTION NO. R94-23 OVER PORTIONS OF VACATED TYSON STREET, CLEVELAND STREET AND MICHIGAN AVENUE RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-164097, OFFICIAL RECORDS.

A 14 RIGHTS OF THE PUBLIC IN AND TO THAT PORTION OF THE LAND LYING WITHIN ANY ROAD, STREET, ALLEY OR HIGHWAY.

THE FOLLOWING MATTERS AFFECT TRACT II:

A 15 AN EASEMENT TO SAN DIEGO GAS AND ELECTRIC COMPANY FOR AN ELECTRICAL SYSTEM RECORDED JUNE 28, 1977 AS INSTRUMENT NO. 256810, OFFICIAL RECORDS. (AFFECTS LOT 1, BLOCK 12, BRYAN'S ADDITION. LOCATION OF THE EASEMENT IS INDETERMINATE FROM RECORD INFORMATION)

A 16 RESERVATION OF PUBLIC UTILITY EASEMENTS FROM RESOLUTION NO. R94-23 OVER PORTIONS OF VACATED TYSON STREET, CLEVELAND STREET AND MICHIGAN AVENUE RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-164097, OFFICIAL RECORDS.

A 17 A "NOTICE OF COMPLETION FOR IFP# 19022-27890" RECORDED OCTOBER 4, 2019 AS INSTRUMENT NO. 2019-0443481, OFFICIAL RECORDS.

THE FOLLOWING MATTERS AFFECT TRACT III:

A 18 THE FACT THAT THE LAND LIES WITHIN THE BOUNDARIES OF THE DOWNTOWN REDEVELOPMENT PROJECT AREA, AS DISCLOSED BY THE DOCUMENT RECORDED JULY 6, 1978 AS INSTRUMENT NO. 78-282288, OFFICIAL RECORDS.

A 19 RESERVATION OF PUBLIC UTILITY EASEMENTS FROM RESOLUTION NO. R94-23 OVER PORTIONS OF VACATED TYSON STREET, CLEVELAND STREET AND MICHIGAN AVENUE RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-164097, OFFICIAL RECORDS.

A 20 RIGHTS OF PARTIES IN POSSESSION.

## EASEMENT / RIGHT OF WAY DISPOSITION NOTES

A EXISTING EASEMENTS AND RIGHT OF WAY TO BE QUITCLAIMED, OR ABANDONED

## LEGEND:

- BOUNDARY LINE
- CENTER LINE
- CURB AND GUTTER
- PROP. DRIVEWAY
- EXIST. CONTOUR
- PROP. CONTOUR (54)
- EASEMENT LINE
- PROP. RETAINING WALL
- EXIST. SEWER (SS)
- EXIST. WATER (W)
- EXIST. STORM DRAIN (SD)
- EXIST. GAS (G)
- EXIST. OVERHEAD POWER (OHP)
- PROP. SEWER (S)
- PROP. WATER
- PROP. STORM DRAIN (SD)
- PROP. GAS (G)
- EXIST. FIRE HYDRANT
- EXIST. SUBDIVISION BOUNDARY

GRAPHIC SCALE

50 0 25 50 100 200

( IN FEET )
1 inch = 50 ft.

PREPARED BY:

Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

# VESTING TENTATIVE MAP AND DEVELOPMENT PLAN ENCUMBRANCE MAP

## NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET

CITY OF OCEANSIDE, CALIFORNIA

SHEET C13 OF C13

DRAWING: u:\2042217600\drawing\sheet_files\217600-1010.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian

# II. EXISTING AND PROPOSED CONDITION HYDROLOGY MAPS

# NCTD OCEANSIDE TRANSIT CENTER TOD
## 235 S. TREMONT AVENUE
## EXISTING HYDROLOGY MAP

S. COAST HIGHWAY
SEAGAZE DR.
TOPEKA ST.
MICHIGAN AVE.
MISSOURI AVE.
S. TREMONT ST.
S. CLEVELAND ST.
AT&SF RAILWAY
S. MYERS ST.
1ST ST.
TYSON ST.
FIR ST.

TRIBUTARY OUTFALL #1
TRIBUTARY OUTFALL #2
TRIBUTARY OUTFALL #3

MATCHLINE - SEE SHEET 1 OF 2

A1 0.27
A2 1.26
A3 3.39
B1 0.80
B2 0.68
B3 0.06
C1 0.42
D1 0.24
D2 0.54
D3 0.86
D4 0.29
D5 0.60
D6 1.31
D7 0.23
D8 0.41
E1 0.48
E2 2.41
E3 0.36
E4 1.71
E5 1.74
E6 0.44
F1 0.43
F2 1.38
F3 1.48
F4 0.52
F5 1.35
F6 0.36
F7 0.41
G1 0.28
G2 0.60
G3 2.12

10 70.0 FS
40 70.0 FS
50 70.0 FS
51 69.0 FS
61 69 FL
62 66.6 FL
63 59.0 FL
64 58.8 FL
65 57.3 FL
66 49.8 FL
67 48.76 FL
$Q_{25}$=20.3 CFS
$Q_{100}$=26.7 CFS
A=5.9 AC
57 49.0 FL
58 48.76 FL
$Q_{25}$=22.2 CFS
$Q_{100}$=29.4 CFS
A=7.1 AC
900 LF
12 60.9 FL
11 64 FS
41 63.0 FS
54.5 INV
52 61.0 FL
53 60.0 FL
54 55.0 FL
55 52.4 FL
56 51.2 FL
44 51.5 FS
45 50.6 FL
48.67 INV
46 47.51 INV
47 47.35 INV
48 46.54 INV
42 46.2 INV
30 52.8 FS
13 50.0 FL
$Q_{25}$=16.9 CFS
$Q_{100}$=22.3 CFS
A=4.9 AC
31 49.7 FL
$Q_{25}$=1.9 CFS
$Q_{100}$=2.5 CFS
A=0.4 AC
21 71.05 FS
$Q_{25}$=7.1CFS
$Q_{100}$=9.2 CFS
A=1.5 AC
20 73.0 FS
22 44.00 INV
23 43.91 INV
49.3 47.80 FS
49.4 45.20 FS
49.5 43.25 FS
43 48.2 FL
43.78 INV
HGL$_{25}$= 47.64
HGL$_{100}$= 48.94
$Q_{25}$=9.49 CFS
$Q_{100}$=12.11 CFS
A=4.5 AC
49.2 EX CURB OUTLET
42.62 FL
$Q_{25-CURB\ OUTLET}$=9.49 CFS
$Q_{100-CURB\ OUTLET}$=12.11 CFS
$Q_{25-UPSTREAM\ ST\ FLOW}$=8.3 CFS
$Q_{100-UPSTREAM\ ST\ FLOW}$=11.18 CFS
$Q_{25-TOTAL\ ST\ FLOW}$=17.79 CFS
$Q_{100-TOTAL\ ST\ FLOW}$=23.29 CFS
49.1 49.00 FL
46.05 INV
HGL$_{25}$= 49.05
HGL$_{100}$= 50.71

30" RCP
24" RCP
18" RCP
18" CONC. CHAN.
18" CMP
12" RCP
15" RCP
36" RCP
3'X1.2' RCB
DIPE SIZE UNK

## LEGEND

- EXISTING STORM DRAIN
- NODE (XX)
- SUBAREA / ACREAGE (XX / X.XX)
- MAJOR HYDROLOGY BOUNDARY
- MINOR HYDROLOGY SUB-BOUNDARY
- FLOW LINE
- CATCH BASIN
- PROPERTY LINE
- TRIBUTARY AREA TO OUTFALL #1
- TRIBUTARY AREA TO OUTFALL #2
- TRIBUTARY AREA TO OUTFALL #3
- TRIBUTARY AREA UPSTREAM OF SIDEWALK UNDER DRAIN IN MYERS STREET

GRAPHIC SCALE
50 0 25 50 100 400
( IN FEET )
1 inch = 50 ft.

Stantec
Toll Brothers APARTMENT LIVING

PROJECT NO. 2042217900
SHEET 1 OF 2
MARCH 26, 2024

DRAWING: c:\2042217900\drawing\exhibit_files\2217900-ex701.dwg PLOTTED: 6/16/2024 11:56 PM BY: Perez, Edward

S. COAST HWY.

TREMONT AVE.

S. CLEVELAND ST.

TRIBUTARY OUTFALL #3

AT & SF RAILWAY

S. MYERS STREET

S. MYERS STREET

MISSOURI AVE.

WASHINGTON AVE.

MINNESOTA AVE.

WISCONSIN AVE.

PINE ST.

ELM ST.

ASH ST.

OAK ST.

C3-1 3.06

C5-1 3.35

C7-2 1.67

C3-2 2.42

C5-2 2.44

C7-3 1.68

C4-1 0.76

C6-1 0.68

C7-1 1.13

C8-1 2.62

C8-2 1.25

F7 0.41

F6 0.36

E6 0.44

60.0 FS 700 LF 69

60.0 FS 700 LF 72

62.0 FS 250 LF 75

59.0 FL 62

54.0 FS 235 LF 70

52.0 FS 235 LF 73

51.0 FS 265 LF 76

58.8 FL 63

57.3 FL 64

49.8 FL 65

48.76 FL $Q_{25}$=20.3 CFS $Q_{100}$=26.7 CFS A=5.9 AC 490 LF 67

45.0 FS 39.5 INV 74

3'X1.2' RCB

51.2 FL 56

49.0 FL 57

48.76 FL $Q_{25}$=22.2 CFS $Q_{100}$=29.4 CFS A=7.1 AC 900 LF 58

47.0 FS 480 LF 68

45.0 FS 414 LF 59

46.0 FS 365 LF 71

44.0 FS 39.5 INV $Q_{25}$=76.3 CFS $Q_{100}$=99.6 CFS A=34.1 60

30" RCP

48" RCP

27" RCP

24" RCP

18" RCP

12" RCP

## LEGEND

- EXISTING STORM DRAIN
- NODE (XX)
- SUBAREA XX / ACREAGE X.XX
- MAJOR HYDROLOGY BOUNDARY
- MINOR HYDROLOGY SUB-BOUNDARY
- FLOW LINE
- CATCH BASIN
- PROPERTY LINE
- TRIBUTARY AREA TO OUTFALL #1
- TRIBUTARY AREA TO OUTFALL #2
- TRIBUTARY AREA TO OUTFALL #3

GRAPHIC SCALE

50 0 25 50 100 400

( IN FEET )

1 inch = 50 ft.

Stantec

Toll Brothers APARTMENT LIVING

# NCTD OCEANSIDE TRANSIT CENTER TOD
## 235 S. TREMONT AVENUE
## EXISTING HYDROLOGY MAP

PROJECT NO. 2042217900

SHEET 2 OF 2

MARCH 26, 2024

DRAWING: u:\2042217900\drawing\exhibit_files\2179200-ex7024.dwg PLOTTED: 6/17/2024 12:31 AM BY: Perez, Edward

S. COAST HIGHWAY

SEAGAZE DR.

TOPEKA ST.

MICHIGAN AVE.

MISSOURI AVE.

S. TREMONT ST.

S. CLEVELAND ST.

S. MYERS ST.

1ST ST.

TYSON ST.

FIR ST.

AT&SF RAILWAY

MATCHLINE - SEE SHEET 2 OF 2

TRIBUTARY OUTFALL #1

TRIBUTARY OUTFALL #2

TRIBUTARY OUTFALL #3

A1-1 0.27
A1-2 1.26
A1-3 1.97
A1-4 1.46
A2-1 0.80
A2-2 0.06
A2-3 0.73
A3 0.35
B1-1 0.18
B1-2 0.49
B1-3 0.11
B1-4 0.64
B1-5 0.86
B2-1 1.66
B2-2 0.54
B2-3 0.66
C1-1 0.48
C1-2 2.48
C1-3 0.27
C1-4 0.38
C1-5 0.40
C1-6 2.69
C1-6 0.19
C2-1 0.43
C2-2 1.38
C2-3 1.48
C2-4 1.73
C2-5 0.40
C8-1 0.22
G1 0.28
G2 0.60
G3 2.12
DB1
DB2

20 70.0 FS 258.6 LF
40 70.0 FS 710 LF
70.0 FS 301.4 LF 10
70.0 FS 254.7 LF 30
69.0 FS 479.2 LF 31
69.0 FS 239.4 LF 36
66.6 FS 482.7 LF 37
41 61.9 FS 54.5 INV
60.9 FS 173.5 LF 12
11 64.0 FS 418.6 LF
65.0 FS 59.0 INV 375.9 LF 21
32 62.34 FL 57.34 INV 275 LF
38 58.9 FS 10 LF
39 58.4 FS 255.8 LF
25 122.76 FS 235 LF
123.31 FL 342 LF 27
13 54.9 FS 133 LF
14 50.5 FS 44.5 INV 31 LF
17 48.2 FL 43.91 INV $Q_{25}$=23.8 CFS $Q_{100}$=31.3 CFS A=6.9 AC
44.00 INV 75 LF 14
22 52.8 FS 47.56 INV 36 LF
23 52.6 FS 47.16 INV 328 LF
26 121.60 FS 46.80 INV 255 LF
15 52.4 FS 470.2 LF
52.93 FS 49.19 INV 72 LF 32
40 50.1 FS 44.1 INV 55.9 LF
48.8 FS 500 LF 51.2
16 50.1 FS 44.2 INV 10 LF
121.60 FS 45.99 INV 53 LF 28
53.18 FS 303 LF 31
52.15 FS 47.15 INV 431 LF 33
34 50.16 FS 44.91 INV 89 LF
49.27 FS 43.00 INV $Q_{25}$=30.1 CFS $Q_{100}$=39.5 CFS A=11.9 AC 35
48.8 FS 910 LF 71
52 71.05 FS 44.5 INV $Q_{25}$=7.4 CFS $Q_{100}$=9.5 CFS A=1.6 AC
51 71.05 FS 44.6 INV 15.3 LF
24 52.8 FS 45.52 INV 73 LF
50 73.0 FS 344.3 LF
32 50.0 FL 46.0 INV 166 LF
27 48.2 FL 43.79 INV $Q_{25}$=8.36 CFS $Q_{100}$=10.66 CFS A=5.1 AC
30 44.92 INV 227 LF
29 45.72 INV 161 LF
47.80 FS 49.3
45.20 FS 49.4
49.5 43.25 FS
EX. 15" RCP
EX CURB OUTLET 42.62 FL $Q_{25-CURB\ OUTLET}$=8.36 CFS $Q_{100-CURB\ OUTLET}$=10.66 CFS $Q_{25-UPSTREAM\ ST\ FLOW}$=8.3 CFS $Q_{100-UPSTREAM\ ST\ FLOW}$=11.18 CFS $Q_{25-TOTAL\ ST\ FLOW}$=16.66 CFS $Q_{100-TOTAL\ ST\ FLOW}$=21.84 CFS 49.2

## LEGEND

**EXISTING STORM DRAIN**

FINISH SURFACE ELEVATION — XX.XX FS — XX — NODE
FLOW LINE LENGTH — XX.XX LF

SUBAREA — XX
ACREAGE — X.XX

MAJOR HYDROLOGY BOUNDARY
MINOR HYDROLOGY SUB-BOUNDARY
CATCH BASIN
PROPERTY LINE
TRIBUTARY AREA TO OUTFALL #1
TRIBUTARY AREA TO OUTFALL #2
TRIBUTARY AREA TO OUTFALL #3
TRIBUTARY AREA UPSTREAM OF SIDEWALK UNDER DRAIN IN MYERS STREET
DRAINAGE FLOW DIRECTION

**NOTES:**

1. PIPE ELEVATIONS SHOWN HEREIN ARE BASED ON GIS METADATA AND AS-BUILT DRAWINGS. THE VERTICAL DATUM HAS NOT BEEN VERIFIED BY DESIGN ENGINEER.
2. FUTURE DESIGN SURVEYS SHALL INCLUDE DATA COLLECTION OF PIPE SIZES AND INVERT ELEVATIONS

GRAPHIC SCALE
50 0 25 50 100 400
( IN FEET )
1 inch = 50 ft.

Stantec

Toll Brothers APARTMENT LIVING

# NCTD OCEANSIDE TRANSIT CENTER TOD
## 235 S. TREMONT AVENUE
## PROPOSED HYDROLOGY MAP

PROJECT NO. 2042217900

SHEET 1 OF 2

JULY 19, 2024

DRAWING: o:\2042217900\drawing\exhibit_files\2179000--exh010.dwg PLOTTED: 7/19/2024 1:47 PM BY: Romirez, Nayid

S. COAST HWY.

TREMONT AVE.

MISSOURI AVE.

WASHINGTON AVE.

MINNESOTA AVE.

WISCONSIN AVE.

S. CLEVELAND ST.

TRIBUTARY OUTFALL #3

AT & SF RAILWAY

PINE ST.

S. MYERS STREET

ELM ST.

ASH ST.

S. MYERS STREET

OAK ST.

C3-1 3.06

C5-1 3.35

C7-1 1.67

C4-1 0.40

C3-2 2.42

C5-2 2.44

C7-2 2.81

C4-2 0.76

C6-1 0.68

C8-1 0.22

C8-2 2.62

C8-3 1.25

60.0 FS 700 LF 60

59.9 FS 521 LF 61

58.9 FS 10 LF 38

58.4 FS 255.8 LF 39

54.0 FS 239 LF 61

60.0 FS 700 LF 63

52.0 FS 235 LF 64

62.0 FS 250 LF 66

51.0 FS 265 LF 67

50.1 FS 44.1 INV 55.9 LF 40

48.8 FS 500 LF 41

50.0 FS 42.00 INV 50 LF 62

46.0 FS 41.29 INV 50 LF 65

45.0 FS 39.5 INV 50 LF 68

49.27 FS 43.00 INV 35

$Q_{25}$=30.1 CFS
$Q_{100}$=39.5 CFS
A=11.9 AC

48.8 FS 910 LF 71

41.60 INV 50 LF 50

47.4 FS 41.46 INV 434 LF 51

46.3 FS 435 LF 72

40.29 INV 50 LF 52

46.1 FS 40.17 INV 414 LF 53

45.0 FS 39.0 INV 54

$Q_{25}$=74.7 CFS
$Q_{100}$=98.2 CFS
A=33.6

50.46 FS 44.91 INV 89 LF 34

50.0 FS 131 LF 70

3'X1.2' RCB

48" RCP

45" RCP

42" RCP

24" RCP

18" RCP

15" RCP

## LEGEND

- EXISTING STORM DRAIN
- FINISH SURFACE ELEVATION — XX.XFS
- FLOW LINE LENGTH — XX.XLF
- NODE — XX
- SUBAREA — XX
- ACREAGE — X.XX
- MAJOR HYDROLOGY BOUNDARY
- MINOR HYDROLOGY SUB-BOUNDARY
- CATCH BASIN
- PROPERTY LINE
- TRIBUTARY AREA TO OUTFALL #1
- TRIBUTARY AREA TO OUTFALL #2
- TRIBUTARY AREA TO OUTFALL #3
- DRAINAGE FLOW DIRECTION

**NOTES:**

1. PIPE ELEVATIONS SHOWN HEREIN ARE BASED ON GIS METADATA AND AS-BUILT DRAWINGS. THE VERTICAL DATUM HAS NOT BEEN VERIFIED BY DESIGN ENGINEER.
2. FUTURE DESIGN SURVEYS SHALL INCLUDE DATA COLLECTION OF PIPE SIZES AND INVERT ELEVATIONS

GRAPHIC SCALE

50 0 25 50 100 400

( IN FEET )
1 inch = 50 ft.

Stantec

Toll Brothers APARTMENT LIVING

# NCTD OCEANSIDE TRANSIT CENTER TOD
## 235 S. TREMONT AVENUE
## PROPOSED HYDROLOGY MAP

PROJECT NO. 2042217900

SHEET 2 OF 2

JULY 19, 2024

DRAWING: c:\2042217900\drawing\exhibit_files\2217900c-ex7021.dwg PLOTTED: 7/19/2024 10:05 AM BY: Ramirez, Nayid

# III. HYDROLOGIC CALCULATIONS

```
______________________________________________________________________________
******************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - NORTHERLY TRIBUTARY AREA                                  *
* EXISTING CONDITION 25-YEAR RATIONAL METHOD                               *
*                                                                          *
 **************************************************************************

  FILE NAME: E25_10.DAT
  TIME/DATE OF STUDY: 14:16 06/16/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     64.30
  ELEVATION DIFFERENCE(FEET) =      5.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.217
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.36
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.19
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      1.19

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   64.30  DOWNSTREAM ELEVATION(FEET) =   61.20
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   3.28   Tc(MIN.) =    6.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.496
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    4.70
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.74
  FLOW VELOCITY(FEET/SEC.) =  2.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.05
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   61.20  DOWNSTREAM ELEVATION(FEET) =   50.00
  STREET LENGTH(FEET) =   280.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   14.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.29
  STREET FLOW TRAVEL TIME(MIN.) =   0.87   Tc(MIN.) =    7.36
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.146
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =   11.67
  TOTAL AREA(ACRES) =        4.9        PEAK FLOW RATE(CFS) =      16.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.38
  FLOW VELOCITY(FEET/SEC.) =  5.85   DEPTH*VELOCITY(FT*FT/SEC.) =   2.77
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
  UPSTREAM ELEVATION(FEET) =     73.00
  DOWNSTREAM ELEVATION(FEET) =     71.05
  ELEVATION DIFFERENCE(FEET) =      1.95
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
```

```
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      3.70
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      3.70

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.68   SUBAREA RUNOFF(CFS) =    3.15
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       6.85
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.28
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       7.13
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.01  DOWNSTREAM(FEET) =    44.00
  FLOW LENGTH(FEET) =    15.32   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.04
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.13
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    3.75
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     405.32 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.01  DOWNSTREAM(FEET) =    43.91
  FLOW LENGTH(FEET) =   112.61   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.27
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.13
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =    4.58
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     517.93 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  UPSTREAM ELEVATION(FEET) =     52.80
```

```
  DOWNSTREAM ELEVATION(FEET) =     49.70
  ELEVATION DIFFERENCE(FEET) =      3.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.514
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    52.40
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.94
  TOTAL AREA(ACRES) =      0.42   TOTAL RUNOFF(CFS) =      1.94

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         1.94     3.51        5.322        0.42
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     31.00 =     500.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        16.93     7.36        4.146        4.92
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     31.00 =     980.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      10.02       3.51        5.322
      2      18.45       7.36        4.146

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.45   Tc(MIN.) =    7.36
  TOTAL AREA(ACRES) =        5.3

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        18.45     7.36        4.146        5.34
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     31.00 =     980.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         7.13     4.58        5.322        1.54
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     31.00 =     517.93 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      18.60       4.58        5.322
      2      24.00       7.36        4.146

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.00   Tc(MIN.) =    7.36
  TOTAL AREA(ACRES) =        6.9

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.9  TC(MIN.) =      7.36
  PEAK FLOW RATE(CFS)   =      24.00
============================================================================
============================================================================
```

END OF RATIONAL METHOD ANALYSIS

```
______________________________________________________________________________
******************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - NORTHERLY TRIBUTARY AREA                                  *
* EXISTING CONDITION 100-YEAR RATIONAL METHOD                              *
*                                                                          *
 **************************************************************************

  FILE NAME: E100_10.DAT
  TIME/DATE OF STUDY: 14:19 06/16/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     64.30
  ELEVATION DIFFERENCE(FEET) =      5.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.217
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.36
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.54
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      1.54

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   64.30  DOWNSTREAM ELEVATION(FEET) =   61.20
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   3.09   Tc(MIN.) =    6.31
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.896
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    6.17
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       7.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.54
  FLOW VELOCITY(FEET/SEC.) =  2.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   61.20  DOWNSTREAM ELEVATION(FEET) =   50.00
  STREET LENGTH(FEET) =   280.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.62
  STREET FLOW TRAVEL TIME(MIN.) =   0.82   Tc(MIN.) =    7.13
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.451
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =   15.34
  TOTAL AREA(ACRES) =        4.9        PEAK FLOW RATE(CFS) =      22.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.41
  FLOW VELOCITY(FEET/SEC.) =  6.25   DEPTH*VELOCITY(FT*FT/SEC.) =   3.18
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
  UPSTREAM ELEVATION(FEET) =     73.00
  DOWNSTREAM ELEVATION(FEET) =     71.05
  ELEVATION DIFFERENCE(FEET) =      1.95
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
```

```
           (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      4.77
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      4.77

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.68   SUBAREA RUNOFF(CFS) =    4.05
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       8.82
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.36
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       9.18
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.01  DOWNSTREAM(FEET) =    44.00
  FLOW LENGTH(FEET) =    15.32   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.19
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.18
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    3.74
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     405.32 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.01  DOWNSTREAM(FEET) =    43.91
  FLOW LENGTH(FEET) =   112.61   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.92
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.18
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =    4.38
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     517.93 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  UPSTREAM ELEVATION(FEET) =     52.80
```

```
  DOWNSTREAM ELEVATION(FEET) =     49.70
  ELEVATION DIFFERENCE(FEET) =      3.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.514
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    52.40
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.50
  TOTAL AREA(ACRES) =      0.42   TOTAL RUNOFF(CFS) =      2.50

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         2.50     3.51        6.850        0.42
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     31.00 =     500.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        22.26     7.13        5.451        4.92
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     31.00 =     980.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      13.48        3.51        6.850
      2      24.25        7.13        5.451

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.25   Tc(MIN.) =    7.13
  TOTAL AREA(ACRES) =        5.3

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        24.25     7.13        5.451        5.34
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     31.00 =     980.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         9.18     4.38        6.850        1.54
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     31.00 =     517.93 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      24.08        4.38        6.850
      2      31.55        7.13        5.451

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.55   Tc(MIN.) =    7.13
  TOTAL AREA(ACRES) =        6.9

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.9  TC(MIN.) =      7.13
  PEAK FLOW RATE(CFS)   =      31.55
============================================================================
============================================================================
```

END OF RATIONAL METHOD ANALYSIS

```
************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - CENTRAL TRIBUTARY AREA                                    *
* EXISTING CONDITION 25-YEAR RATIONAL METHOD (UNDETAINED)                  *
* THIS RM MODEL USED TO DETERMINE TC AND Q FOR RATHYDRO. SEE RM DETAINED.  *
 ************************************************************************

  FILE NAME: E25_40.DAT
  TIME/DATE OF STUDY: 14:25 06/16/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     63.00
  ELEVATION DIFFERENCE(FEET) =      7.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.192
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.21
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.06
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      1.06

************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    54.50  DOWNSTREAM(FEET) =    46.20
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.06
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    3.81
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     560.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    2.39
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.45
  TC(MIN.) =    3.81

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.20  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.98
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.45
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    4.36
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    3.80
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       7.24
  TC(MIN.) =    4.36

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   130.00
  UPSTREAM ELEVATION(FEET) =     51.50
  DOWNSTREAM ELEVATION(FEET) =     50.60
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.031
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    53.85
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.28
  TOTAL AREA(ACRES) =      0.29   TOTAL RUNOFF(CFS) =      1.28

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.30  DOWNSTREAM(FEET) =    45.11
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.14
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       1.28
  PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =    5.30
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     46.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.123
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    2.55
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       3.78
  TC(MIN.) =    5.30

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.11  DOWNSTREAM(FEET) =    44.95
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.78
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.37
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.95  DOWNSTREAM(FEET) =    44.24
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.49
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   2
  PIPE-FLOW(CFS) =       3.78
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    5.90
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     48.00 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.24  DOWNSTREAM(FEET) =    44.10
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.78
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.97
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     49.00 =     520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.748
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.31   SUBAREA RUNOFF(CFS) =    5.16
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       8.67
  TC(MIN.) =    5.97

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.748
```

```
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.23   SUBAREA RUNOFF(CFS) =    0.91
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       9.58
  TC(MIN.) =    5.97

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    43.58
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.19
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.58
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    6.06
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     49.10 =     590.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     49.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.700
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    1.60
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =      11.08
  TC(MIN.) =    6.06

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    43.58  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.11
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.08
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    6.44
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)   (ACRE)
      1       11.08     6.44        4.520        2.84
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     910.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)   (ACRE)
      1        7.24     4.36        5.322        1.64
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
      1      14.75       4.36        5.322
      2      17.23       6.44        4.520

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.23   Tc(MIN.) =    6.44
  TOTAL AREA(ACRES) =        4.5

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  12
----------------------------------------------------------------------------
```

```
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
================================================================================
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         4.5  TC(MIN.) =      6.44
  PEAK FLOW RATE(CFS)   =       17.23
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - CENTRAL TRIBUTARY AREA                                    *
* EXISTING CONDITION 100-YEAR RATIONAL METHOD (UNDETAINED)                 *
* THIS RM MODEL USED TO DETERMINE TC AND Q FOR RATHYDRO. SEE RM DETAINED.  *
 ************************************************************************

  FILE NAME: E100_40.DAT
  TIME/DATE OF STUDY: 14:28 06/16/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     63.00
  ELEVATION DIFFERENCE(FEET) =      7.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.192
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.21
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.36
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      1.36

************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    54.50  DOWNSTREAM(FEET) =    46.20
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.36
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =    3.77
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     560.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    3.07
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       4.43
  TC(MIN.) =    3.77

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.20  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.33
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.43
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    4.29
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    4.89
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       9.32
  TC(MIN.) =    4.29

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   130.00
  UPSTREAM ELEVATION(FEET) =     51.50
  DOWNSTREAM ELEVATION(FEET) =     50.60
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.031
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    53.85
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.29   TOTAL RUNOFF(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.30  DOWNSTREAM(FEET) =    45.11
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.35
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       1.65
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =    5.23
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     46.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.657
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    3.32
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       4.92
  TC(MIN.) =    5.23

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.11  DOWNSTREAM(FEET) =    44.95
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.26
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.92
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.28
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.95  DOWNSTREAM(FEET) =    44.24
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.78
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   2
  PIPE-FLOW(CFS) =       4.92
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    5.76
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     48.00 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.24  DOWNSTREAM(FEET) =    44.10
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.26
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.92
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.82
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     49.00 =     520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.213
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.31   SUBAREA RUNOFF(CFS) =    6.76
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =      11.34
  TC(MIN.) =    5.82

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.213
```

```
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.23   SUBAREA RUNOFF(CFS) =    1.19
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =      12.53
  TC(MIN.) =    5.82

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    43.58
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.95
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.53
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.89
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     49.10 =     590.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     49.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.163
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    2.10
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =      14.53
  TC(MIN.) =    5.89

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    43.58  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.50
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.53
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    6.18
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       14.53      6.18        5.976        2.84
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     910.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        9.32      4.29        6.850        1.64
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)      (MIN.)   (INCH/HOUR)
      1      19.42        4.29        6.850
      2      22.66        6.18        5.976

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.66   Tc(MIN.) =    6.18
  TOTAL AREA(ACRES) =        4.5

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  12
----------------------------------------------------------------------------
```

```
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
================================================================================
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         4.5  TC(MIN.) =      6.18
  PEAK FLOW RATE(CFS)   =       22.66
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* OCEANSIDE TOD - TREMONT SITE                                            *
* EX CONDITION RATIONAL METHOD FOR 25-YR STORM TO INCLUDE EX DETENTION    *
* SEE RATHYDRO AND FLOW-THROUGH DETENTION BASIN MODEL                     *
 *************************************************************************

  FILE NAME: EX25DET.DAT
  TIME/DATE OF STUDY: 18:50 06/12/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     63.00
  ELEVATION DIFFERENCE(FEET) =      7.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.192
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.21
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.06
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      1.06

************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    54.50  DOWNSTREAM(FEET) =    46.20
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.06
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    3.81
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     560.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    2.39
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.45
  TC(MIN.) =    3.81

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.20  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.98
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.45
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    4.36
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    3.80
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       7.24
  TC(MIN.) =    4.36

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.97   RAIN INTENSITY(INCH/HOUR) =  4.75
  TOTAL AREA(ACRES) =     2.20   TOTAL RUNOFF(CFS) =      1.38

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.747
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.1982
  SUBAREA AREA(ACRES) =    0.23   SUBAREA RUNOFF(CFS) =    0.91
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       2.29
  TC(MIN.) =    5.97

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    43.58
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.20
```

```
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.29
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    6.25
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     49.10 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     49.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.610
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2894
  SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    1.57
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =       3.79
  TC(MIN.) =    6.25

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    43.58  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.79
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =    7.35
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =    1180.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         3.79     7.35       4.150        2.84
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =    1180.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         7.24     4.36       5.322        1.64
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       9.49       4.36        5.322
      2       9.44       7.35        4.150

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.49   Tc(MIN.) =    4.36
  TOTAL AREA(ACRES) =        4.5
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.5  TC(MIN.) =      4.36
  PEAK FLOW RATE(CFS)   =       9.49
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                   Stantec



 ************************* DESCRIPTION OF STUDY *************************
* OCEANSIDE TOD - TREMONT SITE                                          *
* EX CONDITION RATIONAL METHOD FOR 100-YEAR STORM TO INCLUDE EX DETENTION  *
* SEE RATHYDRO AND FLOW-THROUGH DETENTION BASIN MODEL                   *
 ************************************************************************

  FILE NAME: EX100DET.DAT
  TIME/DATE OF STUDY: 09:22 06/13/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     63.00
  ELEVATION DIFFERENCE(FEET) =      7.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.192
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.21
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.36
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      1.36

************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    54.50  DOWNSTREAM(FEET) =    46.20
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.36
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =    3.77
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     560.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    3.07
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       4.43
  TC(MIN.) =    3.77

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.20  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.33
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.43
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    4.29
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    4.89
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       9.32
  TC(MIN.) =    4.29

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.82   RAIN INTENSITY(INCH/HOUR) =  6.21
  TOTAL AREA(ACRES) =     2.20   TOTAL RUNOFF(CFS) =      1.38

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.211
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.1700
  SUBAREA AREA(ACRES) =    0.23   SUBAREA RUNOFF(CFS) =    1.19
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       2.57
  TC(MIN.) =    5.82

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    43.58
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.28
```

```
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.57
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    6.09
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     49.10 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     49.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.030
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2653
  SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    2.05
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =       4.54
  TC(MIN.) =    6.09

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    43.58  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.78
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.54
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =    7.01
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =    1180.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         4.54     7.01       5.506        2.84
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =    1180.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         9.32     4.29       6.850        1.64
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      12.11       4.29        6.850
      2      12.04       7.01        5.506

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.11   Tc(MIN.) =    4.29
  TOTAL AREA(ACRES) =        4.5
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.5  TC(MIN.) =      4.29
  PEAK FLOW RATE(CFS)   =      12.11
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
______________________________________________________________________________
******************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
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              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************* DESCRIPTION OF STUDY *************************
* TREMONT SITE - SOUTHERLY TRIBUTARY AREA                                *
* EXISTING CONDITION 25-YEAR RATIONAL METHOD                             *
*                                                                        *
 ************************************************************************

  FILE NAME: E25_50.DAT
  TIME/DATE OF STUDY: 14:03 06/16/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   254.70
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     69.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.330
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.12
  TOTAL AREA(ACRES) =      0.48   TOTAL RUNOFF(CFS) =      2.12

******************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   69.00  DOWNSTREAM ELEVATION(FEET) =   61.00
  STREET LENGTH(FEET) =   479.20   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   14.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   2.38   Tc(MIN.) =    6.71
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.404
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.41      SUBAREA RUNOFF(CFS) =    8.81
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =      10.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.07
  FLOW VELOCITY(FEET/SEC.) =  3.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.77
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     733.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    61.00  DOWNSTREAM(FEET) =    60.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.45
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.56
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    6.76
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =     778.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.381
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.36   SUBAREA RUNOFF(CFS) =    1.31
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =      11.82
  TC(MIN.) =    6.76

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    60.00  DOWNSTREAM(FEET) =    55.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.05
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.82
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.87
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =     878.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     55.00
```

```
  DOWNSTREAM NODE ELEVATION(FEET) =     52.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00
  "V" GUTTER WIDTH(FEET) =   4.00   GUTTER HIKE(FEET) =  0.060
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.977
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     14.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.39
  AVERAGE FLOW DEPTH(FEET) =   0.32   FLOOD WIDTH(FEET) =   29.11
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.98   Tc(MIN.) =    7.86
  SUBAREA AREA(ACRES) =    1.71       SUBAREA RUNOFF(CFS) =    5.64
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  TOTAL AREA(ACRES) =        5.0         PEAK FLOW RATE(CFS) =      16.37

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.33   FLOOD WIDTH(FEET) =   30.46
  FLOW VELOCITY(FEET/SEC.) =   3.47   DEPTH*VELOCITY(FT*FT/SEC) =   1.16
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    1078.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    52.40  DOWNSTREAM(FEET) =    51.20
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.32
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.80    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.37
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    1558.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.841
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.74   SUBAREA RUNOFF(CFS) =    5.55
  TOTAL AREA(ACRES) =        6.7   TOTAL RUNOFF(CFS) =      21.36
  TC(MIN.) =    8.29

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    51.20  DOWNSTREAM(FEET) =    49.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.90
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.80    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.36
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    8.31
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    1588.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     49.00
  DOWNSTREAM NODE ELEVATION(FEET) =     48.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =    55.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.060
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.50
```

```
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.746
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     22.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.99
  AVERAGE FLOW DEPTH(FEET) =   0.40   FLOOD WIDTH(FEET) =   38.17
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.31   Tc(MIN.) =    8.62
  SUBAREA AREA(ACRES) =    0.44       SUBAREA RUNOFF(CFS) =    1.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  TOTAL AREA(ACRES) =        7.1         PEAK FLOW RATE(CFS) =      22.20

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.40   FLOOD WIDTH(FEET) =   38.17
  FLOW VELOCITY(FEET/SEC.) =   3.02   DEPTH*VELOCITY(FT*FT/SEC) =   1.21
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    1643.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   900.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.14
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.70   FLOOD WIDTH(FEET) =   31.58
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.65
    SPLIT DEPTH(FEET) =    0.41   SPLIT FLOOD WIDTH(FEET) =   13.95
    SPLIT FLOW(CFS) =    3.23   SPLIT VELOCITY(FEET/SEC.) =    1.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.85
  STREET FLOW TRAVEL TIME(MIN.) =   5.65   Tc(MIN.) =   14.27
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.706
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    5.88
  TOTAL AREA(ACRES) =        9.8        PEAK FLOW RATE(CFS) =      22.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.58
  FLOW VELOCITY(FEET/SEC.) =  2.65   DEPTH*VELOCITY(FT*FT/SEC.) =   1.85
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    2543.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   45.00  DOWNSTREAM ELEVATION(FEET) =   44.00
  STREET LENGTH(FEET) =   414.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      23.42
```

```
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.70   FLOOD WIDTH(FEET) =   31.58
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.02
    SPLIT DEPTH(FEET) =    0.54   SPLIT FLOOD WIDTH(FEET) =   21.05
    SPLIT FLOW(CFS) =    6.76   SPLIT VELOCITY(FEET/SEC.) =    1.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.41
  STREET FLOW TRAVEL TIME(MIN.) =   3.42   Tc(MIN.) =   17.69
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.356
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    2.44
  TOTAL AREA(ACRES) =       11.0        PEAK FLOW RATE(CFS) =      22.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.58
  FLOW VELOCITY(FEET/SEC.) =  2.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    2957.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   239.40
  UPSTREAM ELEVATION(FEET) =     69.00
  DOWNSTREAM ELEVATION(FEET) =     66.60
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.762
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.03
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.90
  TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      1.90

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.60  DOWNSTREAM ELEVATION(FEET) =   58.90
  STREET LENGTH(FEET) =   482.70   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   11.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
  STREET FLOW TRAVEL TIME(MIN.) =   2.64   Tc(MIN.) =    6.40
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.539
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
```

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  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    5.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       6.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.41
  FLOW VELOCITY(FEET/SEC.) =  3.33   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     63.00 =     722.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    58.80
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.68
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.82
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    6.42
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     64.00 =     732.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     64.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.530
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.48   SUBAREA RUNOFF(CFS) =    5.57
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =      12.37
  TC(MIN.) =    6.42

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    58.80  DOWNSTREAM(FEET) =    57.30
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.75
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.37
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.46
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     65.00 =     767.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     65.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.514
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.52   SUBAREA RUNOFF(CFS) =    1.95
  TOTAL AREA(ACRES) =        3.8   TOTAL RUNOFF(CFS) =      14.27
  TC(MIN.) =    6.46

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   57.30  DOWNSTREAM ELEVATION(FEET) =   49.80
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
```

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  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   17.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.62
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    7.16
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.221
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.35      SUBAREA RUNOFF(CFS) =    4.73
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      18.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.55
  FLOW VELOCITY(FEET/SEC.) =  5.53   DEPTH*VELOCITY(FT*FT/SEC.) =   2.73
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     66.00 =     997.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.221
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.36   SUBAREA RUNOFF(CFS) =    1.26
  TOTAL AREA(ACRES) =        5.5   TOTAL RUNOFF(CFS) =      19.34
  TC(MIN.) =    7.16

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     67.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     49.80
  DOWNSTREAM NODE ELEVATION(FEET) =     49.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    55.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.060
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.133
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     20.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.83
  AVERAGE FLOW DEPTH(FEET) =   0.34   FLOOD WIDTH(FEET) =   32.13
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.24   Tc(MIN.) =    7.40
  SUBAREA AREA(ACRES) =    0.41       SUBAREA RUNOFF(CFS) =    1.41
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  TOTAL AREA(ACRES) =        5.9         PEAK FLOW RATE(CFS) =      20.34

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.34   FLOOD WIDTH(FEET) =   32.29
  FLOW VELOCITY(FEET/SEC.) =   3.85   DEPTH*VELOCITY(FT*FT/SEC) =   1.32
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     67.00 =    1052.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   47.00
  STREET LENGTH(FEET) =   490.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.37
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.70   FLOOD WIDTH(FEET) =   31.58
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.46
    SPLIT DEPTH(FEET) =    0.31   SPLIT FLOOD WIDTH(FEET) =    8.53
    SPLIT FLOW(CFS) =    1.05   SPLIT VELOCITY(FEET/SEC.) =    1.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.72
  STREET FLOW TRAVEL TIME(MIN.) =   3.32   Tc(MIN.) =   10.72
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.254
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    2.05
  TOTAL AREA(ACRES) =        6.7        PEAK FLOW RATE(CFS) =      20.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.58
  FLOW VELOCITY(FEET/SEC.) =  2.46   DEPTH*VELOCITY(FT*FT/SEC.) =   1.72
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     68.00 =    1542.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     68.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.72
  RAINFALL INTENSITY(INCH/HR) =   3.25
  TOTAL STREAM AREA(ACRES) =     6.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.34

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     70.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     54.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.868
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    57.14
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     13.52
  TOTAL AREA(ACRES) =      3.06   TOTAL RUNOFF(CFS) =     13.52

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.00  DOWNSTREAM ELEVATION(FEET) =   47.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.86
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.73
  STREET FLOW TRAVEL TIME(MIN.) =   0.73   Tc(MIN.) =    4.60
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.42      SUBAREA RUNOFF(CFS) =   10.69
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =      24.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  21.29
  FLOW VELOCITY(FEET/SEC.) =  5.71   DEPTH*VELOCITY(FT*FT/SEC.) =   3.10
  LONGEST FLOWPATH FROM NODE     69.00 TO NODE     68.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     68.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.60
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     5.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       20.34    10.72        3.254          6.69
      2       24.21     4.60        5.322          5.48

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       32.93     4.60       5.322
      2       35.14    10.72       3.254

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.14   Tc(MIN.) =   10.72
  TOTAL AREA(ACRES) =       12.2
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     68.00 =    1542.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     71.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   47.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   480.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      35.89
    ***STREET FLOWING FULL***
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.72
    HALFSTREET FLOOD WIDTH(FEET) =   32.83
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
  STREET FLOW TRAVEL TIME(MIN.) =   4.04   Tc(MIN.) =   14.76
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.648
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.68      SUBAREA RUNOFF(CFS) =    1.49
  TOTAL AREA(ACRES) =       12.9        PEAK FLOW RATE(CFS) =      35.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.72   HALFSTREET FLOOD WIDTH(FEET) =  32.65
  FLOW VELOCITY(FEET/SEC.) =  1.97   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     71.00 =    2022.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.76
  RAINFALL INTENSITY(INCH/HR) =   2.65
  TOTAL STREAM AREA(ACRES) =    12.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     35.14

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     73.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     52.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.643
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    61.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     14.80
  TOTAL AREA(ACRES) =      3.35   TOTAL RUNOFF(CFS) =     14.80

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     71.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   52.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.72
  STREET FLOW TRAVEL TIME(MIN.) =   0.76   Tc(MIN.) =    4.40
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
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  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =   10.78
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      25.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.56   HALFSTREET FLOOD WIDTH(FEET) =  22.38
  FLOW VELOCITY(FEET/SEC.) =  5.48   DEPTH*VELOCITY(FT*FT/SEC.) =   3.08
  LONGEST FLOWPATH FROM NODE     72.00 TO NODE     71.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.40
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     5.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.58

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       35.14    14.76        2.648         12.85
      2       25.58     4.40        5.322          5.79

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       43.06     4.40       5.322
      2       47.87    14.76       2.648

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.87   Tc(MIN.) =   14.76
  TOTAL AREA(ACRES) =       18.6
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     71.00 =    2022.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     74.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   46.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      48.99
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.76
    HALFSTREET FLOOD WIDTH(FEET) =   34.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.82
  STREET FLOW TRAVEL TIME(MIN.) =   2.53   Tc(MIN.) =   17.28
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.391
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.24
  TOTAL AREA(ACRES) =       19.8        PEAK FLOW RATE(CFS) =      47.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.75   HALFSTREET FLOOD WIDTH(FEET) =  34.24
  FLOW VELOCITY(FEET/SEC.) =  2.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.80
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     74.00 =    2387.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     74.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.28
  RAINFALL INTENSITY(INCH/HR) =   2.39
  TOTAL STREAM AREA(ACRES) =    19.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     47.87

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     76.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =     62.00
  DOWNSTREAM ELEVATION(FEET) =     51.00
  ELEVATION DIFFERENCE(FEET) =     11.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.767
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    87.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      7.38
  TOTAL AREA(ACRES) =      1.67   TOTAL RUNOFF(CFS) =      7.38

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     74.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   51.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   265.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.09
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.37
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.95
  STREET FLOW TRAVEL TIME(MIN.) =   1.03   Tc(MIN.) =    3.80
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.68      SUBAREA RUNOFF(CFS) =    7.42
  TOTAL AREA(ACRES) =        3.3        PEAK FLOW RATE(CFS) =      14.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.48
  FLOW VELOCITY(FEET/SEC.) =  4.56   DEPTH*VELOCITY(FT*FT/SEC.) =   2.25
  LONGEST FLOWPATH FROM NODE     75.00 TO NODE     74.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     74.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.80
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     3.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.80

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       47.87    17.28        2.391        19.77
      2       14.80     3.80        5.322         3.35

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       36.31     3.80       5.322
      2       54.52    17.28       2.391

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      54.52   Tc(MIN.) =   17.28
  TOTAL AREA(ACRES) =       23.1
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     74.00 =    2387.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     60.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    39.50  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.35
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.52
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   17.33
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     60.00 =    2437.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       54.52    17.33       2.387       23.12
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     60.00 =    2437.10 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       22.20    17.69       2.356       11.01
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    2957.90 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      76.27      17.33        2.387
      2      76.01      17.69        2.356

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      76.27   Tc(MIN.) =   17.33
  TOTAL AREA(ACRES) =       34.1

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
```

```
  TOTAL AREA(ACRES)      =       34.1  TC(MIN.) =     17.33
  PEAK FLOW RATE(CFS)    =      76.27
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                   Stantec



 ************************* DESCRIPTION OF STUDY *************************
* TREMONT SITE - SOUTHERLY TRIBUTARY AREA                                *
* EXISTING CONDITION 100-YEAR RATIONAL METHOD                            *
*                                                                        *
 ************************************************************************

  FILE NAME: E100_50.DAT
  TIME/DATE OF STUDY: 14:05 06/16/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ====== =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   254.70
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     69.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.330
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.73
  TOTAL AREA(ACRES) =      0.48   TOTAL RUNOFF(CFS) =      2.73

******************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   69.00  DOWNSTREAM ELEVATION(FEET) =   61.00
  STREET LENGTH(FEET) =   479.20   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.57
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.58
  STREET FLOW TRAVEL TIME(MIN.) =   2.24   Tc(MIN.) =    6.57
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.745
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.41      SUBAREA RUNOFF(CFS) =   11.49
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =      13.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  19.02
  FLOW VELOCITY(FEET/SEC.) =  4.02   DEPTH*VELOCITY(FT*FT/SEC.) =   2.02
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     733.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    61.00  DOWNSTREAM(FEET) =    60.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.55
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.78
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.61
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =     778.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.721
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.36   SUBAREA RUNOFF(CFS) =    1.71
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =      15.43
  TC(MIN.) =    6.61

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    60.00  DOWNSTREAM(FEET) =    55.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.65
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.43
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    6.70
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =     878.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     55.00
```

```
  DOWNSTREAM NODE ELEVATION(FEET) =     52.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00
  "V" GUTTER WIDTH(FEET) =   4.00   GUTTER HIKE(FEET) =  0.060
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.221
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     19.14
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.61
  AVERAGE FLOW DEPTH(FEET) =   0.35   FLOOD WIDTH(FEET) =   32.30
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =    7.62
  SUBAREA AREA(ACRES) =    1.71       SUBAREA RUNOFF(CFS) =    7.41
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  TOTAL AREA(ACRES) =        5.0         PEAK FLOW RATE(CFS) =      21.49

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOOD WIDTH(FEET) =   33.81
  FLOW VELOCITY(FEET/SEC.) =   3.71   DEPTH*VELOCITY(FT*FT/SEC) =   1.37
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    1078.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    52.40  DOWNSTREAM(FEET) =    51.20
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.05
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.80    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.49
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    7.95
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    1558.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.079
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.74   SUBAREA RUNOFF(CFS) =    7.34
  TOTAL AREA(ACRES) =        6.7   TOTAL RUNOFF(CFS) =      28.25
  TC(MIN.) =    7.95

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    51.20  DOWNSTREAM(FEET) =    49.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.61
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.80    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.25
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.97
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    1588.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     49.00
  DOWNSTREAM NODE ELEVATION(FEET) =     48.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =    55.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.060
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.50
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.958
OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
SOIL CLASSIFICATION IS "A"
S.C.S. CURVE NUMBER (AMC II) =  92
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     29.15
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.20
AVERAGE FLOW DEPTH(FEET) =   0.45   FLOOD WIDTH(FEET) =   42.54
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =    8.25
SUBAREA AREA(ACRES) =    0.44       SUBAREA RUNOFF(CFS) =    1.81
AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
TOTAL AREA(ACRES) =        7.1         PEAK FLOW RATE(CFS) =      29.38

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  0.45   FLOOD WIDTH(FEET) =   42.54
FLOW VELOCITY(FEET/SEC.) =   3.22   DEPTH*VELOCITY(FT*FT/SEC) =   1.43
LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    1643.90 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   45.00
STREET LENGTH(FEET) =   900.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      33.24
  ***STREET FLOW SPLITS OVER STREET-CROWN***
  FULL DEPTH(FEET) =    0.70   FLOOD WIDTH(FEET) =   31.58
  FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.65
  SPLIT DEPTH(FEET) =    0.58   SPLIT FLOOD WIDTH(FEET) =   23.24
  SPLIT FLOW(CFS) =   11.32   SPLIT VELOCITY(FEET/SEC.) =    2.26
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.70
  HALFSTREET FLOOD WIDTH(FEET) =   31.58
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.65
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.85
STREET FLOW TRAVEL TIME(MIN.) =   5.65   Tc(MIN.) =   13.90
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.542
OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
SOIL CLASSIFICATION IS "A"
S.C.S. CURVE NUMBER (AMC II) =  92
AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    7.70
TOTAL AREA(ACRES) =        9.8        PEAK FLOW RATE(CFS) =      29.38

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.58
FLOW VELOCITY(FEET/SEC.) =  2.65   DEPTH*VELOCITY(FT*FT/SEC.) =   1.85
LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    2543.90 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =   45.00  DOWNSTREAM ELEVATION(FEET) =   44.00
STREET LENGTH(FEET) =   414.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.98
```

```
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.70   FLOOD WIDTH(FEET) =   31.58
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.02
    SPLIT DEPTH(FEET) =    0.67   SPLIT FLOOD WIDTH(FEET) =   28.40
    SPLIT FLOW(CFS) =   14.31   SPLIT VELOCITY(FEET/SEC.) =    1.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.41
  STREET FLOW TRAVEL TIME(MIN.) =   3.42   Tc(MIN.) =   17.32
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.074
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    3.19
  TOTAL AREA(ACRES) =       11.0        PEAK FLOW RATE(CFS) =      29.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.58
  FLOW VELOCITY(FEET/SEC.) =  2.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    2957.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   239.40
  UPSTREAM ELEVATION(FEET) =     69.00
  DOWNSTREAM ELEVATION(FEET) =     66.60
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.762
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.03
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.44
  TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      2.44

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.60  DOWNSTREAM ELEVATION(FEET) =   58.90
  STREET LENGTH(FEET) =   482.70   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.86
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   2.49   Tc(MIN.) =    6.26
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.929
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    6.79
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       8.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.13
  FLOW VELOCITY(FEET/SEC.) =  3.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.59
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     63.00 =     722.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    58.80
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.34
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.91
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.27
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     64.00 =     732.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     64.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.920
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.48   SUBAREA RUNOFF(CFS) =    7.27
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =      16.17
  TC(MIN.) =    6.27

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    58.80  DOWNSTREAM(FEET) =    57.30
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.58
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.17
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    6.30
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     65.00 =     767.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     65.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.903
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.52   SUBAREA RUNOFF(CFS) =    2.55
  TOTAL AREA(ACRES) =        3.8   TOTAL RUNOFF(CFS) =      18.67
  TC(MIN.) =    6.30

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   57.30  DOWNSTREAM ELEVATION(FEET) =   49.80
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   20.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.00
  STREET FLOW TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =    6.96
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.532
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.35      SUBAREA RUNOFF(CFS) =    6.20
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      23.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.74
  FLOW VELOCITY(FEET/SEC.) =  5.87   DEPTH*VELOCITY(FT*FT/SEC.) =   3.13
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     66.00 =     997.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.532
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.36   SUBAREA RUNOFF(CFS) =    1.65
  TOTAL AREA(ACRES) =        5.5   TOTAL RUNOFF(CFS) =      25.35
  TC(MIN.) =    6.96

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     67.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     49.80
  DOWNSTREAM NODE ELEVATION(FEET) =     49.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    55.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.060
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.420
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     26.27
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.08
  AVERAGE FLOW DEPTH(FEET) =   0.38   FLOOD WIDTH(FEET) =   35.65
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.22   Tc(MIN.) =    7.19
  SUBAREA AREA(ACRES) =    0.41       SUBAREA RUNOFF(CFS) =    1.84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  TOTAL AREA(ACRES) =        5.9         PEAK FLOW RATE(CFS) =      26.68

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOOD WIDTH(FEET) =   35.82
  FLOW VELOCITY(FEET/SEC.) =   4.11   DEPTH*VELOCITY(FT*FT/SEC) =   1.55
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     67.00 =    1052.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   47.00
  STREET LENGTH(FEET) =   490.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      28.02
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.70   FLOOD WIDTH(FEET) =   31.58
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.46
    SPLIT DEPTH(FEET) =    0.53   SPLIT FLOOD WIDTH(FEET) =   20.51
    SPLIT FLOW(CFS) =    7.70   SPLIT VELOCITY(FEET/SEC.) =    1.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.72
  STREET FLOW TRAVEL TIME(MIN.) =   3.32   Tc(MIN.) =   10.51
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.243
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    2.68
  TOTAL AREA(ACRES) =        6.7        PEAK FLOW RATE(CFS) =      26.68

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.58
  FLOW VELOCITY(FEET/SEC.) =  2.46   DEPTH*VELOCITY(FT*FT/SEC.) =   1.72
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     68.00 =    1542.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     68.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.24
  TOTAL STREAM AREA(ACRES) =     6.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.68

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     70.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     54.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.868
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    57.14
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     17.40
  TOTAL AREA(ACRES) =      3.06   TOTAL RUNOFF(CFS) =     17.40

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.00  DOWNSTREAM ELEVATION(FEET) =   47.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      24.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.54
    HALFSTREET FLOOD WIDTH(FEET) =   21.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.11
  STREET FLOW TRAVEL TIME(MIN.) =   0.68   Tc(MIN.) =    4.55
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.42      SUBAREA RUNOFF(CFS) =   13.76
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =      31.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  23.48
  FLOW VELOCITY(FEET/SEC.) =  6.09   DEPTH*VELOCITY(FT*FT/SEC.) =   3.54
  LONGEST FLOWPATH FROM NODE     69.00 TO NODE     68.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     68.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.55
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     5.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.16

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       26.68    10.51        4.243          6.69
      2       31.16     4.55        6.850          5.48

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       42.72     4.55       6.850
      2       45.98    10.51       4.243

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      45.98   Tc(MIN.) =   10.51
  TOTAL AREA(ACRES) =       12.2
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     68.00 =    1542.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     71.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   47.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   480.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      46.97
    ***STREET FLOWING FULL***
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.77
    HALFSTREET FLOOD WIDTH(FEET) =   35.40
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.68
  STREET FLOW TRAVEL TIME(MIN.) =   3.68   Tc(MIN.) =   14.19
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.496
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.68      SUBAREA RUNOFF(CFS) =    1.97
  TOTAL AREA(ACRES) =       12.9        PEAK FLOW RATE(CFS) =      45.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.77   HALFSTREET FLOOD WIDTH(FEET) =  35.21
  FLOW VELOCITY(FEET/SEC.) =  2.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.66
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     71.00 =    2022.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.19
  RAINFALL INTENSITY(INCH/HR) =   3.50
  TOTAL STREAM AREA(ACRES) =    12.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     45.98

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     73.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     52.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.643
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    61.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     19.05
  TOTAL AREA(ACRES) =      3.35   TOTAL RUNOFF(CFS) =     19.05

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     71.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   52.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   22.54
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.10
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    4.36
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
```

```
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =   13.87
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      32.92

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.60   HALFSTREET FLOOD WIDTH(FEET) =  24.73
  FLOW VELOCITY(FEET/SEC.) =  5.82   DEPTH*VELOCITY(FT*FT/SEC.) =   3.52
  LONGEST FLOWPATH FROM NODE     72.00 TO NODE     71.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.36
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     5.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.92

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       45.98    14.19        3.496         12.85
      2       32.92     4.36        6.850          5.79

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       56.38     4.36       6.850
      2       62.78    14.19       3.496

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.78   Tc(MIN.) =   14.19
  TOTAL AREA(ACRES) =       18.6
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     71.00 =    2022.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     74.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   46.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      64.27
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.81
    HALFSTREET FLOOD WIDTH(FEET) =   37.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.14
  STREET FLOW TRAVEL TIME(MIN.) =   2.32   Tc(MIN.) =   16.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.171
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.97
  TOTAL AREA(ACRES) =       19.8        PEAK FLOW RATE(CFS) =      62.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.81   HALFSTREET FLOOD WIDTH(FEET) =  37.05
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   2.11
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     74.00 =    2387.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     74.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.50
  RAINFALL INTENSITY(INCH/HR) =   3.17
  TOTAL STREAM AREA(ACRES) =    19.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     62.78

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     76.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =     62.00
  DOWNSTREAM ELEVATION(FEET) =     51.00
  ELEVATION DIFFERENCE(FEET) =     11.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.767
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    87.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      9.50
  TOTAL AREA(ACRES) =      1.67   TOTAL RUNOFF(CFS) =      9.50

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     74.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   51.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   265.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.49
    HALFSTREET FLOOD WIDTH(FEET) =   18.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.21
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    3.74
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.68      SUBAREA RUNOFF(CFS) =    9.55
  TOTAL AREA(ACRES) =        3.3        PEAK FLOW RATE(CFS) =      19.05

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.43
  FLOW VELOCITY(FEET/SEC.) =  4.86   DEPTH*VELOCITY(FT*FT/SEC.) =   2.56
  LONGEST FLOWPATH FROM NODE     75.00 TO NODE     74.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     74.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.74
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     3.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.05

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       62.78    16.50        3.171         19.77
      2       19.05     3.74        6.850          3.35

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       48.11     3.74       6.850
      2       71.60    16.50       3.171

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      71.60   Tc(MIN.) =   16.50
  TOTAL AREA(ACRES) =       23.1
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     74.00 =    2387.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     60.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    39.50  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.79
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      71.60
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   16.54
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     60.00 =    2437.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       71.60    16.54       3.166       23.12
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     60.00 =    2437.10 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       29.38    17.32       3.074       11.01
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    2957.90 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      99.65      16.54        3.166
      2      98.88      17.32        3.074

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      99.65   Tc(MIN.) =   16.54
  TOTAL AREA(ACRES) =       34.1

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
```

```
  TOTAL AREA(ACRES)      =       34.1  TC(MIN.) =     16.54
  PEAK FLOW RATE(CFS)    =      99.65
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
______________________________________________________________________________
******************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - NORTHERLY TRIBUTARY AREA                                  *
* PROPOSED CONDITION 25-YEAR RATIONAL METHOD                               *
*                                                                          *
 **************************************************************************

  FILE NAME: P25_10.DAT
  TIME/DATE OF STUDY: 11:30 06/16/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   18.0      9.0    0.020/0.020/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.63 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.3 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   301.40
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     64.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.230
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    69.91
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.19
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      1.19

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   64.00  DOWNSTREAM ELEVATION(FEET) =   60.90
  STREET LENGTH(FEET) =   418.60   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   11.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.20
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   3.17   Tc(MIN.) =    6.40
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.540
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    4.75
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  14.66
  FLOW VELOCITY(FEET/SEC.) =  2.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   60.90  DOWNSTREAM ELEVATION(FEET) =   54.90
  STREET LENGTH(FEET) =   173.50   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   12.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.07
  STREET FLOW TRAVEL TIME(MIN.) =   0.58   Tc(MIN.) =    6.98
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.291
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.97      SUBAREA RUNOFF(CFS) =    7.02
  TOTAL AREA(ACRES) =        3.5        PEAK FLOW RATE(CFS) =      12.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  14.66
  FLOW VELOCITY(FEET/SEC.) =  5.33   DEPTH*VELOCITY(FT*FT/SEC.) =   2.41
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     893.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.90  DOWNSTREAM ELEVATION(FEET) =   50.50
  STREET LENGTH(FEET) =   133.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   16.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.61
  STREET FLOW TRAVEL TIME(MIN.) =   0.41   Tc(MIN.) =    7.39
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.137
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.01
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =      17.03

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  16.84
  FLOW VELOCITY(FEET/SEC.) =  5.63   DEPTH*VELOCITY(FT*FT/SEC.) =   2.79
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    1026.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.50  DOWNSTREAM(FEET) =    44.00
  FLOW LENGTH(FEET) =    31.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.18
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.03
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.44
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.10 =    1057.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     14.10 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.44
  RAINFALL INTENSITY(INCH/HR) =   4.12
  TOTAL STREAM AREA(ACRES) =     4.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.03

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   470.20
  UPSTREAM ELEVATION(FEET) =     52.40
  DOWNSTREAM ELEVATION(FEET) =     50.10
  ELEVATION DIFFERENCE(FEET) =      2.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.62
  TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      1.62

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     14.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    14.20  DOWNSTREAM(FEET) =    14.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.61
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.62
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    3.72
  LONGEST FLOWPATH FROM NODE     15.00 TO NODE     14.10 =     480.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     14.10 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.72
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.62

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       17.03     7.44        4.117          4.96
      2        1.62     3.72        5.322          0.35

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       10.13     3.72       5.322
      2       18.29     7.44       4.117

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.29   Tc(MIN.) =    7.44
  TOTAL AREA(ACRES) =        5.3
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.10 =    1057.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.00  DOWNSTREAM(FEET) =    43.91
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.55
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.29
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    7.80
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =    1132.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.80
  RAINFALL INTENSITY(INCH/HR) =   4.00
  TOTAL STREAM AREA(ACRES) =     5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.29

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   344.30
  UPSTREAM ELEVATION(FEET) =     73.00
  DOWNSTREAM ELEVATION(FEET) =     71.05
  ELEVATION DIFFERENCE(FEET) =      1.95
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.585
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    51.33
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      3.70
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      3.70

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  95
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.73   SUBAREA RUNOFF(CFS) =    3.38
 TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       7.08
 TC(MIN.) =    3.58

****************************************************************************
 FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  95
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.28
 TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       7.36
 TC(MIN.) =    3.58

****************************************************************************
 FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    44.60  DOWNSTREAM(FEET) =    44.50
 FLOW LENGTH(FEET) =    15.32   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.29
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.36
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    3.63
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     359.62 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     52.00 TO NODE     17.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    44.50  DOWNSTREAM(FEET) =    43.91
 FLOW LENGTH(FEET) =   112.61   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.98
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.36
 PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    4.01
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     17.00 =     472.23 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    4.01
 RAINFALL INTENSITY(INCH/HR) =   5.32
 TOTAL STREAM AREA(ACRES) =     1.59
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.36

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       18.29     7.80        3.996          5.31
     2        7.36     4.01        5.322          1.59

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       21.09     4.01       5.322
     2       23.81     7.80       3.996

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.81   Tc(MIN.) =    7.80
```

```
  TOTAL AREA(ACRES) =        6.9
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =    1132.50 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         6.9  TC(MIN.) =      7.80
  PEAK FLOW RATE(CFS)   =       23.81
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
______________________________________________________________________________
******************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - NORTHERLY TRIBUTARY AREA                                  *
* PROPOSED CONDITION 100-YEAR RATIONAL METHOD                              *
*                                                                          *
 **************************************************************************

  FILE NAME: P100_10.DAT
  TIME/DATE OF STUDY: 11:33 06/16/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   18.0      9.0    0.020/0.020/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.63 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.3 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   301.40
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     64.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.230
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    69.91
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.54
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      1.54

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   64.00  DOWNSTREAM ELEVATION(FEET) =   60.90
  STREET LENGTH(FEET) =   418.60   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   13.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
  STREET FLOW TRAVEL TIME(MIN.) =   2.99   Tc(MIN.) =    6.22
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.950
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    6.22
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       7.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  16.42
  FLOW VELOCITY(FEET/SEC.) =  2.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   60.90  DOWNSTREAM ELEVATION(FEET) =   54.90
  STREET LENGTH(FEET) =   173.50   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   14.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.38
  STREET FLOW TRAVEL TIME(MIN.) =   0.55   Tc(MIN.) =    6.77
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.635
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.97      SUBAREA RUNOFF(CFS) =    9.21
  TOTAL AREA(ACRES) =        3.5        PEAK FLOW RATE(CFS) =      16.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  16.42
  FLOW VELOCITY(FEET/SEC.) =  5.67   DEPTH*VELOCITY(FT*FT/SEC.) =   2.76
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     893.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.90  DOWNSTREAM ELEVATION(FEET) =   50.50
  STREET LENGTH(FEET) =   133.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   17.89
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.99
  STREET FLOW TRAVEL TIME(MIN.) =   0.38   Tc(MIN.) =    7.15
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.439
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    6.59
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =      22.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  5.85   DEPTH*VELOCITY(FT*FT/SEC.) =   3.03
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    1026.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.50  DOWNSTREAM(FEET) =    44.00
  FLOW LENGTH(FEET) =    31.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.90
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.39
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.20
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.10 =    1057.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     14.10 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.20
  RAINFALL INTENSITY(INCH/HR) =   5.41
  TOTAL STREAM AREA(ACRES) =     4.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.39

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   470.20
  UPSTREAM ELEVATION(FEET) =     52.40
  DOWNSTREAM ELEVATION(FEET) =     50.10
  ELEVATION DIFFERENCE(FEET) =      2.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.09
  TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      2.09

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     14.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    14.20  DOWNSTREAM(FEET) =    14.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.99
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.09
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    3.72
  LONGEST FLOWPATH FROM NODE     15.00 TO NODE     14.10 =     480.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     14.10 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.72
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.09

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       22.39     7.20        5.414          4.96
      2        2.09     3.72        6.850          0.35

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       13.64     3.72       6.850
      2       24.04     7.20       5.414

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.04   Tc(MIN.) =    7.20
  TOTAL AREA(ACRES) =        5.3
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.10 =    1057.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.00  DOWNSTREAM(FEET) =    43.91
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.78
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.04
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    7.53
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =    1132.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.53
  RAINFALL INTENSITY(INCH/HR) =   5.26
  TOTAL STREAM AREA(ACRES) =     5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.04

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   344.30
  UPSTREAM ELEVATION(FEET) =     73.00
  DOWNSTREAM ELEVATION(FEET) =     71.05
  ELEVATION DIFFERENCE(FEET) =      1.95
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.585
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    51.33
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      4.77
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      4.77

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "A"
S.C.S. CURVE NUMBER (AMC II) =  95
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
SUBAREA AREA(ACRES) =    0.73   SUBAREA RUNOFF(CFS) =    4.35
TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       9.12
TC(MIN.) =    3.58

****************************************************************************
FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "A"
S.C.S. CURVE NUMBER (AMC II) =  95
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.36
TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       9.48
TC(MIN.) =    3.58

****************************************************************************
FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    44.60  DOWNSTREAM(FEET) =    44.50
FLOW LENGTH(FEET) =    15.32   MANNING'S N =  0.013
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.36
PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       9.48
PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    3.63
LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     359.62 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     52.00 TO NODE     17.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    44.50  DOWNSTREAM(FEET) =    43.91
FLOW LENGTH(FEET) =   112.61   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.30
GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       9.48
PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    3.99
LONGEST FLOWPATH FROM NODE     50.00 TO NODE     17.00 =     472.23 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    3.99
RAINFALL INTENSITY(INCH/HR) =   6.85
TOTAL STREAM AREA(ACRES) =     1.59
PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.48

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       24.04     7.53        5.259          5.31
    2        9.48     3.99        6.850          1.59

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       27.93     3.99       6.850
    2       31.32     7.53       5.259

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      31.32   Tc(MIN.) =    7.53
  TOTAL AREA(ACRES) =        6.9
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =    1132.50 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         6.9  TC(MIN.) =      7.53
  PEAK FLOW RATE(CFS)   =       31.32
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
______________________________________________________________________________
******************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - CENTRAL TRIBUTARY AREA                                      *
* PROPOSED CONDITION 25-YEAR STORM (UNDETAINED)                              *
* SEE RATHYDRO, DETENTION ROUTING, AND RATIONAL METHOD (DETAINED) CALCS      *
 ******************************************************************************

  FILE NAME: P25_20U.DAT
  TIME/DATE OF STUDY: 10:57 06/15/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   259.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.227
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    73.96
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.73

******************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    47.56
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.23
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.73
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =    5.43
```

```
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.049
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.49   SUBAREA RUNOFF(CFS) =    1.88
 TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.57
 TC(MIN.) =    5.43

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.56  DOWNSTREAM(FEET) =    47.16
 FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.05
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.57
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.54
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     671.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.979
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.42
 TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       2.95
 TC(MIN.) =    5.54

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.16  DOWNSTREAM(FEET) =    45.52
 FLOW LENGTH(FEET) =   328.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.88
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.95
 PIPE TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =    6.96
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.96
 RAINFALL INTENSITY(INCH/HR) =   4.30
 TOTAL STREAM AREA(ACRES) =     0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.95

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
 UPSTREAM ELEVATION(FEET) =    122.26
 DOWNSTREAM ELEVATION(FEET) =    121.60
 ELEVATION DIFFERENCE(FEET) =      0.66
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
```

```
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.033
  SUBAREA RUNOFF(CFS) =      2.45
  TOTAL AREA(ACRES) =      0.64   TOTAL RUNOFF(CFS) =      2.45

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.80  DOWNSTREAM(FEET) =    45.52
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.57
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.45
  PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =    6.64
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     24.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.431
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    2.90
  TOTAL AREA(ACRES) =       1.5   TOTAL RUNOFF(CFS) =       5.05
  TC(MIN.) =    6.64

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.64
  RAINFALL INTENSITY(INCH/HR) =   4.43
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.05

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.95     6.96        4.302          0.78
      2        5.05     6.64        4.431          1.50

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        7.87     6.64       4.431
      2        7.86     6.96       4.302

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.87   Tc(MIN.) =    6.64
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.52  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.80
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.87
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.78
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   342.00
  UPSTREAM ELEVATION(FEET) =    123.31
  DOWNSTREAM ELEVATION(FEET) =    121.60
  ELEVATION DIFFERENCE(FEET) =      1.71
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.033
  SUBAREA RUNOFF(CFS) =      6.35
  TOTAL AREA(ACRES) =      1.66   TOTAL RUNOFF(CFS) =      6.35

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.99  DOWNSTREAM(FEET) =    45.72
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.66
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.35
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    5.64
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     29.00 =     395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.923
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    2.02
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       8.23
  TC(MIN.) =    5.64

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.72  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.98
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.23
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    6.18
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     30.00 =     556.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.18
  RAINFALL INTENSITY(INCH/HR) =   4.64
  TOTAL STREAM AREA(ACRES) =     2.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.23

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   303.00
  UPSTREAM ELEVATION(FEET) =     53.18
  DOWNSTREAM ELEVATION(FEET) =     50.00
  ELEVATION DIFFERENCE(FEET) =      3.18
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.694
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.74
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.67
  TOTAL AREA(ACRES) =      0.66   TOTAL RUNOFF(CFS) =      2.67

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.00  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   166.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.06
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.67
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    5.38
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     30.00 =     469.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.38
  RAINFALL INTENSITY(INCH/HR) =   5.08
  TOTAL STREAM AREA(ACRES) =     0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.67

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.23     6.18        4.642          2.20
      2        2.67     5.38        5.079          0.66

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        9.83     5.38       5.079
      2       10.67     6.18       4.642

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.67   Tc(MIN.) =    6.18
  TOTAL AREA(ACRES) =        2.9
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     30.00 =     556.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.92  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =   227.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.16
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.67
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =    6.91
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     27.00 =     783.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  11
```

```
--------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.67     6.91       4.318        2.86
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     27.00 =     783.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.87     6.78       4.372        2.28
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      18.34       6.78        4.372
      2      18.44       6.91        4.318

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.44   Tc(MIN.) =    6.91
  TOTAL AREA(ACRES) =        5.1

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.1  TC(MIN.) =      6.91
  PEAK FLOW RATE(CFS)   =      18.44
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - CENTRAL TRIBUTARY AREA                                    *
* PROPOSED CONDITION 100-YEAR STORM (UNDETAINED)                           *
* SEE RATHYDRO, DETENTION ROUTING, AND RATIONAL METHOD (DETAINED) CALCS    *
 ************************************************************************

  FILE NAME: P100_20U.DAT
  TIME/DATE OF STUDY: 11:17 06/15/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   259.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.227
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    73.96
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.94

************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    47.56
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.94
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =    5.35
```

```
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.560
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.49   SUBAREA RUNOFF(CFS) =    2.44
 TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       3.34
 TC(MIN.) =    5.35

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.56  DOWNSTREAM(FEET) =    47.16
 FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.28
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.34
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.46
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     671.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.472
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.54
 TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.84
 TC(MIN.) =    5.46

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.16  DOWNSTREAM(FEET) =    45.52
 FLOW LENGTH(FEET) =   328.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.84
 PIPE TRAVEL TIME(MIN.) =   1.34    Tc(MIN.) =    6.80
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.80
 RAINFALL INTENSITY(INCH/HR) =   5.62
 TOTAL STREAM AREA(ACRES) =     0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.84

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
 UPSTREAM ELEVATION(FEET) =    122.26
 DOWNSTREAM ELEVATION(FEET) =    121.60
 ELEVATION DIFFERENCE(FEET) =      0.66
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
```

```
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.478
  SUBAREA RUNOFF(CFS) =      3.15
  TOTAL AREA(ACRES) =      0.64   TOTAL RUNOFF(CFS) =      3.15

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.80  DOWNSTREAM(FEET) =    45.52
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.94
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.15
  PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =    6.53
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     24.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.767
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    3.77
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       6.57
  TC(MIN.) =    6.53

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.53
  RAINFALL INTENSITY(INCH/HR) =   5.77
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.57

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.84     6.80        5.618          0.78
      2        6.57     6.53        5.767          1.50

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       10.26     6.53       5.767
      2       10.24     6.80       5.618

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.26   Tc(MIN.) =    6.53
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.52  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.26
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    6.66
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   342.00
  UPSTREAM ELEVATION(FEET) =    123.31
  DOWNSTREAM ELEVATION(FEET) =    121.60
  ELEVATION DIFFERENCE(FEET) =      1.71
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.478
  SUBAREA RUNOFF(CFS) =      8.17
  TOTAL AREA(ACRES) =      1.66   TOTAL RUNOFF(CFS) =      8.17

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.99  DOWNSTREAM(FEET) =    45.72
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.02
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.17
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    5.63
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     29.00 =     395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.347
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    2.60
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =      10.61
  TC(MIN.) =    5.63

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.72  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.16
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.61
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    6.15
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     30.00 =     556.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.15
  RAINFALL INTENSITY(INCH/HR) =   6.00
  TOTAL STREAM AREA(ACRES) =     2.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.61

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   303.00
  UPSTREAM ELEVATION(FEET) =     53.18
  DOWNSTREAM ELEVATION(FEET) =     50.00
  ELEVATION DIFFERENCE(FEET) =      3.18
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.694
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.74
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      3.44
  TOTAL AREA(ACRES) =      0.66   TOTAL RUNOFF(CFS) =      3.44

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.00  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   166.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.44
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.44
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    5.32
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     30.00 =     469.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.32
  RAINFALL INTENSITY(INCH/HR) =   6.58
  TOTAL STREAM AREA(ACRES) =     0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.44

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.61     6.15        5.995          2.20
      2        3.44     5.32        6.585          0.66

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       12.61     5.32       6.585
      2       13.74     6.15       5.995

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.74   Tc(MIN.) =    6.15
  TOTAL AREA(ACRES) =        2.9
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     30.00 =     556.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.92  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =   227.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.59
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.74
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    6.83
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     27.00 =     783.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  11
```

```
--------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       13.74     6.83       5.605        2.86
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     27.00 =     783.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.26     6.66       5.695        2.28
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      23.66       6.66        5.695
      2      23.84       6.83        5.605

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.84   Tc(MIN.) =    6.83
  TOTAL AREA(ACRES) =        5.1

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.1  TC(MIN.) =      6.83
  PEAK FLOW RATE(CFS)   =      23.84
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                   Stantec



 ************************* DESCRIPTION OF STUDY *************************
* TREMONT SITE - CENTRAL TRIBUTARY AREA                                  *
* PROPOSED CONDITON 25-YEAR STORM RATIONAL METHOD (DETAINED)             *
* SEE RATHYDRO, DETENTION ROUTING, AND RATIONAL METHOD (UNDETAINED) CALCS  *
 ************************************************************************

  FILE NAME: P25_20D.DAT
  TIME/DATE OF STUDY: 16:47 06/15/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   259.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.227
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    73.96
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.73

************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    47.56
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.23
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.73
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =    5.43
```

```
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.049
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.49   SUBAREA RUNOFF(CFS) =    1.88
 TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.57
 TC(MIN.) =    5.43

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.56  DOWNSTREAM(FEET) =    47.16
 FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.05
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.57
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.54
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     671.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.979
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.42
 TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       2.95
 TC(MIN.) =    5.54

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.16  DOWNSTREAM(FEET) =    45.52
 FLOW LENGTH(FEET) =   328.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.88
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.95
 PIPE TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =    6.96
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.96
 RAINFALL INTENSITY(INCH/HR) =   4.30
 TOTAL STREAM AREA(ACRES) =     0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.95

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =   6.64   RAIN INTENSITY(INCH/HOUR) =  4.43
 TOTAL AREA(ACRES) =     1.50   TOTAL RUNOFF(CFS) =      1.28

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.64
  RAINFALL INTENSITY(INCH/HR) =   4.43
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.95     6.96        4.302          0.78
      2        1.28     6.64        4.432          1.50

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.10     6.64       4.432
      2        4.19     6.96       4.302

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.19   Tc(MIN.) =    6.96
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.52  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.54
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.19
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    7.12
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   6.18   RAIN INTENSITY(INCH/HOUR) =  4.64
  TOTAL AREA(ACRES) =     2.20   TOTAL RUNOFF(CFS) =      2.16

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.72  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.52
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.16
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    6.94
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     30.00 =    1233.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.94
  RAINFALL INTENSITY(INCH/HR) =   4.31
  TOTAL STREAM AREA(ACRES) =     2.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.16
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   303.00
  UPSTREAM ELEVATION(FEET) =     53.18
  DOWNSTREAM ELEVATION(FEET) =     50.00
  ELEVATION DIFFERENCE(FEET) =      3.18
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.694
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.74
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.67
  TOTAL AREA(ACRES) =      0.66   TOTAL RUNOFF(CFS) =      2.67

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.00  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   166.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.06
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.67
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    5.38
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     30.00 =     469.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.38
  RAINFALL INTENSITY(INCH/HR) =   5.08
  TOTAL STREAM AREA(ACRES) =     0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.67

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.16     6.94        4.307          2.20
      2        2.67     5.38        5.079          0.66

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
      1        4.34     5.38       5.079
      2        4.42     6.94       4.307

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.42   Tc(MIN.) =    6.94
  TOTAL AREA(ACRES) =        2.9
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     30.00 =    1233.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.92  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =   227.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.12
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.42
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =    7.86
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1460.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         4.42     7.86        3.975        2.86
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1460.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         4.19     7.12        4.238        2.28
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1        8.20       7.12        4.238
      2        8.36       7.86        3.975

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.36   Tc(MIN.) =    7.86
  TOTAL AREA(ACRES) =        5.1

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.1  TC(MIN.) =      7.86
  PEAK FLOW RATE(CFS)   =       8.36
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
______________________________________________________________________________
******************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - CENTRAL TRIBUTARY AREA                                      *
* PROPOSED CONDITON 100-YEAR RATIONAL METHOD (DETAINED)                      *
* SEE RATHYDRO, DETENTION ROUTING, AND RATIONAL METHOD (UNDETAINED) CALCS    *
 ****************************************************************************

  FILE NAME: P100_20D.DAT
  TIME/DATE OF STUDY: 16:57 06/15/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   259.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.227
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    73.96
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.94

******************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    47.56
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.94
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =    5.35
```

```
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.560
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.49   SUBAREA RUNOFF(CFS) =    2.44
 TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       3.34
 TC(MIN.) =    5.35

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.56  DOWNSTREAM(FEET) =    47.16
 FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.28
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.34
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.46
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     671.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.472
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.54
 TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.84
 TC(MIN.) =    5.46

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.16  DOWNSTREAM(FEET) =    45.52
 FLOW LENGTH(FEET) =   328.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.84
 PIPE TRAVEL TIME(MIN.) =   1.34    Tc(MIN.) =    6.80
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.80
 RAINFALL INTENSITY(INCH/HR) =   5.62
 TOTAL STREAM AREA(ACRES) =     0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.84

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =   6.53   RAIN INTENSITY(INCH/HOUR) =  5.77
 TOTAL AREA(ACRES) =     1.50   TOTAL RUNOFF(CFS) =      1.63

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.53
  RAINFALL INTENSITY(INCH/HR) =   5.77
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.63

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.84     6.80        5.618          0.78
      2        1.63     6.53        5.767          1.50

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1        5.31     6.53       5.767
      2        5.42     6.80       5.618

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.42   Tc(MIN.) =    6.80
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.52  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.12
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.42
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.95
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   6.15   RAIN INTENSITY(INCH/HOUR) =  5.99
  TOTAL AREA(ACRES) =     2.20   TOTAL RUNOFF(CFS) =      2.67

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.72  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.78
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.67
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =    6.86
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     30.00 =    1233.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.86
  RAINFALL INTENSITY(INCH/HR) =   5.59
  TOTAL STREAM AREA(ACRES) =     2.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.67
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   303.00
  UPSTREAM ELEVATION(FEET) =     53.18
  DOWNSTREAM ELEVATION(FEET) =     50.00
  ELEVATION DIFFERENCE(FEET) =      3.18
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.694
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.74
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      3.44
  TOTAL AREA(ACRES) =      0.66   TOTAL RUNOFF(CFS) =      3.44

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.00  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   166.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.44
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.44
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    5.32
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     30.00 =     469.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.32
  RAINFALL INTENSITY(INCH/HR) =   6.58
  TOTAL STREAM AREA(ACRES) =     0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.44

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.67     6.86        5.587          2.20
      2        3.44     5.32        6.585          0.66

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
      1        5.51     5.32       6.585
      2        5.59     6.86       5.587

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.59   Tc(MIN.) =    6.86
  TOTAL AREA(ACRES) =        2.9
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     30.00 =    1233.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.92  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =   227.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.59
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    7.70
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1460.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         5.59     7.70        5.186        2.86
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1460.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         5.42     6.95        5.540        2.28
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       10.47       6.95        5.540
      2       10.66       7.70        5.186

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       10.66   Tc(MIN.) =     7.70
  TOTAL AREA(ACRES) =         5.1

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         5.1  TC(MIN.) =      7.70
  PEAK FLOW RATE(CFS)   =       10.66
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************* DESCRIPTION OF STUDY *************************
* TREMONT SITE - SOUTHERLY TRIBUTARY AREA                                *
* PROPOSED CONDITION 25-YEAR RATIONAL METHOD                             *
*                                                                        *
 ************************************************************************

  FILE NAME: P25_30.DAT
  TIME/DATE OF STUDY: 14:14 07/19/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   18.0      9.0    0.020/0.020/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.63 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.3 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   254.70
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     69.00
  ELEVATION DIFFERENCE(FEET) =      1.00
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.033
  SUBAREA RUNOFF(CFS) =      1.84
  TOTAL AREA(ACRES) =      0.48   TOTAL RUNOFF(CFS) =      1.84

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   69.00  DOWNSTREAM ELEVATION(FEET) =   62.34
  STREET LENGTH(FEET) =   479.20   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   12.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.27
  STREET FLOW TRAVEL TIME(MIN.) =   2.59   Tc(MIN.) =    8.04
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.919
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    2.48      SUBAREA RUNOFF(CFS) =    7.39
  TOTAL AREA(ACRES) =        3.0        PEAK FLOW RATE(CFS) =       8.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  15.36
  FLOW VELOCITY(FEET/SEC.) =  3.46   DEPTH*VELOCITY(FT*FT/SEC.) =   1.61
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     733.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    57.34  DOWNSTREAM(FEET) =    49.19
  FLOW LENGTH(FEET) =   275.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.84
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.82
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    8.50
```

```
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.10 =    1008.90 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.779
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    0.78
 TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =       9.28
 TC(MIN.) =    8.50

****************************************************************************
 FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.779
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    1.09
 TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      10.37
 TC(MIN.) =    8.50

****************************************************************************
 FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.779
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.15
 TOTAL AREA(ACRES) =        4.0   TOTAL RUNOFF(CFS) =      11.52
 TC(MIN.) =    8.50

****************************************************************************
 FLOW PROCESS FROM NODE     32.10 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    49.19  DOWNSTREAM(FEET) =    47.15
 FLOW LENGTH(FEET) =    71.77   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.46
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.52
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.62
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =    1080.67 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.746
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.54
  TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =      11.96
  TC(MIN.) =    8.62

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.15  DOWNSTREAM(FEET) =    44.91
  FLOW LENGTH(FEET) =   430.85   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.56
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.96
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =    9.91
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =    1511.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     34.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.423
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    2.69   SUBAREA RUNOFF(CFS) =    7.00
  TOTAL AREA(ACRES) =        6.9   TOTAL RUNOFF(CFS) =      17.93
  TC(MIN.) =    9.91

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.91  DOWNSTREAM(FEET) =    43.00
  FLOW LENGTH(FEET) =    89.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.43
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.93
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   10.05
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =    1600.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   239.40
  UPSTREAM ELEVATION(FEET) =     69.00
  DOWNSTREAM ELEVATION(FEET) =     66.60
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.738
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.04
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.74
  TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      1.74

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.60  DOWNSTREAM ELEVATION(FEET) =   58.90
  STREET LENGTH(FEET) =   482.70   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   10.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   2.65   Tc(MIN.) =    7.39
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.136
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    4.34
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       5.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  12.41
  FLOW VELOCITY(FEET/SEC.) =  3.29   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     38.00 =     722.10 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    58.90  DOWNSTREAM(FEET) =    58.40
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.79
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.69
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.41
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     39.00 =     732.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.130
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    1.48   SUBAREA RUNOFF(CFS) =    4.65
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =      10.33
  TC(MIN.) =    7.41

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   58.40  DOWNSTREAM ELEVATION(FEET) =   50.10
  STREET LENGTH(FEET) =   255.80   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.87
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   15.08
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.40
  STREET FLOW TRAVEL TIME(MIN.) =   0.82   Tc(MIN.) =    8.22
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.861
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
```

```
  SUBAREA AREA(ACRES) =    1.73      SUBAREA RUNOFF(CFS) =    5.08
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =      14.73

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  15.93
  FLOW VELOCITY(FEET/SEC.) =  5.40   DEPTH*VELOCITY(FT*FT/SEC.) =   2.58
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     40.00 =     987.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    42.98
  FLOW LENGTH(FEET) =    55.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.75
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.73
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    8.32
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     35.00 =    1043.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       14.73     8.32        3.832        5.02
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     35.00 =    1043.80 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       17.93    10.05        3.392        6.89
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =    1600.52 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      29.57       8.32        3.832
      2      30.96      10.05        3.392

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.96   Tc(MIN.) =   10.05
  TOTAL AREA(ACRES) =       11.9

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    43.00  DOWNSTREAM(FEET) =    41.60
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.88
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.96
  PIPE TRAVEL TIME(MIN.) =   2.39    Tc(MIN.) =   12.44
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     50.00 =    2300.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.44
  RAINFALL INTENSITY(INCH/HR) =   2.96
  TOTAL STREAM AREA(ACRES) =    11.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     30.96

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     64.00
  DOWNSTREAM ELEVATION(FEET) =     54.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.460
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    64.29
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     13.52
  TOTAL AREA(ACRES) =      3.06   TOTAL RUNOFF(CFS) =     13.52

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.00  DOWNSTREAM ELEVATION(FEET) =   50.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.86
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
```

```
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    4.19
    SPLIT DEPTH(FEET) =    0.38   SPLIT FLOOD WIDTH(FEET) =   11.00
    SPLIT FLOW(CFS) =    4.48   SPLIT VELOCITY(FEET/SEC.) =    3.20
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.17
  STREET FLOW TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    4.39
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.42      SUBAREA RUNOFF(CFS) =   10.69
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =      24.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.19   DEPTH*VELOCITY(FT*FT/SEC.) =   2.17
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     62.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    42.00  DOWNSTREAM(FEET) =    41.60
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.68
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.21
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    4.50
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     50.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.50
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     5.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       30.96    12.44        2.956         11.91
      2       24.21     4.50        5.322          5.48

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

```
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       35.41     4.50       5.322
      2       44.41    12.44       2.956

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      44.41   Tc(MIN.) =   12.44
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     50.00 =    2300.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.60  DOWNSTREAM(FEET) =    41.46
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.06
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.41
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   12.58
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     51.00 =    2350.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.58
  RAINFALL INTENSITY(INCH/HR) =   2.94
  TOTAL STREAM AREA(ACRES) =    17.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     44.41

****************************************************************************
  FLOW PROCESS FROM NODE     51.10 TO NODE     51.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   521.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     48.76
  ELEVATION DIFFERENCE(FEET) =     11.24
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.182
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.57
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     51.20 TO NODE     51.00 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   47.40
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.93
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   13.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
  STREET FLOW TRAVEL TIME(MIN.) =   5.85   Tc(MIN.) =    9.03
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.634
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    2.29
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       3.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  14.73
  FLOW VELOCITY(FEET/SEC.) =  1.48   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE     51.10 TO NODE     51.00 =    1021.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.03
  RAINFALL INTENSITY(INCH/HR) =   3.63
  TOTAL STREAM AREA(ACRES) =     1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       44.41    12.58        2.935         17.39
      2        3.50     9.03        3.634          1.16

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
```

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       39.36     9.03       3.634
      2       47.24    12.58       2.935

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.24   Tc(MIN.) =   12.58
  TOTAL AREA(ACRES) =       18.5
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     51.00 =    2350.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.46  DOWNSTREAM(FEET) =    40.29
  FLOW LENGTH(FEET) =   434.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.01
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.24
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =   13.78
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    2784.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.78
  RAINFALL INTENSITY(INCH/HR) =   2.77
  TOTAL STREAM AREA(ACRES) =    18.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     47.24

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     52.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.643
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    61.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     14.80
  TOTAL AREA(ACRES) =      3.35   TOTAL RUNOFF(CFS) =     14.80

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =   52.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.19
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    5.14
    SPLIT DEPTH(FEET) =    0.31   SPLIT FLOOD WIDTH(FEET) =    7.66
    SPLIT FLOW(CFS) =    2.58   SPLIT VELOCITY(FEET/SEC.) =    3.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.66
  STREET FLOW TRAVEL TIME(MIN.) =   0.76   Tc(MIN.) =    4.41
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =   10.78
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      25.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  5.14   DEPTH*VELOCITY(FT*FT/SEC.) =   2.66
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     65.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.29  DOWNSTREAM(FEET) =    40.29
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.08
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.58
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    4.48
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     52.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.48
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     5.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.58

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       47.24    13.78        2.767         18.55
      2       25.58     4.48        5.322          5.79

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       50.13     4.48       5.322
      2       60.53    13.78       2.767

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      60.53   Tc(MIN.) =   13.78
  TOTAL AREA(ACRES) =       24.3
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    2784.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    40.29  DOWNSTREAM(FEET) =    40.17
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.53
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   13.92
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     53.00 =    2834.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.750
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7967
  SUBAREA AREA(ACRES) =    0.68   SUBAREA RUNOFF(CFS) =    1.55
  TOTAL AREA(ACRES) =       25.0   TOTAL RUNOFF(CFS) =      60.53
  TC(MIN.) =   13.92
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    40.17  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =   414.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.46
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.53
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   14.99
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     54.00 =    3248.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.99
  RAINFALL INTENSITY(INCH/HR) =   2.62
  TOTAL STREAM AREA(ACRES) =    25.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     60.53

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     67.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =     62.00
  DOWNSTREAM ELEVATION(FEET) =     51.00
  ELEVATION DIFFERENCE(FEET) =     11.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.767
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    87.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      7.38
  TOTAL AREA(ACRES) =      1.67   TOTAL RUNOFF(CFS) =      7.38

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   51.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   265.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.49
    HALFSTREET FLOOD WIDTH(FEET) =   16.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.26
  STREET FLOW TRAVEL TIME(MIN.) =   0.96   Tc(MIN.) =    3.73
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =   12.41
  TOTAL AREA(ACRES) =        4.5        PEAK FLOW RATE(CFS) =      19.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.84   DEPTH*VELOCITY(FT*FT/SEC.) =   2.51
  LONGEST FLOWPATH FROM NODE     66.00 TO NODE     68.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    39.50  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.94
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.79
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    3.83
  LONGEST FLOWPATH FROM NODE     66.00 TO NODE     54.00 =     565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.83
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     4.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.79

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   131.00
  UPSTREAM ELEVATION(FEET) =     50.00
  DOWNSTREAM ELEVATION(FEET) =     48.80
  ELEVATION DIFFERENCE(FEET) =      1.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.822
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    58.32
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.97
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      0.97

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     72.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.80  DOWNSTREAM ELEVATION(FEET) =   46.30
  STREET LENGTH(FEET) =   910.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   15.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.73
  STREET FLOW TRAVEL TIME(MIN.) =   9.78   Tc(MIN.) =   13.60
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.791
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    6.07
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       6.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  1.68   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     72.00 =    1041.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   46.30  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  8.0
```

```
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.80
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    1.76
    SPLIT DEPTH(FEET) =    0.37   SPLIT FLOOD WIDTH(FEET) =   10.72
    SPLIT FLOW(CFS) =    1.77   SPLIT VELOCITY(FEET/SEC.) =    1.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.91
  STREET FLOW TRAVEL TIME(MIN.) =   4.13   Tc(MIN.) =   17.73
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.353
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    2.44
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =       7.99

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  1.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     54.00 =    1476.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.73
  RAINFALL INTENSITY(INCH/HR) =   2.35
  TOTAL STREAM AREA(ACRES) =     4.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.99

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       60.53    14.99        2.622         25.02
      2       19.79     3.83        5.322          4.48
      3        7.99    17.73        2.353          4.09

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
```

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       51.33     3.83       5.322
      2       77.03    14.99       2.622
      3       71.05    17.73       2.353

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      77.03   Tc(MIN.) =   14.99
  TOTAL AREA(ACRES) =       33.6
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     54.00 =    3248.52 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       33.6  TC(MIN.) =     14.99
  PEAK FLOW RATE(CFS)   =      77.03
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
_____
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************* DESCRIPTION OF STUDY *************************
* TREMONT SITE - SOUTHERLY TRIBUTARY AREA                                *
* PROPOSED CONDITION 100-YEAR RATIONAL METHOD                            *
*                                                                        *
 **************************************************************************

  FILE NAME: P100_30.DAT
  TIME/DATE OF STUDY: 12:57 07/19/2024
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   18.0      9.0    0.020/0.020/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.63 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.3 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   254.70
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     69.00
  ELEVATION DIFFERENCE(FEET) =      1.00
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.478
  SUBAREA RUNOFF(CFS) =      2.36
  TOTAL AREA(ACRES) =      0.48   TOTAL RUNOFF(CFS) =      2.36

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   69.00  DOWNSTREAM ELEVATION(FEET) =   62.34
  STREET LENGTH(FEET) =   479.20   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   14.17
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
  STREET FLOW TRAVEL TIME(MIN.) =   2.43   Tc(MIN.) =    7.89
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.106
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    2.48      SUBAREA RUNOFF(CFS) =    9.62
  TOTAL AREA(ACRES) =        3.0        PEAK FLOW RATE(CFS) =      11.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  17.12
  FLOW VELOCITY(FEET/SEC.) =  3.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.84
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     733.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    57.34  DOWNSTREAM(FEET) =    49.19
  FLOW LENGTH(FEET) =   275.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.49
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    8.32
```

```
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.10 =    1008.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.934
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    1.01
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =      12.11
  TC(MIN.) =    8.32

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.934
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    1.42
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      13.54
  TC(MIN.) =    8.32

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.934
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.50
  TOTAL AREA(ACRES) =        4.0   TOTAL RUNOFF(CFS) =      15.04
  TC(MIN.) =    8.32

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    49.19  DOWNSTREAM(FEET) =    47.15
  FLOW LENGTH(FEET) =    72.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.04
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.43
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =    1080.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.892
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.71
  TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =      15.62
  TC(MIN.) =    8.43

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.15  DOWNSTREAM(FEET) =    44.91
  FLOW LENGTH(FEET) =   431.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.62
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =    9.67
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =    1511.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     34.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.476
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    2.69   SUBAREA RUNOFF(CFS) =    9.15
  TOTAL AREA(ACRES) =        6.9   TOTAL RUNOFF(CFS) =      23.44
  TC(MIN.) =    9.67

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.91  DOWNSTREAM(FEET) =    43.00
  FLOW LENGTH(FEET) =    89.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.21
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.44
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.80
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =    1600.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   239.40
  UPSTREAM ELEVATION(FEET) =     69.00
  DOWNSTREAM ELEVATION(FEET) =     66.60
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.738
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.04
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.24
  TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      2.24

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.60  DOWNSTREAM ELEVATION(FEET) =   58.90
  STREET LENGTH(FEET) =   482.70   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.09
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   11.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.26
  STREET FLOW TRAVEL TIME(MIN.) =   2.52   Tc(MIN.) =    7.26
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.386
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    5.65
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       7.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  13.89
  FLOW VELOCITY(FEET/SEC.) =  3.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.53
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     38.00 =     722.10 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    58.80
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.43
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.41
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.28
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     39.00 =     732.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.378
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    1.48   SUBAREA RUNOFF(CFS) =    6.05
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =      13.45
  TC(MIN.) =    7.28

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   58.40  DOWNSTREAM ELEVATION(FEET) =   50.10
  STREET LENGTH(FEET) =   255.80   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   16.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.74
  STREET FLOW TRAVEL TIME(MIN.) =   0.77   Tc(MIN.) =    8.05
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.040
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    1.73      SUBAREA RUNOFF(CFS) =    6.63
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =      19.23

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  17.75
  FLOW VELOCITY(FEET/SEC.) =  5.75   DEPTH*VELOCITY(FT*FT/SEC.) =   2.95
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     40.00 =     987.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    42.98
  FLOW LENGTH(FEET) =    55.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.25
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.23
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    8.14
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     35.00 =    1043.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       19.23     8.14        5.004        5.02
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     35.00 =    1043.80 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       23.44     9.80        4.437        6.89
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =    1600.90 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      38.68       8.14        5.004
      2      40.49       9.80        4.437

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.49   Tc(MIN.) =    9.80
  TOTAL AREA(ACRES) =       11.9

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    42.98  DOWNSTREAM(FEET) =    41.60
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.0 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.14
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.49
  PIPE TRAVEL TIME(MIN.) =   2.27    Tc(MIN.) =   12.07
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     50.00 =    2300.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.07
  RAINFALL INTENSITY(INCH/HR) =   3.88
  TOTAL STREAM AREA(ACRES) =    11.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     40.49

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     64.00
  DOWNSTREAM ELEVATION(FEET) =     54.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.460
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    64.29
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     17.40
  TOTAL AREA(ACRES) =      3.06   TOTAL RUNOFF(CFS) =     17.40

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.00  DOWNSTREAM ELEVATION(FEET) =   50.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      24.28
    ***STREET FLOW SPLITS OVER STREET-CROWN***
```

```
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    4.19
    SPLIT DEPTH(FEET) =    0.47   SPLIT FLOOD WIDTH(FEET) =   15.43
    SPLIT FLOW(CFS) =    9.90   SPLIT VELOCITY(FEET/SEC.) =    3.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.17
  STREET FLOW TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    4.39
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.42      SUBAREA RUNOFF(CFS) =   13.76
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =      31.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.33   DEPTH*VELOCITY(FT*FT/SEC.) =   2.29
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     62.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    42.00  DOWNSTREAM(FEET) =    41.60
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.21
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.16
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    4.50
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     50.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.50
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     5.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.16

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       40.49    12.07        3.879         11.91
      2       31.16     4.50        6.850          5.48

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       46.24     4.50       6.850
      2       58.14    12.07       3.879

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      58.14   Tc(MIN.) =   12.07
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     50.00 =    2300.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.60  DOWNSTREAM(FEET) =    41.46
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.14
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   12.20
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     51.00 =    2350.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.20
  RAINFALL INTENSITY(INCH/HR) =   3.85
  TOTAL STREAM AREA(ACRES) =    17.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     58.14

****************************************************************************
  FLOW PROCESS FROM NODE     51.10 TO NODE     51.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   521.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     48.76
  ELEVATION DIFFERENCE(FEET) =     11.24
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.182
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.57
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.27
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      2.27

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     51.20 TO NODE     51.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   47.40
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   15.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.52
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   5.48   Tc(MIN.) =    8.66
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.806
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    3.03
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       4.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  16.49
  FLOW VELOCITY(FEET/SEC.) =  1.59   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE     51.10 TO NODE     51.00 =    1021.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.66
  RAINFALL INTENSITY(INCH/HR) =   4.81
  TOTAL STREAM AREA(ACRES) =     1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.63

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       58.14    12.20        3.853         17.39
      2        4.63     8.66        4.806          1.16

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

```
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       51.23     8.66       4.806
      2       61.85    12.20       3.853

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      61.85   Tc(MIN.) =   12.20
  TOTAL AREA(ACRES) =       18.5
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     51.00 =    2350.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.46  DOWNSTREAM(FEET) =    40.29
  FLOW LENGTH(FEET) =   434.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.85
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =   13.32
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    2784.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.32
  RAINFALL INTENSITY(INCH/HR) =   3.64
  TOTAL STREAM AREA(ACRES) =    18.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     61.85

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     52.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.643
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    61.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     19.05
  TOTAL AREA(ACRES) =      3.35   TOTAL RUNOFF(CFS) =     19.05

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   52.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.98
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    5.14
    SPLIT DEPTH(FEET) =    0.42   SPLIT FLOOD WIDTH(FEET) =   13.25
    SPLIT FLOW(CFS) =    8.37   SPLIT VELOCITY(FEET/SEC.) =    4.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.66
  STREET FLOW TRAVEL TIME(MIN.) =   0.76   Tc(MIN.) =    4.41
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =   13.87
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      32.92

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  5.14   DEPTH*VELOCITY(FT*FT/SEC.) =   2.66
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     65.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.29  DOWNSTREAM(FEET) =    40.29
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.85
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.92
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    4.48
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     52.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.48
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     5.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.92

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       61.85    13.32        3.642         18.55
      2       32.92     4.48        6.850          5.79

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       65.80     4.48       6.850
      2       79.35    13.32       3.642

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      79.35   Tc(MIN.) =   13.32
  TOTAL AREA(ACRES) =       24.3
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    2784.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    40.29  DOWNSTREAM(FEET) =    40.17
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  41.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.48
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      79.35
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.45
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     53.00 =    2834.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.619
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7967
  SUBAREA AREA(ACRES) =    0.68   SUBAREA RUNOFF(CFS) =    2.04
  TOTAL AREA(ACRES) =       25.0   TOTAL RUNOFF(CFS) =      79.35
  TC(MIN.) =   13.45
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    40.17  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =   414.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.99
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      79.35
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =   14.43
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     54.00 =    3248.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.43
  RAINFALL INTENSITY(INCH/HR) =   3.46
  TOTAL STREAM AREA(ACRES) =    25.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     79.35

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     67.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =     62.00
  DOWNSTREAM ELEVATION(FEET) =     51.00
  ELEVATION DIFFERENCE(FEET) =     11.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.767
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    87.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      9.50
  TOTAL AREA(ACRES) =      1.67   TOTAL RUNOFF(CFS) =      9.50

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   51.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   265.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.48
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    4.84
    SPLIT DEPTH(FEET) =    0.23   SPLIT FLOOD WIDTH(FEET) =    3.56
    SPLIT FLOW(CFS) =    0.90   SPLIT VELOCITY(FEET/SEC.) =    2.84
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.51
  STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =    3.68
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =   15.98
  TOTAL AREA(ACRES) =        4.5        PEAK FLOW RATE(CFS) =      25.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.84   DEPTH*VELOCITY(FT*FT/SEC.) =   2.51
  LONGEST FLOWPATH FROM NODE     66.00 TO NODE     68.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    39.50  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.51
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.47
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    3.78
  LONGEST FLOWPATH FROM NODE     66.00 TO NODE     54.00 =     565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.78
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     4.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.47

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   131.00
  UPSTREAM ELEVATION(FEET) =     50.00
  DOWNSTREAM ELEVATION(FEET) =     48.80
  ELEVATION DIFFERENCE(FEET) =      1.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.822
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    58.32
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.25
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      1.25

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     72.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.80  DOWNSTREAM ELEVATION(FEET) =   46.30
  STREET LENGTH(FEET) =   910.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   17.40
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   9.20   Tc(MIN.) =   13.02
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.696
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    8.04
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       8.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  1.68   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     72.00 =    1041.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     54.00 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   46.30  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.32
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    1.76
    SPLIT DEPTH(FEET) =    0.47   SPLIT FLOOD WIDTH(FEET) =   15.71
    SPLIT FLOW(CFS) =    4.29   SPLIT VELOCITY(FEET/SEC.) =    1.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.91
  STREET FLOW TRAVEL TIME(MIN.) =   4.13   Tc(MIN.) =   17.14
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.094
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    3.21
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =      10.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  1.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     54.00 =    1476.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.14
  RAINFALL INTENSITY(INCH/HR) =   3.09
  TOTAL STREAM AREA(ACRES) =     4.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       79.35    14.43        3.457         25.02
      2       25.47     3.78        6.850          4.48
      3       10.50    17.14        3.094          4.09
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       67.83     3.78       6.850
      2      101.05    14.43       3.457
      3       93.02    17.14       3.094

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     101.05   Tc(MIN.) =   14.43
  TOTAL AREA(ACRES) =       33.6
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     54.00 =    3248.90 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       33.6  TC(MIN.) =     14.43
  PEAK FLOW RATE(CFS)   =     101.05
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************* DESCRIPTION OF STUDY *************************
* TREMONT SITE - SOUTHERLY TRIBUTARY AREA                                *
* PROPOSED CONDITION 2-YEAR RATIONAL METHOD                              *
*                                                                        *
 **************************************************************************

  FILE NAME: P2_30.DAT
  TIME/DATE OF STUDY: 13:13 07/19/2024
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =   2.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.200
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   18.0      9.0    0.020/0.020/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.63 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.3 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   254.70
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     69.00
  ELEVATION DIFFERENCE(FEET) =      1.00
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.990
  SUBAREA RUNOFF(CFS) =      1.09
  TOTAL AREA(ACRES) =      0.48   TOTAL RUNOFF(CFS) =      1.09

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   69.00  DOWNSTREAM ELEVATION(FEET) =   62.34
  STREET LENGTH(FEET) =   479.20   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =    9.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   2.90   Tc(MIN.) =    8.35
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.271
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    2.48      SUBAREA RUNOFF(CFS) =    4.28
  TOTAL AREA(ACRES) =        3.0        PEAK FLOW RATE(CFS) =       5.11

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  12.20
  FLOW VELOCITY(FEET/SEC.) =  3.04   DEPTH*VELOCITY(FT*FT/SEC.) =   1.22
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     733.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    57.34  DOWNSTREAM(FEET) =    49.19
  FLOW LENGTH(FEET) =   275.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.54
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.11
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    8.89
```

```
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.10 =    1008.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.181
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    0.45
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =       5.36
  TC(MIN.) =    8.89

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.181
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    0.63
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =       5.99
  TC(MIN.) =    8.89

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.181
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.66
  TOTAL AREA(ACRES) =        4.0   TOTAL RUNOFF(CFS) =       6.65
  TC(MIN.) =    8.89

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    49.19  DOWNSTREAM(FEET) =    47.15
  FLOW LENGTH(FEET) =    72.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.12
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.65
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.02
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =    1080.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.161
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.31
  TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =       6.90
  TC(MIN.) =    9.02

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.15  DOWNSTREAM(FEET) =    44.91
  FLOW LENGTH(FEET) =   431.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.75
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.90
  PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =   10.53
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =    1511.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     34.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.955
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    2.69   SUBAREA RUNOFF(CFS) =    4.00
  TOTAL AREA(ACRES) =        6.9   TOTAL RUNOFF(CFS) =      10.24
  TC(MIN.) =   10.53

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.91  DOWNSTREAM(FEET) =    43.00
  FLOW LENGTH(FEET) =    89.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.13
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.24
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   10.70
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =    1600.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  10
------------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   239.40
  UPSTREAM ELEVATION(FEET) =     69.00
  DOWNSTREAM ELEVATION(FEET) =     66.60
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.738
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.04
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.03
  TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      1.03

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.60  DOWNSTREAM ELEVATION(FEET) =   58.90
  STREET LENGTH(FEET) =   482.70   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   2.99   Tc(MIN.) =    7.73
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.387
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    2.50
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       3.28

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =   9.67
  FLOW VELOCITY(FEET/SEC.) =  2.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.03
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     38.00 =     722.10 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    58.80
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.69
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.28
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.76
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     39.00 =     732.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.382
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    1.48   SUBAREA RUNOFF(CFS) =    2.68
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =       5.96
  TC(MIN.) =    7.76

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   58.40  DOWNSTREAM ELEVATION(FEET) =   50.10
  STREET LENGTH(FEET) =   255.80   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   11.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.83
  STREET FLOW TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    8.68
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.215
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
```

```
  SUBAREA AREA(ACRES) =    1.73      SUBAREA RUNOFF(CFS) =    2.91
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =       8.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  12.62
  FLOW VELOCITY(FEET/SEC.) =  4.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     40.00 =     987.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    42.98
  FLOW LENGTH(FEET) =    55.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.26
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.45
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.79
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     35.00 =    1043.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        8.45     8.79       2.197        5.02
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     35.00 =    1043.80 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.24    10.70       1.936        6.89
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =    1600.90 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      16.87       8.79        2.197
      2      17.69      10.70        1.936

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.69   Tc(MIN.) =   10.70
  TOTAL AREA(ACRES) =       11.9

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    42.98  DOWNSTREAM(FEET) =    41.60
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.12
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.69
  PIPE TRAVEL TIME(MIN.) =   2.83    Tc(MIN.) =   13.53
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     50.00 =    2300.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.53
  RAINFALL INTENSITY(INCH/HR) =   1.66
  TOTAL STREAM AREA(ACRES) =    11.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.69

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     64.00
  DOWNSTREAM ELEVATION(FEET) =     54.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.460
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    64.29
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      8.03
  TOTAL AREA(ACRES) =      3.06   TOTAL RUNOFF(CFS) =      8.03

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.00  DOWNSTREAM ELEVATION(FEET) =   50.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
```

```
    HALFSTREET FLOOD WIDTH(FEET) =   16.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.91
  STREET FLOW TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =    4.45
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.42      SUBAREA RUNOFF(CFS) =    6.35
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =      14.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.19   DEPTH*VELOCITY(FT*FT/SEC.) =   2.17
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     62.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    42.00  DOWNSTREAM(FEET) =    41.60
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.38
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    4.57
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     50.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.57
  RAINFALL INTENSITY(INCH/HR) =   3.16
  TOTAL STREAM AREA(ACRES) =     5.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.38

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       17.69    13.53        1.664         11.91
      2       14.38     4.57        3.162          5.48

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       20.36     4.57       3.162
      2       25.26    13.53       1.664
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.26   Tc(MIN.) =   13.53
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     50.00 =    2300.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.60  DOWNSTREAM(FEET) =    41.46
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.21
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.26
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   13.68
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     51.00 =    2350.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.68
  RAINFALL INTENSITY(INCH/HR) =   1.65
  TOTAL STREAM AREA(ACRES) =    17.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.26

****************************************************************************
  FLOW PROCESS FROM NODE     51.10 TO NODE     51.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   521.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     48.76
  ELEVATION DIFFERENCE(FEET) =     11.24
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.182
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.57
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.05
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.05

****************************************************************************
  FLOW PROCESS FROM NODE     51.20 TO NODE     51.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   47.40
```

```
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   10.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
  STREET FLOW TRAVEL TIME(MIN.) =   6.61   Tc(MIN.) =    9.79
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.049
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    1.29
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       1.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  11.50
  FLOW VELOCITY(FEET/SEC.) =  1.31   DEPTH*VELOCITY(FT*FT/SEC.) =   0.51
  LONGEST FLOWPATH FROM NODE     51.10 TO NODE     51.00 =    1021.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.79
  RAINFALL INTENSITY(INCH/HR) =   2.05
  TOTAL STREAM AREA(ACRES) =     1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.97

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       25.26    13.68        1.652         17.39
      2        1.97     9.79        2.049          1.16

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       22.33     9.79       2.049
      2       26.85    13.68       1.652

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      26.85   Tc(MIN.) =   13.68
  TOTAL AREA(ACRES) =       18.5
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     51.00 =    2350.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.46  DOWNSTREAM(FEET) =    40.29
  FLOW LENGTH(FEET) =   434.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.30
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.85
  PIPE TRAVEL TIME(MIN.) =   1.36    Tc(MIN.) =   15.05
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    2784.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.05
  RAINFALL INTENSITY(INCH/HR) =   1.55
  TOTAL STREAM AREA(ACRES) =    18.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.85

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     52.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.643
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    61.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      8.79
  TOTAL AREA(ACRES) =      3.35   TOTAL RUNOFF(CFS) =      8.79

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   52.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
```

```
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   15.36
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.19
  STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =    4.48
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =    6.40
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      15.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  16.98
  FLOW VELOCITY(FEET/SEC.) =  4.94   DEPTH*VELOCITY(FT*FT/SEC.) =   2.46
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     65.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.29  DOWNSTREAM(FEET) =    40.29
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.81
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.19
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    4.56
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     52.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.56
  RAINFALL INTENSITY(INCH/HR) =   3.16
  TOTAL STREAM AREA(ACRES) =     5.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.19

  ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       26.85    15.05        1.553         18.55
      2       15.19     4.56        3.162          5.79

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       28.38     4.56       3.162
      2       34.31    15.05       1.553

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.31   Tc(MIN.) =   15.05
  TOTAL AREA(ACRES) =       24.3
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    2784.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    40.29  DOWNSTREAM(FEET) =    40.17
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.35
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.31
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   15.21
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     53.00 =    2834.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.543
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7967
  SUBAREA AREA(ACRES) =    0.68   SUBAREA RUNOFF(CFS) =    0.87
  TOTAL AREA(ACRES) =       25.0   TOTAL RUNOFF(CFS) =      34.31
  TC(MIN.) =   15.21
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    40.17  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =   414.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.31
```

```
  PIPE TRAVEL TIME(MIN.) =   1.24    Tc(MIN.) =   16.44
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     54.00 =    3248.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.44
  RAINFALL INTENSITY(INCH/HR) =   1.47
  TOTAL STREAM AREA(ACRES) =    25.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     34.31

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     67.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =     62.00
  DOWNSTREAM ELEVATION(FEET) =     51.00
  ELEVATION DIFFERENCE(FEET) =     11.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.767
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    87.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      4.38
  TOTAL AREA(ACRES) =      1.67   TOTAL RUNOFF(CFS) =      4.38

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   51.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   265.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.07
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   13.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.07
```

```
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.73
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =    3.85
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =    7.37
  TOTAL AREA(ACRES) =        4.5        PEAK FLOW RATE(CFS) =      11.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  15.64
  FLOW VELOCITY(FEET/SEC.) =  4.46   DEPTH*VELOCITY(FT*FT/SEC.) =   2.10
  LONGEST FLOWPATH FROM NODE     66.00 TO NODE     68.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    39.50  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.76
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    3.97
  LONGEST FLOWPATH FROM NODE     66.00 TO NODE     54.00 =     565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.97
  RAINFALL INTENSITY(INCH/HR) =   3.16
  TOTAL STREAM AREA(ACRES) =     4.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.76

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   131.00
  UPSTREAM ELEVATION(FEET) =     50.00
  DOWNSTREAM ELEVATION(FEET) =     48.80
  ELEVATION DIFFERENCE(FEET) =      1.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.822
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    58.32
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     72.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.80  DOWNSTREAM ELEVATION(FEET) =   46.30
  STREET LENGTH(FEET) =   910.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   12.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
  STREET FLOW TRAVEL TIME(MIN.) =  11.14   Tc(MIN.) =   14.96
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.559
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    3.39
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       3.68

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  14.94
  FLOW VELOCITY(FEET/SEC.) =  1.52   DEPTH*VELOCITY(FT*FT/SEC.) =   0.69
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     72.00 =    1041.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   46.30  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   15.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   4.46   Tc(MIN.) =   19.42
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.318
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    1.37
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =       4.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  15.93
  FLOW VELOCITY(FEET/SEC.) =  1.64   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     54.00 =    1476.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.42
  RAINFALL INTENSITY(INCH/HR) =   1.32
  TOTAL STREAM AREA(ACRES) =     4.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.47

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       34.31    16.44        1.467         25.02
      2       11.76     3.97        3.162          4.48
      3        4.47    19.42        1.318          4.09

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       28.59     3.97       3.162
      2       43.55    16.44       1.467
      3       40.19    19.42       1.318

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      43.55   Tc(MIN.) =   16.44
  TOTAL AREA(ACRES) =       33.6
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     54.00 =    3248.90 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       33.6  TC(MIN.) =     16.44
  PEAK FLOW RATE(CFS)   =      43.55
============================================================================
============================================================================
```

END OF RATIONAL METHOD ANALYSIS

# IV. DETENTION CALCULATIONS

a) Rathydro Hydrographs

b) Stage-Storage-Discharge Calculations

c) Existing Detention (Double 36” RCP)

d) Proposed Detention Basin 1 (Double 3’x12’ Contech Con/Span)

e) Proposed Detention Basin 2 (Triple 3’x12’ Contech Con/Span)

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RUN DATE 6/12/2024
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.02 INCHES
BASIN AREA 2.2 ACRES
RUNOFF COEFFICIENT 0.83
PEAK DISCHARGE 8.67 CFS

# RATHYDRO FOR AREA DRAINING TO EX DETENTION BASIN 25-YEAR STORM

| | |
|---|---|
| TIME (MIN) = 0 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 8 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 16 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 24 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 32 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 40 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 48 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 56 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 64 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 72 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 80 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 88 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 96 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 104 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 112 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 120 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 128 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 136 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 144 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 152 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 160 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 168 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 176 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 184 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 192 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 200 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 208 | DISCHARGE (CFS) = 0.7 |
| TIME (MIN) = 216 | DISCHARGE (CFS) = 0.8 |
| TIME (MIN) = 224 | DISCHARGE (CFS) = 1 |
| TIME (MIN) = 232 | DISCHARGE (CFS) = 1.4 |
| TIME (MIN) = 240 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 248 | DISCHARGE (CFS) = 8.67 |
| TIME (MIN) = 256 | DISCHARGE (CFS) = 1.1 |
| TIME (MIN) = 264 | DISCHARGE (CFS) = 0.8 |
| TIME (MIN) = 272 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 280 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 288 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 296 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 304 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 312 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 320 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 328 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 336 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 344 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 352 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 360 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 368 | DISCHARGE (CFS) = 0 |

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RUN DATE 6/12/2024
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.6 INCHES
BASIN AREA 2.2 ACRES
RUNOFF COEFFICIENT 0.83
PEAK DISCHARGE 11.34 CFS

# RATHYDRO FOR AREA DRAINING TO EX DETENTION BASIN
# 100-YEAR STORM

| | |
|---|---|
| TIME (MIN) = 0 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 8 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 16 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 24 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 32 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 40 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 48 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 56 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 64 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 72 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 80 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 88 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 96 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 104 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 112 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 120 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 128 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 136 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 144 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 152 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 160 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 168 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 176 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 184 | DISCHARGE (CFS) = 0.7 |
| TIME (MIN) = 192 | DISCHARGE (CFS) = 0.7 |
| TIME (MIN) = 200 | DISCHARGE (CFS) = 0.8 |
| TIME (MIN) = 208 | DISCHARGE (CFS) = 0.9 |
| TIME (MIN) = 216 | DISCHARGE (CFS) = 1.1 |
| TIME (MIN) = 224 | DISCHARGE (CFS) = 1.2 |
| TIME (MIN) = 232 | DISCHARGE (CFS) = 1.8 |
| TIME (MIN) = 240 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 248 | DISCHARGE (CFS) = 11.34 |
| TIME (MIN) = 256 | DISCHARGE (CFS) = 1.5 |
| TIME (MIN) = 264 | DISCHARGE (CFS) = 1 |
| TIME (MIN) = 272 | DISCHARGE (CFS) = 0.8 |
| TIME (MIN) = 280 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 288 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 296 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 304 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 312 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 320 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 328 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 336 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 344 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 352 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 360 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 368 | DISCHARGE (CFS) = 0 |

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RATHYDRO FOR AREA DRAINING TO DETENTION BASIN 1
25-YEAR STORM

RUN DATE 6/15/2024
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.02 INCHES
BASIN AREA 1.5 ACRES
RUNOFF COEFFICIENT 0.76
PEAK DISCHARGE 5.05 CFS

| | |
|---|---|
| TIME (MIN) = 0 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 8 | DISCHARGE (CFS) = 0.1 |
| TIME (MIN) = 16 | DISCHARGE (CFS) = 0.1 |
| TIME (MIN) = 24 | DISCHARGE (CFS) = 0.1 |
| TIME (MIN) = 32 | DISCHARGE (CFS) = 0.1 |
| TIME (MIN) = 40 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 48 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 56 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 64 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 72 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 80 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 88 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 96 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 104 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 112 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 120 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 128 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 136 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 144 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 152 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 160 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 168 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 176 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 184 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 192 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 200 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 208 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 216 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 224 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 232 | DISCHARGE (CFS) = 0.9 |
| TIME (MIN) = 240 | DISCHARGE (CFS) = 0.7 |
| TIME (MIN) = 248 | DISCHARGE (CFS) = 5.05 |
| TIME (MIN) = 256 | DISCHARGE (CFS) = 0.7 |
| TIME (MIN) = 264 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 272 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 280 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 288 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 296 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 304 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 312 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 320 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 328 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 336 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 344 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 352 | DISCHARGE (CFS) = 0.1 |
| TIME (MIN) = 360 | DISCHARGE (CFS) = 0.1 |
| TIME (MIN) = 368 | DISCHARGE (CFS) = 0 |

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RATIONAL METHOD HYDROGRAPH PROGRAM
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RUN DATE 6/15/2024
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.6 INCHES
BASIN AREA 1.5 ACRES
RUNOFF COEFFICIENT 0.76
PEAK DISCHARGE 6.57 CFS

# RATHYDRO FOR AREA DRAINING TO DETENTION BASIN 1
# 100-YEAR STORM

| | |
|---|---|
| TIME (MIN) = 0 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 8 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 16 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 24 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 32 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 40 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 48 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 56 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 64 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 72 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 80 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 88 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 96 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 104 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 112 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 120 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 128 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 136 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 144 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 152 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 160 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 168 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 176 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 184 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 192 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 200 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 208 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 216 | DISCHARGE (CFS) = 0.7 |
| TIME (MIN) = 224 | DISCHARGE (CFS) = 0.8 |
| TIME (MIN) = 232 | DISCHARGE (CFS) = 1.1 |
| TIME (MIN) = 240 | DISCHARGE (CFS) = 0.8 |
| TIME (MIN) = 248 | DISCHARGE (CFS) = 6.57 |
| TIME (MIN) = 256 | DISCHARGE (CFS) = 0.9 |
| TIME (MIN) = 264 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 272 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 280 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 288 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 296 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 304 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 312 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 320 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 328 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 336 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 344 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 352 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 360 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 368 | DISCHARGE (CFS) = 0 |

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RUN DATE 6/15/2024
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.02 INCHES
BASIN AREA 2.2 ACRES
RUNOFF COEFFICIENT 0.76
PEAK DISCHARGE 8.23 CFS

# RATHYDRO FOR AREA DRAINING TO DETENTION BASIN 2
# 25-YEAR STORM

| | |
|---|---|
| TIME (MIN) = 0 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 8 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 16 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 24 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 32 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 40 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 48 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 56 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 64 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 72 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 80 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 88 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 96 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 104 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 112 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 120 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 128 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 136 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 144 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 152 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 160 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 168 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 176 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 184 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 192 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 200 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 208 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 216 | DISCHARGE (CFS) = 0.8 |
| TIME (MIN) = 224 | DISCHARGE (CFS) = 0.9 |
| TIME (MIN) = 232 | DISCHARGE (CFS) = 1.3 |
| TIME (MIN) = 240 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 248 | DISCHARGE (CFS) = 8.23 |
| TIME (MIN) = 256 | DISCHARGE (CFS) = 1 |
| TIME (MIN) = 264 | DISCHARGE (CFS) = 0.7 |
| TIME (MIN) = 272 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 280 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 288 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 296 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 304 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 312 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 320 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 328 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 336 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 344 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 352 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 360 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 368 | DISCHARGE (CFS) = 0 |

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RUN DATE 6/15/2024
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.6 INCHES
BASIN AREA 2.2 ACRES
RUNOFF COEFFICIENT 0.76
PEAK DISCHARGE 10.61 CFS

# RATHYDRO FOR AREA DRAINING TO DETENTION BASIN 2
# 100-YEAR STORM

| | |
|---|---|
| TIME (MIN) = 0 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 8 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 16 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 24 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 32 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 40 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 48 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 56 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 64 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 72 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 80 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 88 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 96 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 104 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 112 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 120 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 128 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 136 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 144 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 152 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 160 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 168 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 176 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 184 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 192 | DISCHARGE (CFS) = 0.7 |
| TIME (MIN) = 200 | DISCHARGE (CFS) = 0.8 |
| TIME (MIN) = 208 | DISCHARGE (CFS) = 0.8 |
| TIME (MIN) = 216 | DISCHARGE (CFS) = 1 |
| TIME (MIN) = 224 | DISCHARGE (CFS) = 1.1 |
| TIME (MIN) = 232 | DISCHARGE (CFS) = 1.7 |
| TIME (MIN) = 240 | DISCHARGE (CFS) = 0.2 |
| TIME (MIN) = 248 | DISCHARGE (CFS) = 10.61 |
| TIME (MIN) = 256 | DISCHARGE (CFS) = 1.3 |
| TIME (MIN) = 264 | DISCHARGE (CFS) = 0.9 |
| TIME (MIN) = 272 | DISCHARGE (CFS) = 0.7 |
| TIME (MIN) = 280 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 288 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 296 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 304 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 312 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 320 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 328 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 336 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 344 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 352 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 360 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 368 | DISCHARGE (CFS) = 0 |

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**OCEANSIDE TOD - TREMONT SITE**
**STAGE-STORAGE-DISCHARGE RATING CURVE CALCULATIONS**

ORIFICE EQUATION = Q=BCA(2gH)^0.5

**EXISTING CONDITION DETENTION BASIN (DBL 36" RCP; L=132')**
**OUTLET CONTROL ORIFICE CALCULATIONS (5"HX8"W)**

| B | C | A | 2 | g | H | Q PER ORIFICE (CFS) |
|---|---|---|---|---|---|---|
| 0.5 | 0.66 | 0.2778 | 2 | 32.2 | 0.00 | 0.000 |
| 0.5 | 0.66 | 0.2778 | 2 | 32.2 | 0.50 | 0.520 |
| 0.5 | 0.66 | 0.2778 | 2 | 32.2 | 1.00 | 0.736 |
| 0.5 | 0.66 | 0.2778 | 2 | 32.2 | 1.50 | 0.901 |
| 0.5 | 0.66 | 0.2778 | 2 | 32.2 | 1.75 | 0.973 |
| 0.5 | 0.66 | 0.2778 | 2 | 32.2 | 2.00 | 1.040 |
| 0.5 | 0.66 | 0.2778 | 2 | 32.2 | 2.25 | 1.103 |
| 0.5 | 0.66 | 0.2778 | 2 | 32.2 | 2.50 | 1.163 |
| 0.5 | 0.66 | 0.2778 | 2 | 32.2 | 2.75 | 1.220 |
| 0.5 | 0.66 | 0.2778 | 2 | 32.2 | 3.00 | 1.274 |
| 0.5 | 0.66 | 0.2778 | 2 | 32.2 | 3.49 | 1.374 |
| 0.5 | 0.66 | 0.2778 | 2 | 32.2 | 3.99 | 1.469 |

**STAGE-STORAGE-DISCHARGE RATING CURVE**

| | DEPTH | ELEV | FLOW AREA (1 PIPE) | FLOW AREA (2 PIPES) | VOLUME (L=132') (CF) | VOLUME (AC-FT) | Q |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 44.1 | 0 | 0 | 0 | 0.0000 | 0.000 |
| 2 | 0.5 | 44.6 | 0.774 | 1.548 | 204.336 | 0.0047 | 0.520 |
| 3 | 1 | 45.1 | 2.063 | 4.126 | 544.632 | 0.0125 | 0.736 |
| 4 | 1.5 | 45.6 | 3.534 | 7.068 | 932.976 | 0.0214 | 0.901 |
| 5 | 1.75 | 45.85 | 4.3 | 8.6 | 1135.2 | 0.0261 | 0.973 |
| 6 | 2 | 46.1 | 5.006 | 10.012 | 1321.584 | 0.0303 | 1.040 |
| 7 | 2.25 | 46.35 | 5.7 | 11.4 | 1504.8 | 0.0345 | 1.103 |
| 8 | 2.5 | 46.6 | 6.294 | 12.588 | 1661.616 | 0.0381 | 1.163 |
| 9 | 2.75 | 46.85 | 6.8 | 13.6 | 1795.2 | 0.0412 | 1.220 |
| 10 | 3 | 47.1 | 7.069 | 14.138 | 1866.216 | 0.0428 | 1.274 |
| 11 | 3.49 | 47.59 | 7.069 | 14.138 | 1866.216 | 0.0428 | 1.374 |
| 12 | 3.99 | 47.59 | 7.069 | 14.138 | 1866.216 | 0.0428 | 1.469 |

**NORTH DETENTION BASIN (DOUBLE 3'X12' SPAN)**
**OUTLET CONTROL ORIFICE CALCULATIONS (5"HX12"W)**

| B | C | A | 2 | g | H | Q PER ORIFICE (CFS) |
|---|---|---|---|---|---|---|
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 0.00 | 0.000 |
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 0.50 | 0.780 |
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 1.00 | 1.103 |
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 1.50 | 1.351 |
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 1.75 | 1.460 |
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 2.00 | 1.560 |
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 2.25 | 1.655 |
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 2.50 | 1.745 |
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 2.75 | 1.830 |
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 3.00 | 1.911 |
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 3.50 | 2.064 |
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 4.00 | 2.207 |
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 7.30 | 2.981 |
| 0.5 | 0.66 | 0.4167 | 2 | 32.2 | 7.80 | 3.082 |

**STAGE-STORAGE-DISCHARGE RATING CURVE**

| | DEPTH | ELEV | FLOW AREA (1 ROW) | FLOW AREA (2 ROWS) | VOLUME (L=100') (CF) | VOLUME (AC-FT) | Q |
|---|---|---|---|---|---|---|---|
| 1 | 0.00 | 45.5 | 0 | 0 | 0 | 0.000 | 0.000 |
| 2 | 0.50 | 46.00 | 3.55 | 7.1 | 710 | 0.016 | 0.780 |
| 3 | 1.00 | 46.50 | 7.1 | 14.2 | 1420 | 0.033 | 1.103 |
| 4 | 1.50 | 47.00 | 9.015 | 18.03 | 1803 | 0.041 | 1.351 |
| 5 | 1.75 | 47.25 | 9.9725 | 19.945 | 1994.5 | 0.046 | 1.460 |
| 6 | 2.00 | 47.50 | 10.93 | 21.86 | 2186 | 0.050 | 1.560 |
| 7 | 2.25 | 47.75 | 11.165 | 22.33 | 2233 | 0.051 | 1.655 |
| 8 | 2.50 | 48.00 | 11.4 | 22.8 | 2280 | 0.052 | 1.745 |
| 9 | 2.75 | 48.25 | 11.635 | 23.27 | 2327 | 0.053 | 1.830 |
| 10 | 3.00 | 48.50 | 11.87 | 23.74 | 2374 | 0.054 | 1.911 |
| 11 | 3.50 | 49.00 | 11.87 | 23.74 | 2374 | 0.054 | 2.064 |
| 12 | 4.00 | 49.50 | 11.87 | 23.74 | 2374 | 0.054 | 2.207 |
| 13 | 7.30 | 52.80 | 11.87 | 23.74 | 2374 | 0.054 | 2.981 |
| 14 | 7.80 | 53.30 | 11.87 | 23.74 | 2374 | 1.055 | 3.082 |

**SOUTH DETENTION BASIN (TRIPLE 3'X12' SPAN)**
**OUTLET CONTROL ORIFICE CALCULATIONS (6"HX18"W)**

| B | C | A | 2 | g | H | Q PER ORIFICE (CFS) |
|---|---|---|---|---|---|---|
| 0.5 | 0.66 | 0.7500 | 2 | 32.2 | 0.00 | 0.000 |
| 0.5 | 0.66 | 0.7500 | 2 | 32.2 | 0.50 | 1.404 |
| 0.5 | 0.66 | 0.7500 | 2 | 32.2 | 1.00 | 1.986 |
| 0.5 | 0.66 | 0.7500 | 2 | 32.2 | 1.50 | 2.433 |
| 0.5 | 0.66 | 0.7500 | 2 | 32.2 | 1.75 | 2.627 |
| 0.5 | 0.66 | 0.7500 | 2 | 32.2 | 2.00 | 2.809 |
| 0.5 | 0.66 | 0.7500 | 2 | 32.2 | 2.25 | 2.979 |
| 0.5 | 0.66 | 0.7500 | 2 | 32.2 | 2.50 | 3.140 |
| 0.5 | 0.66 | 0.7500 | 2 | 32.2 | 2.75 | 3.294 |
| 0.5 | 0.66 | 0.7500 | 2 | 32.2 | 3.00 | 3.440 |
| 0.5 | 0.66 | 0.7500 | 2 | 32.2 | 3.40 | 3.662 |
| 0.5 | 0.66 | 0.7500 | 2 | 32.2 | 3.90 | 3.922 |

**STAGE-STORAGE-DISCHARGE RATING CURVE**

| | DEPTH | ELEV | FLOW AREA (1 ROW) | FLOW AREA (3 ROWS) | VOLUME (L=100') (CF) | VOLUME (AC-FT) | Q |
|---|---|---|---|---|---|---|---|
| 1 | 0.00 | 44.85 | 0 | 0 | 0 | 0.000 | 0.000 |
| 2 | 0.50 | 45.35 | 3.55 | 10.65 | 1065 | 0.024 | 1.404 |
| 3 | 1.00 | 45.85 | 7.1 | 21.3 | 2130 | 0.049 | 1.986 |
| 4 | 1.50 | 46.35 | 9.015 | 27.045 | 2704.5 | 0.062 | 2.433 |
| 5 | 1.75 | 46.60 | 9.9725 | 29.9175 | 2991.75 | 0.069 | 2.627 |
| 6 | 2.00 | 46.85 | 10.93 | 32.79 | 3279 | 0.075 | 2.809 |
| 7 | 2.25 | 47.10 | 11.165 | 33.495 | 3349.5 | 0.077 | 2.979 |
| 8 | 2.50 | 47.35 | 11.4 | 34.2 | 3420 | 0.079 | 3.140 |
| 9 | 2.75 | 47.60 | 11.635 | 34.905 | 3490.5 | 0.080 | 3.294 |
| 10 | 3.00 | 47.85 | 11.87 | 35.61 | 3561 | 0.082 | 3.440 |
| 11 | 3.40 | 48.25 | 11.87 | 35.61 | 3561 | 0.082 | 3.662 |
| 12 | 3.90 | 48.75 | 11.87 | 35.61 | 3561 | 1.082 | 3.922 |

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Analysis prepared by:

Stantec

Problem Descriptions:
Oceanside TOD - Existing Condition Detention Routing Calcs
25-Year; detention includes DBL 36" RCP (L=132') with 5"x8" orifice
6/12/2024

USER SPECIFIED INFLOW HYDROGRAPH

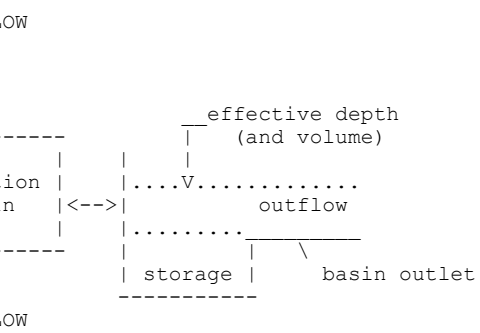
CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 48

| INTERVAL NUMBER | FLOW (CFS) |
|---|---|
| 1 | 0.00 |
| 2 | 0.20 |
| 3 | 0.20 |
| 4 | 0.20 |
| 5 | 0.20 |
| 6 | 0.20 |
| 7 | 0.20 |
| 8 | 0.30 |
| 9 | 0.30 |
| 10 | 0.30 |
| 11 | 0.30 |
| 12 | 0.30 |
| 13 | 0.30 |
| 14 | 0.30 |
| 15 | 0.30 |
| 16 | 0.30 |
| 17 | 0.30 |
| 18 | 0.40 |
| 19 | 0.40 |
| 20 | 0.40 |
| 21 | 0.40 |
| 22 | 0.50 |
| 23 | 0.50 |
| 24 | 0.50 |
| 25 | 0.60 |
| 26 | 0.60 |
| 27 | 0.70 |
| 28 | 0.80 |
| 29 | 1.00 |
| 30 | 1.40 |
| 31 | 0.50 |
| 32 | 8.67 |
| 33 | 1.10 |
| 34 | 0.80 |
| 35 | 0.60 |
| 36 | 0.50 |
| 37 | 0.40 |
| 38 | 0.40 |
| 39 | 0.40 |
| 40 | 0.30 |
| 41 | 0.30 |
| 42 | 0.30 |
| 43 | 0.30 |
| 44 | 0.20 |
| 45 | 0.20 |
| 46 | 0.00 |
| 47 | 0.00 |
| 48 | 0.00 |

Problem Descriptions:
Oceanside TOD - Existing Condition Detention Routing Calcs
25-Year; detention includes DBL 36" RCP (L=132') with 5"x8" orifice
6/12/2024

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 5.000
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00




DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 12

| *BASIN-DEPTH (FEET) | STORAGE (ACRE-FEET) | OUTFLOW (CFS) | ** | **BASIN-DEPTH (FEET) | STORAGE (ACRE-FEET) | OUTFLOW (CFS) | * |
|---|---|---|---|---|---|---|---|
| 0.000 | 0.000 | 0.000** | | 0.500 | 0.005 | 0.520 | * |
| 1.000 | 0.013 | 0.736** | | 1.500 | 0.021 | 0.901 | * |
| 1.750 | 0.026 | 0.973** | | 2.000 | 0.030 | 1.040 | * |
| 2.250 | 0.034 | 1.103** | | 2.500 | 0.038 | 1.163 | * |
| 2.750 | 0.041 | 1.220** | | 3.000 | 0.043 | 1.274 | * |
| 3.490 | 0.043 | 1.374** | | 3.990 | 1.043 | 1.469 | * |

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

| INTERVAL NUMBER | DEPTH (FEET) | {S-O*DT/2} (ACRE-FEET) | {S+O*DT/2} (ACRE-FEET) |
|---|---|---|---|
| 1 | 0.00 | 0.00000 | 0.00000 |
| 2 | 0.50 | 0.00291 | 0.00649 |
| 3 | 1.00 | 0.00997 | 0.01503 |
| 4 | 1.50 | 0.01830 | 0.02450 |
| 5 | 1.75 | 0.02275 | 0.02945 |
| 6 | 2.00 | 0.02672 | 0.03388 |
| 7 | 2.25 | 0.03070 | 0.03830 |
| 8 | 2.50 | 0.03410 | 0.04210 |
| 9 | 2.75 | 0.03700 | 0.04540 |
| 10 | 3.00 | 0.03841 | 0.04719 |
| 11 | 3.49 | 0.03807 | 0.04753 |
| 12 | 3.99 | 1.03774 | 1.04786 |

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

| TIME (HRS) | DEAD-STORAGE FILLED(AF) | INFLOW (CFS) | EFFECTIVE DEPTH(FT) | OUTFLOW (CFS) | EFFECTIVE VOLUME(AF) |
|---|---|---|---|---|---|
| 0.083 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 0.167 | 0.000 | 0.20 | 0.11 | 0.06 | 0.001 |
| 0.250 | 0.000 | 0.20 | 0.15 | 0.14 | 0.001 |
| 0.333 | 0.000 | 0.20 | 0.17 | 0.17 | 0.002 |
| 0.417 | 0.000 | 0.20 | 0.18 | 0.19 | 0.002 |
| 0.500 | 0.000 | 0.20 | 0.19 | 0.19 | 0.002 |
| 0.583 | 0.000 | 0.20 | 0.19 | 0.20 | 0.002 |
| 0.667 | 0.000 | 0.30 | 0.24 | 0.23 | 0.002 |
| 0.750 | 0.000 | 0.30 | 0.27 | 0.27 | 0.003 |
| 0.833 | 0.000 | 0.30 | 0.28 | 0.29 | 0.003 |
| 0.917 | 0.000 | 0.30 | 0.28 | 0.29 | 0.003 |
| 1.000 | 0.000 | 0.30 | 0.29 | 0.30 | 0.003 |
| 1.083 | 0.000 | 0.30 | 0.29 | 0.30 | 0.003 |
| 1.167 | 0.000 | 0.30 | 0.29 | 0.30 | 0.003 |
| 1.250 | 0.000 | 0.30 | 0.29 | 0.30 | 0.003 |
| 1.333 | 0.000 | 0.30 | 0.29 | 0.30 | 0.003 |
| 1.417 | 0.000 | 0.30 | 0.29 | 0.30 | 0.003 |
| 1.500 | 0.000 | 0.40 | 0.34 | 0.33 | 0.003 |
| 1.583 | 0.000 | 0.40 | 0.37 | 0.37 | 0.003 |
| 1.667 | 0.000 | 0.40 | 0.38 | 0.39 | 0.004 |
| 1.750 | 0.000 | 0.40 | 0.38 | 0.39 | 0.004 |
| 1.833 | 0.000 | 0.50 | 0.44 | 0.42 | 0.004 |
| 1.917 | 0.000 | 0.50 | 0.46 | 0.47 | 0.004 |
| 2.000 | 0.000 | 0.50 | 0.47 | 0.48 | 0.004 |

| | | | | | |
|---|---|---|---|---|---|
| 2.083 | 0.000 | 0.60 | 0.52 | 0.51 | 0.005 |
| 2.167 | 0.000 | 0.60 | 0.55 | 0.54 | 0.005 |
| 2.250 | 0.000 | 0.70 | 0.61 | 0.56 | 0.006 |
| 2.333 | 0.000 | 0.80 | 0.71 | 0.59 | 0.008 |
| 2.417 | 0.000 | 1.00 | 0.86 | 0.64 | 0.010 |
| 2.500 | 0.000 | 1.40 | 1.14 | 0.73 | 0.015 |
| 2.583 | 0.000 | 0.50 | 1.04 | 0.77 | 0.013 |
| 2.667 | 0.000 | 8.67 | 3.50 | 1.06 | 0.066 |
| 2.750 | 0.000 | 1.10 | 3.50 | 1.38 | 0.064 |
| 2.833 | 0.000 | 0.80 | 3.50 | 1.38 | 0.060 |
| 2.917 | 0.000 | 0.60 | 3.50 | 1.38 | 0.054 |
| 3.000 | 0.000 | 0.50 | 3.49 | 1.37 | 0.048 |
| 3.083 | 0.000 | 0.40 | 2.88 | 1.31 | 0.042 |
| 3.167 | 0.000 | 0.40 | 2.40 | 1.19 | 0.037 |
| 3.250 | 0.000 | 0.40 | 2.09 | 1.10 | 0.032 |
| 3.333 | 0.000 | 0.30 | 1.79 | 1.02 | 0.027 |
| 3.417 | 0.000 | 0.30 | 1.55 | 0.95 | 0.022 |
| 3.500 | 0.000 | 0.30 | 1.33 | 0.88 | 0.018 |
| 3.583 | 0.000 | 0.30 | 1.13 | 0.81 | 0.015 |
| 3.667 | 0.000 | 0.20 | 0.91 | 0.74 | 0.011 |
| 3.750 | 0.000 | 0.20 | 0.71 | 0.65 | 0.008 |
| 3.833 | 0.000 | 0.00 | 0.45 | 0.54 | 0.004 |
| 3.917 | 0.000 | 0.00 | 0.20 | 0.34 | 0.002 |
| 4.000 | 0.000 | 0.00 | 0.09 | 0.15 | 0.001 |
| 4.083 | 0.000 | 0.00 | 0.04 | 0.07 | 0.000 |

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Ver. 23.0 Release Date: 07/01/2016 License ID 1535

Analysis prepared by:

Stantec

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Problem Descriptions:
Oceanside TOD - Existing Condition Detention Routing Calcs
100-Year; detention includes DBL 36" RCP (L=132') with 5"x8" orifice
6/12/2024

**********

USER SPECIFIED INFLOW HYDROGRAPH

==========

CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 47

| INTERVAL NUMBER | FLOW (CFS) |
|---|---|
| 1 | 0.00 |
| 2 | 0.30 |
| 3 | 0.30 |
| 4 | 0.30 |
| 5 | 0.30 |
| 6 | 0.30 |
| 7 | 0.30 |
| 8 | 0.30 |
| 9 | 0.30 |
| 10 | 0.30 |
| 11 | 0.40 |
| 12 | 0.40 |
| 13 | 0.40 |
| 14 | 0.40 |
| 15 | 0.40 |
| 16 | 0.40 |
| 17 | 0.40 |
| 18 | 0.50 |
| 19 | 0.50 |
| 20 | 0.50 |
| 21 | 0.50 |
| 22 | 0.60 |
| 23 | 0.60 |
| 24 | 0.70 |
| 25 | 0.70 |
| 26 | 0.80 |
| 27 | 0.90 |
| 28 | 1.10 |
| 29 | 1.20 |
| 30 | 1.80 |
| 31 | 0.50 |
| 32 | 11.34 |
| 33 | 1.50 |
| 34 | 1.00 |
| 35 | 0.80 |
| 36 | 0.60 |
| 37 | 0.60 |
| 38 | 0.50 |
| 39 | 0.50 |
| 40 | 0.40 |
| 41 | 0.40 |
| 42 | 0.40 |
| 43 | 0.30 |
| 44 | 0.30 |
| 45 | 0.30 |
| 46 | 0.30 |
| 47 | 0.00 |

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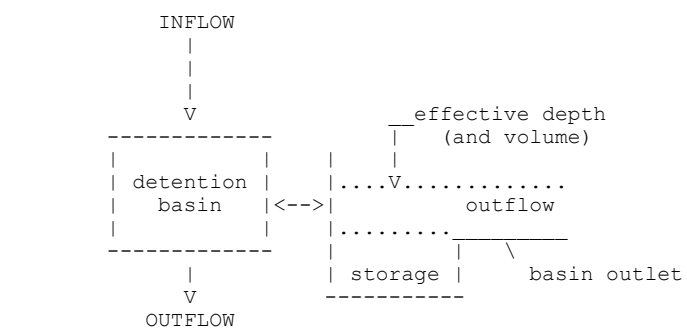
Problem Descriptions:
Oceanside TOD - Existing Condition Detention Routing Calcs
100-Year; detention includes DBL 36" RCP (L=132') with 5"x8" orifice
6/12/2024

==========

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 5.000
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00




DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 12

| *BASIN-DEPTH (FEET) | STORAGE (ACRE-FEET) | OUTFLOW (CFS) | ** | **BASIN-DEPTH (FEET) | STORAGE (ACRE-FEET) | OUTFLOW (CFS) | * |
|---|---|---|---|---|---|---|---|
| 0.000 | 0.000 | 0.000** | | 0.500 | 0.005 | 0.520 | * |
| 1.000 | 0.013 | 0.736** | | 1.500 | 0.021 | 0.901 | * |
| 1.750 | 0.026 | 0.973** | | 2.000 | 0.030 | 1.040 | * |
| 2.250 | 0.034 | 1.103** | | 2.500 | 0.038 | 1.163 | * |
| 2.750 | 0.041 | 1.220** | | 3.000 | 0.043 | 1.274 | * |
| 3.490 | 0.043 | 1.374** | | 3.990 | 1.043 | 1.469 | * |

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

| INTERVAL NUMBER | DEPTH (FEET) | {S-O*DT/2} (ACRE-FEET) | {S+O*DT/2} (ACRE-FEET) |
|---|---|---|---|
| 1 | 0.00 | 0.00000 | 0.00000 |
| 2 | 0.50 | 0.00291 | 0.00649 |
| 3 | 1.00 | 0.00997 | 0.01503 |
| 4 | 1.50 | 0.01830 | 0.02450 |
| 5 | 1.75 | 0.02275 | 0.02945 |
| 6 | 2.00 | 0.02672 | 0.03388 |
| 7 | 2.25 | 0.03070 | 0.03830 |
| 8 | 2.50 | 0.03410 | 0.04210 |
| 9 | 2.75 | 0.03700 | 0.04540 |
| 10 | 3.00 | 0.03841 | 0.04719 |
| 11 | 3.49 | 0.03807 | 0.04753 |
| 12 | 3.99 | 1.03774 | 1.04786 |

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

| TIME (HRS) | DEAD-STORAGE FILLED(AF) | INFLOW (CFS) | EFFECTIVE DEPTH(FT) | OUTFLOW (CFS) | EFFECTIVE VOLUME(AF) |
|---|---|---|---|---|---|
| 0.083 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 0.167 | 0.000 | 0.30 | 0.16 | 0.08 | 0.001 |
| 0.250 | 0.000 | 0.30 | 0.23 | 0.20 | 0.002 |
| 0.333 | 0.000 | 0.30 | 0.26 | 0.26 | 0.002 |
| 0.417 | 0.000 | 0.30 | 0.28 | 0.28 | 0.003 |
| 0.500 | 0.000 | 0.30 | 0.28 | 0.29 | 0.003 |
| 0.583 | 0.000 | 0.30 | 0.29 | 0.30 | 0.003 |
| 0.667 | 0.000 | 0.30 | 0.29 | 0.30 | 0.003 |
| 0.750 | 0.000 | 0.30 | 0.29 | 0.30 | 0.003 |
| 0.833 | 0.000 | 0.30 | 0.29 | 0.30 | 0.003 |
| 0.917 | 0.000 | 0.40 | 0.34 | 0.33 | 0.003 |
| 1.000 | 0.000 | 0.40 | 0.37 | 0.37 | 0.003 |
| 1.083 | 0.000 | 0.40 | 0.38 | 0.39 | 0.004 |
| 1.167 | 0.000 | 0.40 | 0.38 | 0.39 | 0.004 |
| 1.250 | 0.000 | 0.40 | 0.38 | 0.40 | 0.004 |
| 1.333 | 0.000 | 0.40 | 0.38 | 0.40 | 0.004 |
| 1.417 | 0.000 | 0.40 | 0.38 | 0.40 | 0.004 |
| 1.500 | 0.000 | 0.50 | 0.44 | 0.43 | 0.004 |
| 1.583 | 0.000 | 0.50 | 0.46 | 0.47 | 0.004 |
| 1.667 | 0.000 | 0.50 | 0.47 | 0.49 | 0.004 |
| 1.750 | 0.000 | 0.50 | 0.48 | 0.49 | 0.004 |
| 1.833 | 0.000 | 0.60 | 0.52 | 0.51 | 0.005 |
| 1.917 | 0.000 | 0.60 | 0.55 | 0.54 | 0.006 |
| 2.000 | 0.000 | 0.70 | 0.62 | 0.56 | 0.007 |

| | | | | | |
|---|---|---|---|---|---|
| 2.083 | 0.000 | 0.70 | 0.67 | 0.58 | 0.007 |
| 2.167 | 0.000 | 0.80 | 0.75 | 0.61 | 0.009 |
| 2.250 | 0.000 | 0.90 | 0.86 | 0.65 | 0.010 |
| 2.333 | 0.000 | 1.10 | 1.03 | 0.71 | 0.013 |
| 2.417 | 0.000 | 1.20 | 1.19 | 0.77 | 0.016 |
| 2.500 | 0.000 | 1.80 | 1.56 | 0.86 | 0.022 |
| 2.583 | 0.000 | 0.50 | 1.41 | 0.89 | 0.020 |
| 2.667 | 0.000 | 11.34 | 3.51 | 1.12 | 0.090 |
| 2.750 | 0.000 | 1.50 | 3.51 | 1.38 | 0.091 |
| 2.833 | 0.000 | 1.00 | 3.51 | 1.38 | 0.088 |
| 2.917 | 0.000 | 0.80 | 3.51 | 1.38 | 0.084 |
| 3.000 | 0.000 | 0.60 | 3.51 | 1.38 | 0.079 |
| 3.083 | 0.000 | 0.60 | 3.51 | 1.38 | 0.074 |
| 3.167 | 0.000 | 0.50 | 3.50 | 1.38 | 0.068 |
| 3.250 | 0.000 | 0.50 | 3.50 | 1.38 | 0.062 |
| 3.333 | 0.000 | 0.40 | 3.50 | 1.38 | 0.055 |
| 3.417 | 0.000 | 0.40 | 3.49 | 1.37 | 0.048 |
| 3.500 | 0.000 | 0.40 | 2.85 | 1.31 | 0.042 |
| 3.583 | 0.000 | 0.30 | 2.34 | 1.18 | 0.036 |
| 3.667 | 0.000 | 0.30 | 2.01 | 1.08 | 0.030 |
| 3.750 | 0.000 | 0.30 | 1.72 | 1.00 | 0.026 |
| 3.833 | 0.000 | 0.30 | 1.49 | 0.93 | 0.021 |
| 3.917 | 0.000 | 0.00 | 1.16 | 0.84 | 0.015 |
| 4.000 | 0.000 | 0.00 | 0.86 | 0.73 | 0.010 |
| 4.083 | 0.000 | 0.00 | 0.59 | 0.62 | 0.006 |
| 4.167 | 0.000 | 0.00 | 0.32 | 0.45 | 0.003 |
| 4.250 | 0.000 | 0.00 | 0.14 | 0.24 | 0.001 |

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Analysis prepared by:

Stantec

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Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 25-YEAR STORM NORTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

**********

USER SPECIFIED INFLOW HYDROGRAPH

==========

CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 47

---

| INTERVAL NUMBER | FLOW (CFS) |
|---|---|
| 1 | 0.00 |
| 2 | 0.10 |
| 3 | 0.10 |
| 4 | 0.10 |
| 5 | 0.10 |
| 6 | 0.20 |
| 7 | 0.20 |
| 8 | 0.20 |
| 9 | 0.20 |
| 10 | 0.20 |
| 11 | 0.20 |
| 12 | 0.20 |
| 13 | 0.20 |
| 14 | 0.20 |
| 15 | 0.20 |
| 16 | 0.20 |
| 17 | 0.20 |
| 18 | 0.20 |
| 19 | 0.20 |
| 20 | 0.30 |
| 21 | 0.30 |
| 22 | 0.30 |
| 23 | 0.30 |
| 24 | 0.30 |
| 25 | 0.30 |
| 26 | 0.40 |
| 27 | 0.40 |
| 28 | 0.50 |
| 29 | 0.60 |
| 30 | 0.90 |
| 31 | 0.70 |
| 32 | 5.05 |
| 33 | 0.70 |
| 34 | 0.50 |
| 35 | 0.40 |
| 36 | 0.30 |
| 37 | 0.30 |
| 38 | 0.20 |
| 39 | 0.20 |
| 40 | 0.20 |
| 41 | 0.20 |
| 42 | 0.20 |
| 43 | 0.20 |
| 44 | 0.20 |
| 45 | 0.10 |
| 46 | 0.10 |
| 47 | 0.00 |

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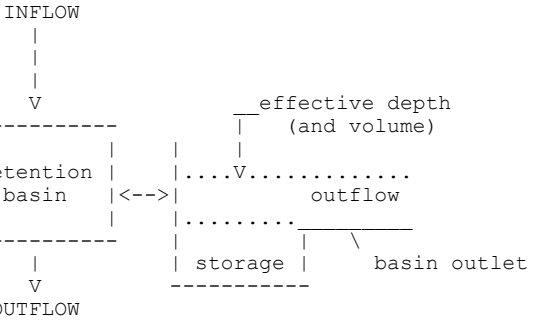
Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 25-YEAR STORM NORTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 5.000
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00




DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 14

| *BASIN-DEPTH (FEET) | STORAGE (ACRE-FEET) | OUTFLOW (CFS) | ** | **BASIN-DEPTH (FEET) | STORAGE (ACRE-FEET) | OUTFLOW (CFS) | * |
|---|---|---|---|---|---|---|---|
| 0.000 | 0.000 | 0.000** | | 0.500 | 0.016 | 0.780 | * |
| 1.000 | 0.033 | 1.103** | | 1.500 | 0.041 | 1.351 | * |
| 1.750 | 0.046 | 1.460** | | 2.000 | 0.050 | 1.560 | * |
| 2.250 | 0.051 | 1.655** | | 2.500 | 0.052 | 1.745 | * |
| 2.750 | 0.053 | 1.830** | | 3.000 | 0.054 | 1.911 | * |
| 3.500 | 0.054 | 2.064** | | 4.000 | 0.054 | 2.207 | * |
| 7.300 | 0.054 | 2.981** | | 7.800 | 1.055 | 3.082 | * |

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

| INTERVAL NUMBER | DEPTH (FEET) | {S-O*DT/2} (ACRE-FEET) | {S+O*DT/2} (ACRE-FEET) |
|---|---|---|---|
| 1 | 0.00 | 0.00000 | 0.00000 |
| 2 | 0.50 | 0.01331 | 0.01869 |
| 3 | 1.00 | 0.02920 | 0.03680 |
| 4 | 1.50 | 0.03635 | 0.04565 |
| 5 | 1.75 | 0.04097 | 0.05103 |
| 6 | 2.00 | 0.04463 | 0.05537 |
| 7 | 2.25 | 0.04530 | 0.05670 |
| 8 | 2.50 | 0.04599 | 0.05801 |
| 9 | 2.75 | 0.04670 | 0.05930 |
| 10 | 3.00 | 0.04742 | 0.06058 |
| 11 | 3.50 | 0.04689 | 0.06111 |
| 12 | 4.00 | 0.04640 | 0.06160 |
| 13 | 7.30 | 0.04373 | 0.06427 |
| 14 | 7.80 | 1.04439 | 1.06561 |

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

| TIME (HRS) | DEAD-STORAGE FILLED(AF) | INFLOW (CFS) | EFFECTIVE DEPTH(FT) | OUTFLOW (CFS) | EFFECTIVE VOLUME(AF) |
|---|---|---|---|---|---|
| 0.083 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 0.167 | 0.000 | 0.10 | 0.02 | 0.01 | 0.001 |
| 0.250 | 0.000 | 0.10 | 0.03 | 0.04 | 0.001 |
| 0.333 | 0.000 | 0.10 | 0.04 | 0.06 | 0.001 |
| 0.417 | 0.000 | 0.10 | 0.05 | 0.07 | 0.002 |
| 0.500 | 0.000 | 0.20 | 0.07 | 0.09 | 0.002 |
| 0.583 | 0.000 | 0.20 | 0.09 | 0.12 | 0.003 |
| 0.667 | 0.000 | 0.20 | 0.10 | 0.15 | 0.003 |
| 0.750 | 0.000 | 0.20 | 0.11 | 0.16 | 0.003 |
| 0.833 | 0.000 | 0.20 | 0.11 | 0.17 | 0.004 |
| 0.917 | 0.000 | 0.20 | 0.12 | 0.18 | 0.004 |
| 1.000 | 0.000 | 0.20 | 0.12 | 0.19 | 0.004 |
| 1.083 | 0.000 | 0.20 | 0.12 | 0.19 | 0.004 |

| | | | | | |
|---|---|---|---|---|---|
| 1.167 | 0.000 | 0.20 | 0.12 | 0.19 | 0.004 |
| 1.250 | 0.000 | 0.20 | 0.13 | 0.19 | 0.004 |
| 1.333 | 0.000 | 0.20 | 0.13 | 0.20 | 0.004 |
| 1.417 | 0.000 | 0.20 | 0.13 | 0.20 | 0.004 |
| 1.500 | 0.000 | 0.20 | 0.13 | 0.20 | 0.004 |
| 1.583 | 0.000 | 0.20 | 0.13 | 0.20 | 0.004 |
| 1.667 | 0.000 | 0.30 | 0.15 | 0.21 | 0.005 |
| 1.750 | 0.000 | 0.30 | 0.16 | 0.24 | 0.005 |
| 1.833 | 0.000 | 0.30 | 0.17 | 0.26 | 0.005 |
| 1.917 | 0.000 | 0.30 | 0.18 | 0.27 | 0.006 |
| 2.000 | 0.000 | 0.30 | 0.18 | 0.28 | 0.006 |
| 2.083 | 0.000 | 0.30 | 0.18 | 0.28 | 0.006 |
| 2.167 | 0.000 | 0.40 | 0.20 | 0.30 | 0.007 |
| 2.250 | 0.000 | 0.40 | 0.22 | 0.33 | 0.007 |
| 2.333 | 0.000 | 0.50 | 0.25 | 0.37 | 0.008 |
| 2.417 | 0.000 | 0.60 | 0.29 | 0.42 | 0.009 |
| 2.500 | 0.000 | 0.90 | 0.37 | 0.51 | 0.012 |
| 2.583 | 0.000 | 0.70 | 0.39 | 0.60 | 0.013 |
| 2.667 | 0.000 | 5.05 | 1.48 | 0.98 | 0.041 |
| 2.750 | 0.000 | 0.70 | 1.23 | 1.28 | 0.037 |
| 2.833 | 0.000 | 0.50 | 0.98 | 1.15 | 0.032 |
| 2.917 | 0.000 | 0.40 | 0.84 | 1.04 | 0.028 |
| 3.000 | 0.000 | 0.30 | 0.71 | 0.96 | 0.023 |
| 3.083 | 0.000 | 0.30 | 0.59 | 0.88 | 0.019 |
| 3.167 | 0.000 | 0.20 | 0.47 | 0.79 | 0.015 |
| 3.250 | 0.000 | 0.20 | 0.37 | 0.66 | 0.012 |
| 3.333 | 0.000 | 0.20 | 0.30 | 0.53 | 0.010 |
| 3.417 | 0.000 | 0.20 | 0.25 | 0.43 | 0.008 |
| 3.500 | 0.000 | 0.20 | 0.22 | 0.37 | 0.007 |
| 3.583 | 0.000 | 0.20 | 0.19 | 0.32 | 0.006 |
| 3.667 | 0.000 | 0.20 | 0.17 | 0.28 | 0.006 |
| 3.750 | 0.000 | 0.10 | 0.14 | 0.25 | 0.005 |
| 3.833 | 0.000 | 0.10 | 0.12 | 0.20 | 0.004 |
| 3.917 | 0.000 | 0.00 | 0.09 | 0.16 | 0.003 |
| 4.000 | 0.000 | 0.00 | 0.06 | 0.11 | 0.002 |
| 4.083 | 0.000 | 0.00 | 0.04 | 0.08 | 0.001 |
| 4.167 | 0.000 | 0.00 | 0.03 | 0.06 | 0.001 |

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Analysis prepared by:

Stantec

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Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 100-YEAR STORM NORTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

**********

USER SPECIFIED INFLOW HYDROGRAPH

==========

CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 47

---

| INTERVAL NUMBER | FLOW (CFS) |
|---|---|
| 1 | 0.00 |
| 2 | 0.20 |
| 3 | 0.20 |
| 4 | 0.20 |
| 5 | 0.20 |
| 6 | 0.20 |
| 7 | 0.20 |
| 8 | 0.20 |
| 9 | 0.20 |
| 10 | 0.20 |
| 11 | 0.20 |
| 12 | 0.20 |
| 13 | 0.20 |
| 14 | 0.20 |
| 15 | 0.30 |
| 16 | 0.30 |
| 17 | 0.30 |
| 18 | 0.30 |
| 19 | 0.30 |
| 20 | 0.30 |
| 21 | 0.30 |
| 22 | 0.40 |
| 23 | 0.40 |
| 24 | 0.40 |
| 25 | 0.40 |
| 26 | 0.50 |
| 27 | 0.60 |
| 28 | 0.70 |
| 29 | 0.80 |
| 30 | 1.10 |
| 31 | 0.80 |
| 32 | 6.57 |
| 33 | 0.90 |
| 34 | 0.60 |
| 35 | 0.50 |
| 36 | 0.40 |
| 37 | 0.30 |
| 38 | 0.30 |
| 39 | 0.30 |
| 40 | 0.30 |
| 41 | 0.20 |
| 42 | 0.20 |
| 43 | 0.20 |
| 44 | 0.20 |
| 45 | 0.20 |
| 46 | 0.20 |
| 47 | 0.00 |

---

Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 100-YEAR STORM NORTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

**********

USER SPECIFIED INFLOW HYDROGRAPH

==========

CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 47

---

| INTERVAL NUMBER | FLOW (CFS) |
|---|---|
| 1 | 0.00 |
| 2 | 0.20 |
| 3 | 0.20 |
| 4 | 0.20 |
| 5 | 0.20 |
| 6 | 0.20 |
| 7 | 0.20 |
| 8 | 0.20 |
| 9 | 0.20 |
| 10 | 0.20 |
| 11 | 0.20 |
| 12 | 0.20 |
| 13 | 0.20 |
| 14 | 0.20 |
| 15 | 0.30 |
| 16 | 0.30 |
| 17 | 0.30 |
| 18 | 0.30 |
| 19 | 0.30 |
| 20 | 0.30 |
| 21 | 0.30 |
| 22 | 0.40 |
| 23 | 0.40 |
| 24 | 0.40 |
| 25 | 0.40 |
| 26 | 0.50 |
| 27 | 0.60 |
| 28 | 0.70 |
| 29 | 0.80 |
| 30 | 1.10 |
| 31 | 0.80 |
| 32 | 6.57 |
| 33 | 0.90 |
| 34 | 0.60 |
| 35 | 0.50 |
| 36 | 0.40 |
| 37 | 0.30 |
| 38 | 0.30 |
| 39 | 0.30 |
| 40 | 0.30 |
| 41 | 0.20 |
| 42 | 0.20 |
| 43 | 0.20 |
| 44 | 0.20 |
| 45 | 0.20 |
| 46 | 0.20 |
| 47 | 0.00 |

---

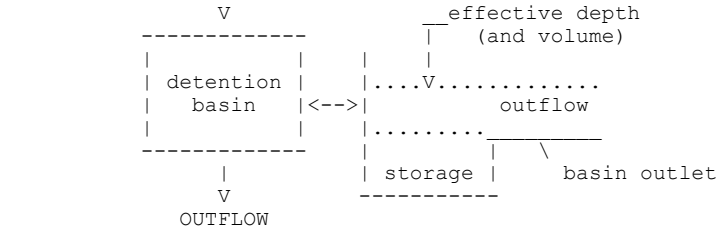
Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 100-YEAR STORM NORTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

==========

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 5.000
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00

INFLOW
|
|
|




DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 14

| *BASIN-DEPTH (FEET) | STORAGE (ACRE-FEET) | OUTFLOW (CFS) | ** | **BASIN-DEPTH (FEET) | STORAGE (ACRE-FEET) | OUTFLOW (CFS) | * |
|---|---|---|---|---|---|---|---|
| 0.000 | 0.000 | 0.000 | ** | 0.500 | 0.016 | 0.780 | * |
| 1.000 | 0.033 | 1.103 | ** | 1.500 | 0.041 | 1.351 | * |
| 1.750 | 0.046 | 1.460 | ** | 2.000 | 0.050 | 1.560 | * |
| 2.250 | 0.051 | 1.655 | ** | 2.500 | 0.052 | 1.745 | * |
| 2.750 | 0.053 | 1.830 | ** | 3.000 | 0.054 | 1.911 | * |
| 3.500 | 0.054 | 2.064 | ** | 4.000 | 0.054 | 2.207 | * |
| 7.300 | 0.054 | 2.981 | ** | 7.800 | 1.055 | 3.082 | * |

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

| INTERVAL NUMBER | DEPTH (FEET) | {S-O*DT/2} (ACRE-FEET) | {S+O*DT/2} (ACRE-FEET) |
|---|---|---|---|
| 1 | 0.00 | 0.00000 | 0.00000 |
| 2 | 0.50 | 0.01331 | 0.01869 |
| 3 | 1.00 | 0.02920 | 0.03680 |
| 4 | 1.50 | 0.03635 | 0.04565 |
| 5 | 1.75 | 0.04097 | 0.05103 |
| 6 | 2.00 | 0.04463 | 0.05537 |
| 7 | 2.25 | 0.04530 | 0.05670 |
| 8 | 2.50 | 0.04599 | 0.05801 |
| 9 | 2.75 | 0.04670 | 0.05930 |
| 10 | 3.00 | 0.04742 | 0.06058 |
| 11 | 3.50 | 0.04689 | 0.06111 |
| 12 | 4.00 | 0.04640 | 0.06160 |
| 13 | 7.30 | 0.04373 | 0.06427 |
| 14 | 7.80 | 1.04439 | 1.06561 |

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

| TIME (HRS) | DEAD-STORAGE FILLED(AF) | INFLOW (CFS) | EFFECTIVE DEPTH(FT) | OUTFLOW (CFS) | EFFECTIVE VOLUME(AF) |
|---|---|---|---|---|---|
| 0.083 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 |
| 0.167 | 0.000 | 0.20 | 0.04 | 0.03 | 0.001 |
| 0.250 | 0.000 | 0.20 | 0.06 | 0.08 | 0.002 |
| 0.333 | 0.000 | 0.20 | 0.08 | 0.11 | 0.003 |
| 0.417 | 0.000 | 0.20 | 0.10 | 0.14 | 0.003 |
| 0.500 | 0.000 | 0.20 | 0.10 | 0.16 | 0.003 |
| 0.583 | 0.000 | 0.20 | 0.11 | 0.17 | 0.004 |
| 0.667 | 0.000 | 0.20 | 0.12 | 0.18 | 0.004 |
| 0.750 | 0.000 | 0.20 | 0.12 | 0.18 | 0.004 |
| 0.833 | 0.000 | 0.20 | 0.12 | 0.19 | 0.004 |
| 0.917 | 0.000 | 0.20 | 0.12 | 0.19 | 0.004 |
| 1.000 | 0.000 | 0.20 | 0.13 | 0.19 | 0.004 |
| 1.083 | 0.000 | 0.20 | 0.13 | 0.20 | 0.004 |
| 1.167 | 0.000 | 0.20 | 0.13 | 0.20 | 0.004 |
| 1.250 | 0.000 | 0.30 | 0.15 | 0.21 | 0.005 |
| 1.333 | 0.000 | 0.30 | 0.16 | 0.24 | 0.005 |
| 1.417 | 0.000 | 0.30 | 0.17 | 0.26 | 0.005 |
| 1.500 | 0.000 | 0.30 | 0.18 | 0.27 | 0.006 |
| 1.583 | 0.000 | 0.30 | 0.18 | 0.28 | 0.006 |
| 1.667 | 0.000 | 0.30 | 0.18 | 0.28 | 0.006 |
| 1.750 | 0.000 | 0.30 | 0.19 | 0.29 | 0.006 |
| 1.833 | 0.000 | 0.40 | 0.21 | 0.31 | 0.007 |
| 1.917 | 0.000 | 0.40 | 0.22 | 0.33 | 0.007 |
| 2.000 | 0.000 | 0.40 | 0.23 | 0.35 | 0.007 |
| 2.083 | 0.000 | 0.40 | 0.24 | 0.37 | 0.008 |
| 2.167 | 0.000 | 0.50 | 0.26 | 0.39 | 0.008 |
| 2.250 | 0.000 | 0.60 | 0.30 | 0.44 | 0.010 |
| 2.333 | 0.000 | 0.70 | 0.34 | 0.50 | 0.011 |
| 2.417 | 0.000 | 0.80 | 0.39 | 0.57 | 0.012 |
| 2.500 | 0.000 | 1.10 | 0.48 | 0.68 | 0.015 |

| | | | | | |
|---|---|---|---|---|---|
| 2.583 | 0.000 | 0.80 | 0.49 | 0.76 | 0.016 |
| 2.667 | 0.000 | 6.57 | 2.56 | 1.26 | 0.052 |
| 2.750 | 0.000 | 0.90 | 1.83 | 1.63 | 0.047 |
| 2.833 | 0.000 | 0.60 | 1.53 | 1.43 | 0.042 |
| 2.917 | 0.000 | 0.50 | 1.20 | 1.28 | 0.036 |
| 3.000 | 0.000 | 0.40 | 0.94 | 1.13 | 0.031 |
| 3.083 | 0.000 | 0.30 | 0.80 | 1.02 | 0.026 |
| 3.167 | 0.000 | 0.30 | 0.67 | 0.93 | 0.022 |
| 3.250 | 0.000 | 0.30 | 0.56 | 0.85 | 0.018 |
| 3.333 | 0.000 | 0.30 | 0.46 | 0.77 | 0.015 |
| 3.417 | 0.000 | 0.20 | 0.37 | 0.64 | 0.012 |
| 3.500 | 0.000 | 0.20 | 0.30 | 0.52 | 0.010 |
| 3.583 | 0.000 | 0.20 | 0.25 | 0.43 | 0.008 |
| 3.667 | 0.000 | 0.20 | 0.21 | 0.36 | 0.007 |
| 3.750 | 0.000 | 0.20 | 0.19 | 0.31 | 0.006 |
| 3.833 | 0.000 | 0.20 | 0.17 | 0.28 | 0.005 |
| 3.917 | 0.000 | 0.00 | 0.12 | 0.23 | 0.004 |
| 4.000 | 0.000 | 0.00 | 0.09 | 0.16 | 0.003 |
| 4.083 | 0.000 | 0.00 | 0.06 | 0.12 | 0.002 |
| 4.167 | 0.000 | 0.00 | 0.04 | 0.08 | 0.001 |
| 4.250 | 0.000 | 0.00 | 0.03 | 0.06 | 0.001 |

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Analysis prepared by:

Stantec

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Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 25-YEAR STORM SOUTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

**********

USER SPECIFIED INFLOW HYDROGRAPH

==========

CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 47

---

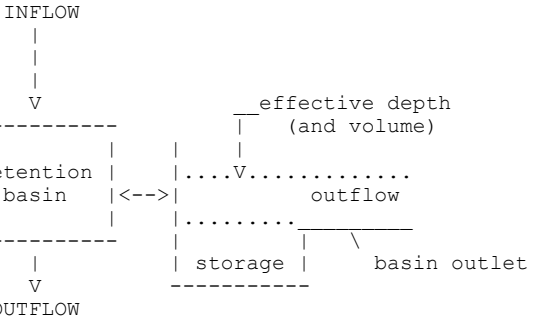
| INTERVAL NUMBER | FLOW (CFS) |
|---|---|
| 1 | 0.00 |
| 2 | 0.20 |
| 3 | 0.20 |
| 4 | 0.20 |
| 5 | 0.20 |
| 6 | 0.20 |
| 7 | 0.20 |
| 8 | 0.20 |
| 9 | 0.20 |
| 10 | 0.20 |
| 11 | 0.30 |
| 12 | 0.30 |
| 13 | 0.30 |
| 14 | 0.30 |
| 15 | 0.30 |
| 16 | 0.30 |
| 17 | 0.30 |
| 18 | 0.30 |
| 19 | 0.30 |
| 20 | 0.40 |
| 21 | 0.40 |
| 22 | 0.40 |
| 23 | 0.40 |
| 24 | 0.50 |
| 25 | 0.50 |
| 26 | 0.60 |
| 27 | 0.60 |
| 28 | 0.80 |
| 29 | 0.90 |
| 30 | 1.30 |
| 31 | 0.20 |
| 32 | 8.23 |
| 33 | 1.00 |
| 34 | 0.70 |
| 35 | 0.50 |
| 36 | 0.50 |
| 37 | 0.40 |
| 38 | 0.40 |
| 39 | 0.30 |
| 40 | 0.30 |
| 41 | 0.30 |
| 42 | 0.30 |
| 43 | 0.20 |
| 44 | 0.20 |
| 45 | 0.20 |
| 46 | 0.20 |
| 47 | 0.00 |

---

Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 25-YEAR STORM SOUTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

```
================================================================================
     FLOW-THROUGH DETENTION BASIN MODEL

     SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
     CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =    5.000
     DEAD STORAGE(AF) =       0.00
     SPECIFIED DEAD STORAGE(AF) FILLED =       0.00
     ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.00
```




```
     DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
     TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES =  14
     *BASIN-DEPTH  STORAGE    OUTFLOW  **BASIN-DEPTH  STORAGE    OUTFLOW  *
     *   (FEET)  (ACRE-FEET)    (CFS)    **   (FEET)  (ACRE-FEET)    (CFS)   *
     *      0.000      0.000      0.000**      0.500      0.024      1.404*
     *      1.000      0.049      1.986**      1.500      0.062      2.433*
     *      1.750      0.069      2.627**      2.000      0.075      2.809*
     *      2.250      0.077      2.979**      2.500      0.079      3.140*
     *      2.750      0.080      3.294**      3.000      0.082      3.440*
     *      3.400      0.082      3.662**      3.900      1.082      3.922*
     *      7.300      0.054      2.981**      7.800      1.055      3.082*
--------------------------------------------------------------------------------
     BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
      INTERVAL   DEPTH   {S-O*DT/2}   {S+O*DT/2}
       NUMBER   (FEET)   (ACRE-FEET)  (ACRE-FEET)
           1     0.00       0.00000      0.00000
           2     0.50       0.01917      0.02883
           3     1.00       0.04216      0.05584
           4     1.50       0.05362      0.07038
           5     1.75       0.05995      0.07805
           6     2.00       0.06533      0.08467
           7     2.25       0.06674      0.08726
           8     2.50       0.06819      0.08981
           9     2.75       0.06866      0.09134
          10     3.00       0.07015      0.09385
          11     3.40       0.06939      0.09461
          12     3.90       1.06849      1.09551
          13     7.30       0.04373      0.06427
          14     7.80       1.04439      1.06561
     WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)
--------------------------------------------------------------------------------
     DETENTION BASIN ROUTING RESULTS:
     NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
           OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
           AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

        TIME  DEAD-STORAGE  INFLOW  EFFECTIVE  OUTFLOW  EFFECTIVE
       (HRS)   FILLED(AF)    (CFS)  DEPTH(FT)   (CFS)   VOLUME(AF)
--------------------------------------------------------------------------------
       0.083        0.000     0.00       0.00     0.00       0.000
       0.167        0.000     0.20       0.02     0.03       0.001
       0.250        0.000     0.20       0.04     0.09       0.002
       0.333        0.000     0.20       0.05     0.13       0.002
       0.417        0.000     0.20       0.06     0.15       0.003
       0.500        0.000     0.20       0.06     0.17       0.003
       0.583        0.000     0.20       0.07     0.18       0.003
       0.667        0.000     0.20       0.07     0.19       0.003
       0.750        0.000     0.20       0.07     0.19       0.003
       0.833        0.000     0.20       0.07     0.19       0.003
       0.917        0.000     0.30       0.08     0.21       0.004
       1.000        0.000     0.30       0.09     0.24       0.004
       1.083        0.000     0.30       0.10     0.26       0.005
```

| | | | | | |
|---|---|---|---|---|---|
| 1.167 | 0.000 | 0.30 | 0.10 | 0.27 | 0.005 |
| 1.250 | 0.000 | 0.30 | 0.10 | 0.28 | 0.005 |
| 1.333 | 0.000 | 0.30 | 0.10 | 0.29 | 0.005 |
| 1.417 | 0.000 | 0.30 | 0.10 | 0.29 | 0.005 |
| 1.500 | 0.000 | 0.30 | 0.11 | 0.29 | 0.005 |
| 1.583 | 0.000 | 0.30 | 0.11 | 0.30 | 0.005 |
| 1.667 | 0.000 | 0.40 | 0.12 | 0.31 | 0.006 |
| 1.750 | 0.000 | 0.40 | 0.13 | 0.34 | 0.006 |
| 1.833 | 0.000 | 0.40 | 0.13 | 0.36 | 0.006 |
| 1.917 | 0.000 | 0.40 | 0.14 | 0.37 | 0.006 |
| 2.000 | 0.000 | 0.50 | 0.15 | 0.40 | 0.007 |
| 2.083 | 0.000 | 0.50 | 0.16 | 0.43 | 0.008 |
| 2.167 | 0.000 | 0.60 | 0.18 | 0.47 | 0.009 |
| 2.250 | 0.000 | 0.60 | 0.19 | 0.52 | 0.009 |
| 2.333 | 0.000 | 0.80 | 0.22 | 0.58 | 0.011 |
| 2.417 | 0.000 | 0.90 | 0.25 | 0.67 | 0.012 |
| 2.500 | 0.000 | 1.30 | 0.32 | 0.81 | 0.016 |
| 2.583 | 0.000 | 0.20 | 0.24 | 0.79 | 0.012 |
| 2.667 | 0.000 | 8.23 | 1.34 | 1.48 | 0.058 |
| 2.750 | 0.000 | 1.00 | 1.04 | 2.16 | 0.050 |
| 2.833 | 0.000 | 0.70 | 0.85 | 1.92 | 0.042 |
| 2.917 | 0.000 | 0.50 | 0.68 | 1.72 | 0.033 |
| 3.000 | 0.000 | 0.50 | 0.54 | 1.54 | 0.026 |
| 3.083 | 0.000 | 0.40 | 0.41 | 1.31 | 0.020 |
| 3.167 | 0.000 | 0.40 | 0.32 | 1.03 | 0.015 |
| 3.250 | 0.000 | 0.30 | 0.25 | 0.80 | 0.012 |
| 3.333 | 0.000 | 0.30 | 0.20 | 0.64 | 0.010 |
| 3.417 | 0.000 | 0.30 | 0.17 | 0.52 | 0.008 |
| 3.500 | 0.000 | 0.30 | 0.15 | 0.45 | 0.007 |
| 3.583 | 0.000 | 0.20 | 0.12 | 0.38 | 0.006 |
| 3.667 | 0.000 | 0.20 | 0.11 | 0.32 | 0.005 |
| 3.750 | 0.000 | 0.20 | 0.09 | 0.28 | 0.005 |
| 3.833 | 0.000 | 0.20 | 0.09 | 0.25 | 0.004 |
| 3.917 | 0.000 | 0.00 | 0.06 | 0.20 | 0.003 |
| 4.000 | 0.000 | 0.00 | 0.04 | 0.13 | 0.002 |
| 4.083 | 0.000 | 0.00 | 0.03 | 0.09 | 0.001 |

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Analysis prepared by:

Stantec

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Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 100-YEAR STORM SOUTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

**********

USER SPECIFIED INFLOW HYDROGRAPH

==========

CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 47

---

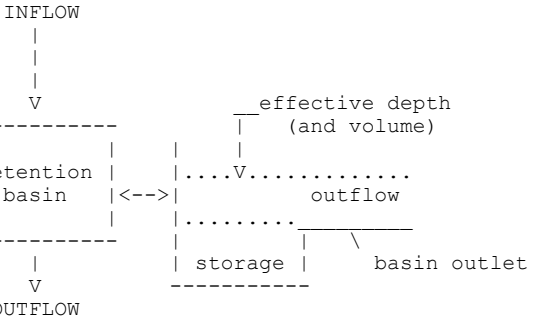
| INTERVAL NUMBER | FLOW (CFS) |
|---|---|
| 1 | 0.00 |
| 2 | 0.30 |
| 3 | 0.30 |
| 4 | 0.30 |
| 5 | 0.30 |
| 6 | 0.30 |
| 7 | 0.30 |
| 8 | 0.30 |
| 9 | 0.30 |
| 10 | 0.30 |
| 11 | 0.30 |
| 12 | 0.30 |
| 13 | 0.30 |
| 14 | 0.40 |
| 15 | 0.40 |
| 16 | 0.40 |
| 17 | 0.40 |
| 18 | 0.40 |
| 19 | 0.40 |
| 20 | 0.50 |
| 21 | 0.50 |
| 22 | 0.50 |
| 23 | 0.60 |
| 24 | 0.60 |
| 25 | 0.70 |
| 26 | 0.80 |
| 27 | 0.80 |
| 28 | 1.00 |
| 29 | 1.10 |
| 30 | 1.70 |
| 31 | 0.20 |
| 32 | 10.61 |
| 33 | 1.30 |
| 34 | 0.90 |
| 35 | 0.70 |
| 36 | 0.60 |
| 37 | 0.50 |
| 38 | 0.50 |
| 39 | 0.40 |
| 40 | 0.40 |
| 41 | 0.40 |
| 42 | 0.30 |
| 43 | 0.30 |
| 44 | 0.30 |
| 45 | 0.30 |
| 46 | 0.30 |
| 47 | 0.30 |

---

Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 100-YEAR STORM SOUTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

```
================================================================================
     FLOW-THROUGH DETENTION BASIN MODEL

     SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
     CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =    5.000
     DEAD STORAGE(AF) =       0.00
     SPECIFIED DEAD STORAGE(AF) FILLED =       0.00
     ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.00
```




```
     DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
     TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES =  12
     *BASIN-DEPTH  STORAGE    OUTFLOW  **BASIN-DEPTH  STORAGE    OUTFLOW  *
     *   (FEET)  (ACRE-FEET)    (CFS)    **   (FEET)  (ACRE-FEET)    (CFS)   *
     *      0.000      0.000      0.000**      0.500      0.024      1.404*
     *      1.000      0.049      1.986**      1.500      0.062      2.433*
     *      1.750      0.069      2.627**      2.000      0.075      2.809*
     *      2.250      0.077      2.979**      2.500      0.079      3.140*
     *      2.750      0.080      3.294**      3.000      0.082      3.440*
     *      3.400      0.082      3.662**      3.900      1.082      3.922*
--------------------------------------------------------------------------------
     BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
      INTERVAL   DEPTH   {S-O*DT/2}   {S+O*DT/2}
       NUMBER   (FEET)   (ACRE-FEET)  (ACRE-FEET)
           1     0.00       0.00000      0.00000
           2     0.50       0.01917      0.02883
           3     1.00       0.04216      0.05584
           4     1.50       0.05362      0.07038
           5     1.75       0.05995      0.07805
           6     2.00       0.06533      0.08467
           7     2.25       0.06674      0.08726
           8     2.50       0.06819      0.08981
           9     2.75       0.06866      0.09134
          10     3.00       0.07015      0.09385
          11     3.40       0.06939      0.09461
          12     3.90       1.06849      1.09551
     WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)
--------------------------------------------------------------------------------
     DETENTION BASIN ROUTING RESULTS:
     NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
           OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
           AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

        TIME  DEAD-STORAGE  INFLOW  EFFECTIVE  OUTFLOW  EFFECTIVE
       (HRS)   FILLED(AF)    (CFS)  DEPTH(FT)   (CFS)   VOLUME(AF)
--------------------------------------------------------------------------------
       0.083        0.000     0.00       0.00     0.00       0.000
       0.167        0.000     0.30       0.04     0.05       0.002
       0.250        0.000     0.30       0.06     0.13       0.003
       0.333        0.000     0.30       0.08     0.19       0.004
       0.417        0.000     0.30       0.09     0.23       0.004
       0.500        0.000     0.30       0.09     0.25       0.004
       0.583        0.000     0.30       0.10     0.27       0.005
       0.667        0.000     0.30       0.10     0.28       0.005
       0.750        0.000     0.30       0.10     0.29       0.005
       0.833        0.000     0.30       0.10     0.29       0.005
       0.917        0.000     0.30       0.11     0.29       0.005
       1.000        0.000     0.30       0.11     0.30       0.005
       1.083        0.000     0.30       0.11     0.30       0.005
       1.167        0.000     0.40       0.12     0.31       0.006
       1.250        0.000     0.40       0.13     0.34       0.006
       1.333        0.000     0.40       0.13     0.36       0.006
```

| | | | | | |
|---|---|---|---|---|---|
| 1.417 | 0.000 | 0.40 | 0.14 | 0.38 | 0.006 |
| 1.500 | 0.000 | 0.40 | 0.14 | 0.38 | 0.007 |
| 1.583 | 0.000 | 0.40 | 0.14 | 0.39 | 0.007 |
| 1.667 | 0.000 | 0.50 | 0.15 | 0.41 | 0.007 |
| 1.750 | 0.000 | 0.50 | 0.16 | 0.44 | 0.008 |
| 1.833 | 0.000 | 0.50 | 0.17 | 0.46 | 0.008 |
| 1.917 | 0.000 | 0.60 | 0.18 | 0.49 | 0.009 |
| 2.000 | 0.000 | 0.60 | 0.19 | 0.53 | 0.009 |
| 2.083 | 0.000 | 0.70 | 0.21 | 0.57 | 0.010 |
| 2.167 | 0.000 | 0.80 | 0.24 | 0.63 | 0.011 |
| 2.250 | 0.000 | 0.80 | 0.25 | 0.69 | 0.012 |
| 2.333 | 0.000 | 1.00 | 0.29 | 0.76 | 0.014 |
| 2.417 | 0.000 | 1.10 | 0.32 | 0.86 | 0.015 |
| 2.500 | 0.000 | 1.70 | 0.42 | 1.04 | 0.020 |
| 2.583 | 0.000 | 0.20 | 0.30 | 1.01 | 0.014 |
| 2.667 | 0.000 | 10.61 | 2.00 | 1.83 | 0.075 |
| 2.750 | 0.000 | 1.30 | 1.63 | 2.67 | 0.066 |
| 2.833 | 0.000 | 0.90 | 1.25 | 2.37 | 0.055 |
| 2.917 | 0.000 | 0.70 | 0.94 | 2.06 | 0.046 |
| 3.000 | 0.000 | 0.60 | 0.77 | 1.82 | 0.038 |
| 3.083 | 0.000 | 0.50 | 0.62 | 1.63 | 0.030 |
| 3.167 | 0.000 | 0.50 | 0.49 | 1.45 | 0.023 |
| 3.250 | 0.000 | 0.40 | 0.37 | 1.20 | 0.018 |
| 3.333 | 0.000 | 0.40 | 0.29 | 0.93 | 0.014 |
| 3.417 | 0.000 | 0.40 | 0.24 | 0.75 | 0.012 |
| 3.500 | 0.000 | 0.30 | 0.20 | 0.62 | 0.009 |
| 3.583 | 0.000 | 0.30 | 0.17 | 0.51 | 0.008 |
| 3.667 | 0.000 | 0.30 | 0.15 | 0.44 | 0.007 |
| 3.750 | 0.000 | 0.30 | 0.13 | 0.39 | 0.006 |
| 3.833 | 0.000 | 0.30 | 0.12 | 0.36 | 0.006 |
| 3.917 | 0.000 | 0.00 | 0.08 | 0.29 | 0.004 |
| 4.000 | 0.000 | 0.00 | 0.06 | 0.19 | 0.003 |
| 4.083 | 0.000 | 0.00 | 0.04 | 0.13 | 0.002 |
| 4.167 | 0.000 | 0.00 | 0.02 | 0.09 | 0.001 |

---

# V. NOAA RAINFALL DATA

**NOAA Atlas 14, Volume 6, Version 2**
**Location name: Oceanside, California, USA***
**Latitude: 33.193°, Longitude: -117.3784°**
**Elevation: 62.34 ft****
* source: ESRI Maps
** source: USGS

**POINT PRECIPITATION FREQUENCY ESTIMATES**

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

## PF tabular

**PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | **0.141** (0.119-0.169) | **0.178** (0.150-0.214) | **0.230** (0.193-0.277) | **0.274** (0.228-0.333) | **0.337** (0.270-0.425) | **0.389** (0.305-0.502) | **0.444** (0.339-0.588) | **0.505** (0.374-0.688) | **0.591** (0.419-0.843) | **0.664** (0.453-0.982) |
| 10-min | **0.202** (0.170-0.243) | **0.256** (0.215-0.307) | **0.329** (0.276-0.397) | **0.393** (0.326-0.478) | **0.484** (0.388-0.610) | **0.558** (0.437-0.719) | **0.637** (0.486-0.843) | **0.723** (0.536-0.986) | **0.848** (0.601-1.21) | **0.951** (0.649-1.41) |
| 15-min | **0.245** (0.206-0.294) | **0.309** (0.260-0.371) | **0.398** (0.334-0.480) | **0.475** (0.395-0.578) | **0.585** (0.469-0.737) | **0.674** (0.529-0.870) | **0.770** (0.588-1.02) | **0.875** (0.648-1.19) | **1.02** (0.726-1.46) | **1.15** (0.785-1.70) |
| 30-min | **0.346** (0.291-0.415) | **0.438** (0.368-0.526) | **0.564** (0.473-0.680) | **0.672** (0.558-0.817) | **0.828** (0.663-1.04) | **0.955** (0.748-1.23) | **1.09** (0.832-1.44) | **1.24** (0.917-1.69) | **1.45** (1.03-2.07) | **1.63** (1.11-2.41) |
| 60-min | **0.456** (0.383-0.547) | **0.576** (0.484-0.692) | **0.742** (0.622-0.894) | **0.885** (0.735-1.08) | **1.09** (0.873-1.37) | **1.26** (0.984-1.62) | **1.44** (1.10-1.90) | **1.63** (1.21-2.22) | **1.91** (1.35-2.72) | **2.14** (1.46-3.17) |
| 2-hr | **0.609** (0.512-0.731) | **0.757** (0.636-0.910) | **0.961** (0.805-1.16) | **1.14** (0.943-1.38) | **1.38** (1.11-1.74) | **1.59** (1.24-2.04) | **1.80** (1.38-2.38) | **2.03** (1.51-2.77) | **2.37** (1.68-3.38) | **2.65** (1.81-3.92) |
| 3-hr | **0.708** (0.596-0.850) | **0.879** (0.739-1.06) | **1.11** (0.932-1.34) | **1.31** (1.09-1.59) | **1.59** (1.28-2.01) | **1.82** (1.43-2.35) | **2.06** (1.57-2.73) | **2.32** (1.72-3.16) | **2.69** (1.90-3.83) | **2.99** (2.04-4.42) |
| 6-hr | **0.895** (0.754-1.07) | **1.12** (0.939-1.34) | **1.42** (1.19-1.71) | **1.67** (1.38-2.03) | **2.02** (1.62-2.54) | **2.30** (1.80-2.96) | **2.59** (1.97-3.42) | **2.89** (2.14-3.95) | **3.32** (2.35-4.74) | **3.67** (2.51-5.43) |
| 12-hr | **1.10** (0.928-1.32) | **1.41** (1.18-1.69) | **1.81** (1.52-2.18) | **2.14** (1.78-2.60) | **2.59** (2.08-3.27) | **2.94** (2.31-3.80) | **3.31** (2.52-4.38) | **3.68** (2.73-5.02) | **4.20** (2.97-5.98) | **4.60** (3.14-6.80) |
| 24-hr | **1.33** (1.17-1.54) | **1.74** (1.53-2.01) | **2.27** (2.00-2.64) | **2.70** (2.36-3.16) | **3.29** (2.78-3.97) | **3.74** (3.10-4.61) | **4.20** (3.40-5.29) | **4.67** (3.69-6.04) | **5.31** (4.03-7.15) | **5.81** (4.27-8.08) |
| 2-day | **1.62** (1.43-1.87) | **2.14** (1.88-2.47) | **2.81** (2.47-3.26) | **3.36** (2.93-3.93) | **4.10** (3.47-4.95) | **4.67** (3.87-5.75) | **5.25** (4.25-6.61) | **5.84** (4.61-7.56) | **6.64** (5.04-8.94) | **7.26** (5.33-10.1) |
| 3-day | **1.81** (1.60-2.09) | **2.39** (2.11-2.77) | **3.16** (2.78-3.67) | **3.78** (3.30-4.43) | **4.63** (3.91-5.59) | **5.28** (4.38-6.50) | **5.94** (4.81-7.49) | **6.63** (5.23-8.57) | **7.55** (5.72-10.2) | **8.27** (6.07-11.5) |
| 4-day | **1.96** (1.73-2.27) | **2.60** (2.29-3.01) | **3.44** (3.03-4.00) | **4.13** (3.60-4.83) | **5.07** (4.28-6.12) | **5.79** (4.80-7.13) | **6.52** (5.28-8.22) | **7.28** (5.74-9.42) | **8.31** (6.30-11.2) | **9.11** (6.69-12.7) |
| 7-day | **2.26** (1.99-2.61) | **3.01** (2.65-3.48) | **4.00** (3.51-4.64) | **4.81** (4.20-5.63) | **5.93** (5.01-7.16) | **6.79** (5.63-8.36) | **7.68** (6.22-9.67) | **8.60** (6.78-11.1) | **9.85** (7.47-13.3) | **10.8** (7.95-15.1) |
| 10-day | **2.51** (2.21-2.90) | **3.35** (2.95-3.88) | **4.47** (3.93-5.19) | **5.40** (4.71-6.31) | **6.67** (5.64-8.05) | **7.67** (6.35-9.44) | **8.69** (7.04-10.9) | **9.75** (7.69-12.6) | **11.2** (8.50-15.1) | **12.4** (9.07-17.2) |
| 20-day | **3.06** (2.70-3.54) | **4.12** (3.63-4.77) | **5.56** (4.89-6.45) | **6.76** (5.90-7.91) | **8.45** (7.14-10.2) | **9.78** (8.11-12.0) | **11.2** (9.05-14.1) | **12.6** (9.97-16.3) | **14.7** (11.1-19.7) | **16.3** (12.0-22.7) |
| 30-day | **3.60** (3.17-4.16) | **4.86** (4.29-5.63) | **6.60** (5.80-7.66) | **8.07** (7.04-9.44) | **10.1** (8.58-12.2) | **11.8** (9.79-14.5) | **13.6** (11.0-17.1) | **15.4** (12.2-20.0) | **18.0** (13.7-24.3) | **20.1** (14.8-28.0) |
| 45-day | **4.24** (3.74-4.90) | **5.73** (5.05-6.64) | **7.81** (6.86-9.06) | **9.58** (8.36-11.2) | **12.1** (10.3-14.6) | **14.2** (11.8-17.5) | **16.4** (13.3-20.7) | **18.8** (14.8-24.3) | **22.1** (16.8-29.8) | **24.9** (18.3-34.6) |
| 60-day | **4.86** (4.29-5.62) | **6.56** (5.78-7.59) | **8.93** (7.85-10.4) | **11.0** (9.58-12.8) | **14.0** (11.8-16.9) | **16.4** (13.6-20.2) | **19.0** (15.4-24.0) | **21.9** (17.3-28.3) | **26.0** (19.7-35.0) | **29.4** (21.5-40.8) |

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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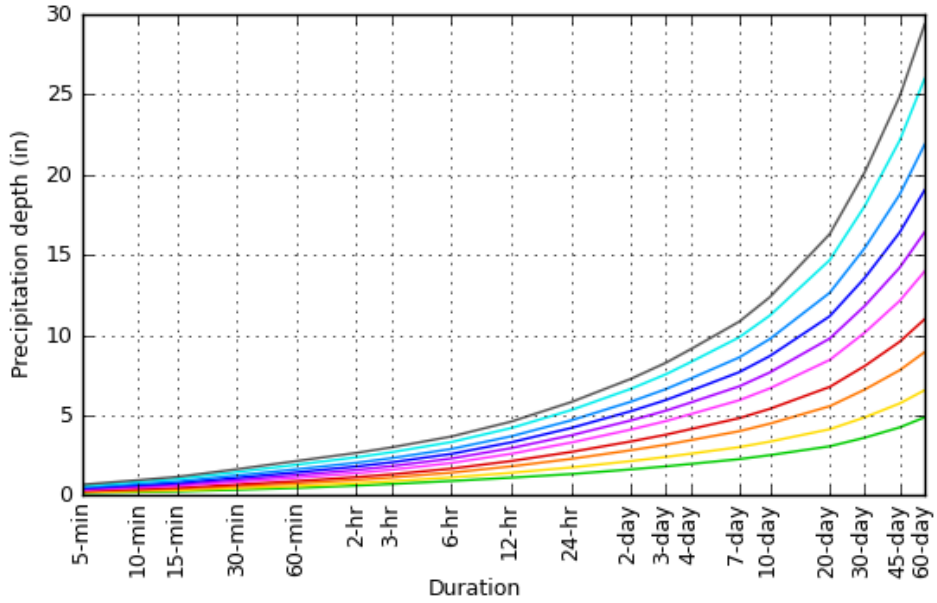
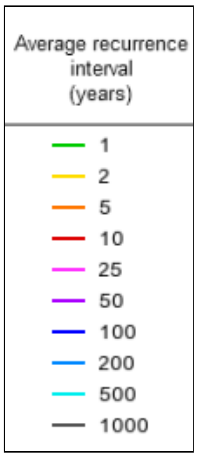
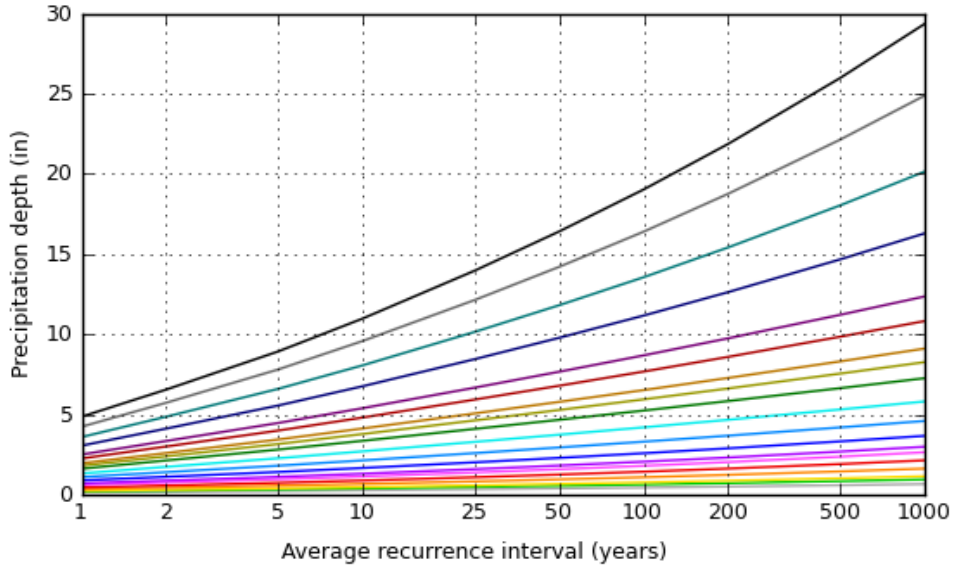
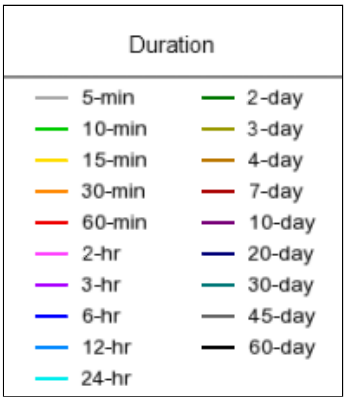
## PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.1930°, Longitude: -117.3784°




NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Wed Aug 3 22:09:38 2022

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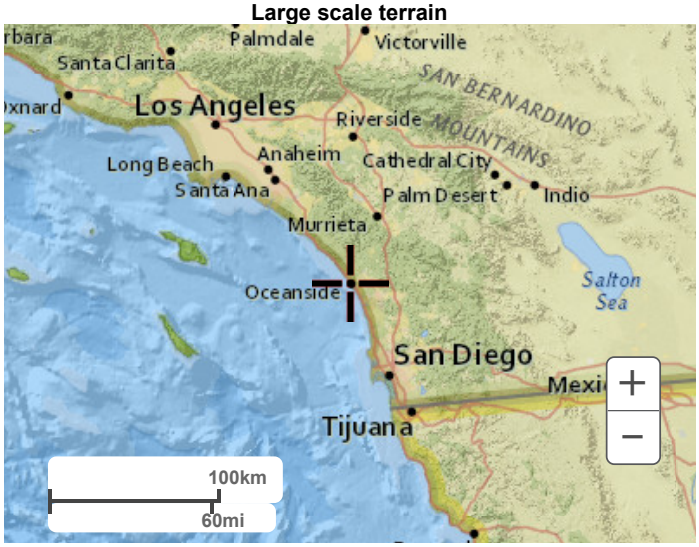
## Maps & aerials

**Small scale terrain**

**Large scale terrain**




**Large scale map**

**Large scale aerial**

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

# VI. GEOTECHNICAL STUDY

Michael Winter, Senior Development Manager
Toll Brothers Apartment Living
23382 Mill Creek Drive, Suite 120
Laguna Hills, CA 92653

January 15, 2024
NOVA Project No. 2021010

Subject: Design Phase Infiltration Feasibility Study
Proposed NCTD Oceanside Transit Center Redevelopment
Oceanside, California

Dear Mr Winter:

NOVA Services, Inc. (NOVA) prepared this report to present the results of our infiltration feasibility study for the subject project. In 2021 NOVA performed a geotechnical investigation for the proposed project that included drilling six geotechnical borings (B-1 through B-6) and two percolation test borings (P-1 and P-2). At the time of that investigation, the stormwater BMP facilities had not been designed. In 2023 the project civil engineer provided us the BMP locations and infiltration depths (Stantec, 2023), and we performed a design-phase infiltration investigation, the results of which are presented herein. Figure 1 presents a site location map.

**Figure 1. Site Location Map**

# SCOPE OF WORK

## Field Investigation

We understand four stormwater BMP facilities are proposed in the western portion of the project site. To evaluate infiltration feasibiliy at the BMP locations, we performed a supplemental field investigation consisting of drilling three additional geotechnical borings (B-7 through B-9) to depths between about 3 and 15½ feet below the ground surface (bgs) and eight additional percolation test borings (P-3 through P-10) to depths between about 4½ and 12 feet bgs using a truck-mounted drill rig equipped with a hollow stem auger. Except for Boring B-8, the geotechnical borings were drilled at least about 5 feet below the bottom of the proposed BMP facility in accordance the guidelines in the Oceanside BMP Design Manual (Oceanside, 2022) and Riverside County LID Handbook (Riverside County, 2011). Boring B-8 encountered refusal at a depth of about 3 feet bgs on a buried concrete obstruction. Except for Boring P-8, the percolation test borings were drilled to about the elevation of the bottom of the proposed BMP facility. Boring P-8 was terminated at a depth of about 4½ feet bgs after hitting an unmarked waterline. Figure 2 presents the approximate locations of the geotechnical and percolation test borings to date as well as the proposed BMP locations with their respective identification numbers. This figure is presented in a larger scale on Plate 1.

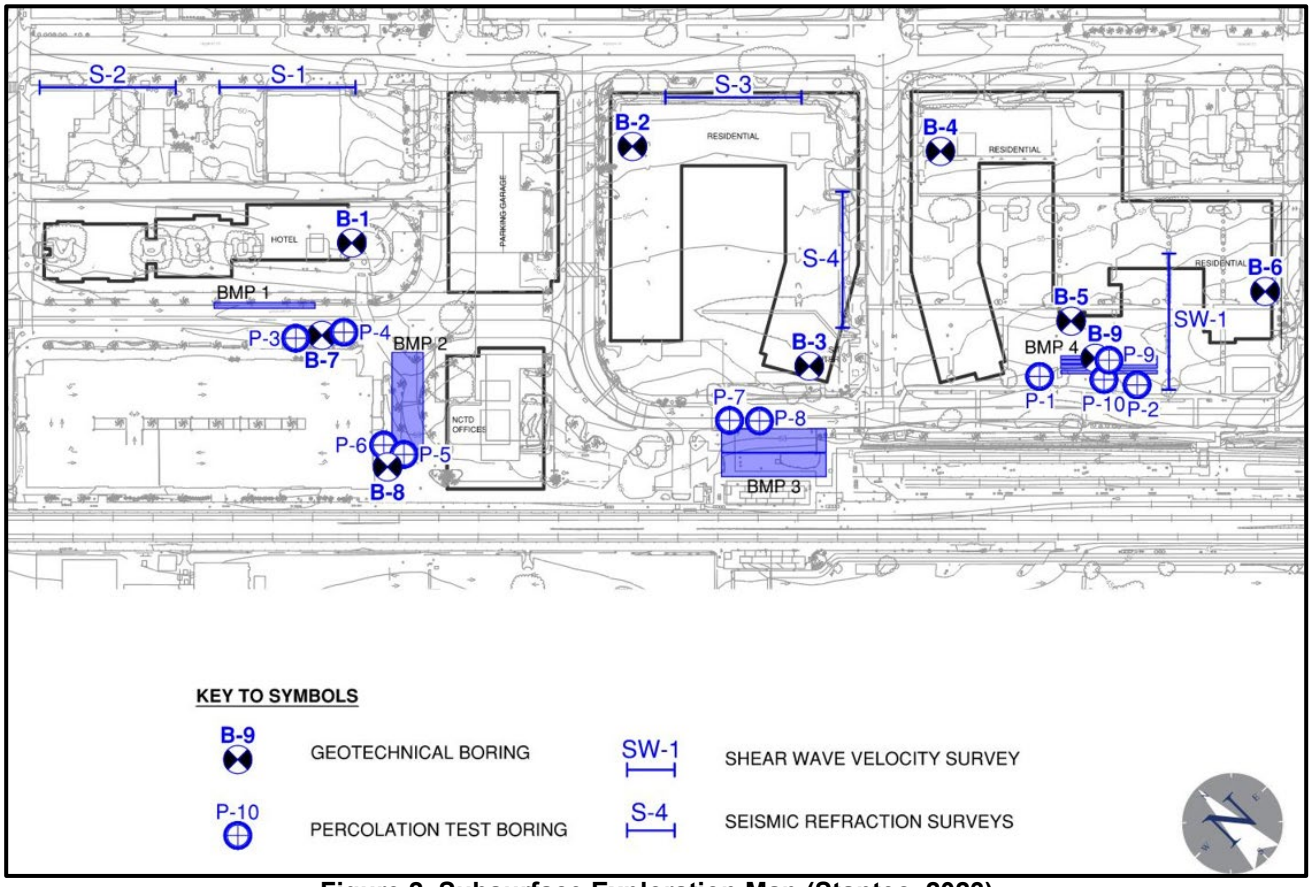


**Figure 2. Subsurface Exploration Map (Stantec, 2023)**

A NOVA geologist logged the borings and collected samples of the materials encountered for laboratory testing. Standard Penetration Testing (SPT) was performed in the borings using a 2-inch outer diameter and 1⅜-inch inner diameter split tube sampler. For the current borings, the CAL and SPT samplers were driven using an automatic hammer with a calibrated Energy Transfer Ratio (ETR) of 70.6%. The number of blows needed to drive the sampler 18 inches is noted in three, 6-inch intervals on the logs. Sampler refusal was encountered when 50 blows were applied during any one of the three 6-inch intervals, a total of 100 blows was applied, or there was no discernible sampler advancement during the application of ten successive blows. The field blow counts, N, were corrected to a standard hammer (cathead and rope) with a 60% ETR. The corrected blow counts are noted on the boring logs as $N_{60}$. Disturbed bulk samples were obtained from the SPT sampler and the drill cuttings. Appendix B presents logs of the borings. Soils are classified according to the Unified Soil Classification System.

### Laboratory Testing

NOVA tested selected samples obtained from the borings to evaluate soil classification and engineering properties and develop geotechnical conclusions and recommendations. The laboratory tests consisted of in-place moisture and density, particle-size distribution, direct shear, maximum dry density and optimum moisture content, R-value, corrosivity, and expansion index. Appendix C presents the results of the laboratory tests and brief explanations of the test procedures.

### Borehole Percolation Testing

NOVA performed borehole percolation testing in accordance with the Oceanside BMP Design Manual to evaluate the feasibility of stormwater infiltration at the site.

## GEOLOGY AND SUBSURFACE CONDITIONS

### Regional Geology

The site is located within the Peninsular Ranges Geomorphic Province of California, which stretches from the Los Angeles basin to the tip of Baja California in Mexico. This province is characterized as a series of northwest-trending mountain ranges separated by subparallel fault zones, and coastal plains of subdued landforms. The mountain ranges are underlain primarily by Mesozoic metamorphic rocks that were intruded by plutonic rocks of the Peninsular Ranges batholith, while the coastal plains are underlain by subsequently deposited marine and nonmarine sedimentary formations. The site is located within the Coastal Plains portion of the Peninsular Ranges geomorphic province. The geology is mapped as Units 6-7 of the Quaternary old paralic deposits underlain by the Tertiary-aged San Onofre Breccia. Figure 3 presents the regional geology in the vicinity of the site.

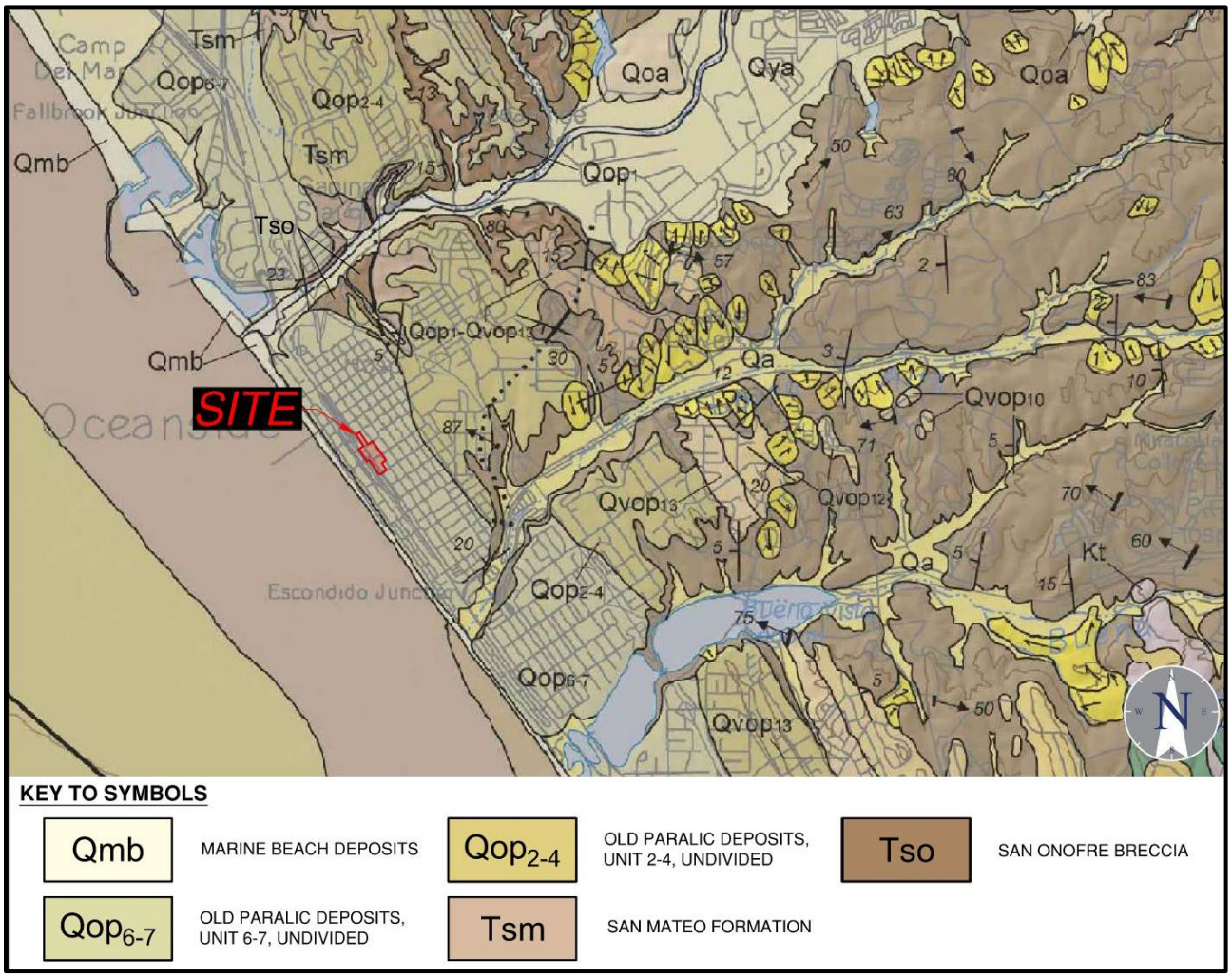


**Figure 3. Regional Geology Map**

## Site-Specific Geology

The site is underlain by fill, Quaternary old paralic deposits and Tertiary San Onofre Breccia. Descriptions of the materials encountered are presented below. Plate 1 presents the site-specific geology. Plate 2 presents the geologic cross-sections.

**Fill (af):** Fill was encountered in several of the borings. NOVA has no records regarding the placement and compaction of the fill; therefore, the fill is considered undocumented and at risk for wide variations in quality. As encountered in the borings, the fill generally consisted of loose to medium dense silty to clayey sand with varying amounts of gravel, roots, and construction debris. Auger refusal was encountered in Boring B-8 at a depth of about 3 feet bgs on an unknown obstacle that appeared to be concrete. Drilling was reattempted two other times in different locations, and refusal was also encountered at the same depth. In Boring P-5, fill with an unknown, lightweight white mineral was encountered. Figure 4 presents a photo of these soils. These soils are not considered suitable for infiltration or the support of future structures.

**Figure 4. Undocumened Fill in P-5**

**Quaternary Old Paralic Deposits (Qop):** Old paralic deposits were encountered beneath the site from the ground surface, extending down to depths ranging from about 6½ feet at the northern east corner of Block 2 parking lot to about 16½ feet at the southwestern end of the same parking lot. At BMPs 1 and 4, the upper portion of these deposits generally consisted of silty to clayey sand to depths about 5½ to 9 feet bgs. Below these depths, the deposits generally consisted of poorly graded sand with silt and silty sand. This lower sand layer is friable and more permeable than the upper layer. Figure 5a presents a photograph of the upper portion of the old paralic deposits. Figure 5b presents a photograph of the lower portion of the old paralic deposits.

**Figure 5a. Old Paralic Deposits Upper Portion in B-7**

**Figure 5b. Old Paralic Deposits Lower Portion in B-7**

**Tertiary San Onofre Breccia (Tso):** The site is underlain by the Eocene San Onofre Breccia, a very dense, cemented silty to clayey sandstone that is matrix-supported with abundant gravel and cobbles. Auger refusal generally encountered within the upper 6 inches to 3 feet of the San Onofre Breccia. Figure 6 presents a photograph of the San Onofre Breccia.

**Figure 6. San Onofre Breccia (4/8/21)**

**Groundwater:** Groundwater was not encountered in the borings. Background research into groundwater levels conducted on GeoTracker indicates groundwater is around 4 feet above mean sea level, approximately 40 to 55 feet below existing ground level at this site.

# SUMMARY OF INFILTRATION TESTING

At least two percolation test wells were installed for each BMP location presented in Figure 2 and Plate 1. In addition to the test wells, one exploratory boring extending 5 feet below the proposed infiltration surface, or refusal, was drilled and logged to document the soils below the infiltration surface. BMPs 1 and 4 were successfully drilled and tested (B-7, B-9, P-3, P-4, P-9 and P-10). Percolation tests P-1 and P-2 from NOVA, 2021 were retested as P-9 and P-10 during this phase of the investigation to test the correct elevation of the BMP 4 infiltration surface, which was not known at the time of the initial investigation.

Borings for BMP 2 (B-8, P-5, and P-6) encountered undocumented fill within the test zone, and drilling refusal on underground obstructions. As such, testing for P-5 and P-6 was not conducted because fill is considered unsuitable for infiltration. Testing at BMP 3 (P-7 and P-8) was unsuccessful because an unmarked waterline was encountered while drilling P-8, saturating the soils within P-7 and compromising the integrity of the soils within P-8. Table 1 summarizes the infiltration rates of the percolation borings that were tested. Appendix D presents the field logs of the testing.

**Test Method**

The percolation borings were drilled using a truck-mounted drill rig equipped with a hollow stem auger to the elevation of the bottom of the proposed BMP. Field measurements were taken to confirm that the borings were excavated to approximately 8 inches in diameter. The borings were logged by a NOVA geologist, who observed and recorded exposed soil cuttings and the boring conditions. Boring logs are presented in Appendix B.

Once the borings were drilled to the desired depth, the borings were converted to percolation test wells by placing an approximately 2-inch layer of ¾-inch gravel on the bottom, then extending 3-inch diameter Schedule 40 perforated PVC pipe to the ground surface. The ¾-inch gravel was used to partially fill the annular space around the perforated pipe below the existing finish grade to minimize the potential of soil caving.

In the percolation borings, the pre-soak water percolated over 6 inches into the soil unit within 25 minutes in the two trials. Based on the results of the trials, water levels were recorded every 10 minutes for at least 1 hour or until stabilized. At the beginning of each test interval, the water level was raised to approximately the same level as the previous tests, in order to maintain a near-constant head during all test periods.

The percolation rate of a soil profile is not the same as its infiltration rate (‘I’). Therefore, the field percolation rates were converted to estimated infiltration rates utilizing the Porchet Method in accordance with the guidance contained in the BMP Manual. The table below provides a summary of the infiltration rates determined by the percolation testing. Appendix D presents the field test data.

***Table 1. Infiltration Rate Test Results***

| Test Location | BMP No. | Test Depth (feet) | Material at Test Depth | Tested Infiltration Rate (in/hr, FS=2)[1] |
|---|---|---|---|---|
| P-1 | 4 | 10 | Old Paralic Deposits: Silty Sand | 1.16 |
| P-2 | 4 | 10 | Old Paralic Deposits: Silty Sand | 1.10 |
| P-3 | 1 | 7 | Old Paralic Deposits: Poorly Graded Sand with Silt | 3.40 |
| P-4 | 1 | 7 | Old Paralic Deposits: Silty Sand | 0.62 |
| ***Borehole percolation testing was not performed in P-5 through P-8 *** | | | | |
| P-9 | 4 | 12 | Old Paralic Deposits: Silty Sand | 4.50 |
| P-10 | 4 | 12 | Old Paralic Deposits: Silty Sand | 1.89 |

Note 1: FS indicates 'Factor of Safety.'

As shown in the table, a factor of safety (FS) is applied to the infiltration rate (I) determined by the percolation testing. This factor of safety, at least FS = 2 in local practice, considers the nature and variability of subsurface materials, as well as the natural tendency of infiltration structures to become less efficient with time. The calculated infiltration rates after applying FS = 2 are greater than 0.5 inches per hour. Full BMPs are typically acceptable on sites with infiltration rates greater than 0.5 inches per hour, however, not recommended for sites that will significantly increase the geotechnical hazards, as discussed in the following sections.

# INFILTRATION RESTRICTIONS

Form 4 from the BMP Design Manual is intended to present the mandatory and optional criteria when considering stormwater infiltration feasibility at a site. NOVA has selected *Restricted* on this form due to the geologic conditions and proximity to the coastal bluff. Form 4 is presented below. Further discussion is presented following the form.

| Infiltration Restrictions | | Form 4 | |
|---|---|---|---|
| Retention is required at the project site to the maximum extent practicable.<br>Complete this form to summarize applicable infiltration restrictions.<br>Supporting documentation must be provided in the Attachments. | | | |
| | **Restriction Element** | **Applicable?** | |
| **Mandatory Considerations** | BMP is within 100 feet of contaminated soils | ☐ Yes | ☒ No |
| | BMP is within 100 feet of industrial activities lacking source control | ☐ Yes | ☒ No |
| | BMP is within 100 feet of well/groundwater basin | ☐ Yes | ☒ No |
| | BMP is within 50 feet of septic tanks/leach fields | ☐ Yes | ☒ No |
| | BMP is within 10 feet of structures/tanks/walls | ☐ Yes | ☒ No |
| | BMP is within 10 feet of sewer utilities | ☐ Yes | ☒ No |
| | BMP is within 10 feet of groundwater table | ☐ Yes | ☒ No |
| | BMP is within hydric soils | ☐ Yes | ☒ No |
| | BMP is within highly liquefiable soils and has connectivity to structures | ☐ Yes | ☒ No |
| | BMP is within 1.5 times the height of adjacent steep slopes (≥25%) | ☐ Yes | ☒ No |
| | City staff has assigned "Restricted" Infiltration Category | ☐ Yes | ☒ No |
| **Optional Considerations** | BMP is within predominantly Type D soil | ☐ Yes | ☒ No |
| | BMP is within 10 feet of property line | ☐ Yes | ☒ No |
| | BMP is within fill depths of ≥5 feet (existing or proposed) | ☐ Yes | ☒ No |
| | BMP is within 10 feet of underground utilities | ☐ Yes | ☒ No |
| | BMP is within 250 feet of ephemeral stream | ☐ Yes | ☒ No |
| | Other (provide detailed geotechnical support in Attachment 6) | ☒ Yes | ☐ No |
| **Result** | **Unrestricted** – No restriction elements are applicable | ☐ | |
| | **Restricted** – One or more restriction elements are applicable | ☒ | |

* Note BMP 2 is within fill depths of ≥5 feet. Therefore the "BMP is within fill depths ≥5 feet" consideration is applicable.

### Geologic Conditions

The site is underlain by old paralic deposits consisting of silty sand within the upper portion and friable sand with silt and silty sand within the lower portion. The infiltration of the proposed BMP facilities would primarily occur within the lower sand portion, which demonstrated very high infiltration rates. The geologic contact of the underlying cemented Eocene-aged San Onofre Breccia is located about 3 to 6 feet below the infiltration surface of the proposed BMP facilities, which would likely result in water perching on the contact and water mounding in the friable sand unit. Additionally, as shown in our geologic cross-sections (Plate 2), the contact between the friable sand of the old paralic deposits and the underlying cemented San Onofre Breccia slopes/dips westward toward the existing bluff. Therefore, it is our opinion that infiltrated stormwater would likely migrate laterally on top of the breccia contact, through the friable sand layer toward the bluff. Furthermore, BMP 2 is located within undocumented fill and is therefore considered unsuitable for infiltration.

### Bluff Stability and Infiltration Concerns

The western edge of the site is located approximately 500 feet from the coastal bluffs. Lateral migration of infiltrated stormwater from the proposed BMP facilities would likely create unintended public health and safety concerns. The geology of the old paralic deposits encountered during our investigation corresponds closely with that observed in the nearby coastal bluff. Figures 7 and 8 are photographs of the coastal bluff, which correlate to the samples of old paralic deposits presented in Figures 4 and 5. The photos indicate that the lower friable sand is susceptible to erosion, sloughing, and potential bluff failure. It is NOVA's opinion that infiltration into the friable and permeable lower sand layer has the potential to contribute to bluff failure over time.

**Figure 7. Coastal Bluff (November 2023)**

**Figure 8. Coastal Bluff Near Playground (November 2023)**

## CONCLUSIONS AND RECOMMENDATIONS

Based on our infiltration test results and assessment of infiltration feasibility related to the geologic and geotechnical conditions, NOVA recommends an infiltration feasibility category of “No Infiltration.” BMP facilities should be completely lined on the sides and bottom with an impermeable geomembrane with a subdrain system to reduce the potential for water-related distress to adjacent structures and improvements nearby coastal bluffs. A subdrain system should be installed at the bottom of BMP facilities. Additionally, BMP facilities should be kept at least 10 feet from structural foundations.

## CLOSURE

NOVA should review project plans and specifications prior to bidding and construction to check that the intent of the recommendations in this report has been incorporated. Observations and tests should be performed during construction. If the conditions encountered during construction differ from those anticipated based on the subsurface exploration program, the presence of personnel from our offices during construction will enable an evaluation of the exposed conditions and modifications of the recommendations in this report or development of additional recommendations in a timely manner.

NOVA should be advised of changes in the project scope so that the recommendations contained in this report can be evaluated with respect to the revised plans. Changes in recommendations will be verified in writing. The findings in this report are valid as of the date of this report. Changes in the condition of the site can, however, occur with the passage of time, whether they are due to natural processes or work on this or adjacent areas. In addition, changes in the standards of practice and government regulations can occur. Thus, the findings in this report may be invalidated wholly or in part by changes beyond our control. This report should not be relied upon after a period of two years without a review by us verifying the suitability of the conclusions and recommendations to site conditions at that time.

In the performance of our professional services, we comply with that level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the boring locations and that our data, interpretations, and recommendations are based solely on the information obtained by us. We will be responsible for those data, interpretations, and recommendations, but shall not be responsible for interpretations by others of the information developed. Our services consist of professional consultation and observation only, and no warranty whatsoever, express or implied, is made or intended in connection with the work performed or to be performed by us, or by our proposal for consulting or other services, or by our furnishing of oral or written reports or findings.

NOVA appreciates the opportunity to be of service to Toll Brothers Apartment Living. If you have any questions, please call us at 858.292.7575 x 413.

Respectfully submitted,
**NOVA Services, Inc.**

Melissa Stayner, PG, CEG
Senior Engineering Geologist

Tom Canady, PE
Principal Engineer

Attachments: Plate 1 – Subsurface Investigation Map
Plate 2 – Geologic Cross-Sections
Appendix A - Use of the Geotechnical Report
Appendix B - Boring Logs
Appendix C - Laboratory Testing
Appendix D - Infiltration Test Results

# REFERENCES

City of Oceanside, 2022, City of Oceanside BMP Design Manual, Appendix D, Geotechnical Engineer Analysis, January 2022.

GeoTracker, State Water Resources Control Board, located at https://geotracker.waterboards.ca.gov/, accessed November 2023.

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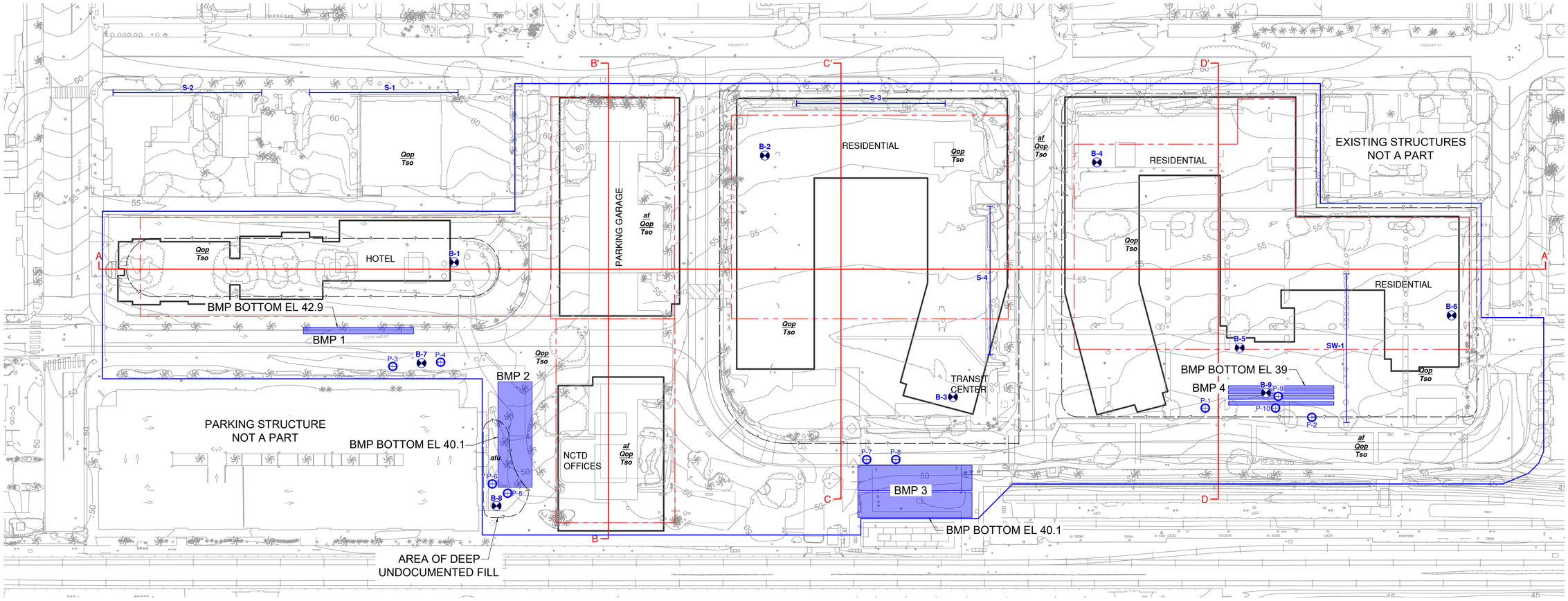
Riverside County, 2011, The Riverside County Design Handbook for Low Impact Development Best Management Practices, Appendix A, Infiltration Testing, September 2011.

Stantec, 2023, Vesting Tentative Map and Development Plan, NCTD Oceanside Transit Center, 235 South Tremont Street, City of Oceanside, California.

# PLATES




**KEY TO SYMBOLS**

| | |
|---|---|
| *af* | PREVIOUSLY PLACED FILL |
| *afu* | UNDOCUMENTED FILL |
| *Qop* | OLD PARALIC DEPOSITS |
| *Tso* | SAN ONOFRE BRECCIA |
| | LIMITS OF PROPOSED STRUCTURES BELOW GRADE |
| | LIMITS OF PROPOSED STRUCTURES ABOVE GRADE |
| | SITE LIMITS |
| | GEOLOGIC CONTACT, QUERIED WHERE UNCERTAIN |
| B-9 | GEOTECHNICAL BORING |
| P-10 | PERCOLATION TEST BORING |
| SW-1 | SHEAR WAVE VELOCITY SURVEY |
| S-4 | SEISMIC REFRACTION SURVEYS |
| D D' | GEOLOGIC CROSS-SECTION |

0 50' 100'

NOVA

GEOTECHNICAL
MATERIALS
SPECIAL INSPECTION

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# PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

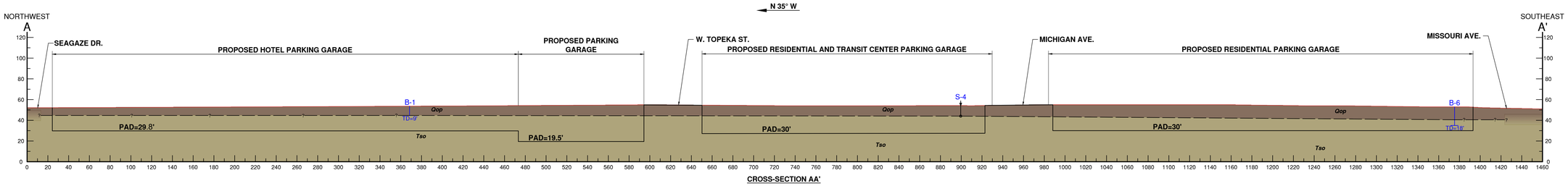
OCEANSIDE TRANSIT CENTER
OCEANSIDE, CA 92054

| | |
|---|---|
| PROJECT NO.: | 2021010 |
| DATE: | JANUARY 2024 |
| DRAWN BY: | DTJ |
| REVIEWED BY: | MS |
| SCALE: | 1"=50' |

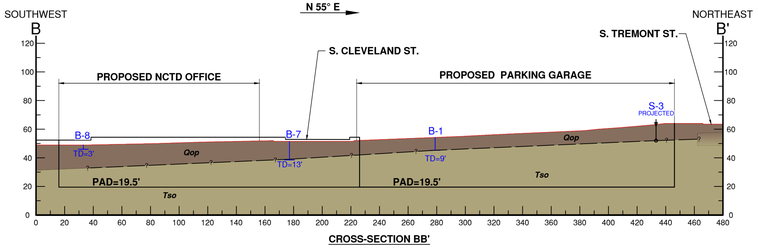
DRAWING TITLE:

GEOTECHNICAL MAP

PLATE NO. 1 OF 2




CROSS-SECTION AA'

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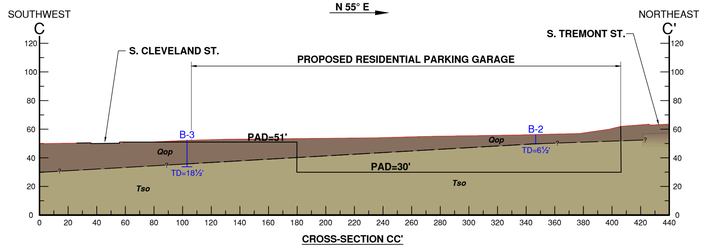


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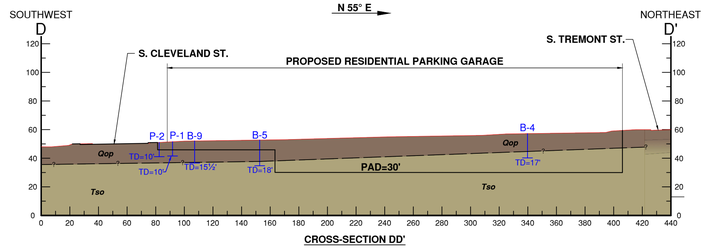


CROSS-SECTION DD'

**KEY TO SYMBOLS**

| | |
|---|---|
| *Qop* | OLD PARALIC DEPOSITS |
| *Tso* | SAN ONOFRE BRECCIA |
| B-9 | GEOTECHNICAL BORING |
| P-2 | PERCOLATION TEST BORING |
| | EXISTING GRADE |
| | PROPOSED GRADE |
| —?— | GEOLOGIC CONTACT, QUERIED WHERE UNCERTAIN |

0 50' 100'


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# PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

OCEANSIDE TRANSIT CENTER
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| PROJECT NO.: | 2021010 |
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| REVIEWED BY: | MS |
| SCALE: | 1"=50' |
| DRAWING TITLE: | |

GEOLOGIC
CROSS-SECTIONS

# APPENDIX A
# USE OF THE GEOTECHNICAL REPORT

# Important Information About Your

# Geotechnical Engineering Report

*Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.*

*The following information is provided to help you manage your risks.*

## Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

## Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

## A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

## Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

## Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

## A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

## A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

## Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

## Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

## Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

## Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

## Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

## Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
The Best People on Earth

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
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# APPENDIX B
# BORING LOGS

| MAJOR DIVISIONS | | | | TYPICAL NAMES |
|---|---|---|---|---|
| COARSE-GRAINED SOILS<br>MORE THAN HALF IS COARSER THAN NO. 200 SIEVE | GRAVEL<br>MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE | CLEAN GRAVEL WITH LESS THAN 15% FINES | GW | WELL-GRADED GRAVEL WITH OR WITHOUT SAND |
| | | | GP | POORLY GRADED GRAVEL WITH OR WITHOUT SAND |
| | | GRAVEL WITH 15% OR MORE FINES | GM | SILTY GRAVEL WITH OR WITHOUT SAND |
| | | | GC | CLAYEY GRAVEL WITH OR WITHOUT SAND |
| | SAND<br>MORE THAN HALF COARSE FRACTION IS FINER THAN NO. 4 SIEVE SIZE | CLEAN SAND WITH LESS THAN 15% FINES | SW | WELL-GRADED SAND WITH OR WITHOUT GRAVEL |
| | | | SP | POORLY GRADED SAND WITH OR WITHOUT GRAVEL |
| | | SAND WITH 15% OR MORE FINES | SM | SILTY SAND WITH OR WITHOUT GRAVEL |
| | | | SC | CLAYEY SAND WITH OR WITHOUT GRAVEL |
| FINE-GRAINED SOILS<br>MORE THAN HALF IS FINER THAN NO. 200 SIEVE | SILTS AND CLAYS<br>LIQUID LIMIT 50% OR LESS | | ML | SILT WITH OR WITHOUT SAND OR GRAVEL |
| | | | CL | LEAN CLAY WITH OR WITHOUT SAND OR GRAVEL |
| | | | OL | ORGANIC SILT OR CLAY OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL |
| | SILTS AND CLAYS<br>LIQUID LIMIT GREATER THAN 50% | | MH | ELASTIC SILT WITH OR WITHOUT SAND OR GRAVEL |
| | | | CH | FAT CLAY WITH OR WITHOUT SAND OR GRAVEL |
| | | | OH | ORGANIC SILT OR CLAY OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL |
| HIGHLY ORGANIC SOILS | | | PT | PEAT AND OTHER HIGHLY ORGANIC SOILS |

- GROUNDWATER / STABILIZED
- GROUNDWATER SEEPAGE
- BULK SAMPLE
- SPT SAMPLE ( ASTM D1586)
- MOD. CAL. SAMPLE (ASTM D3550)
- * UNRELIABLE BLOW COUNTS
- GEOLOGIC CONTACT
- SOIL TYPE CHANGE

**LAB TEST ABBREVIATIONS**

| | |
|---|---|
| AL | ATTERBERG LIMITS |
| CN | CONSOLIDATION |
| CR | CORROSIVITY |
| DS | DIRECT SHEAR |
| EI | EXPANSION INDEX |
| MD | MAXIMUM DENSITY |
| RV | RESISTANCE VALUE |
| SA | SIEVE ANALYSIS |
| SE | SAND EQUIVALENT |

**LOG ABBREVIATIONS**

| | |
|---|---|
| REF | REFUSAL |

| RELATIVE DENSITY OF COHESIONLESS SOILS | | CONSISTENCY OF COHESIVE SOILS | | |
|---|---|---|---|---|
| RELATIVE DENSITY | SPT N60 BLOWS/FOOT | CONSISTENCY | SPT N60 BLOWS/FOOT | POCKET PENETROMETER MEASUREMENT (TSF) |
| VERY LOOSE | 0 - 4 | VERY SOFT | 0 - 2 | 0 - 0.25 |
| LOOSE | 4 - 10 | SOFT | 2 - 4 | 0.25 - 0.50 |
| MEDIUM DENSE | 10 - 30 | MEDIUM STIFF | 4 - 8 | 0.50 - 1.0 |
| DENSE | 30 - 50 | STIFF | 8 - 15 | 1.0 - 2.0 |
| VERY DENSE | OVER 50 | VERY STIFF | 15 - 30 | 2.0 - 4.0 |
| | | HARD | OVER 30 | OVER 4.0 |

NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).
IF THE SEATING INTERVAL (1st 6 INCH INTERVAL) IS NOT ACHEIVED, N IS REPORTED AS REF.

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# SUBSURFACE EXPLORATION LEGEND

# LOG OF BORING B-1

**DATE DRILLED:** 04/08/2021 **DRILLING EQUPMENT:** CME 75 LAR **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 53 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~80.8%, $N_{60} \sim \frac{80.8}{60}$*N~1.35*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | 8<br>12<br>17 | 25 | 8.1 | 129.2 | SM | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *(DISTURBED/REWORKED) SILTY SAND; DARK REDDISH BROWN, MOIST, LOOSE TO MEDIUM DENSE, FINE TO MEDIUM GRAINED, SCATTERED CONCRETE DEBRIS, BRICK, AND GRAVEL* | SA |
| | | | | | | | | *(UNDISTURBED) REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED* | |
| 5 | | | 9<br>9<br>10 | 26 | | | | *ORANGE BROWN* | |
| | | | 6<br>7<br>8 | 13 | 5.4 | 114.5 | | *OLIVE BROWN* | SA |
| | | | 50/0" | REF | | | | **SAN ONOFRE BRECCIA (Tso):** *NO RECOVERY, VERY DENSE* | |
| 10 | | | | | | | | *AUGER REFUSAL AT 9 FT ON VERY DENSE SAN ONOFRE BRECCIA. NO GROUNDWATER ENCOUNTERED.* | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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|---|---|---|

# LOG OF BORING B-2

**DATE DRILLED:** 04/08/2021 **DRILLING EQUPMENT:** CME 75 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 54 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}$*N~1.23*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *2½ INCHES OF ASPHALT CONCRETE OVER 4½ INCHES OF AGGREGATE BASE* | |
| | | | 8<br>6<br>6 | 15 | | | SM | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, WITH SLIGHT PINHOLE POROSITY* | SA |
| | | | 6<br>7<br>8 | 18 | | | | | |
| 5 | | | 9<br>10<br>11 | 26 | | | | | |
| | | | 50/1" | REF | | | | **SAN ONOFRE BRECCIA (Tso):** *NO RECOVERY, VERY DENSE* | |
| | | | | | | | | *AUGER REFUSAL AT 6½ FT ON VERY DENSE SAN ONOFRE BRECCIA. NO GROUNDWATER ENCOUNTERED.* | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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|---|---|---|

# LOG OF BORING B-3

**DATE DRILLED:** 04/08/2021 **DRILLING EQUPMENT:** CME 75 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}$*N~1.23*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *2½ INCHES OF ASPHALT CONCRETE OVER 4½ INCHES OF AGGREGATE BASE* | |
| | | | 8<br>5<br>6 | 14 | | | SM | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND; DARK REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED* | RV |
| | | | 10<br>8<br>4 | 15 | | | | *REDDISH BROWN WITH OLIVE BROWN AND BLACK SAND GRAINS* | SA |
| 5 | | | 9<br>11<br>10 | 26 | | | | *SOME MINOR CALICHE AND MINOR POROSITY* | |
| | | | 6<br>12<br>15 | 22 | | | | | DS |
| 10 | | | 9<br>11*<br>11* | 27* | | | | | |
| | | | 10<br>12<br>11 | 28 | | | SP-SM | *POORLY GRADED SAND WITH SILT; LIGHT ORANGE BROWN AND OLIVE BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED* | SA |
| 15 | | | 10<br>15<br>18 | 41 | | | | *DENSE* | SA |
| | | | 50/5" | REF | | | | **SAN ONOFRE BRECCIA (Tso):** *CLAYEY SANDSTONE MATRIX WITH GRAVEL; GRAYISH BROWN AND ORANGE, MOIST, VERY DENSE, FINE TO COARSE GRAINED, ABUNDANT GRAVEL AND BROKEN ROCK, STRONGLY INDURATED* | CR<br>SA |
| 20 | | | | | | | | *AUGER REFUSAL AT 18½ FT ON VERY DENSE SAN ONOFRE BRECCIA. NO GROUNDWATER ENCOUNTERED.* | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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|---|---|---|

# LOG OF BORING B-4

**DATE DRILLED:** 04/08/2021 **DRILLING EQUPMENT:** CME 75 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 53 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}$*N~1.23*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *2½ INCHES OF ASPHALT CONCRETE OVER 4½ INCHES OF AGGREGATE BASE* | |
| | | | 6<br>6<br>7 | 16 | | | SM | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *(DISTURBED) SILTY SAND; DARK BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED* | |
| | | | 6<br>9<br>13 | 27 | | | SM | *(UNDISTURBED) SILTY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, SOME BLACK MINERALIZATION* | SA |
| 5 | | | 11<br>11<br>9 | 27 | | | SM | *SILTY SAND WITH GRAVEL; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO COARSE GRAINED SAND WITH 25% GRAVEL* | SA |
| | | | 8<br>7<br>7 | 17 | | | SM | *SILTY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED* | SA |
| 10 | | | 9<br>13<br>21 | 27 | | | | *ORANGE BROWN* | DS |
| | | | 27<br>50/2" | REF | | | | **SAN ONOFRE BRECCIA (Tso):** *SILTY SANDSTONE MATRIX WITH GRAVEL; GRAYISH BROWN, DRY, VERY DENSE, FINE TO COARSE GRAINED, SOME ROCK FRAGEMENTS, 41% GRAVEL LIGHT YELLOWISH BROWN, DIFFICULT AUGERING, INDURATED* | SA |
| 15 | | | 26<br>50/3" | REF | | | | *CLAYEY SANDSTONE MATRIX; MOTTLED ORANGE BROWN AND LIGHT GRAYISH BROWN, MOIST, VERY DENSE, FINE GRAINED, WELL INDURATED* | |
| | | | 11<br>50/3" | REF | | | | | SA |
| | | | | | | | | *AUGER REFUSAL AT 17 FT ON VERY DENSE SAN ONOFRE BRECCIA. NO GROUNDWATER ENCOUNTERED.* | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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|---|---|---|

# LOG OF BORING B-5

**DATE DRILLED:** 04/08/2021 **DRILLING EQUPMENT:** CME 75 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 49 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}$*N~1.23*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *2½ INCHES OF ASPHALT CONCRETE OVER 4½ INCHES OF AGGREGATE BASE* | |
| | | | 9<br>18<br>14<br>6<br>5<br>4 | 39<br>11 | | | SM | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *(DISTURBED) SILTY SAND; DARK BROWN, SLIGHTLY MOIST TO MOIST, DENSE, FINE TO MEDIUM GRAINED, SCATTERED GRAVEL*<br>*(UNDISTURBED) REDDISH BROWN, MOIST, MEDIUM DENSE, FINE GRAINED* | SA |
| 5 | | | 9<br>11<br>11 | 27 | | | | *REDDISH BROWN, SLIGHTLY MOIST, MEDIUM DENSE, FINE TO COARSE GRAINED* | SA |
| | | | 8<br>8<br>7 | 18 | | | | *FINE TO MEDIUM GRAINED*<br>*OLIVE BROWN TO ORANGE BROWN*<br>*ORANGE BROWN TO REDDISH BROWN* | SA |
| 10 | | | 11<br>16<br>24 | 32 | | | | *DENSE*<br>*LIGHT YELLOWISH TO ORANGE BROWN* | DS |
| | | | 8<br>11<br>13 | 32 | | | | | MD<br>SA |
| 15 | | | 11<br>22<br>24 | 57 | | | | **SAN ONOFRE BRECCIA (Tso):** *SILTY SANDSTONE MATRIX WITH GRAVEL; MOTTLED PALE OLIVE BROWN AND LIGHT GRAY, MOIST, VERY DENSE, FINE TO COARSE GRAINED, SCATTERED ROCK FRAGMENTS, WITH BLACK SAND GRAINS, INDURATED, ABUNDANT ROCK FRAGMENTS, REFUSAL ON COBBLE* | MD<br>SA<br>EI<br>CR |
| | | | 50/3" | REF | | | | *AUGER REFUSAL AT 18 FT ON VERY DENSE SAN ONOFRE BRECCIA. NO GROUNDWATER ENCOUNTERED.* | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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# LOG OF BORING B-6

**DATE DRILLED:** 04/08/2021 **DRILLING EQUPMENT:** CME 75 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 46 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}$*N~1.23*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER FOOT N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *2½ INCHES OF ASPHALT CONCRETE OVER 4½ INCHES OF AGGREGATE BASE* | |
| | X | | 12<br>8 | | | | SM | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND; DARK REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, SCATTERED GRAVEL* | MD<br>EI<br>CR |
| | X | | 11<br>11 | 23 | | | | | |
| | X | | 13<br>14 | 33 | | | | *DENSE* | |
| 5 | X | | 30<br>21 | | 5.1 | 130 | | | |
| | X | | 18 | 31 | | | | *ORANGE BROWN, MOIST, FINE TO MEDIUM GRAINED* | |
| | X | | 9<br>9 | | | | | *MEDIUM DENSE* | |
| | X | | 11 | 25 | | | | | SA |
| 10 | | | 9<br>11 | | | | SP-SM | *POORLY GRADED SAND WITH SILT; ORANGE BROWN, MOIST, MEDIUM DENSE, MEDIUM GRAINED, SCATTERED GRAVEL* | |
| | X | | 12 | 28 | | | | *DARK BROWN, ABUNDANT BLACK SAND GRAINS* | |
| | X | | 26<br>28<br>37 | 80 | | | | **SAN ONOFRE BRECCIA (Tso):** *CLAYEY SANDSTONE MATRIX WITH ABUNDANT GRAVEL AND ROCK FRAGMENTS; PALE OLIVE BROWN, DRY, VERY DENSE, FINE TO COARSE GRAINED, LIGHT GRAYISH BROWN WITH ORANGE AND DARK GRAY STAINING, INDURATED* | MD<br>EI<br>CR |
| 15 | X | | 11<br>35<br>50/5" | REF | | | | | |
| | | | 50/5" | REF | | | | *PALE OLIVE GRAY* | |
| 20 | | | | | | | | *AUGER REFUSAL AT 18 FT DUE ON VERY DENSE SAN ONOFRE BRECCIA. NO GROUNDWATER ENCOUNTERED.* | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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# LOG OF BORING B-7

**DATE DRILLED:** 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *6 IN CONCRETE* | |
| | | | | | | | SC | **FILL (af):** *CLAYEY SAND WITH GRAVEL; REDDISH BROWN, MOIST, LOOSE TO MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS, ABOUT 15% GRAVEL* | |
| | | | 8<br>16<br>25 | 48 | | | SM/SC | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND/CLAYEY SAND; REDDISH BROWN, MOIST, DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| 5 | | | 12<br>9<br>8 | 20 | | | SM | *ORANGE BROWN*<br>*SILTY SAND; ORANGE BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| 10 | | | 8<br>10<br>13<br>16<br>30 | 27 | | | SP-SM | *POORLY GRADED SAND WITH SILT; OLIVE BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| | | | 41 | 84 | | | | **SAN ONOFRE BRECCIA (Tso):** *SILTY SANDSTONE MATRIX WITH GRAVEL AND ROCK FRAGMENTS, GRAYISH BROWN, MOIST, VERY DENSE, FINE TO MEDIUM GRAINED* | |
| 15 | | | | | | | | *BORING TERMINATED AT 13 FT. NO GROUNDWATER ENCOUNTERED.* | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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# LOG OF BORING B-8

**DATE DRILLED:** 11/30/2023 **DRILLING EQUPMENT:** HAND AUGER **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 45 **DRILLING METHOD:** HAND AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** HAND AUGER **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | X | | | | | | SC | **FILL (af):** *CLAYEY SAND WITH GRAVEL; BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS, ROOTS, ASPHALT DEBRIS, CONSTRUCTION DEBRIS, ABOUT 20-25% GRAVEL, WITH CLAY BLEBS* | |
| | | | | | | | | *AUGER REFUSAL AT 3 FT ON UNDERGROUND OBSTRUCTION. ATTEMPTED ADVANCEMENT AT THREE NEARBY LOCATIONS. NO GROUNDWATER ENCOUNTERED* | |
| 5 | | | | | | | | | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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|---|---|---|

# LOG OF BORING B-9

**DATE DRILLED:** 12/01/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *3 IN ASPHALT CONCRETE OVER 20 IN AGGREGATE BASE* | |
| | X | | | | | | SM/SC | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND/CLAYEY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| 5 | X | / | 3<br>7<br>9 | 19 | | | | *TRACE BLACK MINERAL PRECIPITATE DEPOSITS* | |
| | | / | 10<br>17<br>18 | 41 | | | SM | *SILTY SAND; YELLOW RED/OLIVE BROWN, MOIST, DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| 15 | | / | 50/6" | REF | | | | **SAN ONOFRE BRECCIA (Tso):** *SILTY SANDSTONE MATRIX, LIGHT GRAY, MOIST, VERY DENSE, FINE TO MEDUM GRAINED, ABOUT 15% GRAVEL* | |
| | | | | | | | | *BORING TERMINATED AT 15½ FT. NO GROUNDWATER ENCOUNTERED.* | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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|---|---|---|

# LOG OF PERCOLATION BORING P-1

**DATE DRILLED:** 04/8/2021 **DRILLING EQUPMENT:** CME 75 LAR **SAMPLE METHOD:** HOLLOW STEM AUGER

**ELEVATION (FT):** ± 47 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** N/A **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *2½ INCHES OF ASPHALT CONCRETE OVER 4½ INCHES OF AGGREGATE BASE* | |
| | | | | | | | SM | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND; DARK BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, SCATTERED GRAVEL*<br>*REDDISH BROWN* | |
| 5 | | | | | | | | *OLIVE BROWN, DENSE*<br>*DIFFICULT AUGERING* | |
| 10 | | | | | | | | *BORING TERMINATED AT 10 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.* | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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|---|---|---|

# LOG OF PERCOLATION BORING P-2

**DATE DRILLED:** 04/8/2021 **DRILLING EQUPMENT:** CME 75 LAR **SAMPLE METHOD:** HOLLOW STEM AUGER

**ELEVATION (FT):** ± 46 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** N/A **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *2.5 INCHES OF ASPHALT CONCRETE OVER 4.5 INCHES OF AGGREGATE BASE* | |
| | | | | | | | SM | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND; DARK BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, SCATTERED GRAVEL*<br>*REDDISH BROWN* | |
| 5 | X | | | | | | | *OLIVE BROWN, DENSE* | SA |
| 10 | | | | | | | | *BORING TERMINATED AT 10 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.* | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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|---|---|---|

# LOG OF PERCOLATION BORING P-3

**DATE DRILLED:** 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *6 IN CONCRETE* | |
| | X | | | | | | SM | **FILL (af):** *SILTY SAND; REDDISH BROWN, MOIST, LOOSE, FINE TO MEDIUM GRAINED, MICACEOUS, ROOTS, POROUS* | |
| | X | | 2<br>3<br>5 | 9 | | | SC | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *CLAYEY SAND; LIGHT REDDISH BROWN, MOIST, LOOSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| 5 | X | | 2<br>4<br>6 | 12 | | | SP-SM | *POORLY GRADED SAND WITH SILT; OLIVE BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| | | | | | | | | *BORING TERMINATED AT 7 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.* | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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|---|---|---|

# LOG OF PERCOLATION BORING P-4

**DATE DRILLED:** 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | X | | | | | | | *6 IN CONCRETE* | |
| | | | | | | | SM | **FILL (af):** *SILTY SAND WITH GRAVEL; BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS, ROOTS, ABOUT 15-20% GRAVEL* | |
| | | | PUSH | | | | | | |
| | | | 3<br>6 | 9 | | | SM | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND; REDDISH BROWN, MOIST, LOOSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| 5 | | | 4<br>4 | | | | | *REDDISH BROWN, MEDIUM DENSE* | |
| | X | | 6 | 12 | | | | | |
| | | | | | | | | *BORING TERMINATED AT 7 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.* | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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|---|---|---|

# LOG OF PERCOLATION BORING P-5

**DATE DRILLED:** 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 45 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | X | | | | | | SM | **FILL (af):** *SILTY SAND WITH GRAVEL; BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS, ROOTS, ABOUT 15-20% GRAVEL* | |
| | | / | 2<br>2<br>3 | 6 | | | | *BROWN, SOME ASPHALT DEBRIS* | |
| 5 | | / | 4<br>5<br>6 | 13 | | | | *LIGHT REDDISH BROWN, GLASS DEBRIS* | |
| | X | / | 2<br>PUSH<br>PUSH<br>PUSH<br>PUSH<br>1 | | | | SC | *CLAYEY SAND; BROWN, MOIST, LOOSE, FINE TO MEDIUM GRAINED*<br>*ABUNDANT WHITE MINERAL- GYPSUM, CARBONATE, OR PLASTER* | |
| 10 | | | | | | | | *BORING TERMINATED AT 10 FT. NO GROUNDWATER ENCOUNTERED.* | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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# LOG OF PERCOLATION BORING P-6

**DATE DRILLED:** 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 45 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | X | | | | | | SM | **FILL (af):** *SILTY SAND WITH GRAVEL; REDDISH BROWN, MOIST, LOOSE TO MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| 5 | | X | 6<br>7<br>6 | 15 | | | | *WITH RED STAINING, TRACE ASPHALT DEBRIS*<br>*SAMPLER BOUNCING ON BURIED OBSTRUCTION* | |
| | | | | | | | | *BORING TERMINATED 7 FT. NO GROUNDWATER ENCOUNTERED.* | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |

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# LOG OF PERCOLATION BORING P-7

**DATE DRILLED:** 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 46 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *4 IN ASPHALT CONCRETE OVER 6 IN AGGREGATE BASE* | |
| | X | | | | | | SM | **FILL (af):** *SILTY SAND WITH GRAVEL; REDDISH BROWN AND BLACK, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, ABOUT 20-30% GRAVEL AND ASPHALT DEBRIS* | |
| | X | | | | | | SM/SC | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND/CLAYEY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE TO DENSE, FINE TO MEDIUM GRAINED* | |
| 5 | | / | 11<br>10<br>10 | 24 | | | SM | *SILTY SAND; OLIVE BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| | | / | 10<br>12<br>14 | 28 | | | | | |
| 10 | | / | 10<br>15<br>15 | 35 | | | | *DENSE* | |
| | | | | | | | | *BORING TERMINATED AT 12 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.* | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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# LOG OF PERCOLATION BORING P-8

**DATE DRILLED:** 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 46 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *3 IN ASPHALT CONCRETE OVER 6 IN AGGREGATE BASE* | |
| | | ⊠ | 4<br>5<br>5 | 11 | | | SM | **FILL (af):** *SILTY SAND WITH GRAVEL; BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, ABOUT 15% GRAVEL*<br>*NO SAMPLE, LOST DURING WATER MAIN ENCOUNTER* | |
| 5 | | | | | | | | *BORING TERMINATED AT 4½ FT DUE TO UNMARKED 8 IN WATER MAIN.* | |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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# LOG OF PERCOLATION BORING P-9

**DATE DRILLED:** 12/01/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *2 IN ASPHALT CONCRETE OVER 21 IN AGGREGATE BASE* | |
| | X | | | | | | SM/SC | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND/CLAYEY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| 5 | | / | 7<br>8<br>10 | 21 | | | | | |
| | | / | 7<br>13<br>10 | 27 | | | SM | *SILTY SAND; ORANGE BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| 10 | | / | 6<br>10<br>10 | 24 | | | | *OLIVE BROWN, ABUNDANT BLACK SAND GRAINS* | |
| | X | | | | | | | *BORING TERMINATED AT 12 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.* | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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# LOG OF PERCOLATION BORING P-10

**DATE DRILLED:** 12/01/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

**ELEVATION (FT):** ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

**GROUNDWATER DEPTH (FT):** N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

| DEPTH (FT) | BULK SAMPLE | CAL/SPT SAMPLE | BLOWS PER 6 IN N | $N_{60}$ | MOISTURE (%) | DRY DENSITY (pcf) | SOIL CLASS. (USCS) | SOIL DESCRIPTION<br>*SUMMARY OF SUBSURFACE CONDITIONS*<br>*(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)* | LAB TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | *3 IN ASPHALT CONCRETE OVER 21 IN AGGREGATE BASE* | |
| | X | | | | | | SM/SC | **OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND/CLAYEY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| 5 | | | | | | | SC | *CLAYEY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* | |
| | X | | | | | | | *ORANGE BROWN* | |
| 10 | | / | 10<br>17<br>18 | 41 | | | SM | *SILTY SAND; ORANGE BROWN, MOIST, DENSE, FINE TO MEDIUM GRAINED, MICACEOUS*<br>*OLIVE BROWN, ABUNDANT BLACK SAND GRAINS* | |
| | X | | | | | | | *BORING TERMINATED AT 12 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.* | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |


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# APPENDIX C
# LABORATORY TESTING

*Laboratory tests were performed in accordance with the generally accepted American Society for Testing and Materials (ASTM) test methods or suggested procedures. Brief descriptions of the tests performed are presented below:*

- **CLASSIFICATION:** *Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soils Classification System and are presented on the exploration logs in Appendix B.*

- **GRADATION ANALYSIS (ASTM D6913):** *The grain size distribution of selected soil samples was determined in accordance with ASTM D6913. The results of the tests are summarized on Figures C.1 through C.21.*

- **DENSITY OF SOIL IN PLACE (ASTM D2937):** *In-place moisture contents and dry densities were determined for representative soil samples. This information was an aid to classification and permitted recognition of variations in material consistency with depth. The dry unit weight is determined in pounds per cubic foot, and the in-place moisture content is determined as a percentage of the soil's dry weight. The results are summarized in the exploration logs presented in Appendix B.*

- **MAXIMUM DENSITY AND OPTIMUM MOISTURE CONTENT (ASTM D1557 METHOD A,B,C):** *The maximum dry density and optimum moisture content of typical soils were determined in the laboratory in accordance with ASTM Standard Test D1557, Method A, Method B, Method C.*

- **DIRECT SHEAR (ASTM D3080):** *Direct shear tests were performed on remolded and relatively undisturbed samples in general accordance with ASTM D3080 to evaluate the shear strength characteristics of selected materials. The samples were inundated during shearing to represent adverse field conditions. The results of the tests are summarized on Figures C.22 through C.24.*

- **R-VALUE (ASTM D2844):** *The resistance Value, or R-Value, of near-surface site soils was evaluated in general accordance with California Test (CT) 301 and ASTM D2844. Samples were prepared and evaluated for exudation pressure and expansion pressure. The equilibrium R-value is reported as the lesser or more conservative of the two calculated results.*

- **CORROSIVITY (CAL. TEST METHOD 417, 422, 643):** *Soil PH, and minimum resistivity tests were performed on a representative soil sample in general accordance with test method CT 643. The sulfate and chloride content of the selected sample were evaluated in general accordance with CT 417 and CT 422, respectively.*

- **EXPANSION INDEX (ASTM D4829):** *The expansion index of selected materials was evaluated in general accordance with ASTM D4829. Specimens were molded under a specified compactive energy at approximately 50 percent saturation (plus or minus 1 percent). The prepared 1-inch thick by 4-inch diameter specimens were loaded with a surcharge of 144 pounds per square foot and were inundated with tap water. Readings of volumetric swell were made for a period of 24 hours.*

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# LAB TEST SUMMARY

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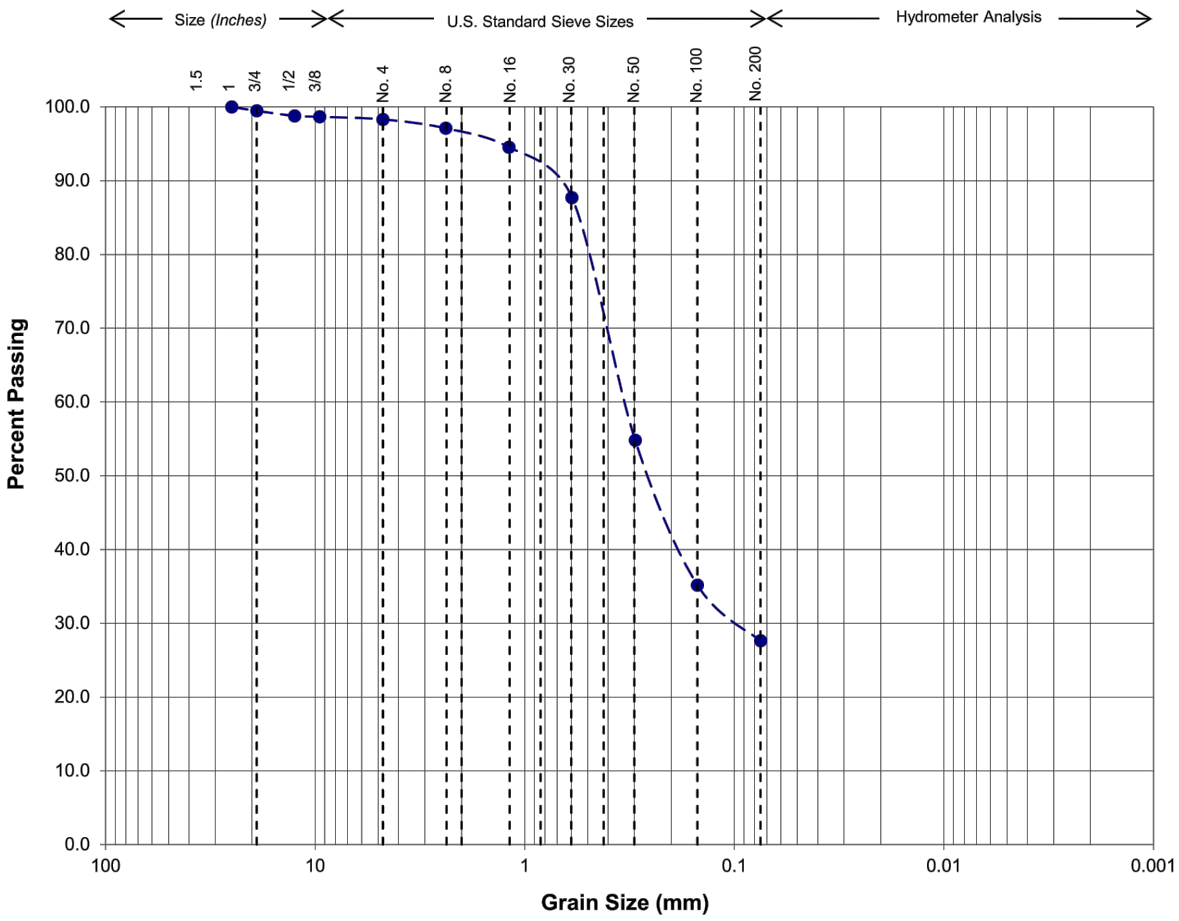


| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B - 1

Depth (ft): 0 - 5

USCS Soil Type: SM

Passing No. 200 (%): 28

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# CLASSIFICATION TEST RESULTS

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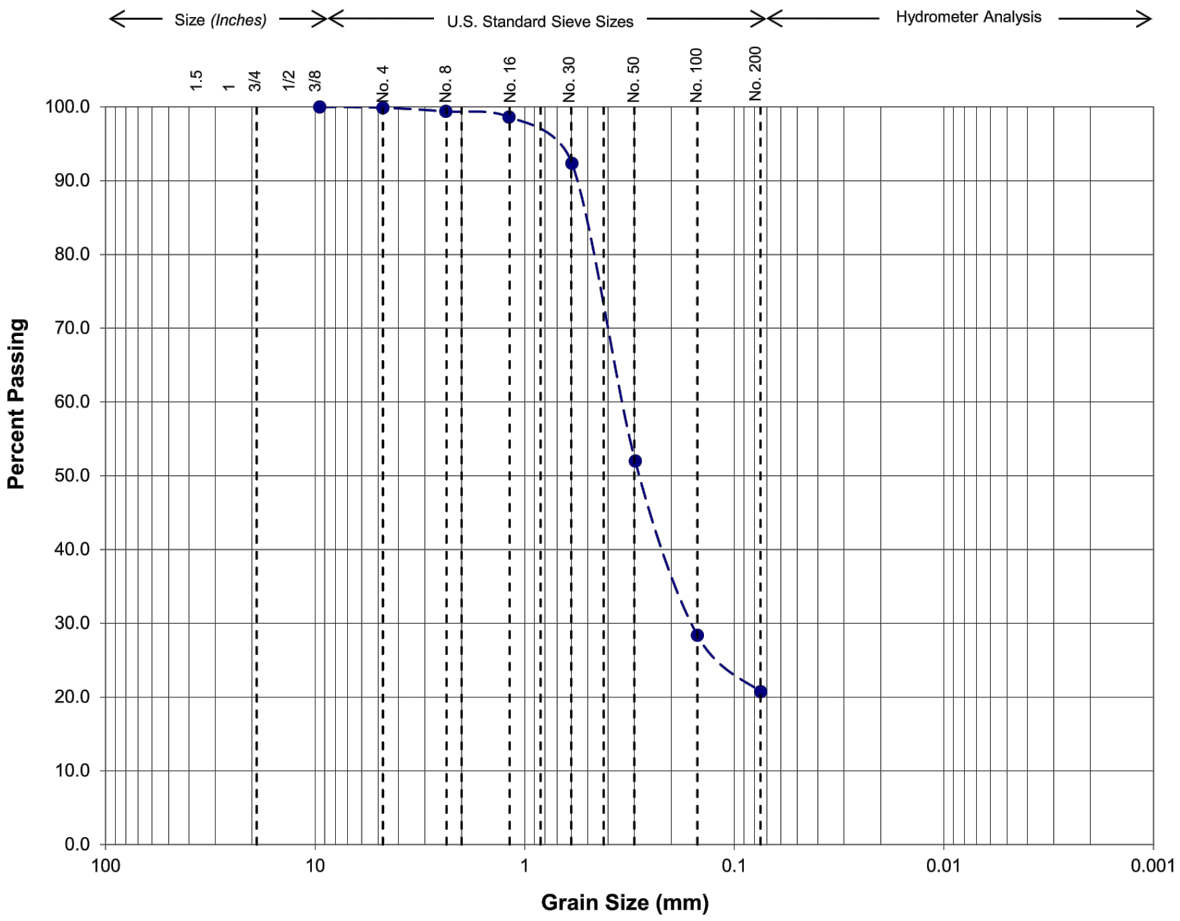
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B - 1

Depth (ft): 7 - 8

USCS Soil Type: SM

Passing No. 200 (%): 21

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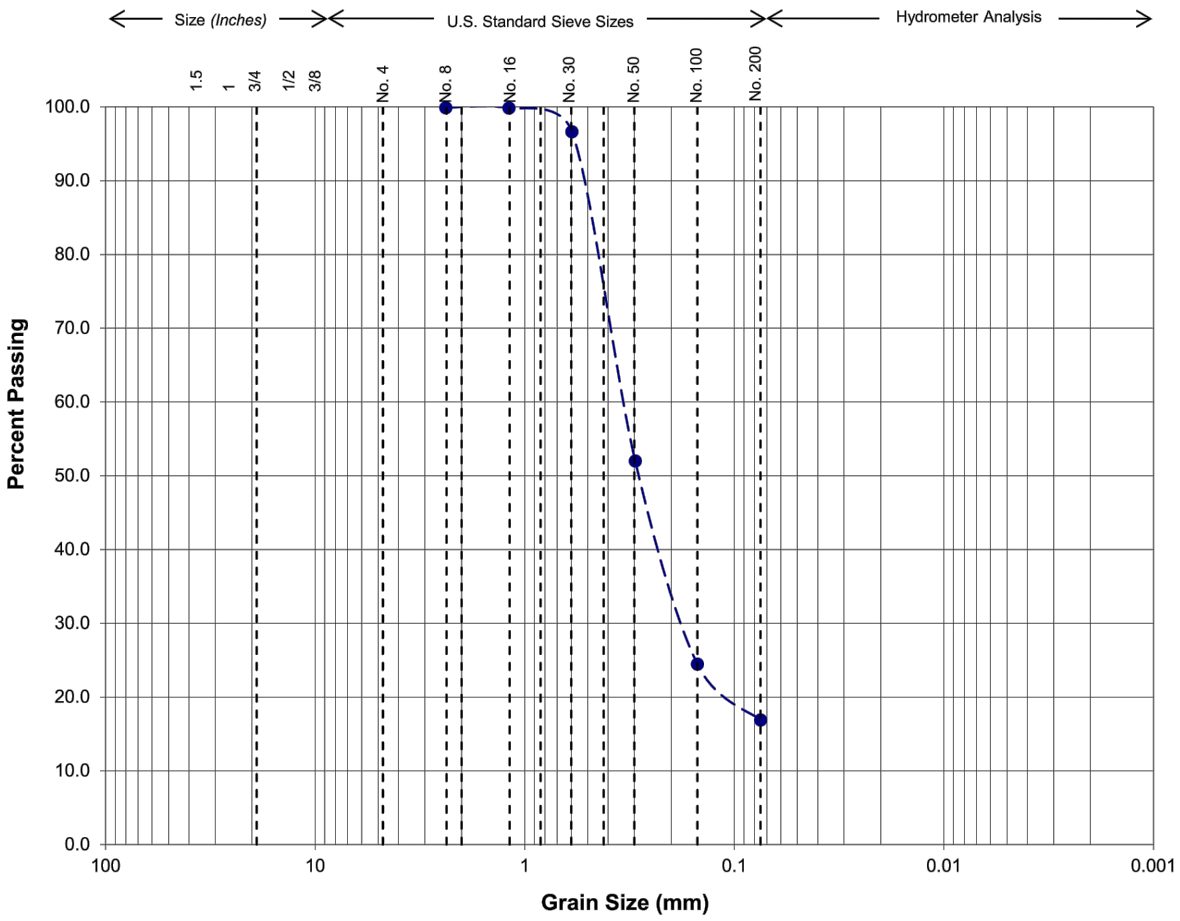
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-2

Depth (ft): 2½ - 4

USCS Soil Type: SM

Passing No. 200 (%): 17

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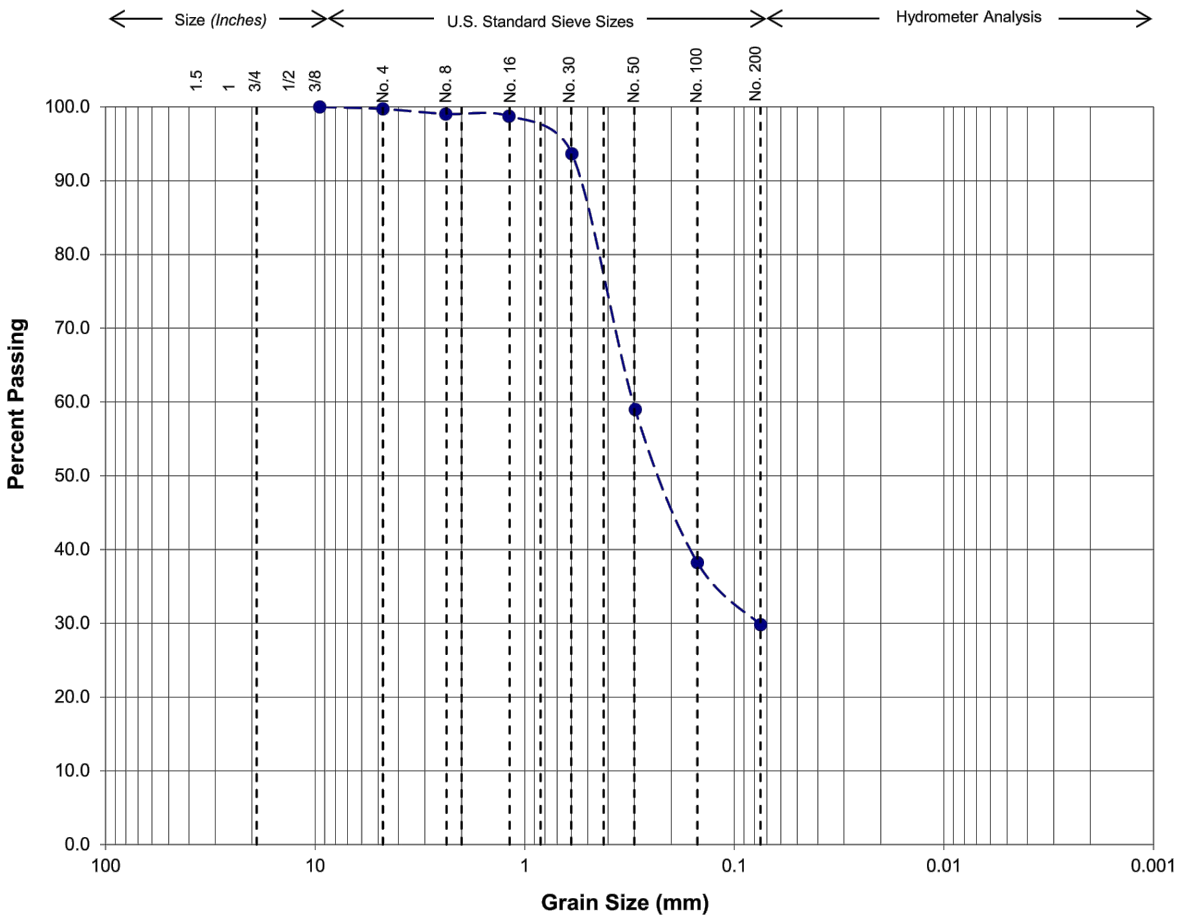
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-3

Depth (ft): 2½ - 4

USCS Soil Type: SM

Passing No. 200 (%): 30

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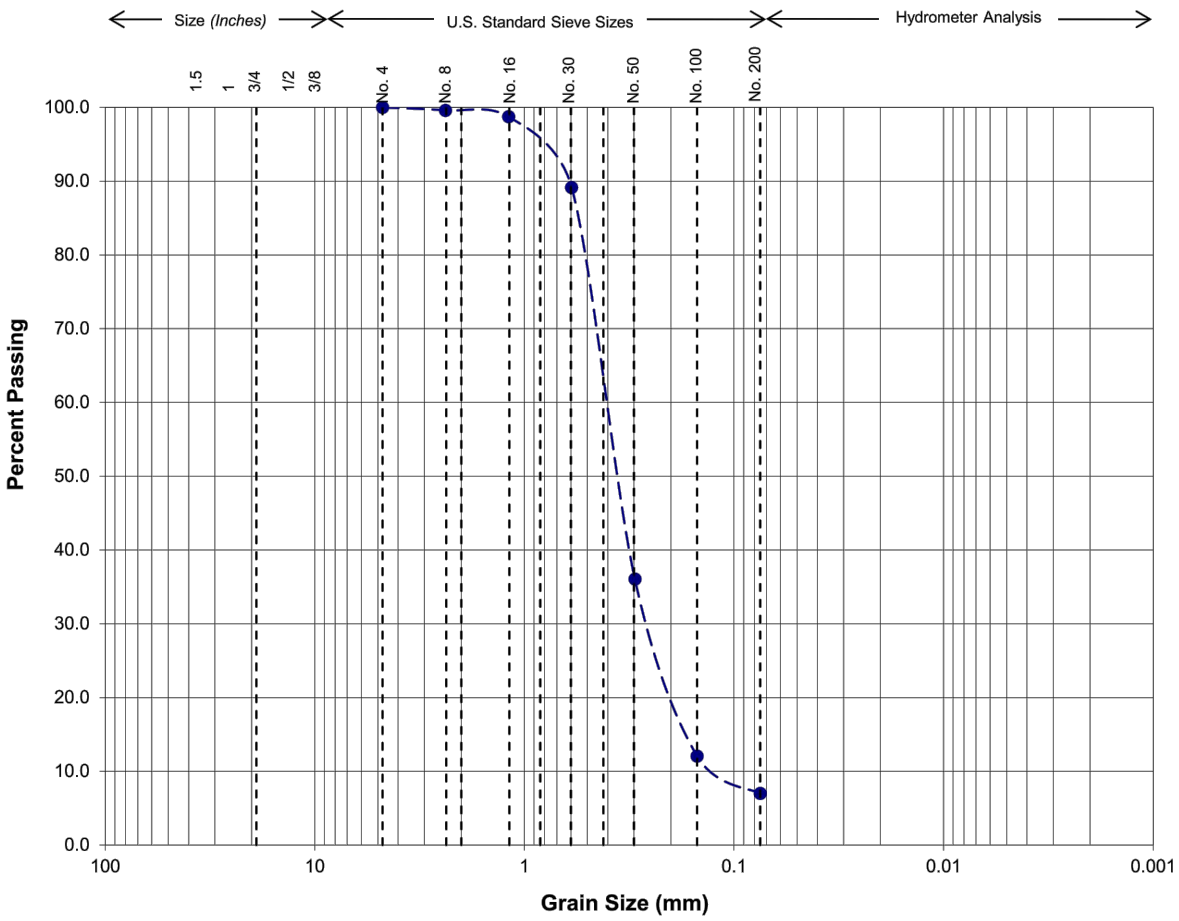
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-3

Depth (ft): 12½ - 14

USCS Soil Type: SP-SM

Passing No. 200 (%): 7

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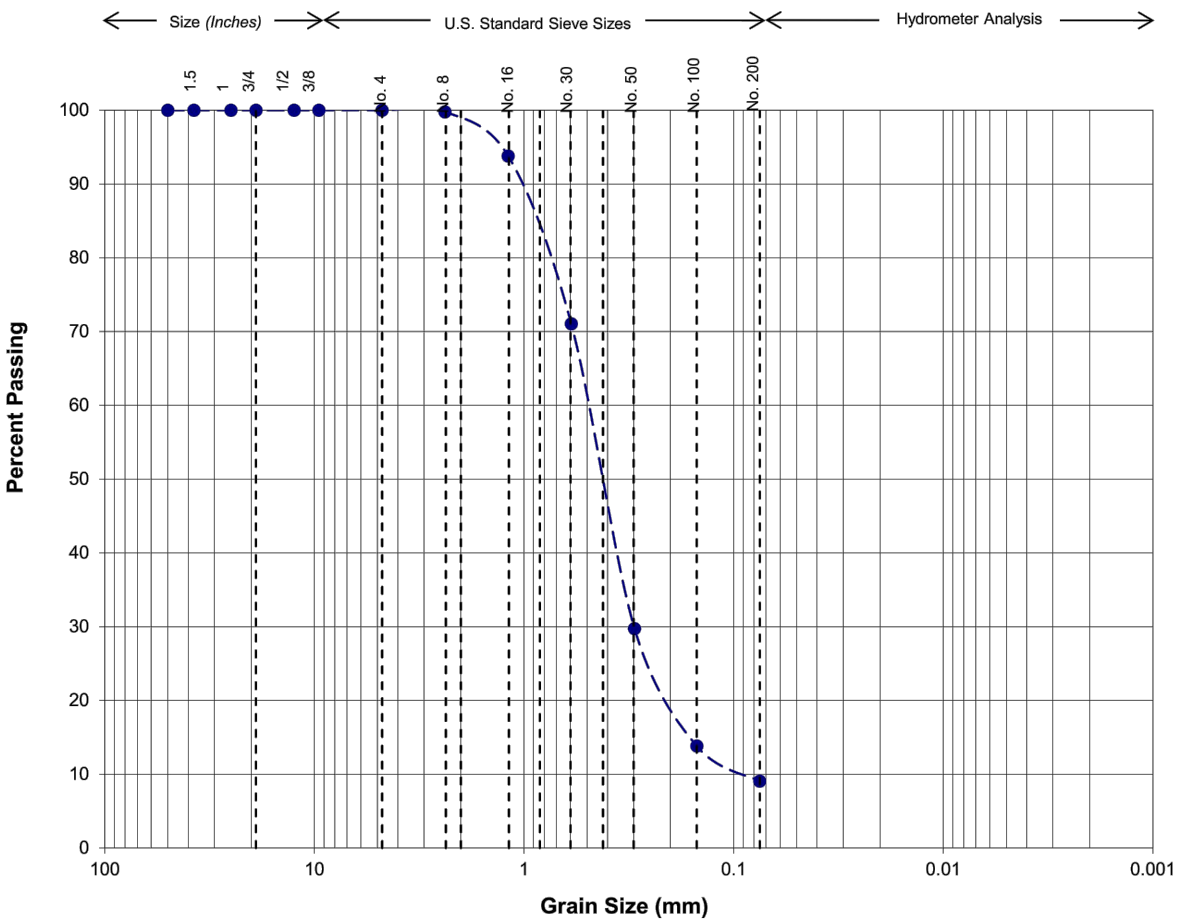
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-3

Depth (ft): 15 - 16½

USCS Soil Type: SP-SM

Passing No. 200 (%): 9

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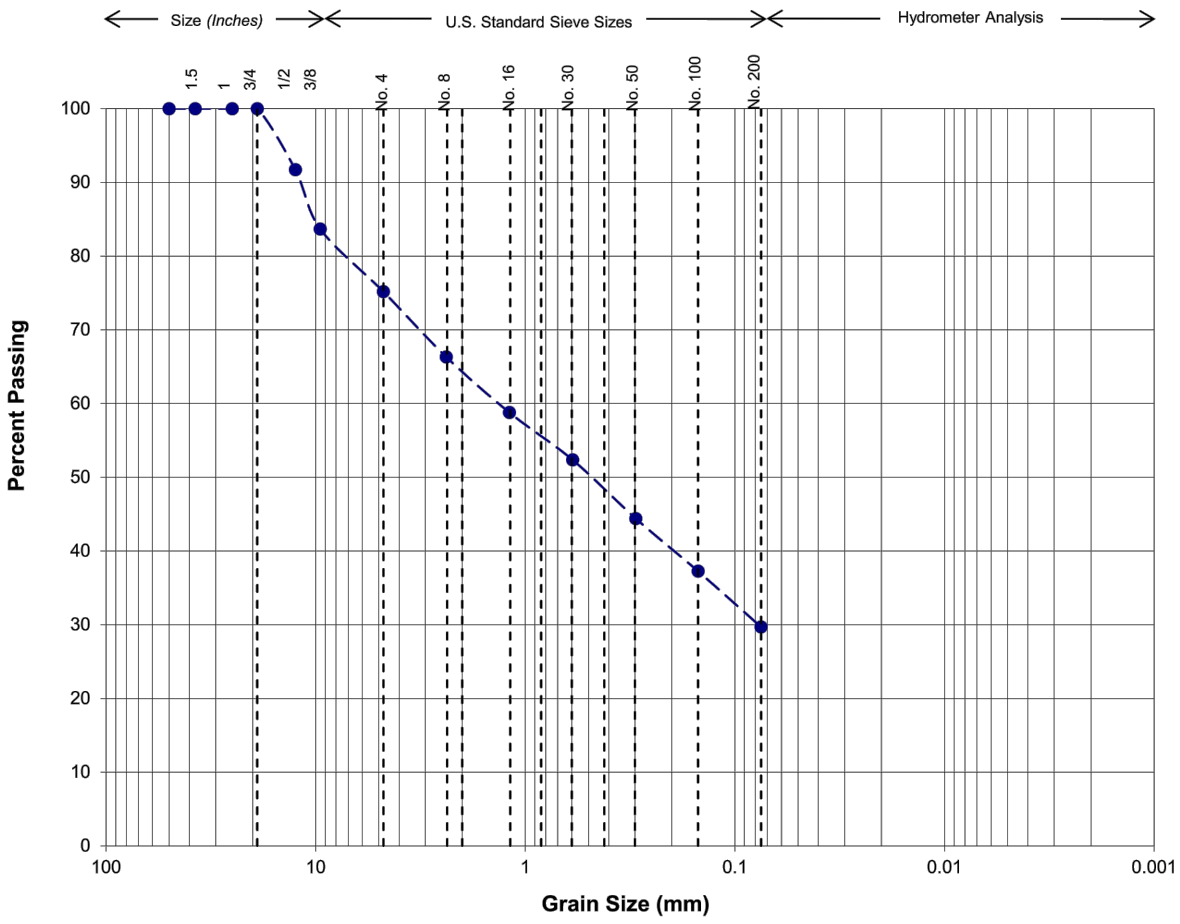
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-3

Depth (ft): 17½ - 18

USCS Soil Type: SC

Passing No. 200 (%): 30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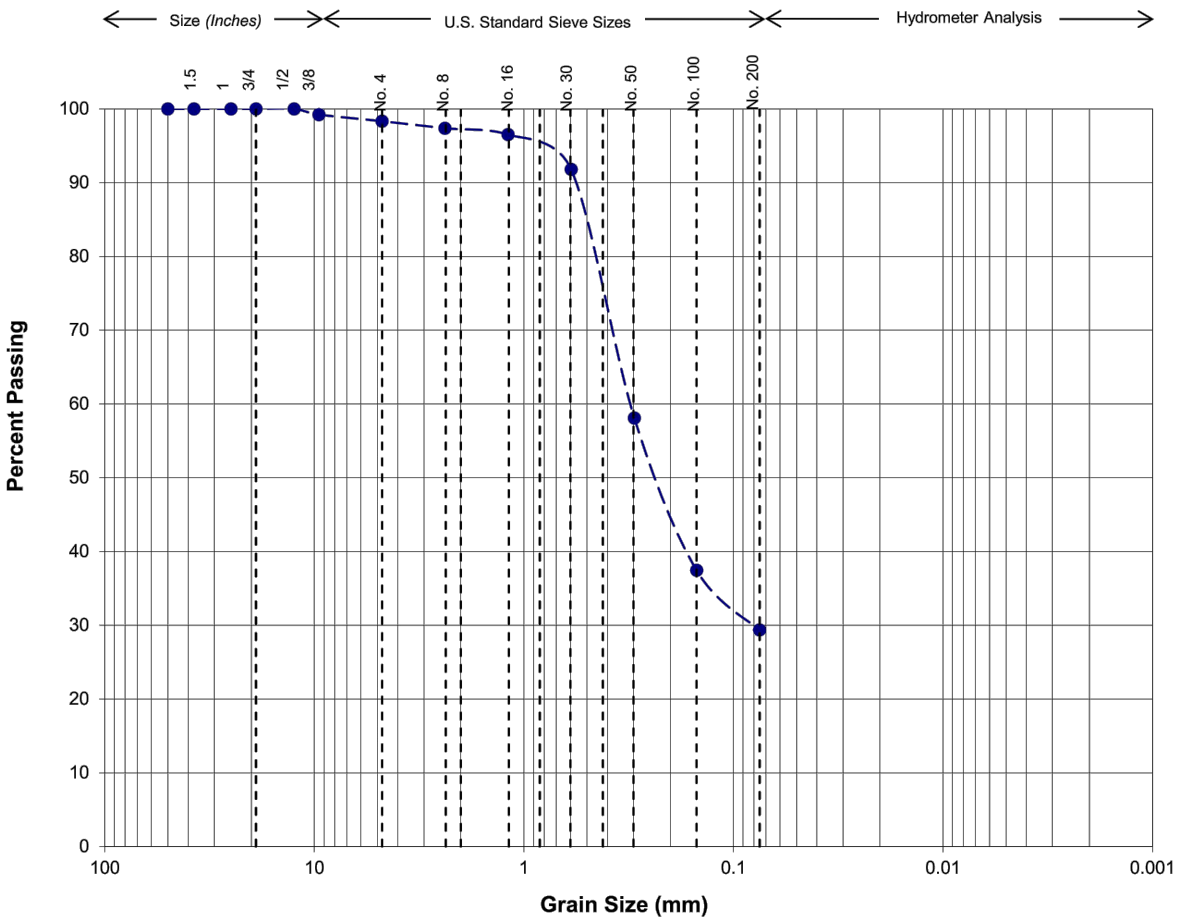
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-4

Depth (ft): 2 - 3½

USCS Soil Type: SM

Passing No. 200 (%): 29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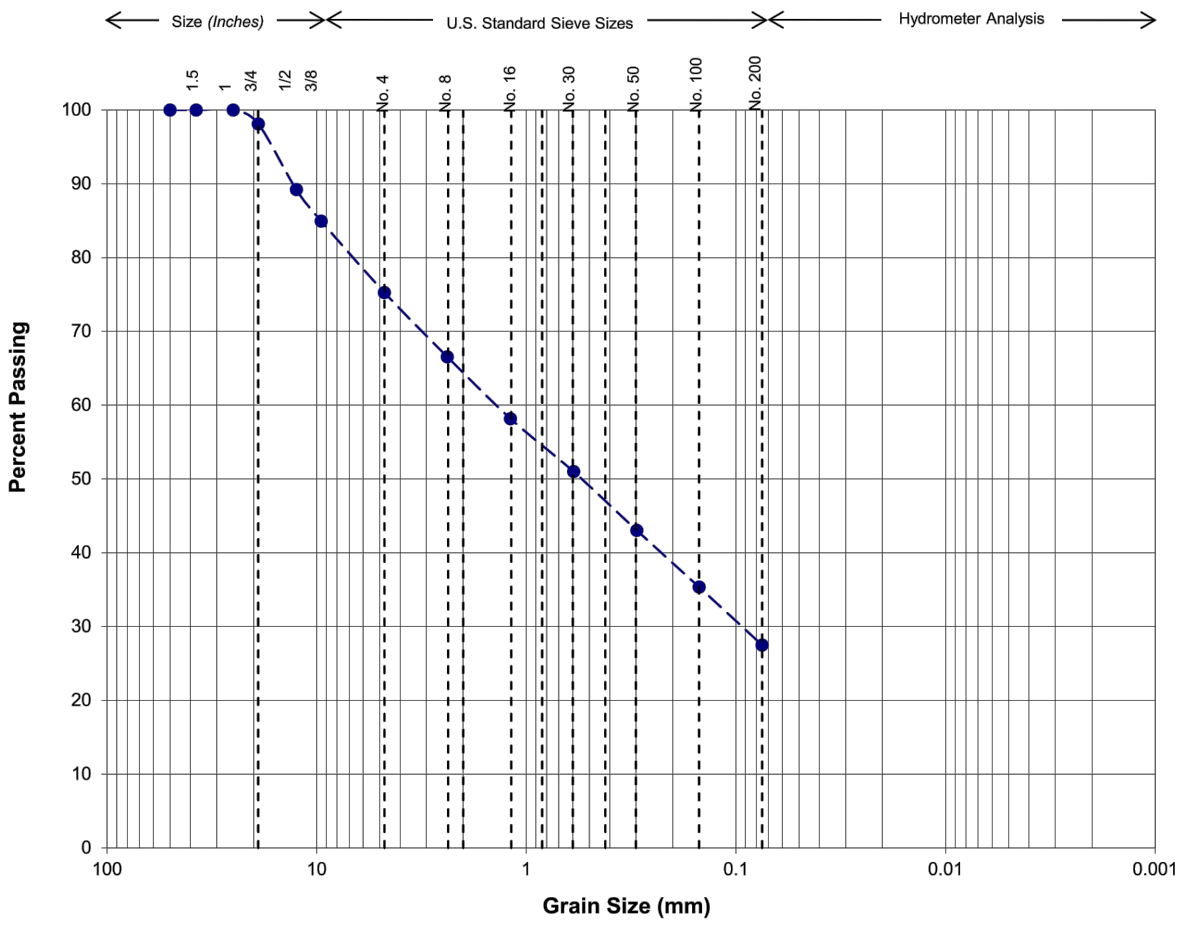
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-4

Depth (ft): 5 - 6½

USCS Soil Type: SM

Passing No. 200 (%): 27

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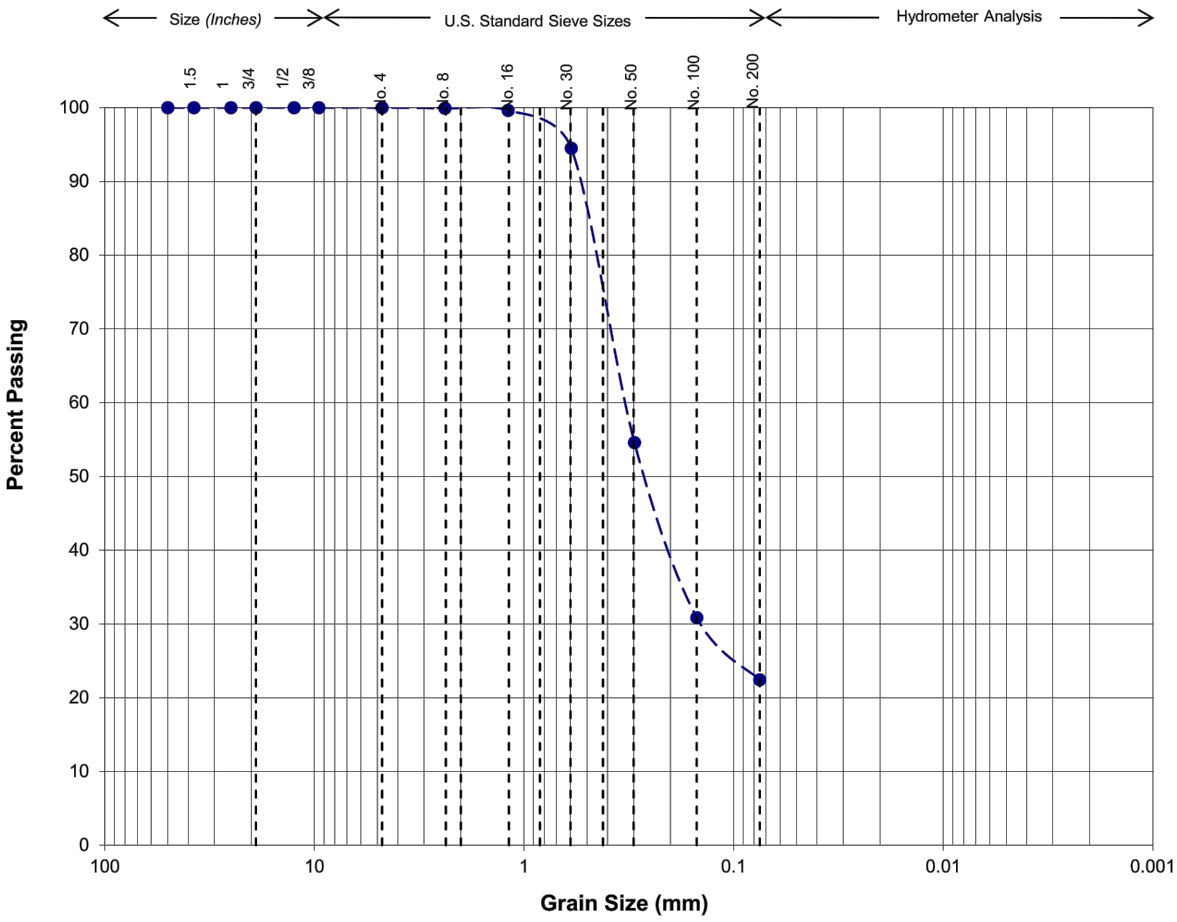
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-4

Depth (ft): 7½ - 9

USCS Soil Type: SM

Passing No. 200 (%): 22

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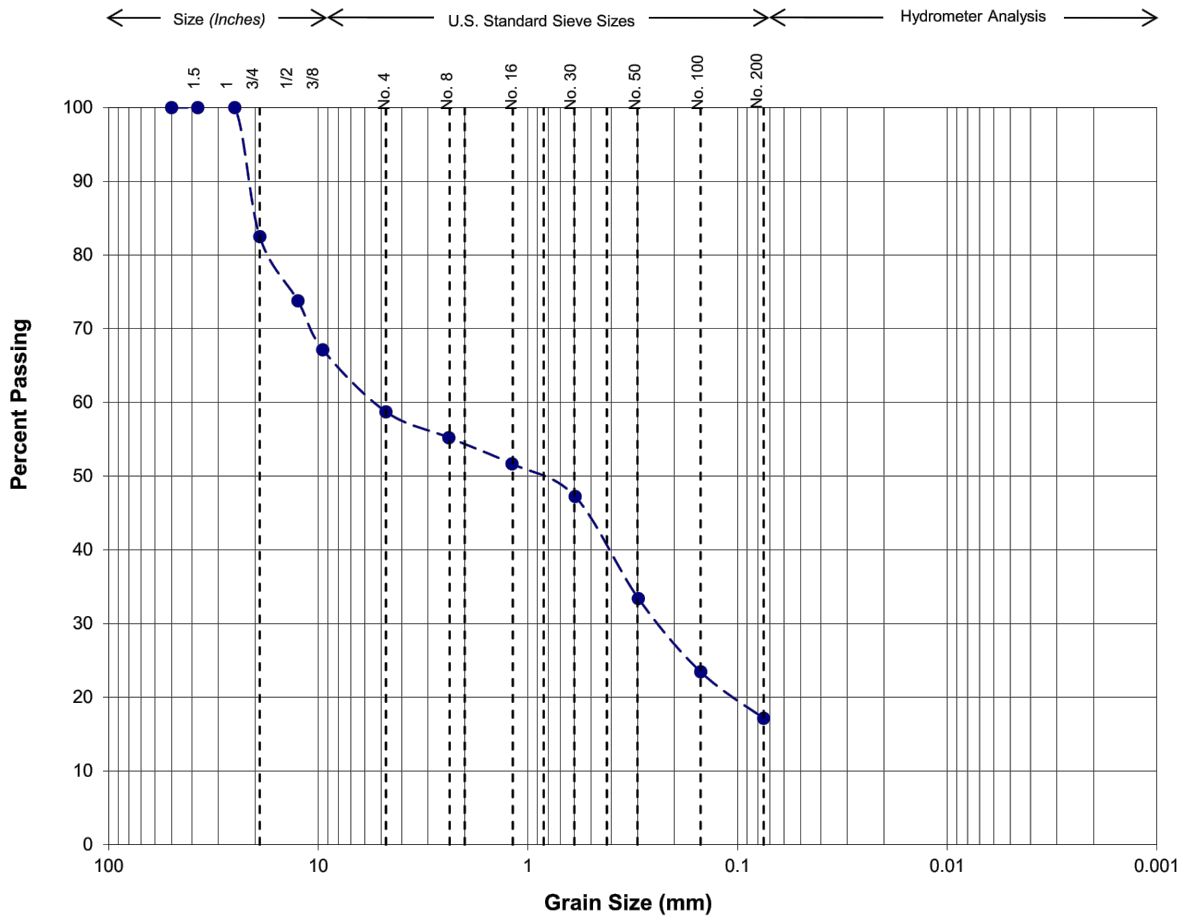
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-4

Depth (ft): 12½ - 13½

USCS Soil Type: SM

Passing No. 200 (%): 17

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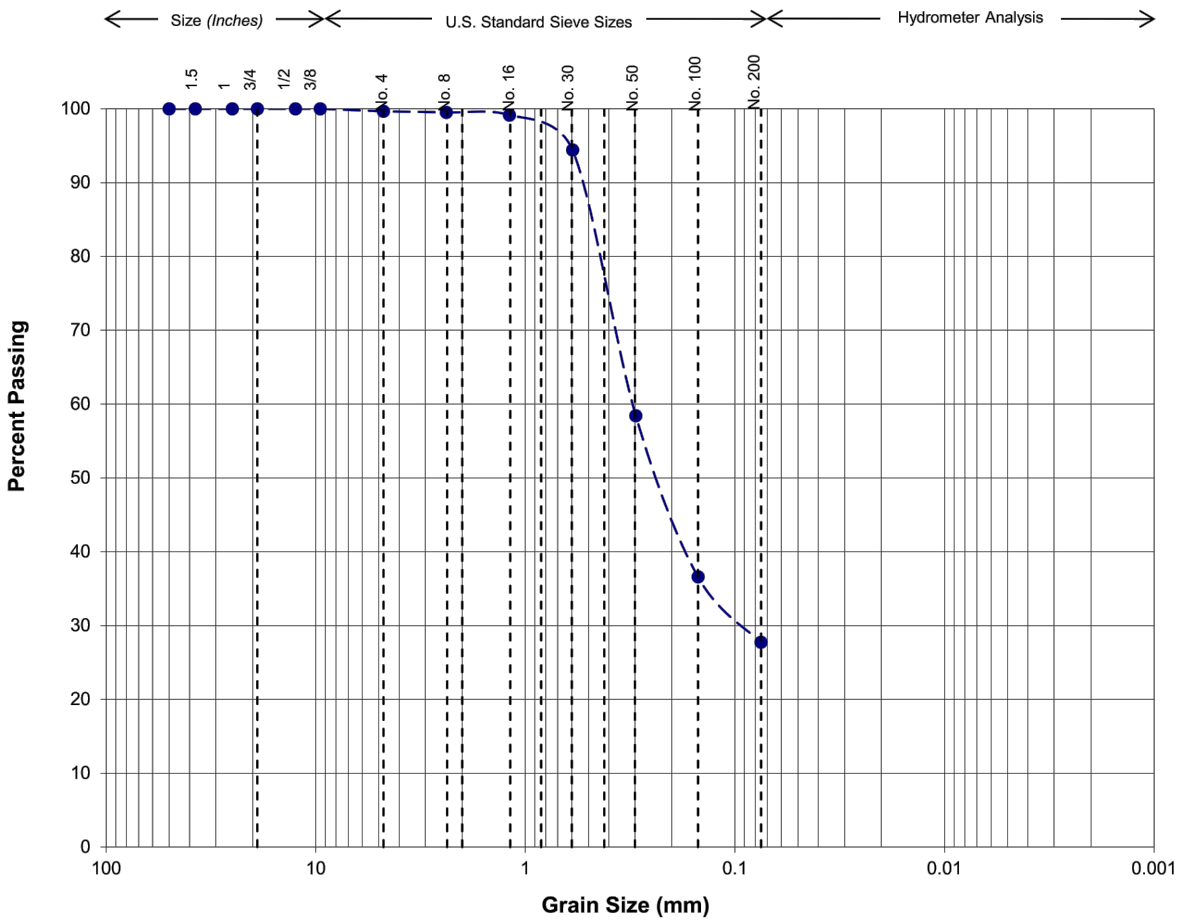
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-4

Depth (ft): 16 - 17

USCS Soil Type: SC

Passing No. 200 (%): 28

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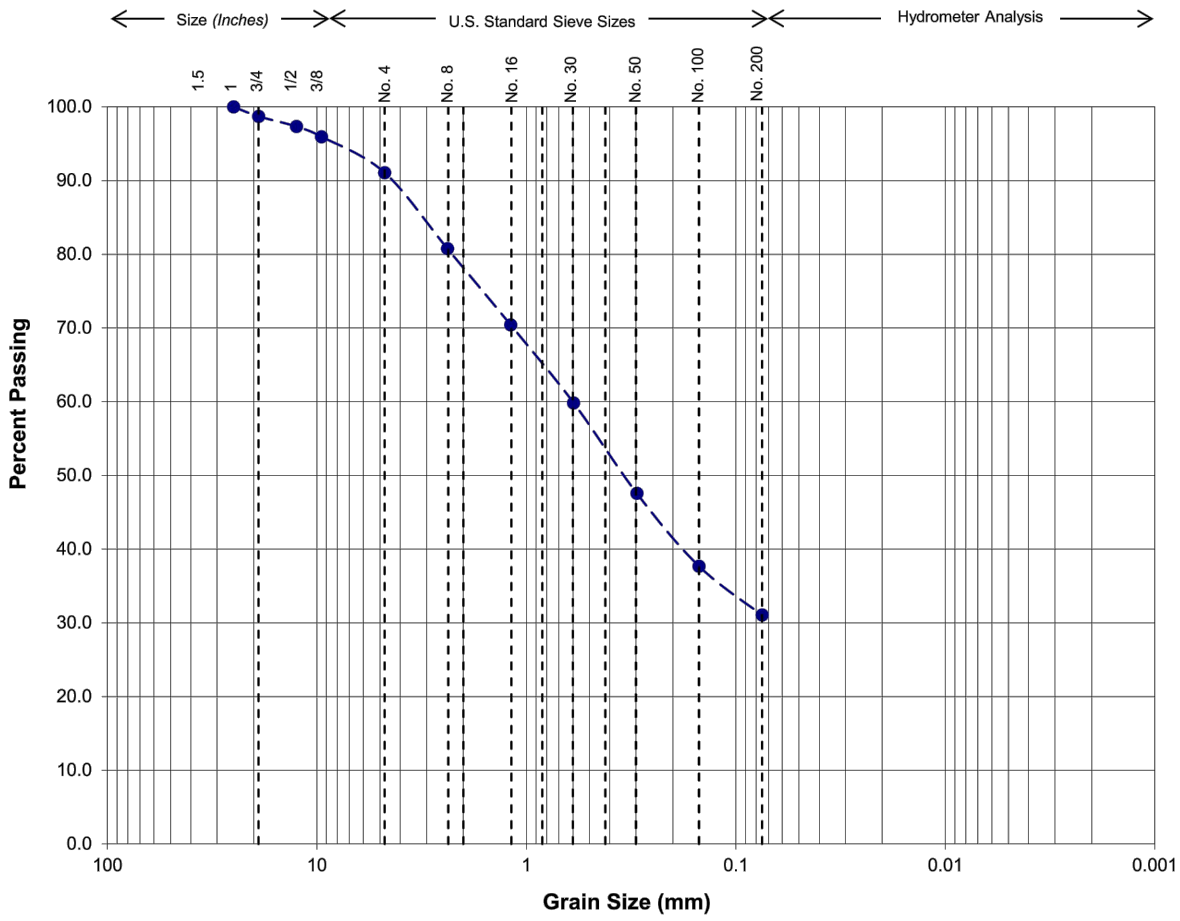


| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-5

Depth (ft): 1 - 2½

USCS Soil Type: SM

Passing No. 200 (%): 31


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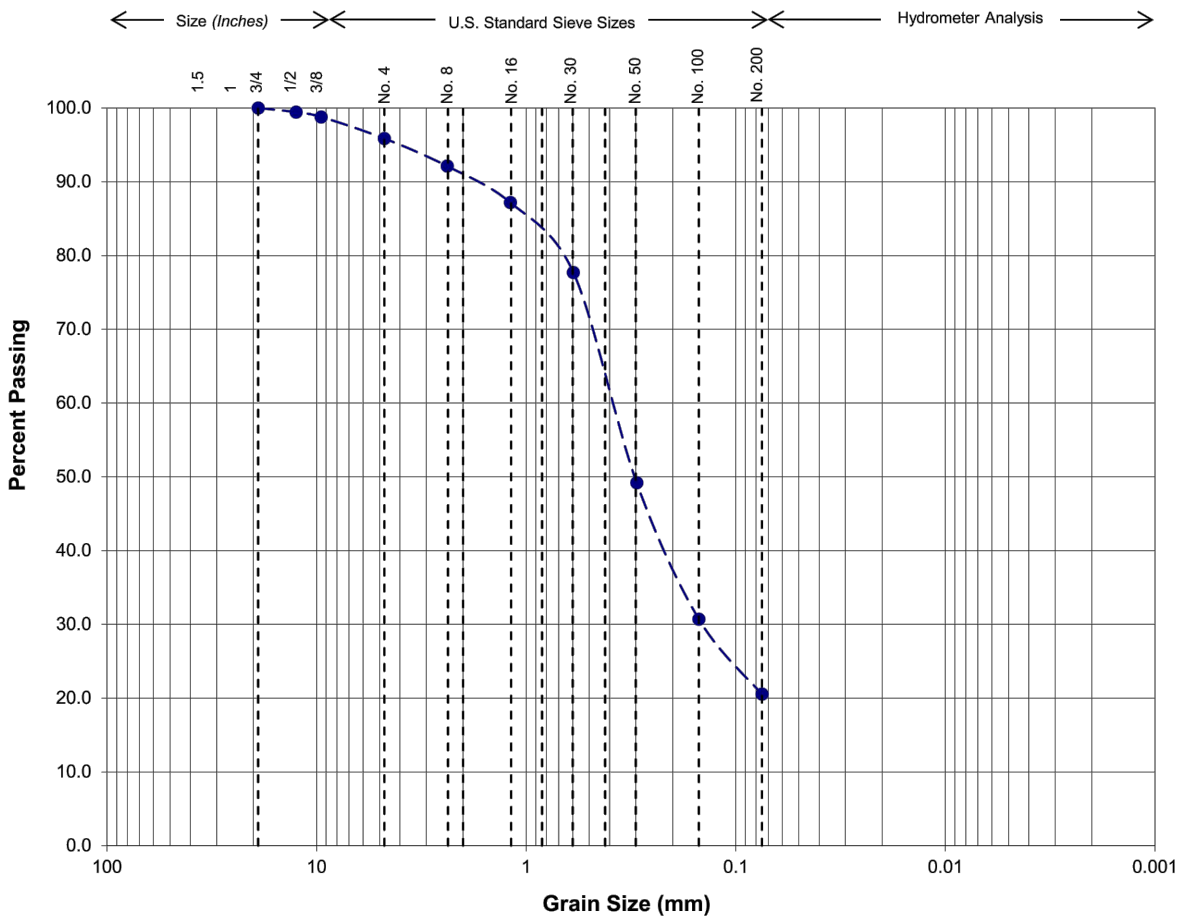
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-5

Depth (ft): 3½ - 6½

USCS Soil Type: SM

Passing No. 200 (%): 21

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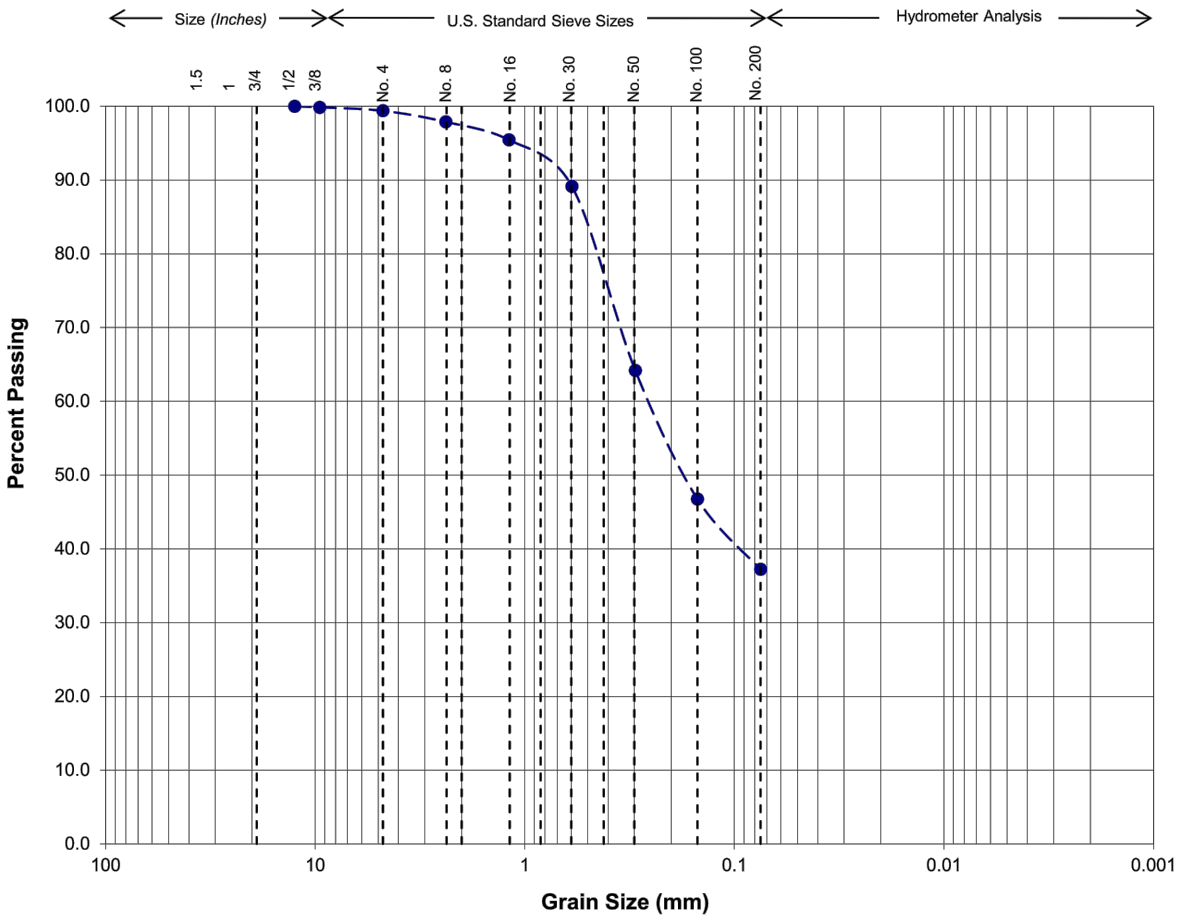
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-5

Depth (ft): 6½ - 9

USCS Soil Type: SM

Passing No. 200 (%): 37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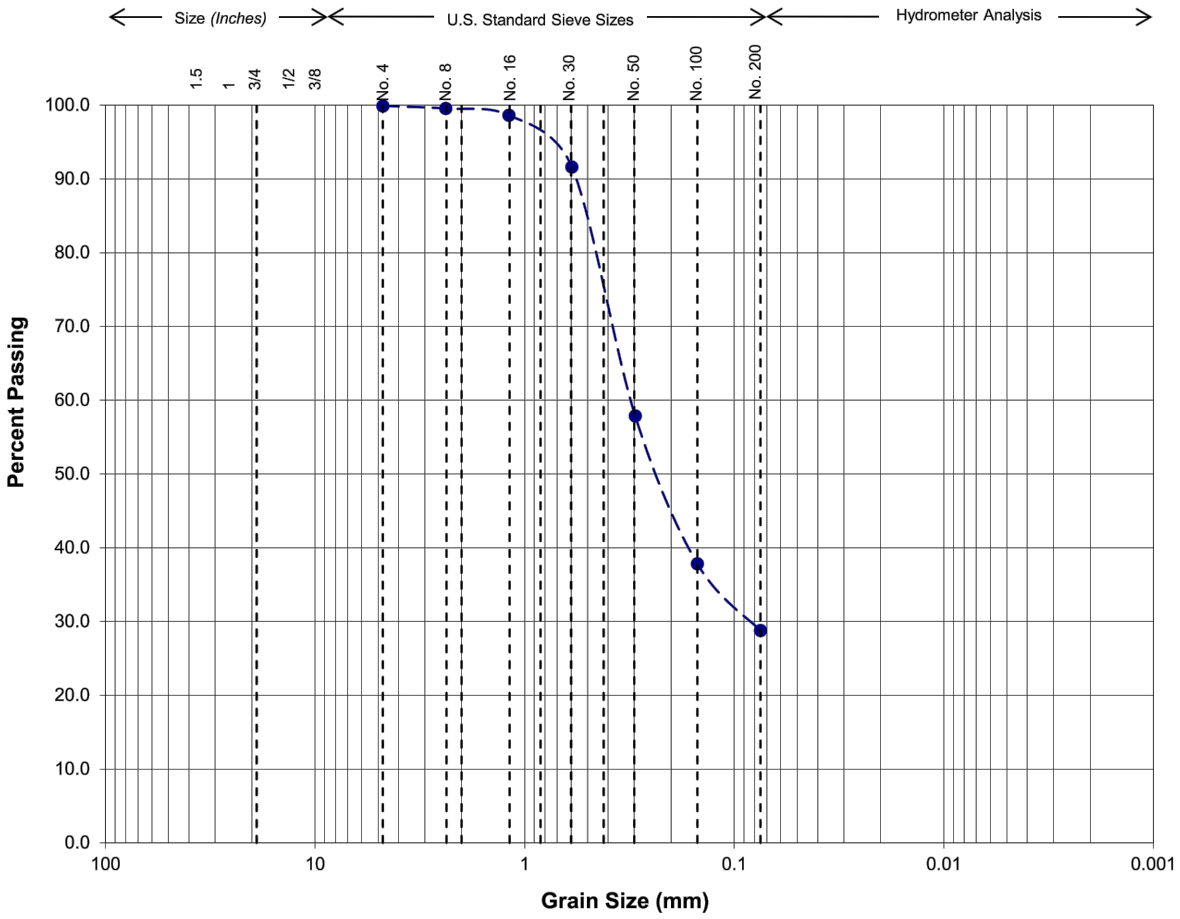
| BY: GN | DATE: AUGUST 2021 | PROJECT: 2021010 | FIGURE: C.16 |
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-5

Depth (ft): 9 - 12

USCS Soil Type: SM

Passing No. 200 (%): 29

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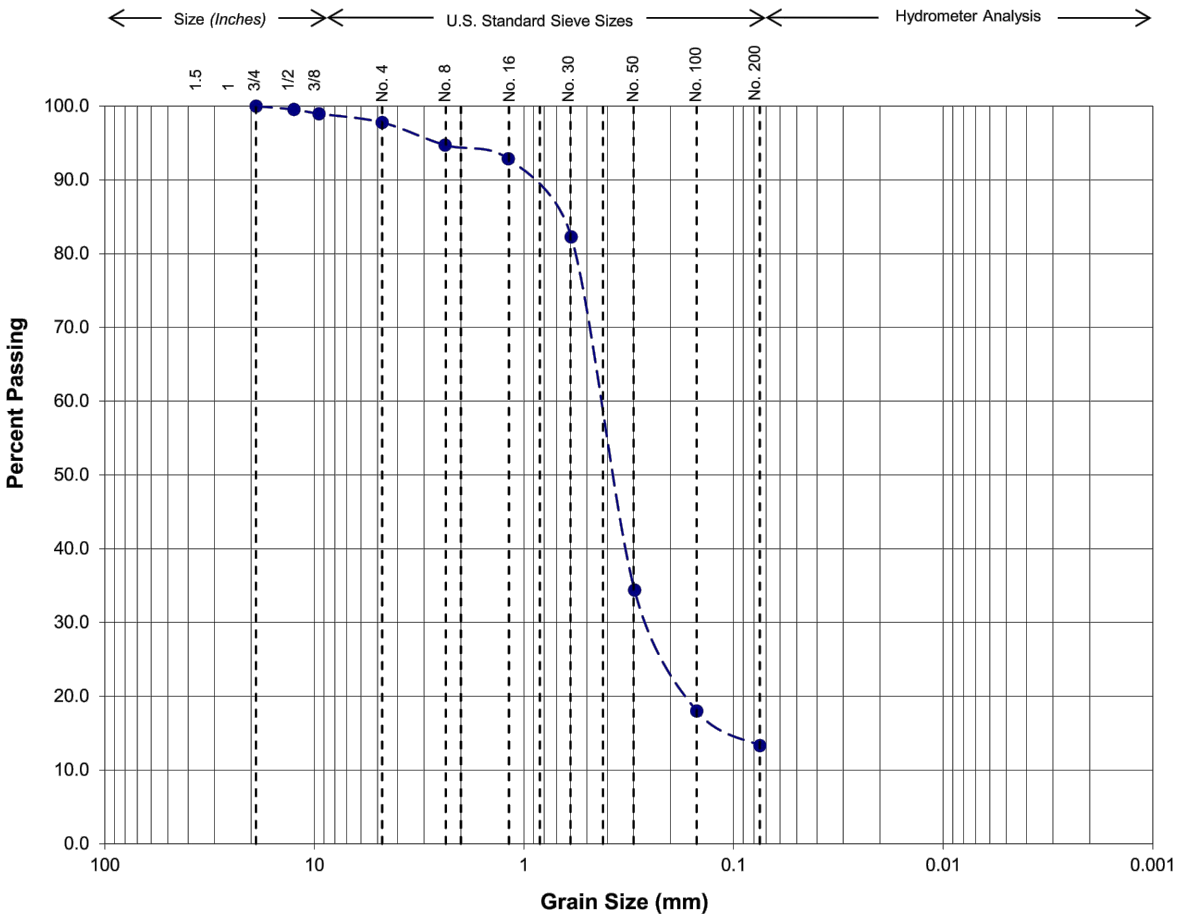
# CLASSIFICATION TEST RESULTS

**PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT**

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

| BY: GN | DATE: AUGUST 2021 | PROJECT: 2021010 | FIGURE: C.17 |
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-5

Depth (ft): 12 - 15

USCS Soil Type: SM

Passing No. 200 (%): 13

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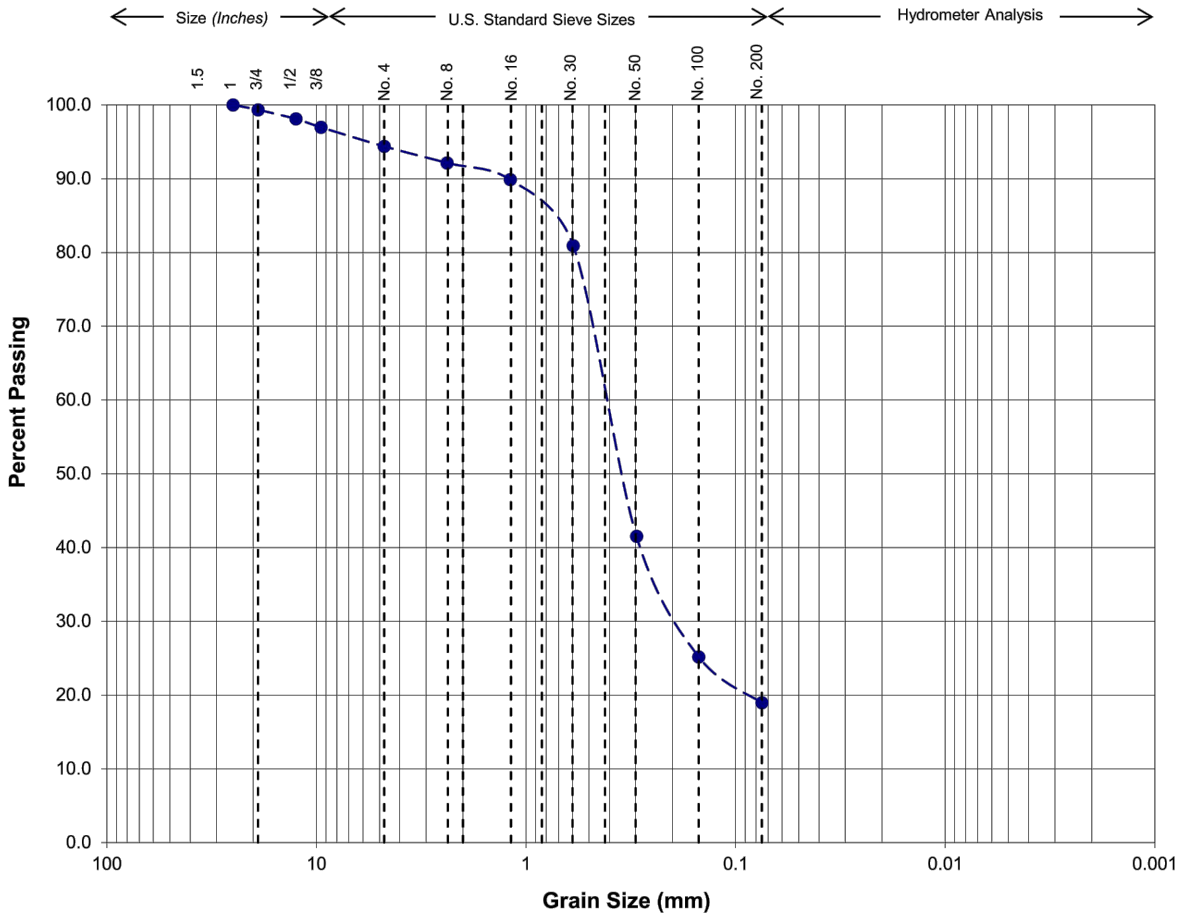
# CLASSIFICATION TEST RESULTS

**PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT**

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

| BY: GN | DATE: AUGUST 2021 | PROJECT: 2021010 | FIGURE: C.18 |
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-5

Depth (ft): 15½ - 17½

USCS Soil Type: SM

Passing No. 200 (%): 19

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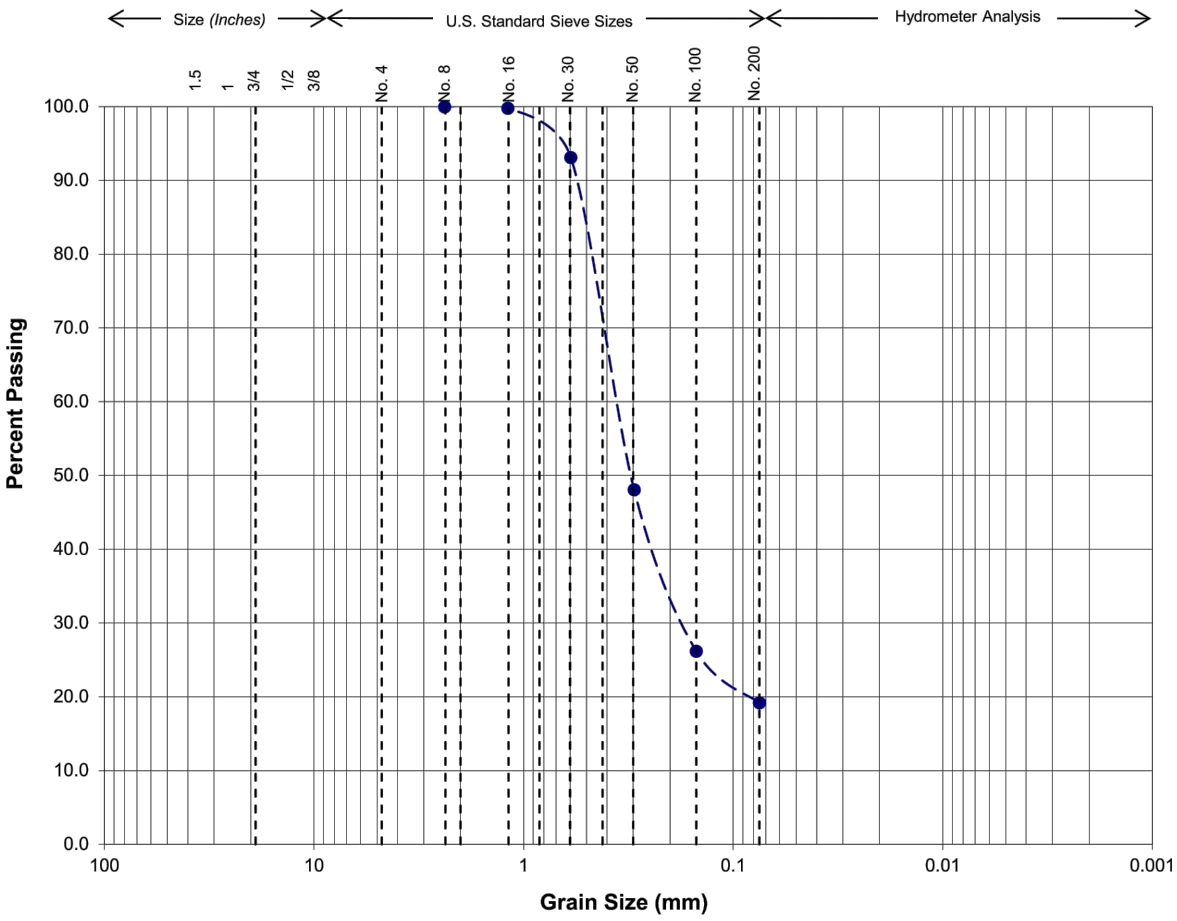
# CLASSIFICATION TEST RESULTS

**PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT**

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

| BY: GN | DATE: AUGUST 2021 | PROJECT: 2021010 | FIGURE: C.19 |
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: B-6

Depth (ft): 7½ - 9

USCS Soil Type: SM

Passing No. 200 (%): 19

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# CLASSIFICATION TEST RESULTS

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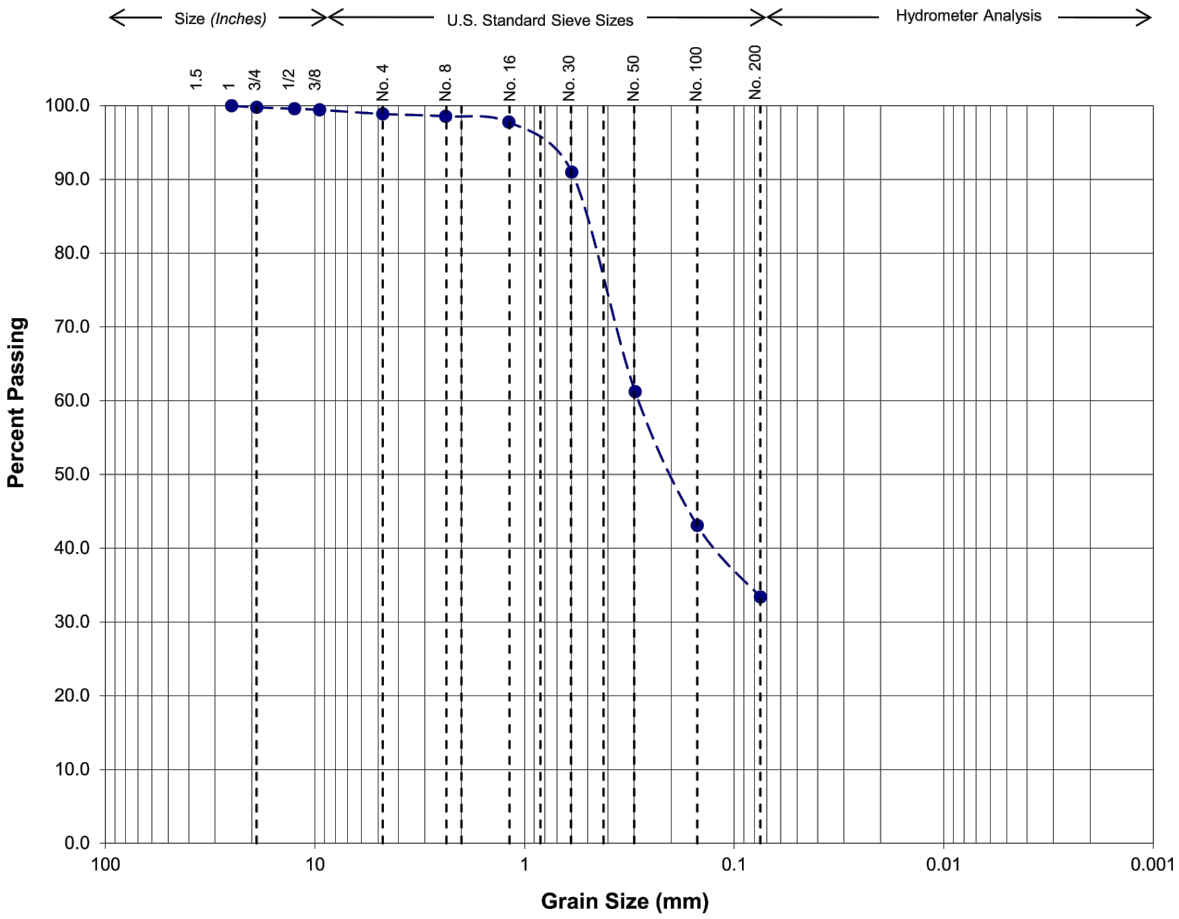
OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

| BY: GN | DATE: AUGUST 2021 | PROJECT: 2021010 | FIGURE: C.20 |
|---|---|---|---|




| Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|
| Coarse | Fine | Coarse | Medium | Fine | |

Sample Location: P-2

Depth (ft): 7 - 10

USCS Soil Type: SM

Passing No. 200 (%): 33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# CLASSIFICATION TEST RESULTS

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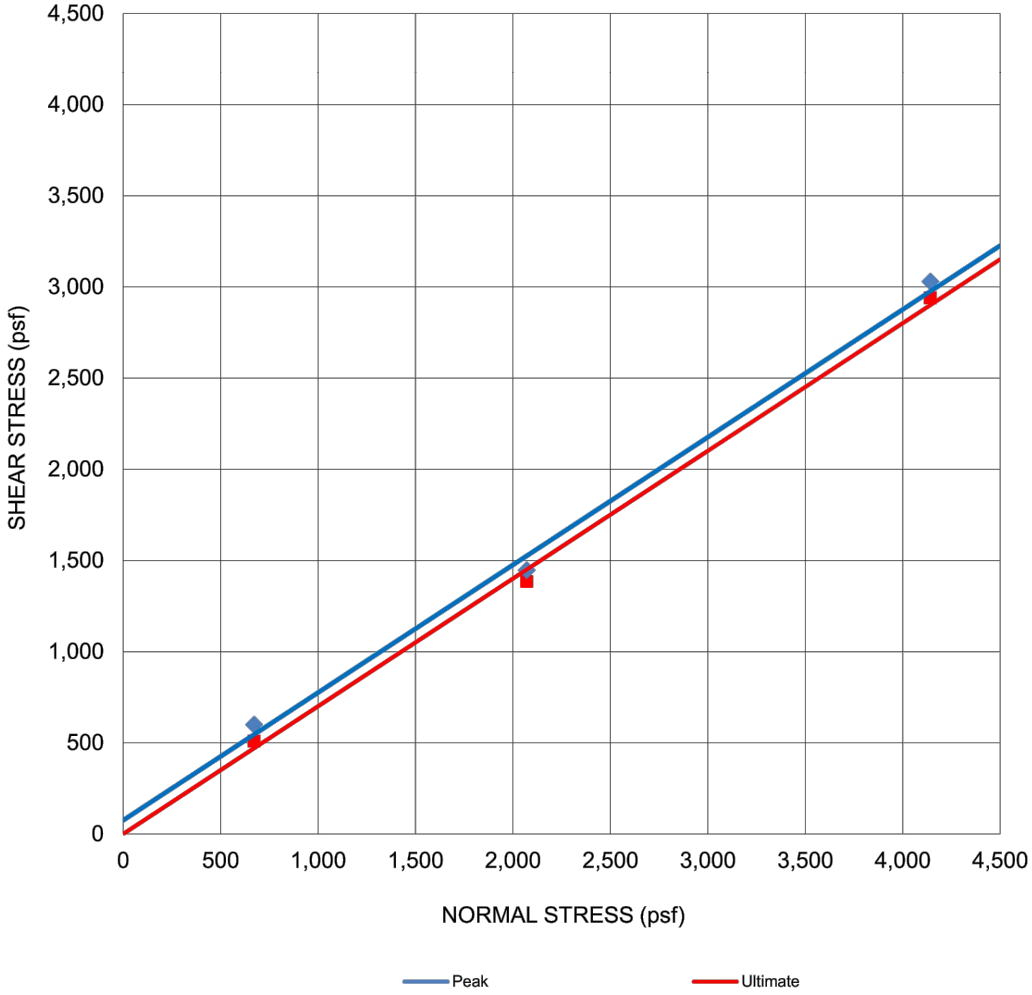
| BY: GN | DATE: AUGUST 2021 | PROJECT: 2021010 | FIGURE: C.21 |
|---|---|---|---|




| | | |
|---|---|---|
| Friction Angle (Φ): | 35 ° | 35 ° |
| Apparent Cohesion (C): | 75 psf | 0 psf |

| | |
|---|---|
| Soil Unit: | Quaternary Old Paralic Deposits (Qop) |
| Sample Location: | B-3 |
| Depth (ft): | 7½ - 9 |
| Notes: | In-Situ |
| USCS Soil Type: | SM |

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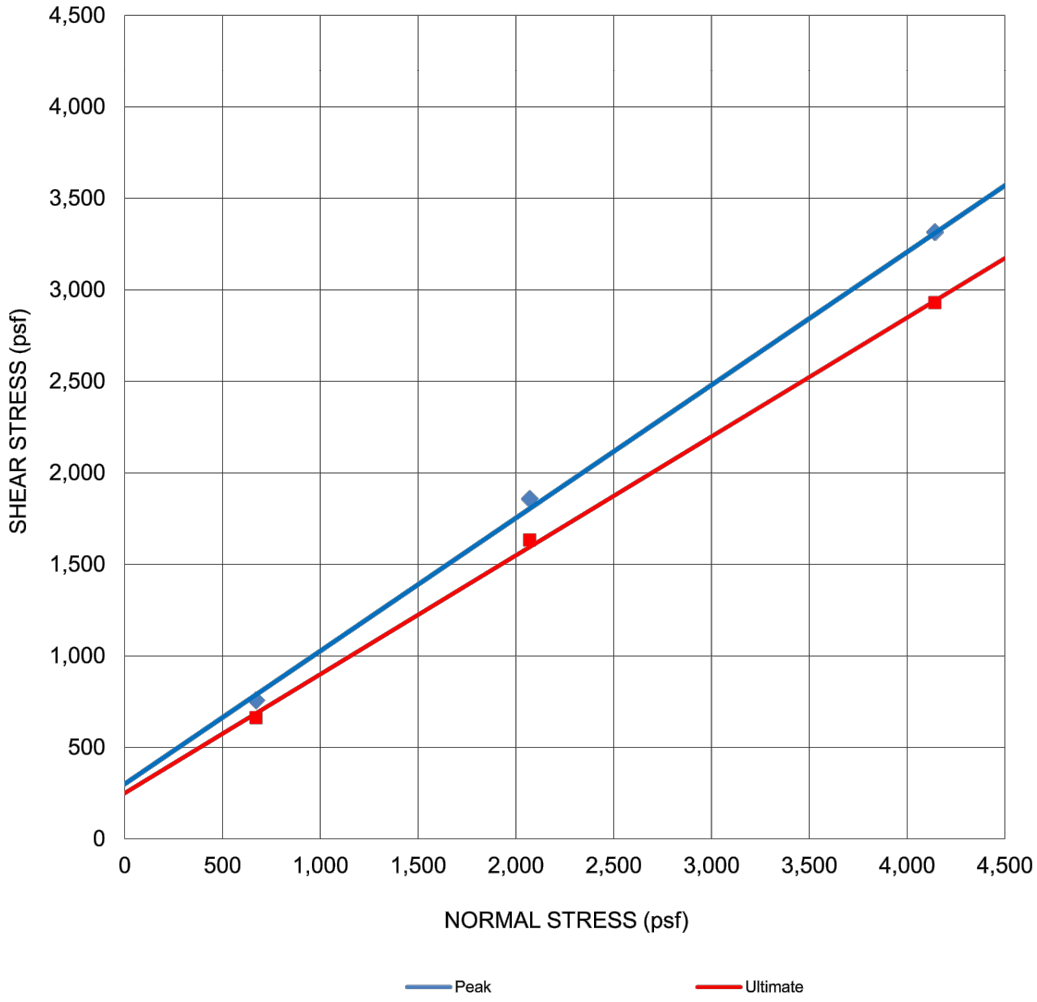
# DIRECT SHEAR TEST RESULTS

**PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT**

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

| BY: GN | DATE: AUGUST 2021 | PROJECT: 2021010 | FIGURE: C.22 |
|---|---|---|---|




| | | |
|---|---|---|
| Friction Angle (Φ): | 36 ° | 33 ° |
| Apparent Cohesion (C): | 300 psf | 250 psf |

| | |
|---|---|
| Soil Unit: | Quaternary Old Paralic Deposits (Qop) |
| Sample Location: | B-4 |
| Depth (ft): | 10 - 11½ |
| Notes: | In-Situ |
| USCS Soil Type: | SM |

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# DIRECT SHEAR TEST RESULTS

**PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT**

OCEANSIDE TRANSIT CENTER

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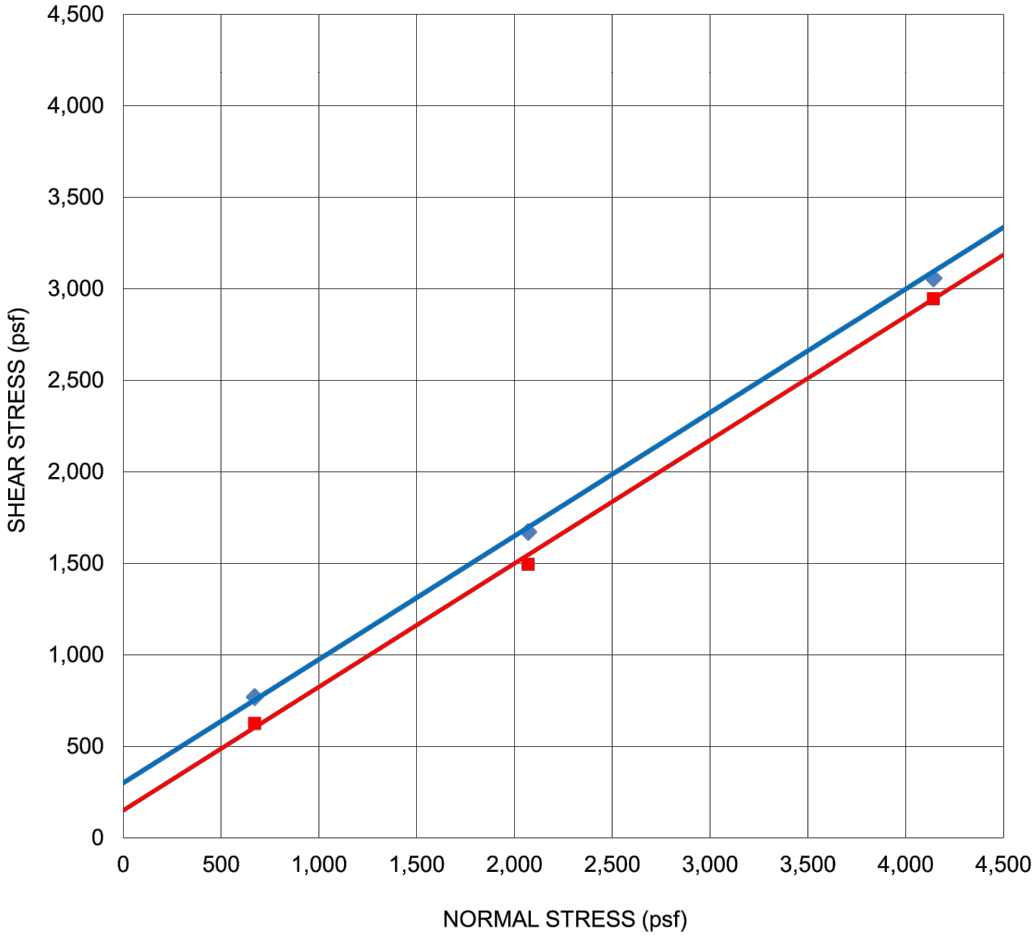
| BY: GN | DATE: AUGUST 2021 | PROJECT: 2021010 | FIGURE: C.23 |
|---|---|---|---|




| | | |
|---|---|---|
| Friction Angle (Φ): | 34 ° | 34 ° |
| Apparent Cohesion (C): | 300 psf | 150 psf |

| | |
|---|---|
| Soil Unit: | Quaternary Old Paralic Deposits (Qop) |
| Sample Location: | B-5 |
| Depth (ft): | 10 - 11½ |
| Notes: | In-Situ |
| USCS Soil Type: | SM |

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# DIRECT SHEAR TEST RESULTS

**PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT**

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

| BY: GN | DATE: AUGUST 2021 | PROJECT: 2021010 | FIGURE: C.24 |
|---|---|---|---|

## Density of Soil in Place (ASTM D2937)

| Sample Location | Sample Depth (ft) | Soil Description | Moisture (%) | Dry Density (pcf) |
|---|---|---|---|---|
| B-1 | 2½ - 4 | Dark Brown Silty Sand with Some Clay | 8.1 | 129.2 |
| B-1 | 8 - 8½ | Olive Brown Silty Sand | 5.4 | 114.5 |
| B-6 | 5 - 6½ | Reddish Brown Silty Sand with Clay | 5.1 | 130.0 |

## Maximum Dry Density and Optimum Moisture Content (ASTM D1557)

| Sample Location | Sample Depth (ft.) | Soil Description | Maximum Dry Density (pcf) | Optimum Moisture Content (%) |
|---|---|---|---|---|
| B-5 | 12 - 15 | Yellow/Orange Brown Silty Sand | 119.0 | 8.0 |
| B-5 | 15 - 17½ | Pale Olive Brown Silty Sandstone | 129.4 | 8.0 |
| B-6 | ½ - 5 | Dark Reddish Brown Silty Sand | 132.0 | 8.5 |
| B-6 | 14 - 17½ | Gray Brown with Orange and Dark Gray Clayey Sandstone | 146.0 | 6.7 |

## Resistance Value (Cal. Test Method 301 & ASTM D2844)

| Sample Location | Sample Depth (ft.) | Soil Description | R-Value |
|---|---|---|---|
| B-3 | 1 - 5 | Dark Reddish Brown Silty Sand | 24 |

## Corrosivity (Cal. Test Method 417,422,643)

| Sample Location | Sample Depth (ft.) | pH | Resistivity (Ohm-cm) | Sulfate Content (ppm) | Sulfate Content (%) | Chloride Content (ppm) | Chloride Content (%) |
|---|---|---|---|---|---|---|---|
| B - 3 | 16½ - 18 | 8.7 | 6700 | <30 | 0.003 | 53 | 0.005 |
| B - 5 | 15½ - 17½ | 8.7 | 5700 | <30 | 0.003 | 64 | 0.006 |
| B - 6 | ½ - 5 | 9.1 | 2400 | 90 | 0.009 | 53 | 0.005 |
| B - 6 | 14 - 17½ | 9.1 | 3500 | <30 | 0.003 | 32 | 0.003 |

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**LAB TEST RESULTS**

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OCEANSIDE TRANSIT CENTER
OCEANSIDE, CA 92054

| BY: GN | DATE: AUGUST 2021 | PROJECT: 2021010 | FIGURE: C.25 |
|---|---|---|---|

## Expansion Index (ASTM D4829)

| Sample Location | Sample Depth (ft.) | Expansion Index | Expansion Potential |
|---|---|---|---|
| B - 3 | 16½ - 18 | 1 | Very Low |
| B - 5 | 15½ - 17½ | 1 | Very Low |
| B - 6 | ½ - 5 | 1 | Very Low |
| B - 6 | 14 - 17½ | 3 | Very Low |

| EXPANSION INDEX | EXPANSION POTENTIAL |
|---|---|
| 0 - 20 | VERY LOW |
| 21 - 50 | LOW |
| 51 - 90 | MEDIUM |
| 91 - 130 | HIGH |
| 131 AND ABOVE | VERY HIGH |

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**LAB TEST RESULTS**

**PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT**
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OCEANSIDE, CA 92054

| BY: GN | DATE: AUGUST 2021 | PROJECT: 2021010 | FIGURE: C.26 |
|---|---|---|---|

# APPENDIX D
# INFILTRATION TEST RESULTS

# REPORT OF BOREHOLE PERCOLATION TESTING
## Storm Water Infiltration

| | | | |
|---|---|---|---|
| Project Name: | Oceanside Transit Center Redevelopment | Test Number: | **P-1** |
| Job Number: | 2021010 | Tested By: | AR |
| Date Drilled: | 4/8/2024 | Date Tested: | 4/9/2024 |
| Drilling Method: | 8-Inch Hollow Stem Auger | Presoak Time: | 24 hours |
| Drilled Depth (feet): | 10.00 | | |
| Test Hole Diameter (inches): | 8.0 | | |
| Gravel Pack: | Y | | |
| Pipe Diameter (inches): | 3.0 | | |

| Trial No. | Time | Time Interval, ΔT (min) | Initial Water Height, $H_o$ (ft) | Final Water Height, $H_f$ (ft) | Change in Water Height, ΔH (in) | Percolation Rate (min/in) |
|---|---|---|---|---|---|---|
| 1 | 10:27<br>10:37 | 0:10 | 2.51 | 1.79 | 8.64 | 1.16 |
| 2 | 10:37<br>10:47 | 0:10 | 2.40 | 1.90 | 6.00 | 1.67 |
| 3 | 10:47<br>10:47 | 0:10 | 2.35 | 1.80 | 6.60 | 1.52 |
| 4 | 10:57<br>10:57 | 0:10 | 2.09 | 1.61 | 5.76 | 1.74 |
| 5 | 11:07<br>11:07 | 0:10 | 2.25 | 1.70 | 6.60 | 1.52 |
| 6 | 11:17<br>11:27 | 0:10 | 2.10 | 1.70 | 4.80 | 2.08 |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |

| | | |
|---|---|---|
| Observed Percolation Rate: | 2.08 | min/in |
| | 28.8 | in/hr |
| **Tested Infiltation Rate Using Porchet Method, $I_t$:** | **2.32** | **in/hr** |
| **Infiltation Rate with Factor of Safety FS=2:** | **1.16** | **in/hr** |

**PORCHET METHOD CALCULATION:**

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

| | **Values from Last Trial** | |
|---|---|---|
| ΔH = Change in water head height over the time interval: | 4.80 | in |
| r = Test hole radius: | 4.00 | in |
| ΔT = Time interval: | 10 | min |
| $H_{avg}$= Average water height over time interval=12($H_o$ + $H_f$)/2: | 22.8 | in |

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| | | | |
|---|---|---|---|
| By: | JK | Date: | January 2024 |
| Job No: | 2021010 | Figure: | D.1 |

# REPORT OF BOREHOLE PERCOLATION TESTING
## Storm Water Infiltration

| | | | |
|---|---|---|---|
| Project Name: | Oceanside Transit Center Redevelopment | Test Number: | **P-2** |
| Job Number: | 2021010 | Tested By: | AR |
| Date Drilled: | 4/8/2024 | Date Tested: | 4/9/2024 |
| Drilling Method: | 8-Inch Hollow Stem Auger | Presoak Time: | 24 hours |
| Drilled Depth (feet): | 10.00 | | |
| Test Hole Diameter (inches): | 8.0 | | |
| Gravel Pack: | Y | | |
| Pipe Diameter (inches): | 3.0 | | |

| Trial No. | Time | Time Interval, ΔT (min) | Initial Water Height, $H_o$ (ft) | Final Water Height, $H_f$ (ft) | Change in Water Height, ΔH (in) | Percolation Rate (min/in) |
|---|---|---|---|---|---|---|
| 1 | 10:25<br>10:35 | 0:10 | 2.17 | 1.37 | 9.60 | 1.04 |
| 2 | 10:35<br>10:45 | 0:10 | 2.27 | 1.67 | 7.20 | 1.39 |
| 3 | 10:45<br>10:55 | 0:10 | 2.27 | 1.47 | 9.60 | 1.04 |
| 4 | 10:55<br>11:05 | 0:10 | 2.15 | 1.56 | 7.08 | 1.41 |
| 5 | 11:05<br>11:15 | 0:10 | 2.46 | 1.87 | 7.08 | 1.41 |
| 6 | 11:15<br>11:25 | 0:10 | 2.51 | 2.06 | 5.40 | 1.85 |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |

| | | |
|---|---|---|
| Observed Percolation Rate: | 1.85 | min/in |
| | 32.4 | in/hr |
| **Tested Infiltation Rate Using Porchet Method, $I_t$:** | **2.21** | **in/hr** |
| **Infiltation Rate with Factor of Safety FS=2:** | **1.10** | **in/hr** |

**PORCHET METHOD CALCULATION:**

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

| | Values from Last Trial | |
|---|---|---|
| ΔH = Change in water head height over the time interval: | 5.40 | in |
| r = Test hole radius: | 4.00 | in |
| ΔT = Time interval: | 10 | min |
| $H_{avg}$= Average water height over time interval=12($H_o$ + $H_f$)/2: | 27.4 | in |

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| | | | |
|---|---|---|---|
| By: | JK | Date: | January 2024 |
| Job No: | 2021010 | Figure: | D.2 |

# REPORT OF BOREHOLE PERCOLATION TESTING
## Storm Water Infiltration

| | | | |
|---|---|---|---|
| Project Name: | Oceanside Transit Center Redevelopment | Test Number: | **P-3** |
| Job Number: | 2021010 | Tested By: | JK |
| Date Drilled: | 11/30/2023 | Date Tested: | 11/30/2023 |
| Drilling Method: | 8-Inch Hollow Stem Auger | Presoak Time: | 1 hour |
| Drilled Depth (feet): | 7.00 | | |
| Test Hole Diameter (inches): | 8.0 | | |
| Gravel Pack: | Y | | |
| Pipe Diameter (inches): | 3.0 | | |

| Trial No. | Time | Time Interval, ΔT (min) | Initial Water Height, $H_o$ (ft) | Final Water Height, $H_f$ (ft) | Change in Water Height, ΔH (in) | Percolation Rate (min/in) |
|---|---|---|---|---|---|---|
| 1 | 9:31<br>9:41 | 0:10 | 3.03 | 1.69 | 16.08 | 0.62 |
| 2 | 9:44<br>9:54 | 0:10 | 3.13 | 1.63 | 18.00 | 0.56 |
| 3 | 9:56<br>10:06 | 0:10 | 3.13 | 1.64 | 17.88 | 0.56 |
| 4 | 10:10<br>10:20 | 0:10 | 3.13 | 1.63 | 18.00 | 0.56 |
| 5 | 10:21<br>10:31 | 0:10 | 3.08 | 1.65 | 17.16 | 0.58 |
| 6 | 10:35<br>11:45 | 0:10 | 3.14 | 1.68 | 17.52 | 0.57 |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |

| | | |
|---|---|---|
| Observed Percolation Rate: | 0.57 | min/in |
| | 105.1 | in/hr |
| **Tested Infiltation Rate Using Porchet Method, $I_t$:** | **6.79** | **in/hr** |
| **Infiltation Rate with Factor of Safety FS=2:** | **3.40** | **in/hr** |

**PORCHET METHOD CALCULATION:**

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

| | **Values from Last Trial** | |
|---|---|---|
| ΔH = Change in water head height over the time interval: | 17.52 | in |
| r = Test hole radius: | 4.00 | in |
| ΔT = Time interval: | 10 | min |
| $H_{avg}$= Average water height over time interval=12($H_o$ + $H_f$)/2: | 29.0 | in |

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| | | | |
|---|---|---|---|
| By: | JK | Date: | January 2024 |
| Job No: | 2021010 | Figure: | D.3 |

# REPORT OF BOREHOLE PERCOLATION TESTING
## Storm Water Infiltration

| | | | |
|---|---|---|---|
| Project Name: | Oceanside Transit Center Redevelopment | Test Number: | **P-4** |
| Job Number: | 2021010 | Tested By: | JK |
| Date Drilled: | 11/30/2023 | Date Tested: | 11/30/2023 |
| Drilling Method: | 8-Inch Hollow Stem Auger | Presoak Time: | 1 hour |
| Drilled Depth (feet): | 7.00 | | |
| Test Hole Diameter (inches): | 8.0 | | |
| Gravel Pack: | Y | | |
| Pipe Diameter (inches): | 3.0 | | |

| Trial No. | Time | Time Interval, ΔT (min) | Initial Water Height, $H_o$ (ft) | Final Water Height, $H_f$ (ft) | Change in Water Height, ΔH (in) | Percolation Rate (min/in) |
|---|---|---|---|---|---|---|
| 1 | 12:58<br>13:08 | 0:10 | 3.39 | 3.06 | 3.96 | 2.53 |
| 2 | 13:10<br>13:20 | 0:10 | 3.40 | 3.10 | 3.60 | 2.78 |
| 3 | 13:22<br>13:32 | 0:10 | 3.41 | 3.11 | 3.60 | 2.78 |
| 4 | 13:33<br>13:43 | 0:10 | 3.40 | 3.11 | 3.48 | 2.87 |
| 5 | 13:56<br>14:06 | 0:10 | 3.42 | 3.11 | 3.72 | 2.69 |
| 6 | 14:08<br>14:18 | 0:10 | 3.39 | 3.04 | 4.20 | 2.38 |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| | | | | Observed Percolation Rate: | | 2.38 min/in<br>25.2 in/hr |
| | | | | **Tested Infiltation Rate Using Porchet Method, $I_t$:** | | **1.24 in/hr** |
| | | | | **Infiltation Rate with Factor of Safety FS=2:** | | **0.62 in/hr** |

**PORCHET METHOD CALCULATION:**

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

| | **Values from Last Trial** |
|---|---|
| ΔH = Change in water head height over the time interval: | 4.20 in |
| r = Test hole radius: | 4.00 in |
| ΔT = Time interval: | 10 min |
| $H_{avg}$= Average water height over time interval=12($H_o$ + $H_f$)/2: | 38.5 in |

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4373 VIEWRIDGE AVENUE, SUITE B
SAN DIEGO, CALIFORNIA 92123
858.292.7575

Proposed NCTD Oceanside Transit Center Mixed-Use Development
Oceanside, CA

| | | | |
|---|---|---|---|
| By: | JK | Date: | January 2024 |
| Job No: | 2021010 | Figure: | D.4 |

# REPORT OF BOREHOLE PERCOLATION TESTING
## Storm Water Infiltration

| | | | |
|---|---|---|---|
| Project Name: | Oceanside Transit Center Redevelopment | Test Number: | **P-9** |
| Job Number: | 2021010 | Tested By: | JK |
| Date Drilled: | 12/1/2023 | Date Tested: | 12/1/2023 |
| Drilling Method: | 8-Inch Hollow Stem Auger | Presoak Time: | 1 hour |
| Drilled Depth (feet): | 12.00 | | |
| Test Hole Diameter (inches): | 8.0 | | |
| Gravel Pack: | Y | | |
| Pipe Diameter (inches): | 3.0 | | |

| Trial No. | Time | Time Interval, ΔT (min) | Initial Water Height, $H_o$ (ft) | Final Water Height, $H_f$ (ft) | Change in Water Height, ΔH (in) | Percolation Rate (min/in) |
|---|---|---|---|---|---|---|
| 1 | 9:04<br>9:14 | 0:10 | 2.85 | 1.34 | 18.12 | 0.55 |
| 2 | 9:16<br>9:26 | 0:10 | 2.95 | 1.40 | 18.60 | 0.54 |
| 3 | 9:48<br>9:58 | 0:10 | 2.95 | 1.80 | 13.80 | 0.72 |
| 4 | 10:01<br>10:11 | 0:10 | 2.98 | 1.42 | 18.72 | 0.53 |
| 5 | 10:13<br>10:23 | 0:10 | 2.94 | 1.63 | 15.72 | 0.64 |
| 6 | 10:25<br>10:35 | 0:10 | 3.00 | 1.33 | 20.04 | 0.50 |
| 7 | 10:36<br>10:46 | 0:10 | 3.02 | 1.31 | 20.52 | 0.49 |
| 8 | 10:49<br>10:59 | 0:10 | 2.95 | 1.25 | 20.40 | 0.49 |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |

| | | |
|---|---|---|
| Observed Percolation Rate: | 0.49 | min/in |
| | 122.4 | in/hr |
| **Tested Infiltation Rate Using Porchet Method, $I_t$:** | **9.00** | **in/hr** |
| **Infiltation Rate with Factor of Safety FS=2:** | **4.50** | **in/hr** |

**PORCHET METHOD CALCULATION:**

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

| | Values from Last Trial | |
|---|---|---|
| ΔH = Change in water head height over the time interval: | 20.40 | in |
| r = Test hole radius: | 4.00 | in |
| ΔT = Time interval: | 10 | min |
| $H_{avg}$= Average water height over time interval=12($H_o$ + $H_f$)/2: | 25.2 | in |

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| | | | |
|---|---|---|---|
| By: | JK | Date: | January 2024 |
| Job No: | 2021010 | Figure: | D.5 |

# REPORT OF BOREHOLE PERCOLATION TESTING
## Storm Water Infiltration

| | | | |
|---|---|---|---|
| Project Name: | Oceanside Transit Center Redevelopment | Test Number: | **P-10** |
| Job Number: | 2021010 | Tested By: | JK |
| Date Drilled: | 12/1/2023 | Date Tested: | 12/1/2023 |
| Drilling Method: | 8-Inch Hollow Stem Auger | Presoak Time: | 1 hour |
| Drilled Depth (feet): | 12.00 | | |
| Test Hole Diameter (inches): | 8.0 | | |
| Gravel Pack: | Y | | |
| Pipe Diameter (inches): | 3.0 | | |

| Trial No. | Time | Time Interval, ΔT (min) | Initial Water Height, $H_o$ (ft) | Final Water Height, $H_f$ (ft) | Change in Water Height, ΔH (in) | Percolation Rate (min/in) |
|---|---|---|---|---|---|---|
| 1 | 9:55<br>10:05 | 0:10 | 3.20 | 2.26 | 11.28 | 0.89 |
| 2 | 10:08<br>10:18 | 0:10 | 3.25 | 2.27 | 11.76 | 0.85 |
| 3 | 10:21<br>10:31 | 0:10 | 3.22 | 2.29 | 11.16 | 0.90 |
| 4 | 10:32<br>10:42 | 0:10 | 3.20 | 2.30 | 10.80 | 0.93 |
| 5 | 10:43<br>10:53 | 0:10 | 3.31 | 2.40 | 10.92 | 0.92 |
| 6 | 10:55<br>11:05 | 0:10 | 3.28 | 2.34 | 11.28 | 0.89 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| | | |
|---|---|---|
| Observed Percolation Rate: | 0.89 | min/in |
| | 67.7 | in/hr |
| **Tested Infiltation Rate Using Porchet Method, $I_t$:** | **3.79** | **in/hr** |
| **Infiltation Rate with Factor of Safety FS=2:** | **1.89** | **in/hr** |

**PORCHET METHOD CALCULATION:**

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

| | Values from Last Trial | |
|---|---|---|
| ΔH = Change in water head height over the time interval: | 11.28 | in |
| r = Test hole radius: | 4.00 | in |
| ΔT = Time interval: | 10 | min |
| $H_{avg}$= Average water height over time interval=12($H_o$ + $H_f$)/2: | 33.7 | in |

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| | | | |
|---|---|---|---|
| By: | JK | Date: | January 2024 |
| Job No: | 2021010 | Figure: | D.6 |

# VII. NRCS SOILS REPORT

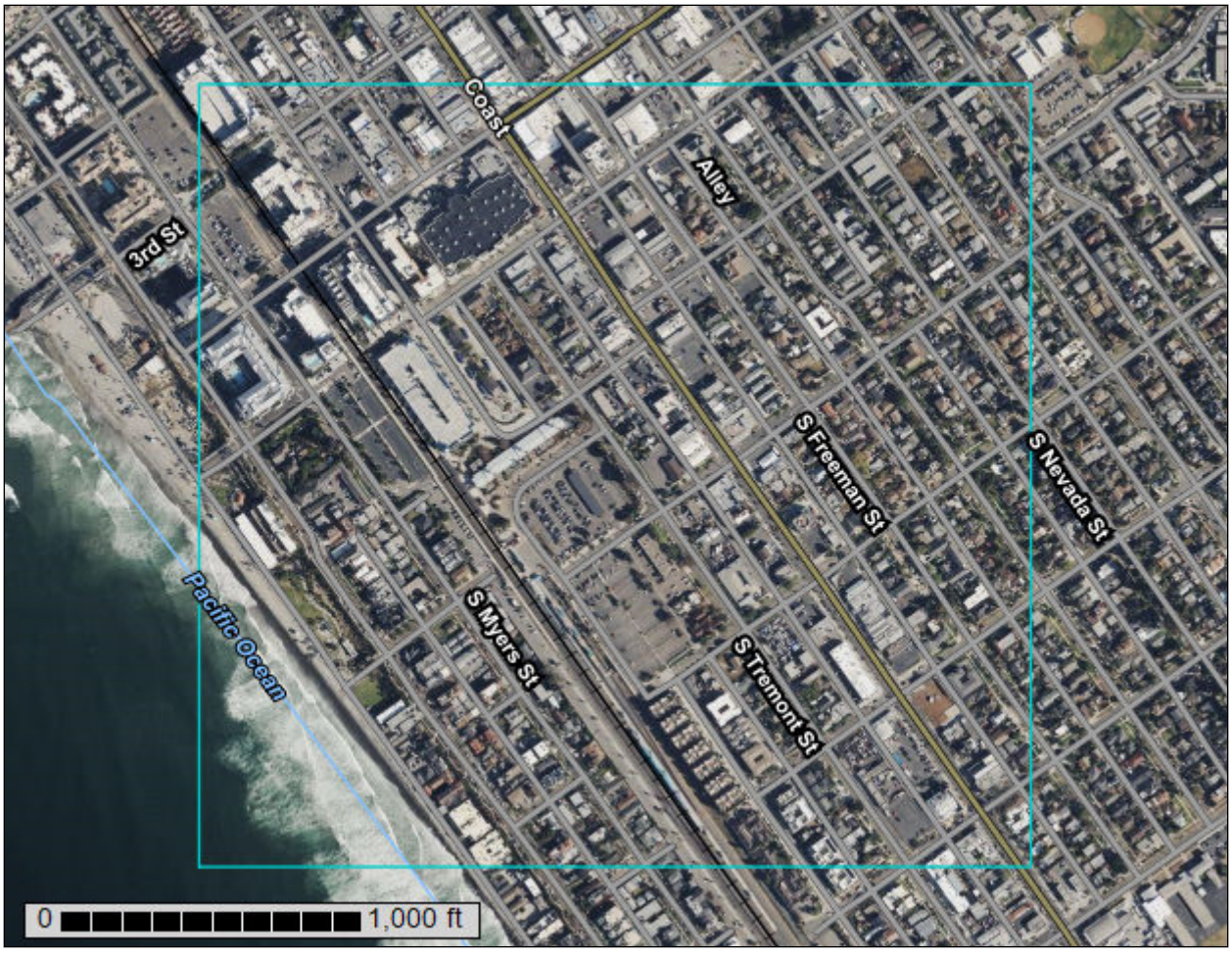
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for San Diego County Area, California




August 24, 2022

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map

Map Scale: 1:6,710 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 16, Sep 13, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| Cr | Coastal beaches | 10.7 | 6.5% |
| TuB | Tujunga sand, 0 to 5 percent slopes | 151.3 | 91.4% |
| **Totals for Area of Interest** | | **165.6** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# San Diego County Area, California

## Cr—Coastal beaches

### Map Unit Setting

*National map unit symbol:* hb9z
*Elevation:* 0 to 10 feet
*Mean annual precipitation:* 42 to 48 inches
*Mean annual air temperature:* 52 to 57 degrees F
*Frost-free period:* 190 to 210 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Beaches, coastal:* 98 percent
*Minor components:* 2 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Beaches, Coastal

#### Setting

*Landform:* Beaches
*Parent material:* Beach sand

#### Typical profile

*H1 - 0 to 6 inches:* coarse sand
*H2 - 6 to 60 inches:* coarse sand

#### Properties and qualities

*Slope:* 1 to 5 percent
*Drainage class:* Poorly drained
*Runoff class:* Negligible
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
*Depth to water table:* About 0 to 72 inches
*Frequency of flooding:* Frequent
*Maximum salinity:* Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
*Available water supply, 0 to 60 inches:* Very low (about 2.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8
*Hydrologic Soil Group:* D
*Ecological site:* R019XG902CA - Beaches
*Hydric soil rating:* Yes

### Minor Components

#### Unnamed

*Percent of map unit:* 2 percent
*Landform:* Tidal flats
*Hydric soil rating:* Yes

## TuB—Tujunga sand, 0 to 5 percent slopes

### Map Unit Setting

*National map unit symbol:* hbh0
*Elevation:* 10 to 2,500 feet
*Mean annual precipitation:* 10 to 25 inches
*Mean annual air temperature:* 59 to 64 degrees F
*Frost-free period:* 280 to 350 days
*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Tujunga and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Tujunga

#### Setting

*Landform:* Flood plains
*Landform position (three-dimensional):* Riser, flat
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 14 inches:* sand
*H2 - 14 to 34 inches:* loamy sand
*H3 - 34 to 60 inches:* stratified gravelly sand to gravelly loamy sand

#### Properties and qualities

*Slope:* 0 to 5 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Somewhat excessively drained
*Runoff class:* Negligible
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* Rare
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Low (about 3.9 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 3s
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* A
*Ecological site:* R019XD035CA - SANDY (1975)
*Hydric soil rating:* No

**Minor Components**

**Ramona**

*Percent of map unit:* 5 percent
*Hydric soil rating:* No

**Grangeville**

*Percent of map unit:* 5 percent
*Hydric soil rating:* No

**Visalia**

*Percent of map unit:* 2 percent
*Hydric soil rating:* No

**Riverwash**

*Percent of map unit:* 2 percent
*Landform:* Drainageways
*Hydric soil rating:* Yes

**Unnamed**

*Percent of map unit:* 1 percent
*Landform:* Flood plains
*Hydric soil rating:* Yes

# Soil Information for All Uses

## Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

### Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group 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.

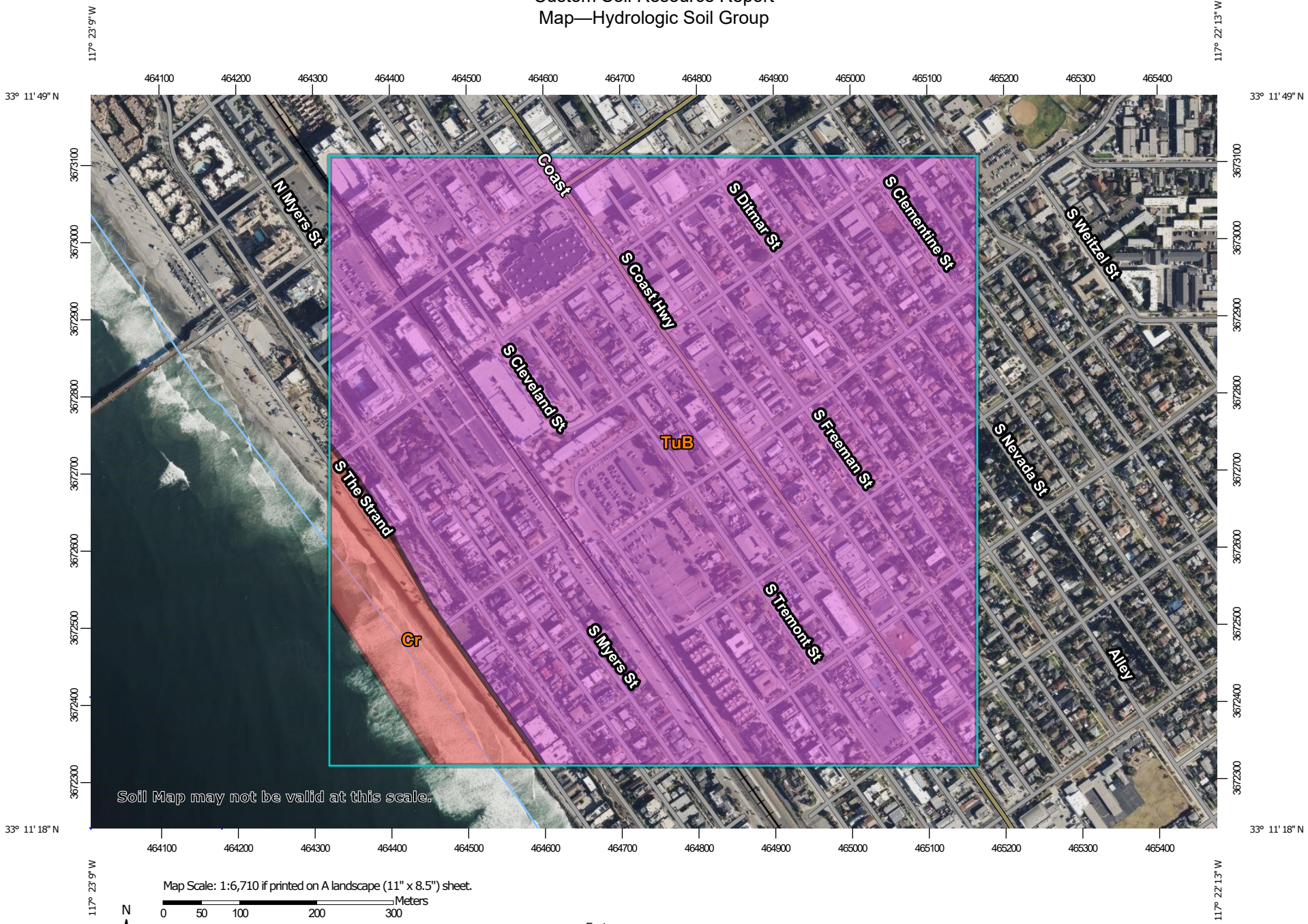
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group 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.

Group 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.

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. Only the soils that in their natural condition are in group D are assigned to dual classes.

# Custom Soil Resource Report
## Map—Hydrologic Soil Group




Map Scale: 1:6,710 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Soil Rating Lines**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Soil Rating Points**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 16, Sep 13, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Table—Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| Cr | Coastal beaches | D | 10.7 | 6.5% |
| TuB | Tujunga sand, 0 to 5 percent slopes | A | 151.3 | 91.4% |
| **Totals for Area of Interest** | | | **165.6** | **100.0%** |

## Rating Options—Hydrologic Soil Group

*Aggregation Method:* Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

*Component Percent Cutoff: None Specified*

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

*Tie-break Rule:* Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

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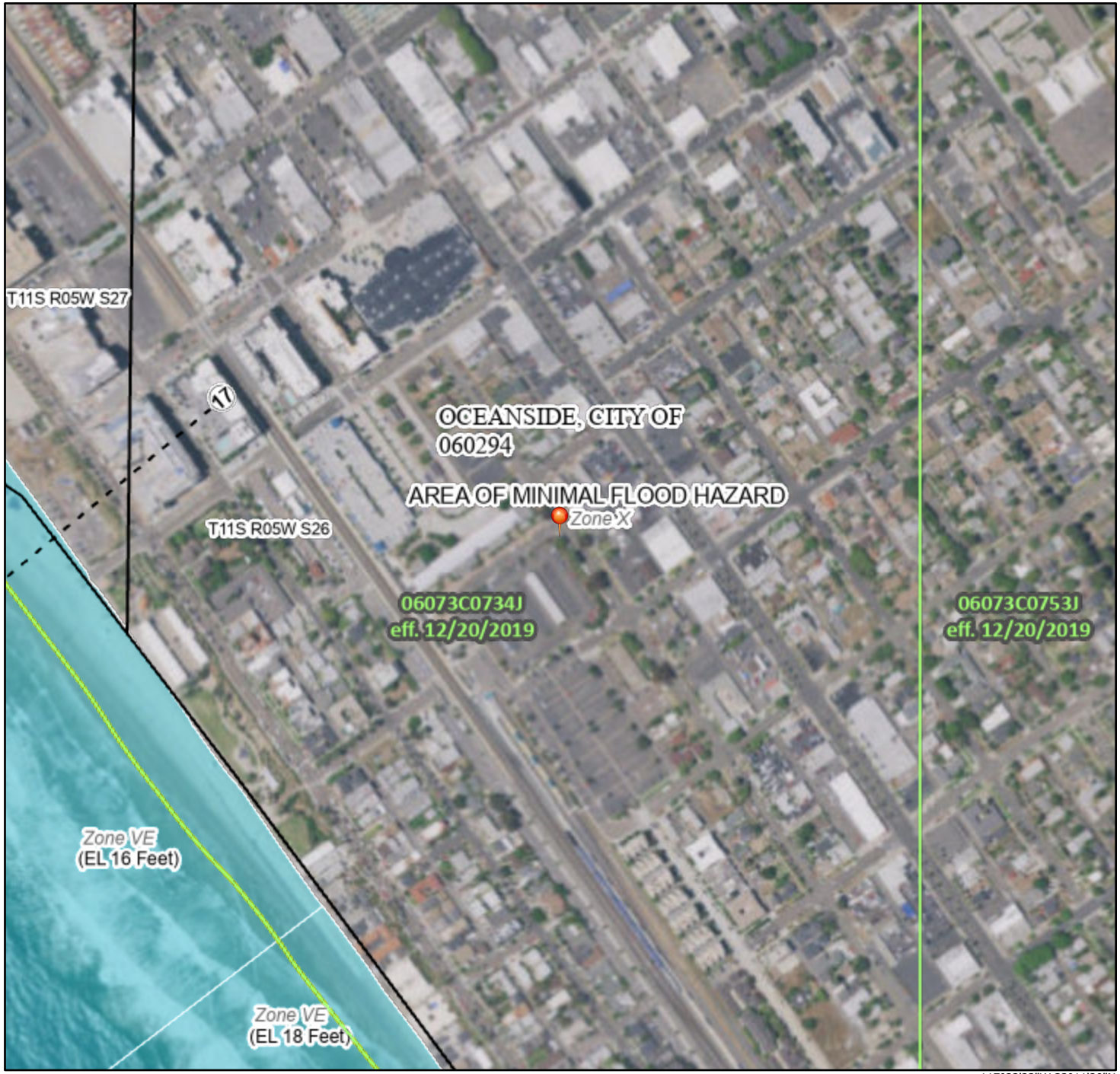
# VIII. FEMA FIRMETTE

# National Flood Hazard Layer FIRMette

FEMA

117°23'1"W 33°11'50"N




0 250 500 1,000 1,500 2,000 Feet 1:6,000

117°22'23"W 33°11'20"N

*Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/24/2022 at 1:51 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# IX. WSPG ANALYSIS

a) Existing Condition - Central Tributary Connection with 15” RCP

b) Proposed Condition - Central Tributary Connection with 15” RCP

c) Proposed Condition - South Cleveland Street Storm Drain Extension

d) Inundation Map

```
T1 NCTD OCEANSIDE TRANSIT CENTER TOD                                          0
T2 EXISTING CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
T3 LINE A WSPG FOR 100-YEAR STORM
SO    -16.000  42.620  1                          43.120
R        .000  42.700  1      .013                                .000    .000 0
TS      4.500  42.720  2      .013                                .000
R     215.500  43.780  2      .013                                .000    .000 0
JX    221.500  43.810  4  3   .013    0.001          43.810       90.0      -68.000
R     245.500  43.930  4      .013                                .000  68.000 0
R     280.500  44.100  4      .013                                .000  90.000 0
R     318.500  44.280  4      .013                                .000 -90.000 0
R     457.500  44.970  4      .013                                .000  90.000 0
R     586.500  45.600  4      .013                                .000 -30.000 0
R     607.125  45.700  4      .013                                .000 -30.000 0
R     627.750  45.810  4      .013                                .000 -30.000 0
JX    631.750  45.990  4  3   .013    0.001          45.990       90.0      -30.000
R     856.750  56.500  4      .013                                .000 -30.000 0
R     885.750  56.870  4      .013                                .000 -30.000 0
R     914.750  57.240  4      .013                                .000 -30.000 0
R     993.750  58.260  4      .013                                .000  30.000 0
R    1001.750  58.360  4      .013                                .000  30.000 0
R    1009.750  58.460  4      .013                                .000  30.000 0
R    1041.750  58.870  4      .013                                .000  45.000 0
R    1051.750  59.000  4      .013                                .000    .000 0
SH   1051.750  59.000  4                          59.000
CD   1  3   0    .000    .250    6.000  .000  .000   .00
CD   2  4   1    .000   1.250     .000  .000  .000   .00
CD   3  4   1    .000   1.250     .000  .000  .000   .00
CD   4  4   1    .000   1.250     .000  .000  .000   .00
Q           12.110   .0
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Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 6-17-2024 Time: 2:22:22

NCTD OCEANSIDE TRANSIT CENTER TOD
EXISTING CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| -16.000 | 42.620 | .500 | 43.120 | 12.11 | 8.07 | 1.01 | 44.13 | .00 | .25 | 6.00 | .250 | 6.000 | .00 | 0 .0 |
| 16.000 | .0050 | | | | | .0843 | 1.35 | .50 | 2.85 | .25 | .013 | .00 | .00 | BOX |
| .000 | 42.700 | 1.769 | 44.469 | 12.11 | 8.07 | 1.01 | 45.48 | .00 | .25 | 6.00 | .250 | 6.000 | .00 | 0 .0 |
| TRANS STR | .0044 | | | | | .0597 | .27 | 1.77 | 2.85 | | .013 | .00 | .00 | BOX |
| 4.500 | 42.720 | 1.768 | 44.488 | 12.11 | 9.87 | 1.51 | 46.00 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 211.000 | .0050 | | | | | .0352 | 7.42 | 1.77 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 215.500 | 43.780 | 8.125 | 51.905 | 12.11 | 9.87 | 1.51 | 53.42 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| JUNCT STR | .0050 | | | | | .0352 | .21 | .00 | .00 | | .013 | .00 | .00 | PIPE |
| 221.500 | 43.810 | 8.307 | 52.117 | 12.11 | 9.87 | 1.51 | 53.63 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 24.000 | .0050 | | | | | .0351 | .84 | 8.31 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 245.500 | 43.930 | 9.370 | 53.300 | 12.11 | 9.87 | 1.51 | 54.81 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 35.000 | .0049 | | | | | .0351 | 1.23 | 9.37 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 280.500 | 44.100 | 10.879 | 54.979 | 12.11 | 9.87 | 1.51 | 56.49 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 38.000 | .0047 | | | | | .0351 | 1.34 | 10.88 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 318.500 | 44.280 | 12.484 | 56.764 | 12.11 | 9.87 | 1.51 | 58.28 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 139.000 | .0050 | | | | | .0351 | 4.89 | 12.48 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 457.500 | 44.970 | 17.129 | 62.099 | 12.11 | 9.87 | 1.51 | 63.61 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 129.000 | .0049 | | | | | .0351 | 4.53 | 17.13 | .00 | 1.25 | .013 | .00 | .00 | PIPE |

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 6-17-2024 Time: 2:22:22

NCTD OCEANSIDE TRANSIT CENTER TOD
EXISTING CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head / SF Ave | Energy Grd.El. / HF | Super Elev / SE Dpth | Critical Depth / Froude N | Flow Top Width / Norm Dp | Height/ Dia.-FT / "N" | Base Wt or I.D. / X-Fall | ZL / ZR | No Wth Prs/Pip / Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | | | | | | | | | |
| 586.500 | 45.600 | 21.183 | 66.783 | 12.11 | 9.87 | 1.51 | 68.30 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 20.625 | .0048 | | | | | .0351 | .72 | 21.18 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 607.125 | 45.700 | 21.958 | 67.658 | 12.11 | 9.87 | 1.51 | 69.17 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 20.625 | .0053 | | | | | .0351 | .72 | 21.96 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 627.750 | 45.810 | 22.722 | 68.532 | 12.11 | 9.87 | 1.51 | 70.04 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| JUNCT STR | .0450 | | | | | .0351 | .14 | .00 | .00 | | .013 | .00 | .00 | PIPE |
| 631.750 | 45.990 | 22.684 | 68.674 | 12.11 | 9.87 | 1.51 | 70.19 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 225.000 | .0467 | | | | | .0351 | 7.91 | 22.68 | .00 | .90 | .013 | .00 | .00 | PIPE |
| 856.750 | 56.500 | 20.231 | 76.731 | 12.11 | 9.87 | 1.51 | 78.24 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 29.000 | .0128 | | | | | .0351 | 1.02 | 20.23 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 885.750 | 56.870 | 21.029 | 77.899 | 12.11 | 9.87 | 1.51 | 79.41 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 29.000 | .0128 | | | | | .0351 | 1.02 | 21.03 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 914.750 | 57.240 | 21.828 | 79.068 | 12.11 | 9.87 | 1.51 | 80.58 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 79.000 | .0129 | | | | | .0351 | 2.78 | 21.83 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 993.750 | 58.260 | 23.734 | 81.994 | 12.11 | 9.87 | 1.51 | 83.51 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 8.000 | .0125 | | | | | .0351 | .28 | 23.73 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 1001.750 | 58.360 | 24.065 | 82.425 | 12.11 | 9.87 | 1.51 | 83.94 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 8.000 | .0125 | | | | | .0351 | .28 | 24.07 | .00 | 1.25 | .013 | .00 | .00 | PIPE |

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 6-17-2024 Time: 2:22:22

NCTD OCEANSIDE TRANSIT CENTER TOD
EXISTING CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1009.750 | 58.460 | 24.396 | 82.856 | 12.11 | 9.87 | 1.51 | 84.37 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 32.000 | .0128 | | | | | .0351 | 1.12 | 24.40 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 1041.750 | 58.870 | 25.335 | 84.205 | 12.11 | 9.87 | 1.51 | 85.72 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 10.000 | .0130 | | | | | .0351 | .35 | 25.34 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 1051.750 | 59.000 | 25.557 | 84.557 | 12.11 | 9.87 | 1.51 | 86.07 | .00 | 1.22 | .00 | 1.250 | .000 | .00 | 1 .0 |

```
T1 NCTD OCEANSIDE TRANSIT CENTER TOD                                                0
T2 PROPOSED CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
T3 LINE A WSPG FOR 100-YEAR STORM
SO    -16.000  42.620  1                          43.120
R        .000  42.700  1      .013                                  .000    .000 0
TS      4.500  42.720  2      .013                                  .000
R     215.500  43.780  2      .013                                  .000    .000 0
JX    221.500  43.810  4  3   .013    0.001          43.810         90.0      -68.000
R     245.500  43.930  4      .013                                  .000  68.000 0
R     280.500  44.100  4      .013                                  .000  90.000 0
R     318.500  44.280  4      .013                                  .000 -90.000 0
R     457.500  44.970  4      .013                                  .000  90.000 0
R     586.500  45.600  4      .013                                  .000 -30.000 0
R     607.125  45.700  4      .013                                  .000 -30.000 0
R     627.750  45.810  4      .013                                  .000 -30.000 0
JX    631.750  45.990  4  3   .013    0.001          45.990         90.0      -30.000
R     856.750  56.500  4      .013                                  .000 -30.000 0
R     885.750  56.870  4      .013                                  .000 -30.000 0
R     914.750  57.240  4      .013                                  .000 -30.000 0
R     993.750  58.260  4      .013                                  .000  30.000 0
R    1001.750  58.360  4      .013                                  .000  30.000 0
R    1009.750  58.460  4      .013                                  .000  30.000 0
R    1041.750  58.870  4      .013                                  .000  45.000 0
R    1051.750  59.000  4      .013                                  .000    .000 0
SH   1051.750  59.000  4                          59.000
CD   1  3   0    .000    .250    6.000  .000  .000   .00
CD   2  4   1    .000   1.250     .000  .000  .000   .00
CD   3  4   1    .000   1.250     .000  .000  .000   .00
CD   4  4   1    .000   1.250     .000  .000  .000   .00
Q           10.660   .0
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Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 6-17-2024 Time: 2:24:54

NCTD OCEANSIDE TRANSIT CENTER TOD
PROPOSED CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| -16.000 | 42.620 | .500 | 43.120 | 10.66 | 7.11 | .78 | 43.90 | .00 | .25 | 6.00 | .250 | 6.000 | .00 | 0 .0 |
| 16.000 | .0050 | | | | | .0653 | 1.05 | .50 | 2.51 | .25 | .013 | .00 | .00 | BOX |
| .000 | 42.700 | 1.465 | 44.165 | 10.66 | 7.11 | .78 | 44.95 | .00 | .25 | 6.00 | .250 | 6.000 | .00 | 0 .0 |
| TRANS STR | .0044 | | | | | .0463 | .21 | 1.47 | 2.51 | | .013 | .00 | .00 | BOX |
| 4.500 | 42.720 | 1.460 | 44.180 | 10.66 | 8.69 | 1.17 | 45.35 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 211.000 | .0050 | | | | | .0272 | 5.75 | 1.46 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 215.500 | 43.780 | 6.148 | 49.928 | 10.66 | 8.69 | 1.17 | 51.10 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| JUNCT STR | .0050 | | | | | .0272 | .16 | .00 | .00 | | .013 | .00 | .00 | PIPE |
| 221.500 | 43.810 | 6.282 | 50.092 | 10.66 | 8.69 | 1.17 | 51.26 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 24.000 | .0050 | | | | | .0272 | .65 | 6.28 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 245.500 | 43.930 | 7.078 | 51.008 | 10.66 | 8.69 | 1.17 | 52.18 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 35.000 | .0049 | | | | | .0272 | .95 | 7.08 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 280.500 | 44.100 | 8.210 | 52.310 | 10.66 | 8.69 | 1.17 | 53.48 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 38.000 | .0047 | | | | | .0272 | 1.04 | 8.21 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 318.500 | 44.280 | 9.413 | 53.693 | 10.66 | 8.69 | 1.17 | 54.86 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 139.000 | .0050 | | | | | .0272 | 3.79 | 9.41 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 457.500 | 44.970 | 12.857 | 57.827 | 10.66 | 8.69 | 1.17 | 59.00 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 129.000 | .0049 | | | | | .0272 | 3.51 | 12.86 | .00 | 1.25 | .013 | .00 | .00 | PIPE |

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 6-17-2024 Time: 2:24:54

NCTD OCEANSIDE TRANSIT CENTER TOD

PROPOSED CONDITION CENTRAL TRIBUTARY AREA ANALYSIS

LINE A WSPG FOR 100-YEAR STORM

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 586.500 | 45.600 | 15.856 | 61.456 | 10.66 | 8.69 | 1.17 | 62.63 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 20.625 | .0048 | | | | | .0272 | .56 | 15.86 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 607.125 | 45.700 | 16.434 | 62.134 | 10.66 | 8.69 | 1.17 | 63.31 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 20.625 | .0053 | | | | | .0272 | .56 | 16.43 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 627.750 | 45.810 | 17.002 | 62.812 | 10.66 | 8.69 | 1.17 | 63.98 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| JUNCT STR | .0450 | | | | | .0272 | .11 | .00 | .00 | | .013 | .00 | .00 | PIPE |
| 631.750 | 45.990 | 16.931 | 62.921 | 10.66 | 8.69 | 1.17 | 64.09 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 225.000 | .0467 | | | | | .0272 | 6.13 | 16.93 | .00 | .82 | .013 | .00 | .00 | PIPE |
| 856.750 | 56.500 | 12.664 | 69.164 | 10.66 | 8.69 | 1.17 | 70.34 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 29.000 | .0128 | | | | | .0272 | .79 | 12.66 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 885.750 | 56.870 | 13.200 | 70.070 | 10.66 | 8.69 | 1.17 | 71.24 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 29.000 | .0128 | | | | | .0272 | .79 | 13.20 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 914.750 | 57.240 | 13.736 | 70.976 | 10.66 | 8.69 | 1.17 | 72.15 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 79.000 | .0129 | | | | | .0272 | 2.15 | 13.74 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 993.750 | 58.260 | 14.983 | 73.243 | 10.66 | 8.69 | 1.17 | 74.41 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 8.000 | .0125 | | | | | .0272 | .22 | 14.98 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 1001.750 | 58.360 | 15.217 | 73.577 | 10.66 | 8.69 | 1.17 | 74.75 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 8.000 | .0125 | | | | | .0272 | .22 | 15.22 | .00 | 1.25 | .013 | .00 | .00 | PIPE |

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 6-17-2024 Time: 2:24:54

NCTD OCEANSIDE TRANSIT CENTER TOD
PROPOSED CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1009.750 | 58.460 | 15.451 | 73.911 | 10.66 | 8.69 | 1.17 | 75.08 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 32.000 | .0128 | | | | | .0272 | .87 | 15.45 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 1041.750 | 58.870 | 16.086 | 74.956 | 10.66 | 8.69 | 1.17 | 76.13 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 10.000 | .0130 | | | | | .0272 | .27 | 16.09 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 1051.750 | 59.000 | 16.229 | 75.229 | 10.66 | 8.69 | 1.17 | 76.40 | .00 | 1.20 | .00 | 1.250 | .000 | .00 | 1 .0 |

# ATTACHMENT C
# 100-YEAR RATIONAL METHOD AND WSPG HYDRAULIC ANALYSIS FOR CENTRAL TRIBUTARY AREA

## 100-YEAR RATIONAL METHOD RESULTS (3 PAGES)

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2016 Advanced Engineering Software (aes)
            Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                          Analysis prepared by:

                                 Stantec



 ************************* DESCRIPTION OF STUDY *************************
* NCTD OCEANSIDE TRANSIT CENTER TOD                                      *
* ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS                              *
* PROPOSED CONDITION FOR 100-YEAR STORM                                  *
 ************************************************************************

  FILE NAME: ALT100YR.DAT
  TIME/DATE OF STUDY: 10:39 01/04/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ====  =====  =======
  1   18.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.760
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    69.61
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.07
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      1.07

**************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    47.00
  FLOW LENGTH(FEET) =   421.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.5 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.68
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.07
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =    3.99
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     676.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.59   SUBAREA RUNOFF(CFS) =    3.52
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       4.59
  TC(MIN.) =    3.99

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.00  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   407.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.59
  PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =    5.05
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =    1083.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.05
  RAINFALL INTENSITY(INCH/HR) =   6.81
  TOTAL STREAM AREA(ACRES) =     0.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.59

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   296.00
  UPSTREAM ELEVATION(FEET) =     52.40
  DOWNSTREAM ELEVATION(FEET) =     50.60
  ELEVATION DIFFERENCE(FEET) =      1.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.529
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    52.16
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      3.46
  TOTAL AREA(ACRES) =      0.58   TOTAL RUNOFF(CFS) =      3.46

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    50.60  DOWNSTREAM(FEET) =    44.60
  FLOW LENGTH(FEET) =   398.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.05
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       3.46
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =    4.63
  LONGEST FLOWPATH FROM NODE    208.00 TO NODE    206.00 =     694.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.63
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     0.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.46

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.59     5.05        6.806          0.77
      2        3.46     4.63        6.850          0.58

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1        7.66     4.63       6.850
      2        8.02     5.05       6.806

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.02   Tc(MIN.) =    5.05
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =    1083.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.3  TC(MIN.) =      5.05
  PEAK FLOW RATE(CFS)   =       8.02
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

# LINE A WSPG INPUT (1 PAGE)

```
T1 NCTD OCEANSIDE TRANSIT CENTER TOD                                        0
T2 ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS
T3 LINE A WSPG FOR 100-YEAR STORM
SO    -16.000  42.620  1                          43.120
R        .000  42.700  1      .013                                .000    .000 0
TS      4.500  42.720  2      .013                                .000
R     215.500  43.780  2      .013                                .000    .000 0
JX    221.500  43.810  4  3   .013    3.43          43.810        90.0      -68.000
R     245.500  43.930  4      .013                                .000  68.000 0
R     280.500  44.100  4      .013                                .000  90.000 0
R     318.500  44.280  4      .013                                .000 -90.000 0
R     457.500  44.970  4      .013                                .000  90.000 0
R     586.500  45.600  4      .013                                .000 -30.000 0
R     607.125  45.700  4      .013                                .000 -30.000 0
R     627.750  45.810  4      .013                                .000 -30.000 0
JX    631.750  45.990  4  3   .013    3.52          45.990        90.0      -30.000
R     856.750  56.500  4      .013                                .000 -30.000 0
R     885.750  56.870  4      .013                                .000 -30.000 0
R     914.750  57.240  4      .013                                .000 -30.000 0
R     993.750  58.260  4      .013                                .000  30.000 0
R    1001.750  58.360  4      .013                                .000  30.000 0
R    1009.750  58.460  4      .013                                .000  30.000 0
R    1041.750  58.870  4      .013                                .000  45.000 0
R    1051.750  59.000  4      .013                                .000    .000 0
SH   1051.750  59.000  4                          59.000
CD   1  3   0    .000    .250    6.000  .000  .000   .00
CD   2  4   1    .000   1.250     .000  .000  .000   .00
CD   3  4   1    .000   1.250     .000  .000  .000   .00
CD   4  4   1    .000   1.250     .000  .000  .000   .00
Q            1.070   .0
```

# LINE A WSPG OUTPUT (6 PAGES)



Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 1-11-2024 Time: 3:39:32

NCTD OCEANSIDE TRANSIT CENTER TOD
ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| -16.000 | 42.620 | .500 | 43.120 | 8.02 | 5.35 | .44 | 43.56 | .00 | .25 | 6.00 | .250 | 6.000 | .00 | 0 .0 |
| 16.000 | .0050 | | | | | .0370 | .59 | .50 | 1.88 | .25 | .013 | .00 | .00 | BOX |
| .000 | 42.700 | 1.011 | 43.711 | 8.02 | 5.35 | .44 | 44.16 | .00 | .25 | 6.00 | .250 | 6.000 | .00 | 0 .0 |
| TRANS STR | .0044 | | | | | | | 1.01 | 1.88 | | .013 | .00 | .00 | BOX |
| 4.500 | 42.720 | 1.116 | 43.836 | 8.02 | 6.94 | .75 | 44.58 | .00 | 1.12 | .77 | 1.250 | .000 | .00 | 1 .0 |
| 2.374 | .0050 | | | | | .0136 | .03 | 1.12 | 1.00 | 1.25 | .013 | .00 | .00 | PIPE |
| 6.874 | 42.732 | 1.204 | 43.936 | 8.02 | 6.61 | .68 | 44.61 | .00 | 1.12 | .47 | 1.250 | .000 | .00 | 1 .0 |
| 3.411 | .0050 | | | | | .0139 | .05 | 1.20 | .73 | 1.25 | .013 | .00 | .00 | PIPE |
| 10.285 | 42.749 | 1.250 | 43.999 | 8.02 | 6.54 | .66 | 44.66 | .00 | 1.12 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 205.215 | .0050 | | | | | .0148 | 3.04 | 1.25 | .00 | 1.25 | .013 | .00 | .00 | PIPE |
| 215.500 | 43.780 | 3.382 | 47.162 | 8.02 | 6.54 | .66 | 47.83 | .00 | 1.12 | .00 | 1.250 | .000 | .00 | 1 .0 |
| JUNCT STR | .0050 | | | | | .0102 | .06 | .00 | .00 | | .013 | .00 | .00 | PIPE |
| 221.500 | 43.810 | 4.306 | 48.116 | 4.59 | 3.74 | .22 | 48.33 | .00 | .87 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 24.000 | .0050 | | | | | .0050 | .12 | 4.31 | .00 | 1.03 | .013 | .00 | .00 | PIPE |
| 245.500 | 43.930 | 4.355 | 48.285 | 4.59 | 3.74 | .22 | 48.50 | .00 | .87 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 35.000 | .0049 | | | | | .0050 | .18 | 4.36 | .00 | 1.05 | .013 | .00 | .00 | PIPE |
| 280.500 | 44.100 | 4.427 | 48.527 | 4.59 | 3.74 | .22 | 48.74 | .00 | .87 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 38.000 | .0047 | | | | | .0050 | .19 | 4.43 | .00 | 1.07 | .013 | .00 | .00 | PIPE |



Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 1-11-2024 Time: 3:39:32

NCTD OCEANSIDE TRANSIT CENTER TOD
ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 318.500 | 44.280 | 4.503 | 48.783 | 4.59 | 3.74 | .22 | 49.00 | .00 | .87 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 139.000 | .0050 | | | | | .0050 | .70 | 4.50 | .00 | 1.03 | .013 | .00 | .00 | PIPE |
| 457.500 | 44.970 | 4.579 | 49.549 | 4.59 | 3.74 | .22 | 49.77 | .00 | .87 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 129.000 | .0049 | | | | | .0050 | .65 | 4.58 | .00 | 1.04 | .013 | .00 | .00 | PIPE |
| 586.500 | 45.600 | 4.622 | 50.222 | 4.59 | 3.74 | .22 | 50.44 | .00 | .87 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 20.625 | .0048 | | | | | .0050 | .10 | 4.62 | .00 | 1.05 | .013 | .00 | .00 | PIPE |
| 607.125 | 45.700 | 4.648 | 50.348 | 4.59 | 3.74 | .22 | 50.57 | .00 | .87 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 20.625 | .0053 | | | | | .0050 | .10 | 4.65 | .00 | 1.00 | .013 | .00 | .00 | PIPE |
| 627.750 | 45.810 | 4.663 | 50.473 | 4.59 | 3.74 | .22 | 50.69 | .00 | .87 | .00 | 1.250 | .000 | .00 | 1 .0 |
| JUNCT STR | .0450 | | | | | .0027 | .01 | .00 | .00 | | .013 | .00 | .00 | PIPE |
| 631.750 | 45.990 | 4.905 | 50.895 | 1.07 | .87 | .01 | 50.91 | .00 | .41 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 78.733 | .0467 | | | | | .0003 | .02 | 4.90 | .00 | .23 | .013 | .00 | .00 | PIPE |
| 710.483 | 49.668 | 1.250 | 50.918 | 1.07 | .87 | .01 | 50.93 | .00 | .41 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 2.448 | .0467 | | | | | .0003 | .00 | 1.25 | .00 | .23 | .013 | .00 | .00 | PIPE |
| 712.931 | 49.782 | 1.134 | 50.916 | 1.07 | .91 | .01 | 50.93 | .00 | .41 | .73 | 1.250 | .000 | .00 | 1 .0 |
| 1.436 | .0467 | | | | | .0002 | .00 | 1.13 | .13 | .23 | .013 | .00 | .00 | PIPE |
| 714.366 | 49.849 | 1.066 | 50.915 | 1.07 | .96 | .01 | 50.93 | .00 | .41 | .89 | 1.250 | .000 | .00 | 1 .0 |
| 1.154 | .0467 | | | | | .0003 | .00 | 1.07 | .15 | .23 | .013 | .00 | .00 | PIPE |





| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 715.520 | 49.903 | 1.011 | 50.914 | 1.07 | 1.01 | .02 | 50.93 | .00 | .41 | .98 | 1.250 | .000 | .00 | 1 .0 |
| 1.022 | .0467 | | | | | .0003 | .00 | 1.01 | .17 | .23 | .013 | .00 | .00 | PIPE |
| 716.542 | 49.951 | .962 | 50.913 | 1.07 | 1.06 | .02 | 50.93 | .00 | .41 | 1.05 | 1.250 | .000 | .00 | 1 .0 |
| .911 | .0467 | | | | | .0003 | .00 | .96 | .19 | .23 | .013 | .00 | .00 | PIPE |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 717.453 | 49.993 | .918 | 50.911 | 1.07 | 1.11 | .02 | 50.93 | .00 | .41 | 1.10 | 1.250 | .000 | .00 | 1 .0 |
| .822 | .0467 | | | | | .0004 | .00 | .92 | .21 | .23 | .013 | .00 | .00 | PIPE |
| 718.275 | 50.032 | .878 | 50.910 | 1.07 | 1.16 | .02 | 50.93 | .00 | .41 | 1.14 | 1.250 | .000 | .00 | 1 .0 |
| .754 | .0467 | | | | | .0004 | .00 | .88 | .23 | .23 | .013 | .00 | .00 | PIPE |
| 719.029 | 50.067 | .841 | 50.908 | 1.07 | 1.22 | .02 | 50.93 | .00 | .41 | 1.17 | 1.250 | .000 | .00 | 1 .0 |
| .685 | .0467 | | | | | .0005 | .00 | .84 | .25 | .23 | .013 | .00 | .00 | PIPE |
| 719.714 | 50.099 | .807 | 50.906 | 1.07 | 1.28 | .03 | 50.93 | .00 | .41 | 1.20 | 1.250 | .000 | .00 | 1 .0 |
| .660 | .0467 | | | | | .0005 | .00 | .81 | .27 | .23 | .013 | .00 | .00 | PIPE |
| 720.374 | 50.130 | .774 | 50.904 | 1.07 | 1.34 | .03 | 50.93 | .00 | .41 | 1.21 | 1.250 | .000 | .00 | 1 .0 |
| .590 | .0467 | | | | | .0006 | .00 | .77 | .29 | .23 | .013 | .00 | .00 | PIPE |
| 720.964 | 50.157 | .744 | 50.901 | 1.07 | 1.40 | .03 | 50.93 | .00 | .41 | 1.23 | 1.250 | .000 | .00 | 1 .0 |
| .563 | .0467 | | | | | .0007 | .00 | .74 | .31 | .23 | .013 | .00 | .00 | PIPE |
| 721.527 | 50.184 | .715 | 50.899 | 1.07 | 1.47 | .03 | 50.93 | .00 | .41 | 1.24 | 1.250 | .000 | .00 | 1 .0 |
| .514 | .0467 | | | | | .0007 | .00 | .72 | .34 | .23 | .013 | .00 | .00 | PIPE |



| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 722.041 | 50.208 | .688 | 50.896 | 1.07 | 1.54 | .04 | 50.93 | .00 | .41 | 1.24 | 1.250 | .000 | .00 | 1 .0 |
| .486 | .0467 | | | | | .0008 | .00 | .69 | .36 | .23 | .013 | .00 | .00 | PIPE |
| 722.528 | 50.230 | .662 | 50.892 | 1.07 | 1.62 | .04 | 50.93 | .00 | .41 | 1.25 | 1.250 | .000 | .00 | 1 .0 |
| .052 | .0467 | | | | | .0010 | .00 | .66 | .39 | .23 | .013 | .00 | .00 | PIPE |
| 722.579 | 50.233 | .637 | 50.870 | 1.07 | 1.70 | .04 | 50.91 | .00 | .41 | 1.25 | 1.250 | .000 | .00 | 1 .0 |
| HYDRAULIC JUMP | | | | | | | | | | | | | | |
| 722.579 | 50.233 | .234 | 50.467 | 1.07 | 6.73 | .70 | 51.17 | .00 | .41 | .98 | 1.250 | .000 | .00 | 1 .0 |
| 94.649 | .0467 | | | | | .0467 | 4.42 | .23 | 2.94 | .23 | .013 | .00 | .00 | PIPE |
| 817.229 | 54.654 | .234 | 54.888 | 1.07 | 6.73 | .70 | 55.59 | .00 | .41 | .98 | 1.250 | .000 | .00 | 1 .0 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18.902 | .0467 | | | | | .0448 | .85 | .23 | 2.94 | .23 | .013 | .00 | .00 | PIPE | | | |
| 836.131 | 55.537 | .239 | 55.776 | 1.07 | 6.52 | .66 | 56.44 | .00 | .41 | .98 | 1.250 | .000 | .00 | 1 | .0 | | |
| 7.879 | .0467 | | | | | .0401 | .32 | .24 | 2.82 | .23 | .013 | .00 | .00 | PIPE | | | |
| 844.010 | 55.905 | .247 | 56.152 | 1.07 | 6.22 | .60 | 56.75 | .00 | .41 | 1.00 | 1.250 | .000 | .00 | 1 | .0 | | |
| 3.987 | .0467 | | | | | .0350 | .14 | .25 | 2.64 | .23 | .013 | .00 | .00 | PIPE | | | |
| 847.997 | 56.091 | .255 | 56.346 | 1.07 | 5.93 | .55 | 56.89 | .00 | .41 | 1.01 | 1.250 | .000 | .00 | 1 | .0 | | |
| 2.523 | .0467 | | | | | .0306 | .08 | .26 | 2.47 | .23 | .013 | .00 | .00 | PIPE | | | |
| 850.520 | 56.209 | .264 | 56.473 | 1.07 | 5.66 | .50 | 56.97 | .00 | .41 | 1.02 | 1.250 | .000 | .00 | 1 | .0 | | |
| 1.811 | .0467 | | | | | .0268 | .05 | .26 | 2.31 | .23 | .013 | .00 | .00 | PIPE | | | |



Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 1-11-2024 Time: 3:39:32

NCTD OCEANSIDE TRANSIT CENTER TOD
ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 852.332 | 56.294 | .273 | 56.567 | 1.07 | 5.39 | .45 | 57.02 | .00 | .41 | 1.03 | 1.250 | .000 | .00 | 1 | .0 | | |
| 1.373 | .0467 | | | | | .0234 | .03 | .27 | 2.17 | .23 | .013 | .00 | .00 | PIPE | | | |
| 853.705 | 56.358 | .282 | 56.640 | 1.07 | 5.14 | .41 | 57.05 | .00 | .41 | 1.05 | 1.250 | .000 | .00 | 1 | .0 | | |
| 1.040 | .0467 | | | | | .0204 | .02 | .28 | 2.03 | .23 | .013 | .00 | .00 | PIPE | | | |
| 854.744 | 56.406 | .292 | 56.698 | 1.07 | 4.90 | .37 | 57.07 | .00 | .41 | 1.06 | 1.250 | .000 | .00 | 1 | .0 | | |
| .830 | .0467 | | | | | .0179 | .01 | .29 | 1.90 | .23 | .013 | .00 | .00 | PIPE | | | |
| 855.574 | 56.445 | .302 | 56.747 | 1.07 | 4.67 | .34 | 57.09 | .00 | .41 | 1.07 | 1.250 | .000 | .00 | 1 | .0 | | |
| .670 | .0467 | | | | | .0156 | .01 | .30 | 1.78 | .23 | .013 | .00 | .00 | PIPE | | | |
| 856.244 | 56.476 | .312 | 56.788 | 1.07 | 4.46 | .31 | 57.10 | .00 | .41 | 1.08 | 1.250 | .000 | .00 | 1 | .0 | | |
| .506 | .0467 | | | | | .0137 | .01 | .31 | 1.67 | .23 | .013 | .00 | .00 | PIPE | | | |
| 856.750 | 56.500 | .323 | 56.823 | 1.07 | 4.25 | .28 | 57.10 | .00 | .41 | 1.09 | 1.250 | .000 | .00 | 1 | .0 | | |
| 29.000 | .0128 | | | | | .0128 | .37 | .32 | 1.56 | .32 | .013 | .00 | .00 | PIPE | | | |
| 885.750 | 56.870 | .323 | 57.193 | 1.07 | 4.25 | .28 | 57.47 | .00 | .41 | 1.09 | 1.250 | .000 | .00 | 1 | .0 | | |
| 11.267 | .0128 | | | | | .0128 | .14 | .32 | 1.56 | .32 | .013 | .00 | .00 | PIPE | | | |

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 897.017 | 57.014 | .323 | 57.337 | 1.07 | 4.25 | .28 | 57.62 | .00 | .41 | 1.09 | 1.250 | .000 | .00 | 1 .0 |
| 17.733 | .0128 | | | | | .0128 | .23 | .32 | 1.56 | .32 | .013 | .00 | .00 | PIPE |
| 914.750 | 57.240 | .322 | 57.562 | 1.07 | 4.27 | .28 | 57.85 | .00 | .41 | 1.09 | 1.250 | .000 | .00 | 1 .0 |
| 59.608 | .0129 | | | | | .0129 | .77 | .32 | 1.57 | .32 | .013 | .00 | .00 | PIPE |





| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 974.358 | 58.010 | .322 | 58.332 | 1.07 | 4.27 | .28 | 58.61 | .00 | .41 | 1.09 | 1.250 | .000 | .00 | 1 .0 |
| 19.392 | .0129 | | | | | .0128 | .25 | .32 | 1.57 | .32 | .013 | .00 | .00 | PIPE |
| 993.750 | 58.260 | .324 | 58.584 | 1.07 | 4.23 | .28 | 58.86 | .00 | .41 | 1.10 | 1.250 | .000 | .00 | 1 .0 |
| 8.000 | .0125 | | | | | .0126 | .10 | .32 | 1.55 | .33 | .013 | .00 | .00 | PIPE |
| 1001.750 | 58.360 | .324 | 58.685 | 1.07 | 4.23 | .28 | 58.96 | .00 | .41 | 1.10 | 1.250 | .000 | .00 | 1 .0 |
| 8.000 | .0125 | | | | | .0127 | .10 | .32 | 1.55 | .33 | .013 | .00 | .00 | PIPE |
| 1009.750 | 58.460 | .323 | 58.783 | 1.07 | 4.26 | .28 | 59.06 | .00 | .41 | 1.09 | 1.250 | .000 | .00 | 1 .0 |
| 13.667 | .0128 | | | | | .0128 | .18 | .32 | 1.57 | .32 | .013 | .00 | .00 | PIPE |
| 1023.417 | 58.635 | .323 | 58.958 | 1.07 | 4.26 | .28 | 59.24 | .00 | .41 | 1.09 | 1.250 | .000 | .00 | 1 .0 |
| 18.333 | .0128 | | | | | .0121 | .22 | .32 | 1.57 | .32 | .013 | .00 | .00 | PIPE |
| 1041.750 | 58.870 | .333 | 59.203 | 1.07 | 4.08 | .26 | 59.46 | .00 | .41 | 1.11 | 1.250 | .000 | .00 | 1 .0 |
| 4.084 | .0130 | | | | | .0108 | .04 | .33 | 1.47 | .32 | .013 | .00 | .00 | PIPE |
| 1045.834 | 58.923 | .341 | 59.264 | 1.07 | 3.93 | .24 | 59.50 | .00 | .41 | 1.11 | 1.250 | .000 | .00 | 1 .0 |
| 2.874 | .0130 | | | | | .0096 | .03 | .34 | 1.40 | .32 | .013 | .00 | .00 | PIPE |
| 1048.708 | 58.960 | .353 | 59.314 | 1.07 | 3.75 | .22 | 59.53 | .00 | .41 | 1.13 | 1.250 | .000 | .00 | 1 .0 |
| 1.482 | .0130 | | | | | .0084 | .01 | .35 | 1.31 | .32 | .013 | .00 | .00 | PIPE |
| 1050.190 | 58.980 | .366 | 59.346 | 1.07 | 3.57 | .20 | 59.54 | .00 | .41 | 1.14 | 1.250 | .000 | .00 | 1 .0 |
| 1.065 | .0130 | | | | | .0074 | .01 | .37 | 1.23 | .32 | .013 | .00 | .00 | PIPE |

WATER SURFACE PROFILE LISTING Date: 1-11-2024 Time: 3:39:32

NCTD OCEANSIDE TRANSIT CENTER TOD
ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1051.255 | 58.994 | .378 | 59.372 | 1.07 | 3.41 | .18 | 59.55 | .00 | .41 | 1.15 | 1.250 | .000 | .00 | 1 .0 |
| .362 | .0130 | | | | | .0064 | .00 | .38 | 1.15 | .32 | .013 | .00 | .00 | PIPE |
| 1051.617 | 58.998 | .392 | 59.390 | 1.07 | 3.25 | .16 | 59.55 | .00 | .41 | 1.16 | 1.250 | .000 | .00 | 1 .0 |
| .133 | .0130 | | | | | .0056 | .00 | .39 | 1.07 | .32 | .013 | .00 | .00 | PIPE |
| 1051.750 | 59.000 | .407 | 59.407 | 1.07 | 3.09 | .15 | 59.55 | .00 | .41 | 1.17 | 1.250 | .000 | .00 | 1 .0 |

## LINE A1 WSPG (1 PAGE)

```
T1 NCTD OCEANSIDE TRANSIT CENTER TOD                                          0
T2 ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS
T3 LINE A1 WSPG FOR 100-YR STORM
SO    221.500  43.810  1                          48.116
R     394.500  44.680  1      .013                              .000 -90.000 0
R     473.050  45.070  1      .013                              .000  90.000 0
R     610.500  45.760  1      .013                              .000  90.000 0
R     618.500  45.800  1      .013                              .000    .000 0
SH    618.500  45.800  1                          45.800
CD   1  4   1    .000   1.250     .000  .000  .000   .00
Q             3.460   .0
```

# LINE A1 WSPG OUTPUT (1 PAGE)



Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 1-11-2024 Time: 3:39:53

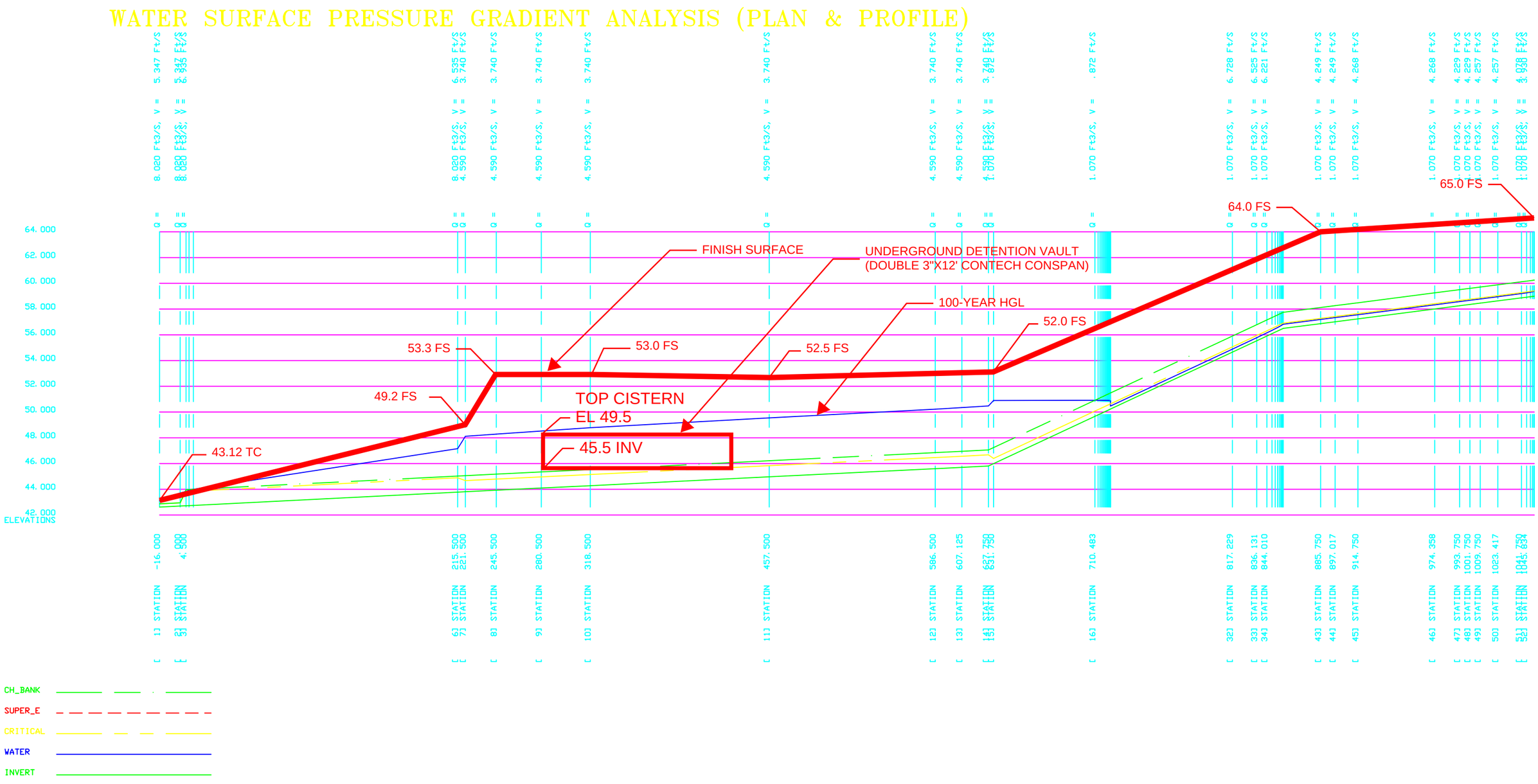
NCTD OCEANSIDE TRANSIT CENTER TOD

ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS

LINE A1 WSPG FOR 100-YR STORM

| Station / L/Elem | Invert Elev / Ch Slope | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head / SF Ave | Energy Grd.El. / HF | Super Elev / SE Dpth | Critical Depth / Froude N | Flow Top Width / Norm Dp | Height/ Dia.-FT / "N" | Base Wt or I.D. / X-Fall | ZL / ZR | No Wth Prs/Pip / Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221.500 | 43.810 | 4.306 | 48.116 | 3.46 | 2.82 | .12 | 48.24 | .00 | .75 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 173.000 | .0050 | | | | | .0029 | .50 | 4.31 | .00 | .81 | .013 | .00 | .00 | PIPE |
| 394.500 | 44.680 | 3.969 | 48.649 | 3.46 | 2.82 | .12 | 48.77 | .00 | .75 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 78.550 | .0050 | | | | | .0029 | .23 | 3.97 | .00 | .82 | .013 | .00 | .00 | PIPE |
| 473.050 | 45.070 | 3.841 | 48.911 | 3.46 | 2.82 | .12 | 49.03 | .00 | .75 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 137.450 | .0050 | | | | | .0029 | .39 | 3.84 | .00 | .81 | .013 | .00 | .00 | PIPE |
| 610.500 | 45.760 | 3.582 | 49.342 | 3.46 | 2.82 | .12 | 49.47 | .00 | .75 | .00 | 1.250 | .000 | .00 | 1 .0 |
| 8.000 | .0050 | | | | | .0029 | .02 | 3.58 | .00 | .81 | .013 | .00 | .00 | PIPE |
| 618.500 | 45.800 | 3.565 | 49.365 | 3.46 | 2.82 | .12 | 49.49 | .00 | .75 | .00 | 1.250 | .000 | .00 | 1 .0 |

**LINE A HGL PROFILE DETAIL (1 PAGE)**



```
T1 Oceanside OTC Tremont                                                    0
T2 Cleveland SD Extention Capacity Analysis
T3 C:\Program Files\CIVILD\OTC_prop100_nf.wsw
SO   1000.000  39.000  1                          42.500
R    1042.550  39.130  1      .013                                    45.0
R    1073.970  39.220  1      .013                                   -45.0
R    1388.420  40.170  1      .013
JX   1392.420  40.180  1  2   .013    0.001          42.18          45.0
R    1428.790  40.290  1      .013
JX   1432.790  40.300  1  2   .013    0.001          42.30          45.0
R    1820.560  41.460  1      .013
JX   1824.560  41.470  1  2   .013    0.001          43.47          45.0
R    1865.820  41.600  1      .013
JX   1869.820  41.610  3  2   .013    0.001          43.11          45.0
R    2327.550  43.000  3      .013
JX   2331.550  44.500  2  2   .013    0.001          44.50          45.0
R    2380.940  44.720  2      .013                              -49.240
R    2416.270  44.910  2      .013                               49.200
JX   2420.270  45.430  4  4   .013    0.001          45.43          -90.0
R    2816.100  47.000  4      .013
R    2849.420  47.150  4      .013                               45.000
JX   2853.420  47.200  4  4   .013    0.001          47.20          -90.0
R    2886.770  48.180  4      .013                               45.000
R    2921.220  49.190  4      .013
JX   2925.220  49.310  4  4  5.013    0.001    1.010  49.31   49.31  45.0-45.0
R    3188.180  57.030  4      .013
R    3197.660  57.340  4      .013
SH   3197.660  57.340  4
CD   1  4   0           4.000    0.000
CD   2  4   0           2.000    0.000
CD   3  4   0           3.500    0.000
CD   4  4   0           1.500    0.000
CD   5  4   0           1.000    0.000
Q            15.500   .0
```

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-19-2024 Time: 2: 4:53

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1000.000 | 39.000 | 3.500 | 42.500 | 16.52 | 1.42 | .03 | 42.53 | .00 | 1.19 | 2.65 | 4.000 | .000 | .00 | 0 .0 |
| 42.550 | .0031 | | | | | .0001 | .01 | 3.50 | .12 | 1.24 | .013 | .00 | .00 | PIPE |
| 1042.550 | 39.130 | 3.373 | 42.503 | 16.52 | 1.46 | .03 | 42.54 | .00 | 1.19 | 2.91 | 4.000 | .000 | .00 | 0 .0 |
| 31.420 | .0029 | | | | | .0001 | .00 | 3.37 | .13 | 1.26 | .013 | .00 | .00 | PIPE |
| 1073.970 | 39.220 | 3.286 | 42.506 | 16.52 | 1.50 | .03 | 42.54 | .00 | 1.19 | 3.06 | 4.000 | .000 | .00 | 0 .0 |
| 54.891 | .0030 | | | | | .0001 | .01 | 3.29 | .14 | 1.24 | .013 | .00 | .00 | PIPE |
| 1128.861 | 39.386 | 3.124 | 42.510 | 16.52 | 1.57 | .04 | 42.55 | .00 | 1.19 | 3.31 | 4.000 | .000 | .00 | 0 .0 |
| 48.881 | .0030 | | | | | .0002 | .01 | 3.12 | .15 | 1.24 | .013 | .00 | .00 | PIPE |
| 1177.742 | 39.534 | 2.980 | 42.514 | 16.52 | 1.64 | .04 | 42.56 | .00 | 1.19 | 3.49 | 4.000 | .000 | .00 | 0 .0 |
| 44.487 | .0030 | | | | | .0002 | .01 | 2.98 | .17 | 1.24 | .013 | .00 | .00 | PIPE |
| 1222.230 | 39.668 | 2.849 | 42.517 | 16.52 | 1.73 | .05 | 42.56 | .00 | 1.19 | 3.62 | 4.000 | .000 | .00 | 0 .0 |
| 41.478 | .0030 | | | | | .0002 | .01 | 2.85 | .19 | 1.24 | .013 | .00 | .00 | PIPE |
| 1263.708 | 39.793 | 2.727 | 42.520 | 16.52 | 1.81 | .05 | 42.57 | .00 | 1.19 | 3.73 | 4.000 | .000 | .00 | 0 .0 |
| 38.097 | .0030 | | | | | .0002 | .01 | 2.73 | .20 | 1.24 | .013 | .00 | .00 | PIPE |
| 1301.805 | 39.908 | 2.615 | 42.523 | 16.52 | 1.90 | .06 | 42.58 | .00 | 1.19 | 3.81 | 4.000 | .000 | .00 | 0 .0 |
| 36.126 | .0030 | | | | | .0002 | .01 | 2.62 | .22 | 1.24 | .013 | .00 | .00 | PIPE |
| 1337.931 | 40.017 | 2.509 | 42.527 | 16.52 | 1.99 | .06 | 42.59 | .00 | 1.19 | 3.87 | 4.000 | .000 | .00 | 0 .0 |
| 33.781 | .0030 | | | | | .0003 | .01 | 2.51 | .24 | 1.24 | .013 | .00 | .00 | PIPE |

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-19-2024 Time: 2: 4:53

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1371.712 | 40.120 | 2.410 | 42.530 | 16.52 | 2.09 | .07 | 42.60 | .00 | 1.19 | 3.92 | 4.000 | .000 | .00 | 0 .0 |
| 16.708 | .0030 | | | | | .0003 | .00 | 2.41 | .26 | 1.24 | .013 | .00 | .00 | PIPE |
| 1388.420 | 40.170 | 2.361 | 42.531 | 16.52 | 2.14 | .07 | 42.60 | .00 | 1.19 | 3.93 | 4.000 | .000 | .00 | 0 .0 |
| JUNCT STR | .0025 | | | | | .0003 | .00 | 2.36 | .27 | | .013 | .00 | .00 | PIPE |
| 1392.420 | 40.180 | 2.352 | 42.532 | 16.52 | 2.15 | .07 | 42.60 | .00 | 1.19 | 3.94 | 4.000 | .000 | .00 | 0 .0 |
| 30.992 | .0030 | | | | | .0003 | .01 | 2.35 | .27 | 1.24 | .013 | .00 | .00 | PIPE |
| 1423.412 | 40.274 | 2.261 | 42.535 | 16.52 | 2.25 | .08 | 42.61 | .00 | 1.19 | 3.97 | 4.000 | .000 | .00 | 0 .0 |
| 5.378 | .0030 | | | | | .0004 | .00 | 2.26 | .29 | 1.24 | .013 | .00 | .00 | PIPE |
| 1428.790 | 40.290 | 2.245 | 42.535 | 16.52 | 2.27 | .08 | 42.62 | .00 | 1.19 | 3.97 | 4.000 | .000 | .00 | 0 .0 |
| JUNCT STR | .0025 | | | | | .0004 | .00 | 2.25 | .30 | | .013 | .00 | .00 | PIPE |
| 1432.790 | 40.300 | 2.236 | 42.536 | 16.52 | 2.29 | .08 | 42.62 | .00 | 1.19 | 3.97 | 4.000 | .000 | .00 | 0 .0 |
| 29.525 | .0030 | | | | | .0004 | .01 | 2.24 | .30 | 1.24 | .013 | .00 | .00 | PIPE |
| 1462.315 | 40.388 | 2.151 | 42.539 | 16.52 | 2.40 | .09 | 42.63 | .00 | 1.19 | 3.99 | 4.000 | .000 | .00 | 0 .0 |
| 27.879 | .0030 | | | | | .0004 | .01 | 2.15 | .32 | 1.24 | .013 | .00 | .00 | PIPE |
| 1490.194 | 40.472 | 2.071 | 42.543 | 16.52 | 2.51 | .10 | 42.64 | .00 | 1.19 | 4.00 | 4.000 | .000 | .00 | 0 .0 |
| 26.982 | .0030 | | | | | .0005 | .01 | 2.07 | .35 | 1.24 | .013 | .00 | .00 | PIPE |
| 1517.177 | 40.552 | 1.994 | 42.547 | 16.52 | 2.64 | .11 | 42.65 | .00 | 1.19 | 4.00 | 4.000 | .000 | .00 | 0 .0 |
| 25.682 | .0030 | | | | | .0006 | .01 | 1.99 | .37 | 1.24 | .013 | .00 | .00 | PIPE |

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-19-2024 Time: 2: 4:53

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1542.859 | 40.629 | 1.921 | 42.550 | 16.52 | 2.77 | .12 | 42.67 | .00 | 1.19 | 4.00 | 4.000 | .000 | .00 | 0 .0 |
| 24.367 | .0030 | | | | | .0006 | .02 | 1.92 | .40 | 1.24 | .013 | .00 | .00 | PIPE |
| 1567.225 | 40.702 | 1.852 | 42.554 | 16.52 | 2.90 | .13 | 42.68 | .00 | 1.19 | 3.99 | 4.000 | .000 | .00 | 0 .0 |
| 23.912 | .0030 | | | | | .0007 | .02 | 1.85 | .43 | 1.24 | .013 | .00 | .00 | PIPE |
| 1591.137 | 40.774 | 1.785 | 42.559 | 16.52 | 3.04 | .14 | 42.70 | .00 | 1.19 | 3.98 | 4.000 | .000 | .00 | 0 .0 |
| 22.574 | .0030 | | | | | .0008 | .02 | 1.79 | .46 | 1.24 | .013 | .00 | .00 | PIPE |
| 1613.712 | 40.841 | 1.722 | 42.563 | 16.52 | 3.19 | .16 | 42.72 | .00 | 1.19 | 3.96 | 4.000 | .000 | .00 | 0 .0 |
| 22.172 | .0030 | | | | | .0010 | .02 | 1.72 | .49 | 1.24 | .013 | .00 | .00 | PIPE |
| 1635.884 | 40.908 | 1.661 | 42.569 | 16.52 | 3.35 | .17 | 42.74 | .00 | 1.19 | 3.94 | 4.000 | .000 | .00 | 0 .0 |
| 21.832 | .0030 | | | | | .0011 | .02 | 1.66 | .53 | 1.24 | .013 | .00 | .00 | PIPE |
| 1657.716 | 40.973 | 1.602 | 42.575 | 16.52 | 3.51 | .19 | 42.77 | .00 | 1.19 | 3.92 | 4.000 | .000 | .00 | 0 .0 |
| 21.011 | .0030 | | | | | .0012 | .03 | 1.60 | .56 | 1.24 | .013 | .00 | .00 | PIPE |
| 1678.727 | 41.036 | 1.546 | 42.582 | 16.52 | 3.68 | .21 | 42.79 | .00 | 1.19 | 3.90 | 4.000 | .000 | .00 | 0 .0 |
| 20.206 | .0030 | | | | | .0014 | .03 | 1.55 | .60 | 1.24 | .013 | .00 | .00 | PIPE |
| 1698.933 | 41.096 | 1.493 | 42.589 | 16.52 | 3.86 | .23 | 42.82 | .00 | 1.19 | 3.87 | 4.000 | .000 | .00 | 0 .0 |
| 20.852 | .0030 | | | | | .0016 | .03 | 1.49 | .65 | 1.24 | .013 | .00 | .00 | PIPE |
| 1719.784 | 41.159 | 1.441 | 42.600 | 16.52 | 4.05 | .25 | 42.85 | .00 | 1.19 | 3.84 | 4.000 | .000 | .00 | 0 .0 |
| 21.190 | .0030 | | | | | .0018 | .04 | 1.44 | .69 | 1.24 | .013 | .00 | .00 | PIPE |

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-19-2024 Time: 2: 4:53

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1740.974 | 41.222 | 1.391 | 42.613 | 16.52 | 4.25 | .28 | 42.89 | .00 | 1.19 | 3.81 | 4.000 | .000 | .00 | 0 .0 |
| 21.118 | .0030 | | | | | .0021 | .04 | 1.39 | .74 | 1.24 | .013 | .00 | .00 | PIPE |
| 1762.092 | 41.285 | 1.344 | 42.629 | 16.52 | 4.45 | .31 | 42.94 | .00 | 1.19 | 3.78 | 4.000 | .000 | .00 | 0 .0 |
| 25.178 | .0030 | | | | | .0024 | .06 | 1.34 | .79 | 1.24 | .013 | .00 | .00 | PIPE |
| 1787.270 | 41.360 | 1.298 | 42.659 | 16.52 | 4.67 | .34 | 43.00 | .00 | 1.19 | 3.75 | 4.000 | .000 | .00 | 0 .0 |
| 33.290 | .0030 | | | | | .0027 | .09 | 1.30 | .85 | 1.24 | .013 | .00 | .00 | PIPE |
| 1820.560 | 41.460 | 1.259 | 42.719 | 16.52 | 4.88 | .37 | 43.09 | .00 | 1.19 | 3.72 | 4.000 | .000 | .00 | 0 .0 |
| JUNCT STR | .0025 | | | | | .0028 | .01 | 1.26 | .90 | | .013 | .00 | .00 | PIPE |
| 1824.560 | 41.470 | 1.266 | 42.736 | 16.51 | 4.84 | .36 | 43.10 | .00 | 1.19 | 3.72 | 4.000 | .000 | .00 | 0 .0 |
| 14.551 | .0032 | | | | | .0030 | .04 | 1.27 | .89 | 1.23 | .013 | .00 | .00 | PIPE |
| 1839.111 | 41.516 | 1.228 | 42.744 | 16.51 | 5.04 | .39 | 43.14 | .00 | 1.19 | 3.69 | 4.000 | .000 | .00 | 0 .0 |
| HYDRAULIC JUMP | | | | | | | | | | | | | | |
| 1839.111 | 41.516 | 1.126 | 42.642 | 16.51 | 5.69 | .50 | 43.14 | .00 | 1.19 | 3.60 | 4.000 | .000 | .00 | 0 .0 |
| 1.825 | .0032 | | | | | .0044 | .01 | 1.13 | 1.12 | 1.23 | .013 | .00 | .00 | PIPE |
| 1840.936 | 41.522 | 1.126 | 42.648 | 16.51 | 5.69 | .50 | 43.15 | .00 | 1.19 | 3.60 | 4.000 | .000 | .00 | 0 .0 |
| 7.786 | .0032 | | | | | .0047 | .04 | 1.13 | 1.12 | 1.23 | .013 | .00 | .00 | PIPE |
| 1848.722 | 41.546 | 1.088 | 42.634 | 16.51 | 5.97 | .55 | 43.19 | .00 | 1.19 | 3.56 | 4.000 | .000 | .00 | 0 .0 |
| 8.571 | .0032 | | | | | .0054 | .05 | 1.09 | 1.19 | 1.23 | .013 | .00 | .00 | PIPE |

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-19-2024 Time: 2: 4:53

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1857.293 | 41.573 | 1.052 | 42.625 | 16.51 | 6.26 | .61 | 43.23 | .00 | 1.19 | 3.52 | 4.000 | .000 | .00 | 0 .0 |
| 8.527 | .0032 | | | | | .0062 | .05 | 1.05 | 1.27 | 1.23 | .013 | .00 | .00 | PIPE |
| 1865.820 | 41.600 | 1.017 | 42.617 | 16.51 | 6.56 | .67 | 43.29 | .00 | 1.19 | 3.48 | 4.000 | .000 | .00 | 0 .0 |
| JUNCT STR | .0025 | | | | | .0052 | .02 | 1.02 | 1.36 | | .013 | .00 | .00 | PIPE |
| 1869.820 | 41.610 | 1.239 | 42.849 | 16.51 | 5.42 | .46 | 43.30 | .00 | 1.24 | 3.35 | 3.500 | .000 | .00 | 0 .0 |
| 5.130 | .0030 | | | | | .0035 | .02 | 1.24 | 1.00 | 1.31 | .013 | .00 | .00 | PIPE |
| 1874.950 | 41.626 | 1.283 | 42.909 | 16.51 | 5.16 | .41 | 43.32 | .00 | 1.24 | 3.37 | 3.500 | .000 | .00 | 0 .0 |
| 42.662 | .0030 | | | | | .0031 | .13 | 1.28 | .93 | 1.31 | .013 | .00 | .00 | PIPE |
| 1917.613 | 41.755 | 1.309 | 43.064 | 16.51 | 5.03 | .39 | 43.46 | .00 | 1.24 | 3.39 | 3.500 | .000 | .00 | 0 .0 |
| 283.789 | .0030 | | | | | .0030 | .86 | 1.31 | .90 | 1.31 | .013 | .00 | .00 | PIPE |
| 2201.402 | 42.617 | 1.309 | 43.926 | 16.51 | 5.03 | .39 | 44.32 | .00 | 1.24 | 3.39 | 3.500 | .000 | .00 | 0 .0 |
| HYDRAULIC JUMP | | | | | | | | | | | | | | |
| 2201.402 | 42.617 | 1.137 | 43.754 | 16.51 | 6.09 | .58 | 44.33 | .00 | 1.24 | 3.28 | 3.500 | .000 | .00 | 0 .0 |
| 5.604 | .0030 | | | | | .0052 | .03 | 1.14 | 1.18 | 1.31 | .013 | .00 | .00 | PIPE |
| 2207.006 | 42.634 | 1.137 | 43.771 | 16.51 | 6.09 | .58 | 44.35 | .00 | 1.24 | 3.28 | 3.500 | .000 | .00 | 0 .0 |
| 7.871 | .0030 | | | | | .0055 | .04 | 1.14 | 1.18 | 1.31 | .013 | .00 | .00 | PIPE |
| 2214.877 | 42.658 | 1.099 | 43.757 | 16.51 | 6.38 | .63 | 44.39 | .00 | 1.24 | 3.25 | 3.500 | .000 | .00 | 0 .0 |
| 8.047 | .0030 | | | | | .0063 | .05 | 1.10 | 1.26 | 1.31 | .013 | .00 | .00 | PIPE |

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 2222.924 | 42.682 | 1.062 | 43.744 | 16.51 | 6.70 | .70 | 44.44 | .00 | 1.24 | 3.22 | 3.500 | .000 | .00 | 0 .0 |
| 8.075 | .0030 | | | | | .0072 | .06 | 1.06 | 1.35 | 1.31 | .013 | .00 | .00 | PIPE |
| 2231.000 | 42.707 | 1.026 | 43.733 | 16.51 | 7.02 | .77 | 44.50 | .00 | 1.24 | 3.19 | 3.500 | .000 | .00 | 0 .0 |
| 8.017 | .0030 | | | | | .0082 | .07 | 1.03 | 1.44 | 1.31 | .013 | .00 | .00 | PIPE |
| 2239.017 | 42.731 | .991 | 43.722 | 16.51 | 7.37 | .84 | 44.56 | .00 | 1.24 | 3.15 | 3.500 | .000 | .00 | 0 .0 |
| 8.058 | .0030 | | | | | .0094 | .08 | .99 | 1.54 | 1.31 | .013 | .00 | .00 | PIPE |
| 2247.075 | 42.756 | .958 | 43.714 | 16.51 | 7.73 | .93 | 44.64 | .00 | 1.24 | 3.12 | 3.500 | .000 | .00 | 0 .0 |
| 7.876 | .0030 | | | | | .0107 | .08 | .96 | 1.64 | 1.31 | .013 | .00 | .00 | PIPE |
| 2254.951 | 42.780 | .926 | 43.706 | 16.51 | 8.10 | 1.02 | 44.72 | .00 | 1.24 | 3.09 | 3.500 | .000 | .00 | 0 .0 |
| 7.678 | .0030 | | | | | .0123 | .09 | .93 | 1.76 | 1.31 | .013 | .00 | .00 | PIPE |
| 2262.629 | 42.803 | .895 | 43.698 | 16.51 | 8.50 | 1.12 | 44.82 | .00 | 1.24 | 3.05 | 3.500 | .000 | .00 | 0 .0 |
| 7.469 | .0030 | | | | | .0140 | .10 | .90 | 1.88 | 1.31 | .013 | .00 | .00 | PIPE |
| 2270.099 | 42.826 | .865 | 43.691 | 16.51 | 8.91 | 1.23 | 44.92 | .00 | 1.24 | 3.02 | 3.500 | .000 | .00 | 0 .0 |
| 7.327 | .0030 | | | | | .0160 | .12 | .87 | 2.00 | 1.31 | .013 | .00 | .00 | PIPE |
| 2277.426 | 42.848 | .837 | 43.685 | 16.51 | 9.35 | 1.36 | 45.04 | .00 | 1.24 | 2.99 | 3.500 | .000 | .00 | 0 .0 |
| 7.029 | .0030 | | | | | .0184 | .13 | .84 | 2.14 | 1.31 | .013 | .00 | .00 | PIPE |
| 2284.454 | 42.869 | .809 | 43.678 | 16.51 | 9.80 | 1.49 | 45.17 | .00 | 1.24 | 2.95 | 3.500 | .000 | .00 | 0 .0 |
| 6.809 | .0030 | | | | | .0210 | .14 | .81 | 2.29 | 1.31 | .013 | .00 | .00 | PIPE |

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 2291.263 | 42.890 | .782 | 43.672 | 16.51 | 10.28 | 1.64 | 45.31 | .00 | 1.24 | 2.92 | 3.500 | .000 | .00 | 0 .0 |
| 6.589 | .0030 | | | | | .0240 | .16 | .78 | 2.44 | 1.31 | .013 | .00 | .00 | PIPE |
| 2297.852 | 42.910 | .756 | 43.666 | 16.51 | 10.78 | 1.81 | 45.47 | .00 | 1.24 | 2.88 | 3.500 | .000 | .00 | 0 .0 |
| 6.370 | .0030 | | | | | .0275 | .17 | .76 | 2.61 | 1.31 | .013 | .00 | .00 | PIPE |
| 2304.222 | 42.929 | .731 | 43.660 | 16.51 | 11.31 | 1.99 | 45.65 | .00 | 1.24 | 2.85 | 3.500 | .000 | .00 | 0 .0 |
| 6.153 | .0030 | | | | | .0314 | .19 | .73 | 2.78 | 1.31 | .013 | .00 | .00 | PIPE |
| 2310.375 | 42.948 | .707 | 43.655 | 16.51 | 11.86 | 2.19 | 45.84 | .00 | 1.24 | 2.81 | 3.500 | .000 | .00 | 0 .0 |
| 5.938 | .0030 | | | | | .0360 | .21 | .71 | 2.97 | 1.31 | .013 | .00 | .00 | PIPE |
| 2316.313 | 42.966 | .684 | 43.650 | 16.51 | 12.44 | 2.40 | 46.05 | .00 | 1.24 | 2.78 | 3.500 | .000 | .00 | 0 .0 |
| 5.726 | .0030 | | | | | .0412 | .24 | .68 | 3.17 | 1.31 | .013 | .00 | .00 | PIPE |
| 2322.039 | 42.983 | .662 | 43.645 | 16.51 | 13.05 | 2.64 | 46.29 | .00 | 1.24 | 2.74 | 3.500 | .000 | .00 | 0 .0 |
| 5.511 | .0030 | | | | | .0471 | .26 | .66 | 3.38 | 1.31 | .013 | .00 | .00 | PIPE |
| 2327.550 | 43.000 | .641 | 43.641 | 16.51 | 13.69 | 2.91 | 46.55 | .00 | 1.24 | 2.71 | 3.500 | .000 | .00 | 0 .0 |
| JUNCT STR | .3750 | | | | | .0292 | .12 | .91 | 3.61 | | .013 | .00 | .00 | PIPE |
| 2331.550 | 44.500 | 1.373 | 45.873 | 16.51 | 7.18 | .80 | 46.67 | .03 | 1.47 | 1.86 | 2.000 | .000 | .00 | 0 .0 |
| 4.444 | .0045 | | | | | .0084 | .04 | 1.40 | 1.14 | 2.00 | .013 | .00 | .00 | PIPE |
| 2335.994 | 44.520 | 1.327 | 45.847 | 16.51 | 7.46 | .86 | 46.71 | .03 | 1.47 | 1.89 | 2.000 | .000 | .00 | 0 .0 |
| 6.647 | .0045 | | | | | .0093 | .06 | 1.36 | 1.21 | 2.00 | .013 | .00 | .00 | PIPE |

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 2342.641 | 44.549 | 1.273 | 45.823 | 16.51 | 7.82 | .95 | 46.77 | .03 | 1.47 | 1.92 | 2.000 | .000 | .00 | 0 .0 |
| 7.270 | .0045 | | | | | .0105 | .08 | 1.30 | 1.32 | 2.00 | .013 | .00 | .00 | PIPE |
| 2349.911 | 44.582 | 1.222 | 45.804 | 16.51 | 8.20 | 1.04 | 46.85 | .04 | 1.47 | 1.95 | 2.000 | .000 | .00 | 0 .0 |
| 7.759 | .0045 | | | | | .0119 | .09 | 1.26 | 1.42 | 2.00 | .013 | .00 | .00 | PIPE |
| 2357.670 | 44.616 | 1.175 | 45.791 | 16.51 | 8.60 | 1.15 | 46.94 | .04 | 1.47 | 1.97 | 2.000 | .000 | .00 | 0 .0 |
| 7.695 | .0045 | | | | | .0134 | .10 | 1.21 | 1.54 | 2.00 | .013 | .00 | .00 | PIPE |
| 2365.365 | 44.651 | 1.129 | 45.780 | 16.51 | 9.02 | 1.26 | 47.04 | .04 | 1.47 | 1.98 | 2.000 | .000 | .00 | 0 .0 |
| 7.867 | .0045 | | | | | .0152 | .12 | 1.17 | 1.66 | 2.00 | .013 | .00 | .00 | PIPE |
| 2373.232 | 44.686 | 1.087 | 45.773 | 16.51 | 9.46 | 1.39 | 47.16 | .05 | 1.47 | 1.99 | 2.000 | .000 | .00 | 0 .0 |
| 7.708 | .0045 | | | | | .0172 | .13 | 1.14 | 1.78 | 2.00 | .013 | .00 | .00 | PIPE |
| 2380.940 | 44.720 | 1.046 | 45.766 | 16.51 | 9.93 | 1.53 | 47.30 | .07 | 1.47 | 2.00 | 2.000 | .000 | .00 | 0 .0 |
| 5.177 | .0054 | | | | | .0191 | .10 | 1.12 | 1.92 | 1.63 | .013 | .00 | .00 | PIPE |
| 2386.117 | 44.748 | 1.021 | 45.769 | 16.51 | 10.23 | 1.63 | 47.39 | .08 | 1.47 | 2.00 | 2.000 | .000 | .00 | 0 .0 |
| 7.952 | .0054 | | | | | .0212 | .17 | 1.10 | 2.01 | 1.63 | .013 | .00 | .00 | PIPE |
| 2394.069 | 44.791 | .984 | 45.775 | 16.51 | 10.73 | 1.79 | 47.56 | .09 | 1.47 | 2.00 | 2.000 | .000 | .00 | 0 .0 |
| 7.650 | .0054 | | | | | .0240 | .18 | 1.07 | 2.16 | 1.63 | .013 | .00 | .00 | PIPE |
| 2401.719 | 44.832 | .948 | 45.780 | 16.51 | 11.25 | 1.97 | 47.75 | .10 | 1.47 | 2.00 | 2.000 | .000 | .00 | 0 .0 |
| 7.410 | .0054 | | | | | .0273 | .20 | 1.04 | 2.31 | 1.63 | .013 | .00 | .00 | PIPE |

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 2409.130 | 44.872 | .914 | 45.786 | 16.51 | 11.80 | 2.16 | 47.95 | .10 | 1.47 | 1.99 | 2.000 | .000 | .00 | 0 .0 |
| 7.140 | .0054 | | | | | .0311 | .22 | 1.02 | 2.48 | 1.63 | .013 | .00 | .00 | PIPE |
| 2416.270 | 44.910 | .881 | 45.791 | 16.51 | 12.38 | 2.38 | 48.17 | .00 | 1.47 | 1.99 | 2.000 | .000 | .00 | 0 .0 |
| JUNCT STR | .1300 | | | | | .0273 | .11 | .88 | 2.66 | | .013 | .00 | .00 | PIPE |
| 2420.270 | 45.430 | 1.433 | 46.863 | 16.51 | 9.50 | 1.40 | 48.26 | .00 | 1.43 | .62 | 1.500 | .000 | .00 | 0 .0 |
| 1.264 | .0040 | | | | | .0222 | .03 | 1.43 | 1.00 | 1.50 | .013 | .00 | .00 | PIPE |
| 2421.534 | 45.435 | 1.500 | 46.935 | 16.51 | 9.34 | 1.36 | 48.29 | .00 | 1.43 | .00 | 1.500 | .000 | .00 | 0 .0 |
| 394.566 | .0040 | | | | | .0239 | 9.41 | 1.50 | .00 | 1.50 | .013 | .00 | .00 | PIPE |
| 2816.100 | 47.000 | 9.684 | 56.684 | 16.51 | 9.34 | 1.36 | 58.04 | .00 | 1.43 | .00 | 1.500 | .000 | .00 | 0 .0 |
| 33.320 | .0045 | | | | | .0247 | .82 | .00 | .00 | 1.50 | .013 | .00 | .00 | PIPE |
| 2849.420 | 47.150 | 10.550 | 57.700 | 16.51 | 9.34 | 1.36 | 59.06 | .00 | 1.43 | .00 | 1.500 | .000 | .00 | 0 .0 |
| JUNCT STR | .0125 | | | | | .0247 | .10 | .00 | .00 | | .013 | .00 | .00 | PIPE |
| 2853.420 | 47.200 | 10.599 | 57.799 | 16.51 | 9.34 | 1.36 | 59.15 | .00 | 1.43 | .00 | 1.500 | .000 | .00 | 0 .0 |
| 33.350 | .0294 | | | | | .0247 | .82 | .00 | .00 | 1.13 | .013 | .00 | .00 | PIPE |
| 2886.770 | 48.180 | 10.634 | 58.814 | 16.51 | 9.34 | 1.36 | 60.17 | .00 | 1.43 | .00 | 1.500 | .000 | .00 | 0 .0 |
| 34.450 | .0293 | | | | | .0247 | .85 | 10.63 | .00 | 1.13 | .013 | .00 | .00 | PIPE |
| 2921.220 | 49.190 | 10.475 | 59.665 | 16.51 | 9.34 | 1.36 | 61.02 | .00 | 1.43 | .00 | 1.500 | .000 | .00 | 0 .0 |
| JUNCT STR | .0300 | | | | | .0232 | .09 | 10.48 | .00 | | .013 | .00 | .00 | PIPE |

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-19-2024 Time: 2: 4:53

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 2925.220 | 49.310 | 10.754 | 60.064 | 15.50 | 8.77 | 1.19 | 61.26 | .00 | 1.42 | .00 | 1.500 | .000 | .00 | 0 .0 |
| 262.960 | .0294 | | | | | .0218 | 5.73 | 10.75 | .00 | 1.07 | .013 | .00 | .00 | PIPE |
| 3188.180 | 57.030 | 8.760 | 65.790 | 15.50 | 8.77 | 1.19 | 66.98 | .00 | 1.42 | .00 | 1.500 | .000 | .00 | 0 .0 |
| 9.480 | .0327 | | | | | .0218 | .21 | 8.76 | .00 | 1.03 | .013 | .00 | .00 | PIPE |
| 3197.660 | 57.340 | 8.656 | 65.996 | 15.50 | 8.77 | 1.19 | 67.19 | .00 | 1.42 | .00 | 1.500 | .000 | .00 | 0 .0 |

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T1 Oceanside OTC Tremont                                                    0
T2 2 YR Cleveland SD Extention Capacity Analysis
T3 C:\Program Files\CIVILD\OTC_prop_.wsw
SO   1000.000  39.000  1                          42.500
R    1042.550  39.130  1      .013                                    45.0
R    1073.970  39.220  1      .013                                   -45.0
R    1388.420  40.170  1      .013
JX   1392.420  40.180  1  2   .013    0.820           42.18          45.0
R    1428.790  40.290  1      .013
JX   1432.790  40.300  1  2   .013   15.190           42.30          45.0
R    1820.560  41.460  1      .013
JX   1824.560  41.470  1  2   .013    1.970           43.47          45.0
R    1865.820  41.600  1      .013
JX   1869.820  41.610  3  2   .013   14.380           43.11          45.0
R    2327.550  43.000  3      .013
JX   2331.550  44.500  2  2   .013    8.460           44.50          45.0
R    2380.940  44.720  2      .013                               -49.240
R    2416.270  44.910  2      .013                                49.200
JX   2420.270  45.430  4  4   .013    4.000           45.43          -90.0
R    2816.100  47.000  4      .013
R    2849.420  47.150  4      .013                                45.000
JX   2853.420  47.200  4  4   .013    0.310           47.20          -90.0
R    2886.770  48.180  4      .013                                45.000
R    2921.220  49.190  4      .013
JX   2925.220  49.310  4  4  5.013    0.660    1.080  49.31   49.31  45.0-45.0
R    3188.180  57.030  4      .013
R    3197.660  57.340  4      .013
SH   3197.660  57.340  4
CD   1  4   0           4.000    0.000
CD   2  4   0           2.000    0.000
CD   3  4   0           3.500    0.000
CD   4  4   0           1.500    0.000
CD   5  4   0           1.000    0.000
Q             5.110   .0
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Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-18-2024 Time: 7:32: 5

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1000.000 | 39.000 | 3.500 | 42.500 | 51.98 | 4.46 | .31 | 42.81 | .00 | 2.17 | 2.65 | 4.000 | .000 | .00 | 0 .0 |
| 42.550 | .0031 | | | | | .0012 | .05 | 3.50 | .37 | 2.36 | .013 | .00 | .00 | PIPE |
| 1042.550 | 39.130 | 3.408 | 42.538 | 51.98 | 4.56 | .32 | 42.86 | .00 | 2.17 | 2.84 | 4.000 | .000 | .00 | 0 .0 |
| 31.420 | .0029 | | | | | .0012 | .04 | 3.41 | .40 | 2.41 | .013 | .00 | .00 | PIPE |
| 1073.970 | 39.220 | 3.347 | 42.567 | 51.98 | 4.63 | .33 | 42.90 | .00 | 2.17 | 2.96 | 4.000 | .000 | .00 | 0 .0 |
| 79.865 | .0030 | | | | | .0013 | .11 | 3.35 | .42 | 2.37 | .013 | .00 | .00 | PIPE |
| 1153.835 | 39.461 | 3.178 | 42.639 | 51.98 | 4.85 | .37 | 43.01 | .00 | 2.17 | 3.23 | 4.000 | .000 | .00 | 0 .0 |
| 72.867 | .0030 | | | | | .0015 | .11 | 3.18 | .47 | 2.37 | .013 | .00 | .00 | PIPE |
| 1226.702 | 39.681 | 3.028 | 42.710 | 51.98 | 5.09 | .40 | 43.11 | .00 | 2.17 | 3.43 | 4.000 | .000 | .00 | 0 .0 |
| 68.071 | .0030 | | | | | .0016 | .11 | 3.03 | .52 | 2.37 | .013 | .00 | .00 | PIPE |
| 1294.773 | 39.887 | 2.893 | 42.780 | 51.98 | 5.34 | .44 | 43.22 | .00 | 2.17 | 3.58 | 4.000 | .000 | .00 | 0 .0 |
| 67.259 | .0030 | | | | | .0018 | .12 | 2.89 | .57 | 2.37 | .013 | .00 | .00 | PIPE |
| 1362.032 | 40.090 | 2.768 | 42.858 | 51.98 | 5.60 | .49 | 43.35 | .00 | 2.17 | 3.69 | 4.000 | .000 | .00 | 0 .0 |
| 26.388 | .0030 | | | | | .0020 | .05 | 2.77 | .62 | 2.37 | .013 | .00 | .00 | PIPE |
| 1388.420 | 40.170 | 2.722 | 42.892 | 51.98 | 5.71 | .51 | 43.40 | .00 | 2.17 | 3.73 | 4.000 | .000 | .00 | 0 .0 |
| JUNCT STR | .0025 | | | | | .0019 | .01 | 2.72 | .64 | | .013 | .00 | .00 | PIPE |
| 1392.420 | 40.180 | 2.767 | 42.947 | 51.16 | 5.52 | .47 | 43.42 | .00 | 2.15 | 3.69 | 4.000 | .000 | .00 | 0 .0 |
| 36.370 | .0030 | | | | | .0019 | .07 | 2.77 | .61 | 2.34 | .013 | .00 | .00 | PIPE |

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-18-2024 Time: 7:32: 5

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1428.790 | 40.290 | 2.702 | 42.992 | 51.16 | 5.67 | .50 | 43.49 | .00 | 2.15 | 3.75 | 4.000 | .000 | .00 | 0 .0 |
| JUNCT STR | .0025 | | | | | | | 2.70 | .64 | | .013 | .00 | .00 | PIPE |
| 1432.790 | 40.300 | 1.785 | 42.085 | 35.97 | 6.63 | .68 | 42.77 | .00 | 1.79 | 3.98 | 4.000 | .000 | .00 | 0 .0 |
| 7.454 | .0030 | | | | | .0035 | .03 | 1.79 | 1.00 | 1.90 | .013 | .00 | .00 | PIPE |
| 1440.244 | 40.322 | 1.851 | 42.173 | 35.97 | 6.32 | .62 | 42.79 | .00 | 1.79 | 3.99 | 4.000 | .000 | .00 | 0 .0 |
| 67.573 | .0030 | | | | | .0031 | .21 | 1.85 | .93 | 1.90 | .013 | .00 | .00 | PIPE |
| 1507.818 | 40.524 | 1.900 | 42.424 | 35.97 | 6.11 | .58 | 43.00 | .00 | 1.79 | 3.99 | 4.000 | .000 | .00 | 0 .0 |
| 312.742 | .0030 | | | | | .0030 | .93 | 1.90 | .89 | 1.90 | .013 | .00 | .00 | PIPE |
| 1820.560 | 41.460 | 1.900 | 43.360 | 35.97 | 6.11 | .58 | 43.94 | .00 | 1.79 | 3.99 | 4.000 | .000 | .00 | 0 .0 |
| JUNCT STR | .0025 | | | | | .0024 | .01 | 1.90 | .89 | | .013 | .00 | .00 | PIPE |
| 1824.560 | 41.470 | 2.110 | 43.580 | 34.00 | 5.06 | .40 | 43.98 | .00 | 1.73 | 3.99 | 4.000 | .000 | .00 | 0 .0 |
| 33.986 | .0032 | | | | | .0020 | .07 | 2.11 | .69 | 1.81 | .013 | .00 | .00 | PIPE |
| 1858.546 | 41.577 | 2.031 | 43.608 | 34.00 | 5.30 | .44 | 44.05 | .00 | 1.73 | 4.00 | 4.000 | .000 | .00 | 0 .0 |
| 7.274 | .0032 | | | | | .0022 | .02 | 2.03 | .74 | 1.81 | .013 | .00 | .00 | PIPE |
| 1865.820 | 41.600 | 2.015 | 43.615 | 34.00 | 5.36 | .45 | 44.06 | .00 | 1.73 | 4.00 | 4.000 | .000 | .00 | 0 .0 |
| JUNCT STR | .0025 | | | | | | | 2.01 | .75 | | .013 | .00 | .00 | PIPE |
| 1869.820 | 41.610 | 1.356 | 42.966 | 19.62 | 5.70 | .50 | 43.47 | .00 | 1.36 | 3.41 | 3.500 | .000 | .00 | 0 .0 |
| 5.400 | .0030 | | | | | .0035 | .02 | 1.36 | 1.00 | 1.44 | .013 | .00 | .00 | PIPE |

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1875.220 | 41.626 | 1.404 | 43.030 | 19.62 | 5.44 | .46 | 43.49 | .00 | 1.36 | 3.43 | 3.500 | .000 | .00 | 0 .0 |
| 47.697 | .0030 | | | | | .0032 | .15 | 1.40 | .93 | 1.44 | .013 | .00 | .00 | PIPE |
| 1922.917 | 41.771 | 1.438 | 43.209 | 19.62 | 5.27 | .43 | 43.64 | .00 | 1.36 | 3.44 | 3.500 | .000 | .00 | 0 .0 |
| 287.122 | .0030 | | | | | .0030 | .87 | 1.44 | .89 | 1.44 | .013 | .00 | .00 | PIPE |
| 2210.039 | 42.643 | 1.438 | 44.081 | 19.62 | 5.27 | .43 | 44.51 | .00 | 1.36 | 3.44 | 3.500 | .000 | .00 | 0 .0 |
| HYDRAULIC JUMP | | | | | | | | | | | | | | |
| 2210.039 | 42.643 | 1.258 | 43.901 | 19.62 | 6.30 | .62 | 44.52 | .00 | 1.36 | 3.36 | 3.500 | .000 | .00 | 0 .0 |
| 3.310 | .0030 | | | | | .0050 | .02 | 1.26 | 1.15 | 1.44 | .013 | .00 | .00 | PIPE |
| 2213.348 | 42.653 | 1.258 | 43.911 | 19.62 | 6.30 | .62 | 44.53 | .00 | 1.36 | 3.36 | 3.500 | .000 | .00 | 0 .0 |
| 8.182 | .0030 | | | | | .0053 | .04 | 1.26 | 1.15 | 1.44 | .013 | .00 | .00 | PIPE |
| 2221.530 | 42.678 | 1.215 | 43.893 | 19.62 | 6.61 | .68 | 44.57 | .00 | 1.36 | 3.33 | 3.500 | .000 | .00 | 0 .0 |
| 8.523 | .0030 | | | | | .0061 | .05 | 1.22 | 1.23 | 1.44 | .013 | .00 | .00 | PIPE |
| 2230.053 | 42.704 | 1.173 | 43.877 | 19.62 | 6.93 | .75 | 44.62 | .00 | 1.36 | 3.30 | 3.500 | .000 | .00 | 0 .0 |
| 8.904 | .0030 | | | | | .0069 | .06 | 1.17 | 1.32 | 1.44 | .013 | .00 | .00 | PIPE |
| 2238.958 | 42.731 | 1.133 | 43.864 | 19.62 | 7.27 | .82 | 44.68 | .00 | 1.36 | 3.28 | 3.500 | .000 | .00 | 0 .0 |
| 9.051 | .0030 | | | | | .0079 | .07 | 1.13 | 1.41 | 1.44 | .013 | .00 | .00 | PIPE |
| 2248.009 | 42.758 | 1.095 | 43.854 | 19.62 | 7.63 | .90 | 44.76 | .00 | 1.36 | 3.25 | 3.500 | .000 | .00 | 0 .0 |
| 8.890 | .0030 | | | | | .0090 | .08 | 1.10 | 1.51 | 1.44 | .013 | .00 | .00 | PIPE |

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 2256.899 | 42.785 | 1.058 | 43.844 | 19.62 | 8.00 | .99 | 44.84 | .00 | 1.36 | 3.21 | 3.500 | .000 | .00 | 0 .0 |
| 8.701 | .0030 | | | | | .0103 | .09 | 1.06 | 1.61 | 1.44 | .013 | .00 | .00 | PIPE |
| 2265.600 | 42.812 | 1.022 | 43.834 | 19.62 | 8.39 | 1.09 | 44.93 | .00 | 1.36 | 3.18 | 3.500 | .000 | .00 | 0 .0 |
| 8.494 | .0030 | | | | | .0118 | .10 | 1.02 | 1.72 | 1.44 | .013 | .00 | .00 | PIPE |
| 2274.094 | 42.838 | .987 | 43.825 | 19.62 | 8.80 | 1.20 | 45.03 | .00 | 1.36 | 3.15 | 3.500 | .000 | .00 | 0 .0 |
| 8.366 | .0030 | | | | | .0135 | .11 | .99 | 1.84 | 1.44 | .013 | .00 | .00 | PIPE |
| 2282.460 | 42.863 | .954 | 43.817 | 19.62 | 9.23 | 1.32 | 45.14 | .00 | 1.36 | 3.12 | 3.500 | .000 | .00 | 0 .0 |
| 8.118 | .0030 | | | | | .0154 | .12 | .95 | 1.97 | 1.44 | .013 | .00 | .00 | PIPE |
| 2290.578 | 42.888 | .922 | 43.810 | 19.62 | 9.68 | 1.45 | 45.26 | .00 | 1.36 | 3.08 | 3.500 | .000 | .00 | 0 .0 |
| 7.933 | .0030 | | | | | .0176 | .14 | .92 | 2.10 | 1.44 | .013 | .00 | .00 | PIPE |
| 2298.511 | 42.912 | .892 | 43.804 | 19.62 | 10.15 | 1.60 | 45.40 | .00 | 1.36 | 3.05 | 3.500 | .000 | .00 | 0 .0 |
| 7.613 | .0030 | | | | | .0201 | .15 | .89 | 2.25 | 1.44 | .013 | .00 | .00 | PIPE |
| 2306.124 | 42.935 | .862 | 43.797 | 19.62 | 10.64 | 1.76 | 45.56 | .00 | 1.36 | 3.02 | 3.500 | .000 | .00 | 0 .0 |
| 7.367 | .0030 | | | | | .0230 | .17 | .86 | 2.40 | 1.44 | .013 | .00 | .00 | PIPE |
| 2313.490 | 42.957 | .833 | 43.790 | 19.62 | 11.16 | 1.94 | 45.73 | .00 | 1.36 | 2.98 | 3.500 | .000 | .00 | 0 .0 |
| 7.162 | .0030 | | | | | .0263 | .19 | .83 | 2.56 | 1.44 | .013 | .00 | .00 | PIPE |
| 2320.653 | 42.979 | .806 | 43.785 | 19.62 | 11.71 | 2.13 | 45.91 | .00 | 1.36 | 2.95 | 3.500 | .000 | .00 | 0 .0 |
| 6.897 | .0030 | | | | | .0301 | .21 | .81 | 2.74 | 1.44 | .013 | .00 | .00 | PIPE |

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 2327.550 | 43.000 | .780 | 43.780 | 19.62 | 12.28 | 2.34 | 46.12 | .00 | 1.36 | 2.91 | 3.500 | .000 | .00 | 0 .0 |
| JUNCT STR | .3750 | | | | | .0188 | .08 | 1.02 | 2.92 | | .013 | .00 | .00 | PIPE |
| 2331.550 | 44.500 | 1.198 | 45.698 | 11.16 | 5.68 | .50 | 46.20 | .02 | 1.20 | 1.96 | 2.000 | .000 | .00 | 0 .0 |
| 5.122 | .0045 | | | | | .0051 | .03 | 1.22 | 1.00 | 1.28 | .013 | .00 | .00 | PIPE |
| 2336.672 | 44.523 | 1.247 | 45.770 | 11.16 | 5.42 | .46 | 46.23 | .02 | 1.20 | 1.94 | 2.000 | .000 | .00 | 0 .0 |
| 39.961 | .0045 | | | | | .0046 | .18 | 1.26 | .93 | 1.28 | .013 | .00 | .00 | PIPE |
| 2376.633 | 44.701 | 1.279 | 45.980 | 11.16 | 5.26 | .43 | 46.41 | .01 | 1.20 | 1.92 | 2.000 | .000 | .00 | 0 .0 |
| 4.307 | .0045 | | | | | .0044 | .02 | 1.29 | .88 | 1.28 | .013 | .00 | .00 | PIPE |
| 2380.940 | 44.720 | 1.279 | 45.999 | 11.16 | 5.26 | .43 | 46.43 | .02 | 1.20 | 1.92 | 2.000 | .000 | .00 | 0 .0 |
| 12.949 | .0054 | | | | | .0047 | .06 | 1.30 | .88 | 1.20 | .013 | .00 | .00 | PIPE |
| 2393.889 | 44.790 | 1.228 | 46.018 | 11.16 | 5.52 | .47 | 46.49 | .02 | 1.20 | 1.95 | 2.000 | .000 | .00 | 0 .0 |
| 6.158 | .0054 | | | | | .0052 | .03 | 1.25 | .95 | 1.20 | .013 | .00 | .00 | PIPE |
| 2400.048 | 44.823 | 1.201 | 46.024 | 11.16 | 5.67 | .50 | 46.52 | .02 | 1.20 | 1.96 | 2.000 | .000 | .00 | 0 .0 |
| 16.222 | .0054 | | | | | .0053 | .09 | 1.22 | 1.00 | 1.20 | .013 | .00 | .00 | PIPE |
| 2416.270 | 44.910 | 1.201 | 46.111 | 11.16 | 5.67 | .50 | 46.61 | .00 | 1.20 | 1.96 | 2.000 | .000 | .00 | 0 .0 |
| JUNCT STR | .1300 | | | | | .0050 | .02 | 1.20 | 1.00 | | .013 | .00 | .00 | PIPE |
| 2420.270 | 45.430 | 1.234 | 46.664 | 7.16 | 4.60 | .33 | 46.99 | .00 | 1.04 | 1.15 | 1.500 | .000 | .00 | 0 .0 |
| 86.982 | .0040 | | | | | .0044 | .39 | 1.23 | .70 | 1.50 | .013 | .00 | .00 | PIPE |

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 2507.252 | 45.775 | 1.304 | 47.079 | 7.16 | 4.39 | .30 | 47.38 | .00 | 1.04 | 1.01 | 1.500 | .000 | .00 | 0 .0 |
| 308.848 | .0040 | | | | | .0041 | 1.28 | 1.30 | .61 | 1.50 | .013 | .00 | .00 | PIPE |
| 2816.100 | 47.000 | 1.381 | 48.381 | 7.16 | 4.21 | .27 | 48.66 | .01 | 1.04 | .81 | 1.500 | .000 | .00 | 0 .0 |
| 24.674 | .0045 | | | | | .0040 | .10 | 1.39 | .51 | 1.25 | .013 | .00 | .00 | PIPE |
| 2840.774 | 47.111 | 1.360 | 48.471 | 7.16 | 4.25 | .28 | 48.75 | .01 | 1.04 | .87 | 1.500 | .000 | .00 | 0 .0 |
| HYDRAULIC JUMP | | | | | | | | | | | | | | |
| 2840.774 | 47.111 | .752 | 47.863 | 7.16 | 8.07 | 1.01 | 48.88 | .04 | 1.04 | 1.50 | 1.500 | .000 | .00 | 0 .0 |
| 3.727 | .0045 | | | | | .0184 | .07 | .79 | 1.85 | 1.25 | .013 | .00 | .00 | PIPE |
| 2844.502 | 47.128 | .752 | 47.880 | 7.16 | 8.06 | 1.01 | 48.89 | .04 | 1.04 | 1.50 | 1.500 | .000 | .00 | 0 .0 |
| 4.918 | .0045 | | | | | .0196 | .10 | .79 | 1.85 | 1.25 | .013 | .00 | .00 | PIPE |
| 2849.420 | 47.150 | .725 | 47.875 | 7.16 | 8.46 | 1.11 | 48.99 | .00 | 1.04 | 1.50 | 1.500 | .000 | .00 | 0 .0 |
| JUNCT STR | .0125 | | | | | .0242 | .10 | .80 | 1.98 | | .013 | .00 | .00 | PIPE |
| 2853.420 | 47.200 | .652 | 47.852 | 6.85 | 9.29 | 1.34 | 49.19 | .09 | 1.01 | 1.49 | 1.500 | .000 | .00 | 0 .0 |
| 11.716 | .0294 | | | | | .0272 | .32 | .75 | 2.32 | .64 | .013 | .00 | .00 | PIPE |
| 2865.136 | 47.544 | .658 | 48.202 | 6.85 | 9.17 | 1.30 | 49.51 | .09 | 1.01 | 1.49 | 1.500 | .000 | .00 | 0 .0 |
| 21.634 | .0294 | | | | | .0251 | .54 | .75 | 2.28 | .64 | .013 | .00 | .00 | PIPE |
| 2886.770 | 48.180 | .683 | 48.863 | 6.85 | 8.74 | 1.19 | 50.05 | .00 | 1.01 | 1.49 | 1.500 | .000 | .00 | 0 .0 |
| 1.250 | .0293 | | | | | .0233 | .03 | .68 | 2.13 | .64 | .013 | .00 | .00 | PIPE |

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-18-2024 Time: 7:32: 5

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 2888.020 | 48.217 | .685 | 48.902 | 6.85 | 8.70 | 1.17 | 50.08 | .00 | 1.01 | 1.49 | 1.500 | .000 | .00 | 0 .0 |
| 10.659 | .0293 | | | | | .0217 | .23 | .69 | 2.11 | .64 | .013 | .00 | .00 | PIPE |
| 2898.680 | 48.529 | .711 | 49.240 | 6.85 | 8.29 | 1.07 | 50.31 | .00 | 1.01 | 1.50 | 1.500 | .000 | .00 | 0 .0 |
| 6.878 | .0293 | | | | | .0191 | .13 | .71 | 1.97 | .64 | .013 | .00 | .00 | PIPE |
| 2905.558 | 48.731 | .738 | 49.469 | 6.85 | 7.91 | .97 | 50.44 | .00 | 1.01 | 1.50 | 1.500 | .000 | .00 | 0 .0 |
| 4.829 | .0293 | | | | | .0168 | .08 | .74 | 1.83 | .64 | .013 | .00 | .00 | PIPE |
| 2910.387 | 48.872 | .766 | 49.638 | 6.85 | 7.54 | .88 | 50.52 | .00 | 1.01 | 1.50 | 1.500 | .000 | .00 | 0 .0 |
| 3.469 | .0293 | | | | | .0148 | .05 | .77 | 1.71 | .64 | .013 | .00 | .00 | PIPE |
| 2913.856 | 48.974 | .796 | 49.770 | 6.85 | 7.19 | .80 | 50.57 | .00 | 1.01 | 1.50 | 1.500 | .000 | .00 | 0 .0 |
| 2.583 | .0293 | | | | | .0131 | .03 | .80 | 1.59 | .64 | .013 | .00 | .00 | PIPE |
| 2916.439 | 49.050 | .827 | 49.877 | 6.85 | 6.85 | .73 | 50.61 | .00 | 1.01 | 1.49 | 1.500 | .000 | .00 | 0 .0 |
| 1.874 | .0293 | | | | | .0116 | .02 | .83 | 1.48 | .64 | .013 | .00 | .00 | PIPE |
| 2918.313 | 49.105 | .860 | 49.965 | 6.85 | 6.53 | .66 | 50.63 | .00 | 1.01 | 1.48 | 1.500 | .000 | .00 | 0 .0 |
| 1.375 | .0293 | | | | | .0102 | .01 | .86 | 1.37 | .64 | .013 | .00 | .00 | PIPE |
| 2919.688 | 49.145 | .894 | 50.039 | 6.85 | 6.23 | .60 | 50.64 | .00 | 1.01 | 1.47 | 1.500 | .000 | .00 | 0 .0 |
| .877 | .0293 | | | | | .0090 | .01 | .89 | 1.27 | .64 | .013 | .00 | .00 | PIPE |
| 2920.564 | 49.171 | .931 | 50.102 | 6.85 | 5.94 | .55 | 50.65 | .00 | 1.01 | 1.46 | 1.500 | .000 | .00 | 0 .0 |
| .507 | .0293 | | | | | .0080 | .00 | .93 | 1.18 | .64 | .013 | .00 | .00 | PIPE |

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 2921.072 | 49.186 | .970 | 50.156 | 6.85 | 5.66 | .50 | 50.65 | .00 | 1.01 | 1.43 | 1.500 | .000 | .00 | 0 .0 |
| .148 | .0293 | | | | | .0071 | .00 | .97 | 1.09 | .64 | .013 | .00 | .00 | PIPE |
| 2921.220 | 49.190 | 1.013 | 50.203 | 6.85 | 5.39 | .45 | 50.65 | .00 | 1.01 | 1.40 | 1.500 | .000 | .00 | 0 .0 |
| JUNCT STR | .0300 | | | | | .0044 | .02 | 1.01 | 1.00 | | .013 | .00 | .00 | PIPE |
| 2925.220 | 49.310 | 1.333 | 50.643 | 5.11 | 3.08 | .15 | 50.79 | .00 | .87 | .94 | 1.500 | .000 | .00 | 0 .0 |
| .041 | .0294 | | | | | .0021 | .00 | 1.33 | .41 | .55 | .013 | .00 | .00 | PIPE |
| 2925.261 | 49.311 | 1.333 | 50.644 | 5.11 | 3.08 | .15 | 50.79 | .00 | .87 | .94 | 1.500 | .000 | .00 | 0 .0 |
| HYDRAULIC JUMP | | | | | | | | | | | | | | |
| 2925.261 | 49.311 | .547 | 49.858 | 5.11 | 8.77 | 1.19 | 51.05 | .00 | .87 | 1.44 | 1.500 | .000 | .00 | 0 .0 |
| 164.110 | .0294 | | | | | .0294 | 4.82 | .55 | 2.43 | .55 | .013 | .00 | .00 | PIPE |
| 3089.371 | 54.129 | .547 | 54.676 | 5.11 | 8.77 | 1.19 | 55.87 | .00 | .87 | 1.44 | 1.500 | .000 | .00 | 0 .0 |
| 50.149 | .0294 | | | | | .0286 | 1.43 | .55 | 2.43 | .55 | .013 | .00 | .00 | PIPE |
| 3139.520 | 55.601 | .554 | 56.156 | 5.11 | 8.60 | 1.15 | 57.30 | .00 | .87 | 1.45 | 1.500 | .000 | .00 | 0 .0 |
| 25.615 | .0294 | | | | | .0261 | .67 | .55 | 2.37 | .55 | .013 | .00 | .00 | PIPE |
| 3165.135 | 56.353 | .574 | 56.928 | 5.11 | 8.20 | 1.04 | 57.97 | .00 | .87 | 1.46 | 1.500 | .000 | .00 | 0 .0 |
| 11.385 | .0294 | | | | | .0229 | .26 | .57 | 2.21 | .55 | .013 | .00 | .00 | PIPE |
| 3176.521 | 56.688 | .595 | 57.283 | 5.11 | 7.82 | .95 | 58.23 | .00 | .87 | 1.47 | 1.500 | .000 | .00 | 0 .0 |
| 6.923 | .0294 | | | | | .0201 | .14 | .60 | 2.06 | .55 | .013 | .00 | .00 | PIPE |

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-18-2024 Time: 7:32: 5

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 3183.443 | 56.891 | .617 | 57.508 | 5.11 | 7.45 | .86 | 58.37 | .00 | .87 | 1.48 | 1.500 | .000 | .00 | 0 .0 |
| 4.737 | .0294 | | | | | .0176 | .08 | .62 | 1.93 | .55 | .013 | .00 | .00 | PIPE |
| 3188.180 | 57.030 | .640 | 57.670 | 5.11 | 7.11 | .78 | 58.45 | .00 | .87 | 1.48 | 1.500 | .000 | .00 | 0 .0 |
| .423 | .0327 | | | | | .0163 | .01 | .64 | 1.80 | .53 | .013 | .00 | .00 | PIPE |
| 3188.602 | 57.044 | .643 | 57.687 | 5.11 | 7.05 | .77 | 58.46 | .00 | .87 | 1.48 | 1.500 | .000 | .00 | 0 .0 |
| 2.628 | .0327 | | | | | .0151 | .04 | .64 | 1.78 | .53 | .013 | .00 | .00 | PIPE |
| 3191.230 | 57.130 | .667 | 57.797 | 5.11 | 6.72 | .70 | 58.50 | .00 | .87 | 1.49 | 1.500 | .000 | .00 | 0 .0 |
| 1.999 | .0327 | | | | | .0133 | .03 | .67 | 1.66 | .53 | .013 | .00 | .00 | PIPE |
| 3193.229 | 57.195 | .692 | 57.887 | 5.11 | 6.41 | .64 | 58.52 | .00 | .87 | 1.50 | 1.500 | .000 | .00 | 0 .0 |
| 1.523 | .0327 | | | | | .0117 | .02 | .69 | 1.55 | .53 | .013 | .00 | .00 | PIPE |
| 3194.752 | 57.245 | .718 | 57.963 | 5.11 | 6.11 | .58 | 58.54 | .00 | .87 | 1.50 | 1.500 | .000 | .00 | 0 .0 |
| 1.147 | .0327 | | | | | .0103 | .01 | .72 | 1.44 | .53 | .013 | .00 | .00 | PIPE |
| 3195.899 | 57.282 | .745 | 58.028 | 5.11 | 5.83 | .53 | 58.55 | .00 | .87 | 1.50 | 1.500 | .000 | .00 | 0 .0 |
| .800 | .0327 | | | | | .0091 | .01 | .75 | 1.34 | .53 | .013 | .00 | .00 | PIPE |
| 3196.699 | 57.309 | .774 | 58.083 | 5.11 | 5.55 | .48 | 58.56 | .00 | .87 | 1.50 | 1.500 | .000 | .00 | 0 .0 |
| .549 | .0327 | | | | | .0080 | .00 | .77 | 1.25 | .53 | .013 | .00 | .00 | PIPE |
| 3197.248 | 57.327 | .804 | 58.131 | 5.11 | 5.30 | .44 | 58.57 | .00 | .87 | 1.50 | 1.500 | .000 | .00 | 0 .0 |
| .335 | .0327 | | | | | .0071 | .00 | .80 | 1.16 | .53 | .013 | .00 | .00 | PIPE |

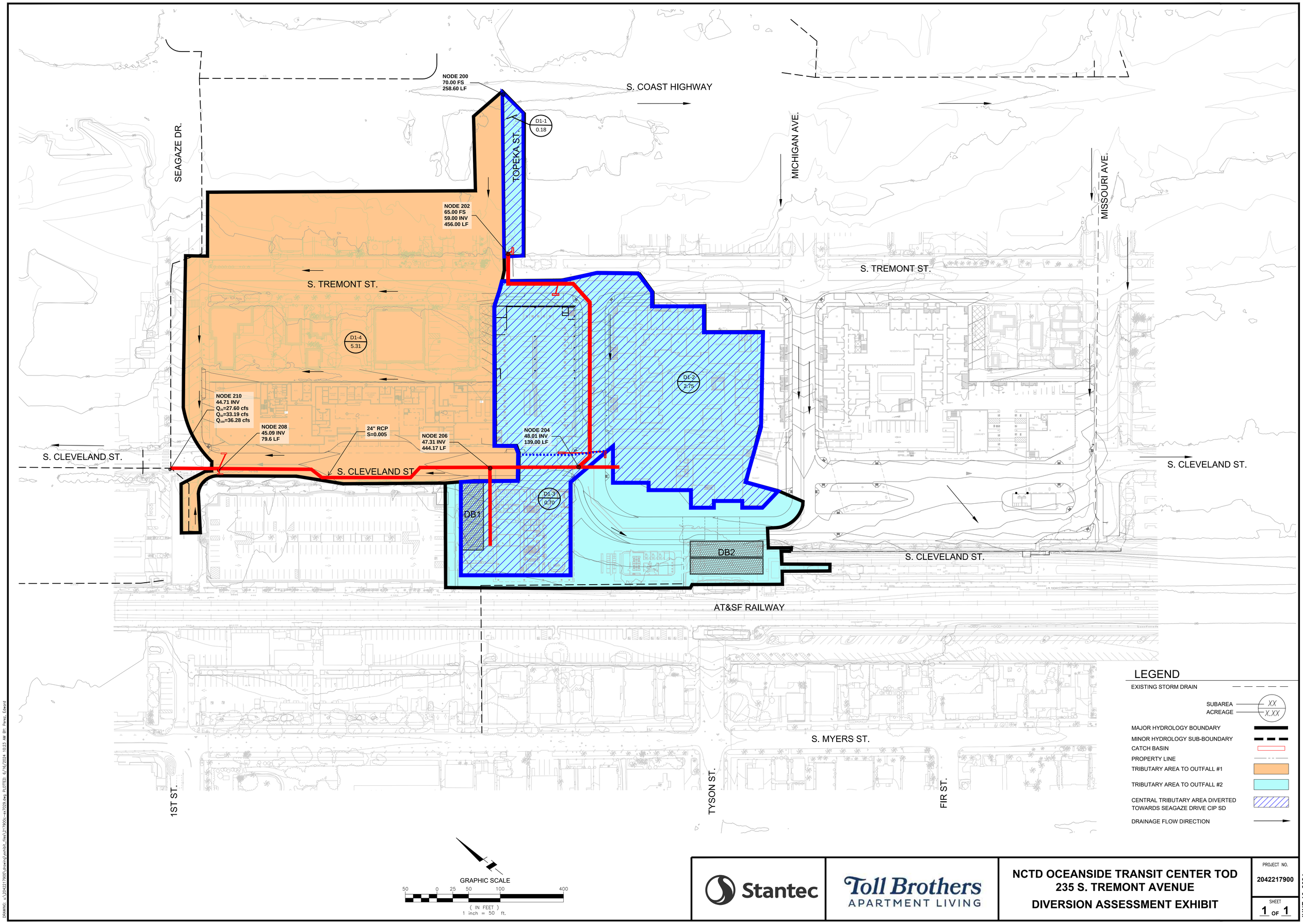
Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-18-2024 Time: 7:32: 5

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 3197.583 | 57.337 | .835 | 58.173 | 5.11 | 5.05 | .40 | 58.57 | .00 | .87 | 1.49 | 1.500 | .000 | .00 | 0 .0 |
| .077 | .0327 | | | | | .0062 | .00 | .84 | 1.08 | .53 | .013 | .00 | .00 | PIPE |
| 3197.660 | 57.340 | .870 | 58.210 | 5.11 | 4.81 | .36 | 58.57 | .00 | .87 | 1.48 | 1.500 | .000 | .00 | 0 .0 |

# X. CENTRAL TRIBUTARY DIVERSION HYDROLOGY & EXHIBIT




## LEGEND

- EXISTING STORM DRAIN
- SUBAREA — XX
- ACREAGE — X.XX
- MAJOR HYDROLOGY BOUNDARY
- MINOR HYDROLOGY SUB-BOUNDARY
- CATCH BASIN
- PROPERTY LINE
- TRIBUTARY AREA TO OUTFALL #1
- TRIBUTARY AREA TO OUTFALL #2
- CENTRAL TRIBUTARY AREA DIVERTED TOWARDS SEAGAZE DRIVE CIP SD
- DRAINAGE FLOW DIRECTION

GRAPHIC SCALE
50 0 25 50 100 400
( IN FEET )
1 inch = 50 ft.

Stantec

Toll Brothers APARTMENT LIVING

# NCTD OCEANSIDE TRANSIT CENTER TOD
## 235 S. TREMONT AVENUE
## DIVERSION ASSESSMENT EXHIBIT

PROJECT NO. 2042217900

SHEET 1 OF 1

JUNE 16, 2024

DRAWING: ...\2042217900\Drawing\xsh\Sht_Files\2217900-ex7029.dwg PLOTTED: 6/16/2024 10:23 AM BY: Perez, Edward

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*****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************* DESCRIPTION OF STUDY *************************
* OCEANSIDE TOD - TREMONT SITE                                          *
* ASSESSMENT TO DIVERT PORTIONS OF THE CENTRAL TRIBUTARY AREA TO THE NORTH *
* 25-YEAR STORM                                                         *
 ************************************************************************

  FILE NAME: DIV25YR.DAT
  TIME/DATE OF STUDY: 10:03 06/16/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   258.60
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.226
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    74.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.73

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    48.01
  FLOW LENGTH(FEET) =   456.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.0 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.78
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.73
  PIPE TRAVEL TIME(MIN.) =   1.59    Tc(MIN.) =    5.82
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     714.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.828
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    2.75   SUBAREA RUNOFF(CFS) =   10.09
  TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =      10.75
  TC(MIN.) =    5.82

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    48.01  DOWNSTREAM(FEET) =    47.31
  FLOW LENGTH(FEET) =   139.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.19
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.75
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    6.26
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     853.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.603
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.45
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      12.70
  TC(MIN.) =    6.26

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.31  DOWNSTREAM(FEET) =    45.09
  FLOW LENGTH(FEET) =   444.17   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.53
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.70
  PIPE TRAVEL TIME(MIN.) =   1.34    Tc(MIN.) =    7.60
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =    1297.77 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.062
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    5.31   SUBAREA RUNOFF(CFS) =   16.39
  TOTAL AREA(ACRES) =        8.9   TOTAL RUNOFF(CFS) =      27.60
  TC(MIN.) =    7.60

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.09  DOWNSTREAM(FEET) =    44.71
  FLOW LENGTH(FEET) =    79.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.60
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    7.81
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =    1377.37 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.9  TC(MIN.) =      7.81
  PEAK FLOW RATE(CFS)   =      27.60
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                   Stantec



 ************************* DESCRIPTION OF STUDY *************************
* OCEANSIDE TOD - TREMONT SITE                                          *
* ASSESSMENT TO DIVERT PORTIONS OF THE CENTRAL TRIBUTARY AREA TO THE NORTH *
* 50-YEAR STORM                                                         *
 ************************************************************************

  FILE NAME: DIV50YR.DAT
  TIME/DATE OF STUDY: 10:07 06/16/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ====== =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   258.60
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.226
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    74.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.87
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.87

************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    48.01
  FLOW LENGTH(FEET) =   456.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.04
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.87
  PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =    5.74
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     714.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.788
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    2.75   SUBAREA RUNOFF(CFS) =   12.10
  TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =      12.89
  TC(MIN.) =    5.74

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    48.01  DOWNSTREAM(FEET) =    47.31
  FLOW LENGTH(FEET) =   139.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.56
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.89
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    6.15
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     853.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.532
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.94
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      15.26
  TC(MIN.) =    6.15

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.31  DOWNSTREAM(FEET) =    45.09
  FLOW LENGTH(FEET) =   444.17   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.65
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.26
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =    7.46
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =    1297.77 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.885
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    5.31   SUBAREA RUNOFF(CFS) =   19.71
  TOTAL AREA(ACRES) =        8.9   TOTAL RUNOFF(CFS) =      33.19
  TC(MIN.) =    7.46

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.09  DOWNSTREAM(FEET) =    44.71
  FLOW LENGTH(FEET) =    79.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.81
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.19
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.66
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =    1377.37 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.9  TC(MIN.) =      7.66
  PEAK FLOW RATE(CFS)   =      33.19
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
______________________________________________________________________________
******************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************* DESCRIPTION OF STUDY *************************
* OCEANSIDE TOD - TREMONT SITE                                           *
* ASSESSMENT TO DIVERT PORTIONS OF THE CENTRAL TRIBUTARY AREA TO THE NORTH *
* 100-YEAR STORM                                                         *
 ************************************************************************

  FILE NAME: DIV100YR.DAT
  TIME/DATE OF STUDY: 10:09 06/16/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   258.60
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.226
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    74.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.94

******************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    48.01
  FLOW LENGTH(FEET) =   456.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.4 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.16
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.94
  PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =    5.70
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     714.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.296
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    2.75   SUBAREA RUNOFF(CFS) =   13.16
  TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =      14.02
  TC(MIN.) =    5.70

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    48.01  DOWNSTREAM(FEET) =    47.31
  FLOW LENGTH(FEET) =   139.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.02
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    6.11
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     853.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.020
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    3.20
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      16.61
  TC(MIN.) =    6.11

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.31  DOWNSTREAM(FEET) =    45.09
  FLOW LENGTH(FEET) =   444.17   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.93
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.61
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =    7.36
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =    1297.77 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.340
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    5.31   SUBAREA RUNOFF(CFS) =   21.55
  TOTAL AREA(ACRES) =        8.9   TOTAL RUNOFF(CFS) =      36.28
  TC(MIN.) =    7.36

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.09  DOWNSTREAM(FEET) =    44.71
  FLOW LENGTH(FEET) =    79.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.28
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.54
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =    1377.37 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.9  TC(MIN.) =      7.54
  PEAK FLOW RATE(CFS)   =      36.28
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

**ATTACHMENT 6**
**Geotechnical and Groundwater Investigation Report**

(For geotechnical studies, refer to Appendix VI and VII of the drainage report provided in Attachment 5.)

**ATTACHMENT 7**
**Storm Water Quality Assessment Form**

DocuSign Envelope ID: 3AB36283-BAA0-47A2-98F6-0F042691C740

*City of Oceanside – Engineering Division – Clean Water Program*

# STORM WATER QUALITY ASSESSMENT FOR PLANNING, ENGINEERING, AND BUILDING PERMIT APPLICATIONS

All applications for Planning, Engineering, or Building Division permits are required to complete this assessment form and include it as part of the initial permit application submittal. Staff will review the permit application content to determine the applicability of State and City storm water requirements. Please note a storm water assessment cannot be provided without a complete permit application package.

| Section 1 – Project Information | |
|---|---|
| Applicant Name:<br>Toll Bros., Inc. | Phone Number:<br>(949) 573-7300 |
| Project Name:<br>North County Transit Center | Project Site Address:<br>235 South Tremont St., Oceanside, CA 92054 |
| Permit Applications Number(s):<br>GPA22-00002 | Assessor Parcel Number(s): 147-350-24; 150-046-17;<br>150-046-01 thru 08; 150-043-01 thru 06; and 147-350-25 |
| Project Description:<br>Mixed Use Redeveoplment | Project Disturbed Area (square feet):<br>482,210 sf |
| Existing Impervious Area (square feet):<br>428,500 sf | Created or Replicated Impervious Area (square feet):<br>425,600 sf |

| Section 2 – Identify Applicable Priority Development Project Categories (Check All Boxes that Apply) | |
|---|---|
| ☐ | **New Development Project** – A project that creates 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land. |
| ☒ | **Redevelopment Project** – A project that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land. |
| ☐ | **Restaurants** – Category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812); where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site). |
| ☐ | **Hillside Development** – Category includes development on any natural slope that is twenty-five percent or greater; where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site). |
| ☒ | **Parking Lots** – Category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce; where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site). |
| ☒ | **Streets, Roads, Highways, Freeways, and Driveways** – Category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles; where new or redevelopment projects that create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site). |
| ☐ | **Water Quality Environmentally Sensitive Area** – New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharge directly to a Water Quality Environmentally Sensitive Area (WQESA). "Discharge directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the WQESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). |
| ☐ | **Automotive Repair Shop** – Category is defined as a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539, where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site). |
| ☐ | **Retail Gasoline Outlet (RGOs)** – Category includes RGOs that meet the following criteria (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day; where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site). |
| ☒ | **Development Projects greater than one acre** – New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. |

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# STORM WATER QUALITY ASSESSMENT FOR PLANNING, ENGINEERING, AND BUILDING PERMIT APPLICATIONS

| Section 3 – Identify Projects Not Subject to Permanent Stormwater Requirements (Check All Boxes that Apply) | |
|---|---|
| ☐ | The project consists of work entirely within an existing structure. |
| ☐ | The project consists of construction of overhead or underground utilities (no new impervious surfaces). |
| ☐ | The project consists of routine maintenance. |
| ☐ | The project consists of less than 50 yards of grading and presents no opportunities to improve water quality. |
| **Section 4 – Project Category Determination** | |
| ☒ | **Priority Development Project**: If any item in Section 2 is applicable, the project is a Priority Development Project. **Please prepare a PDP SWQMP for the project.** |
| ☐ | **Standard Development Project**: If none of the items in Section 2 or 3 are applicable, the project is a Standard Development Project. **Please prepare an SDP SWQMP.** |
| ☐ | **Project Not Subject to Permanent Stormwater Requirements:** If any item in Section 3 is applicable, the project is not subject to Permanent Stormwater Requirements. **Please submit the project plans with this form.** **Note:** Projects in this category are subject to typical pollution prevention measures outlined by the pollution prevention checklist on the following page. |

| Section 5 – Applicant Certification | |
|---|---|
| Name of Responsible Party: Eric Cohen | Title: Vice President |
| Email Address (optional) | Phone Number: (215) 914-1310 |
| I understand and acknowledge the City of Oceanside has adopted minimum requirements, as mandated by the San Diego Regional Water Quality Control Board – Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001 and R9-2015-0100 (NPDES NO. CAS0109266) for mitigating impacts associated with urban runoff, including storm water from construction and land development activities. I certify this assessment has been accurately completed to the best of my knowledge and is consistent with the proposed project. I acknowledge that non-compliance with the City Best Management Practice (BMP) Design Manual, Grading Ordinance, and Erosion Control Ordinance may result in enforcement action by the City, the California State Water Resources Control Board, and/or the San Diego Regional Water Quality Control Board. Enforcement action may include stop work orders, notice of violation, fines, or other actions. | |
| Applicant Signature: DocuSigned by: Eric Cohen F7FDCCE08E97459... | Date: 06-17-2024 |

| If These Sources Will Be on the Project Site … | … Then Your SWQMP Shall Consider These Source Control BMPs | | |
|---|---|---|---|
| 1<br>**Potential Sources of Runoff Pollutants** | 2<br>**Permanent Controls—Show on Drawings** | 3<br>**Permanent Controls—List in Table and Narrative** | 4<br>**Operational BMPs—Include in Table and Narrative** |
| ☒ **A.** Onsite storm drain inlets<br><br>☐ Not Applicable | ☒ Locations of inlets. | ☒ Mark all inlets with the words "No Dumping! Flows to Bay" or similar. | ☒ Maintain and periodically repaint or replace inlet markings.<br>☒ Provide storm water pollution prevention information to new site owners, lessees, or operators.<br>☒ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.<br>☒ Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains." |

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|---|---|---|---|
| 1<br>**Potential Sources of Runoff Pollutants** | 2<br>**Permanent Controls—Show on Drawings** | 3<br>**Permanent Controls—List in Table and Narrative** | 4<br>**Operational BMPs—Include in Table and Narrative** |
| ☒ **B.** Interior floor drains and elevator shaft sump pumps<br>☐ Not Applicable | | ☒ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer. | ☒ Inspect and maintain drains to prevent blockages and overflow. |
| ☒ **C.** Interior parking garages<br>☐ Not Applicable | | ☒ State that parking garage floor drains will be plumbed to the sanitary sewer. | ☒ Inspect and maintain drains to prevent blockages and overflow. |
| ☒ **D1.** Need for future indoor & structural pest control<br>☐ Not Applicable | | ☒ Note building design features that discourage entry of pests. | ☒ Provide Integrated Pest Management information to owners, lessees, and operators. |

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|---|---|---|---|
| 1<br>**Potential Sources of Runoff Pollutants** | 2<br>**Permanent Controls—Show on Drawings** | 3<br>**Permanent Controls—List in Table and Narrative** | 4<br>**Operational BMPs—Include in Table and Narrative** |
| ☒ **D2.** Landscape/ Outdoor Pesticide Use<br>☐ Not Applicable | ☒ Show locations of existing trees or areas of shrubs and ground cover to be undisturbed and retained.<br>☒ Show self-retaining landscape areas, if any.<br>☒ Show storm water treatment facilities. | State that final landscape plans will accomplish all of the following.<br>☒ Preserve existing drought tolerant trees, shrubs, and ground cover to the maximum extent possible.<br>☒ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to storm water pollution.<br>☒ Where landscaped areas are used to retain or detain storm water, specify plants that are tolerant of periodic saturated soil conditions.<br>☒ Consider using pest-resistant plants, especially adjacent to hardscape.<br>☒ To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions. | ☒ Maintain landscaping using minimum or no pesticides.<br>☒ See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.<br>☒ Provide IPM information to new owners, lessees and operators. |

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|---|---|---|---|
| 1<br>**Potential Sources of Runoff Pollutants** | 2<br>**Permanent Controls—Show on Drawings** | 3<br>**Permanent Controls—List in Table and Narrative** | 4<br>**Operational BMPs—Include in Table and Narrative** |
| ☒ **E.** Pools, spas, ponds, decorative fountains, and other water features.<br>☐ Not Applicable | ☒ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. | ☒ If the City requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to City requirements. | ☒ See applicable operational BMPs in Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. |
| ☒ **F.** Food service<br>☐ Not Applicable | ☒ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.<br>☒ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer. | ☒ Describe the location and features of the designated cleaning area.<br>☒ Describe the items to be cleaned in this facility and how it has been sized to ensure that the largest items can be accommodated. | |

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|---|---|---|---|
| 1<br>**Potential Sources of Runoff Pollutants** | 2<br>**Permanent Controls—Show on Drawings** | 3<br>**Permanent Controls—List in Table and Narrative** | 4<br>**Operational BMPs—Include in Table and Narrative** |
| ☒ **G.** Refuse areas<br>☐ Not Applicable | ☒ Show where site refuse and recycled materials will be handled and stored for pickup. See City requirements for sizes and other details of refuse areas.<br>☒ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run- on and show locations of berms to prevent runoff from the area. Also show how the designated area will be protected from wind dispersal.<br>☒ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer. | ☒ State how site refuse will be handled and provide supporting detail to what is shown on plans.<br>☒ State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar. | ☒ State how the following will be implemented:<br>Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on- site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. |

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| 1<br>**Potential Sources of Runoff Pollutants** | 2<br>**Permanent Controls—Show on Drawings** | 3<br>**Permanent Controls—List in Table and Narrative** | 4<br>**Operational BMPs—Include in Table and Narrative Table and Narrative** |
| ❑ **H.** Industrial processes.<br>❑ Not Applicable | ❑ Show process area. | ❑ If industrial processes are to be located onsite, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system." | ❑ See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. |
| ❑ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)<br>❑ Not Applicable | ❑ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or runoff from area and protected from wind dispersal.<br>❑ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.<br>❑ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site. | ❑ Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.<br>Where appropriate, reference documentation of compliance with the requirements of local Hazardous Materials Programs for:<br>▪ Hazardous Waste Generation<br>▪ Hazardous Materials Release Response and Inventory<br>▪ California Accidental Release Prevention Program<br>▪ Aboveground Storage Tank<br>▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991<br>▪ Underground Storage Tank | ❑ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. |

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|---|---|---|---|
| 1<br>**Potential Sources of Runoff Pollutants** | 2<br>**Permanent Controls—Show on Drawings** | 3<br>**Permanent Controls—List in Table and Narrative** | 4<br>**Operational BMPs—Include in Table and Narrative** |
| ❑ **J.** Vehicle and Equipment Cleaning<br>❑ Not Applicable | ❑ Show on drawings as appropriate:<br>(1) Commercial/industrial facilities having vehicle /equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.<br>(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited onsite and hoses are provided with an automatic shut- off to discourage such use).<br>(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.<br>(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed. | ❑ If a car wash area is not provided, describe measures taken to discourage onsite car washing and explain how these will be enforced. | Describe operational measures to implement the following (if applicable):<br>❑ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.<br>❑ Car dealerships and similar may rinse cars with water only.<br>❑ See Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com |

| If These Sources Will Be on the Project Site … | … Then Your SWQMP shall consider These Source Control BMPs | | |
|---|---|---|---|
| **1**<br>**Potential Sources of Runoff Pollutants** | **2**<br>**Permanent Controls—Show on Drawings** | **3**<br>**Permanent Controls—List in Table and Narrative** | **4**<br>**Operational BMPs—Include in Table and Narrative** |
| ❑ **K.** Vehicle/Equipment Repair and Maintenance<br>❑ Not Applicable | ❑ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to protect from rainfall, run-on runoff, and wind dispersal.<br>❑ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.<br>❑ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained. | ❑ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.<br>❑ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.<br>❑ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. | In the report, note that all of the following restrictions apply to use the site:<br>❑ No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.<br>❑ No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.<br>❑ No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment. |

| If These Sources Will Be on the Project Site … | … Then Your SWQMP shall consider These Source Control BMPs | | |
|---|---|---|---|
| 1<br>**Potential Sources of Runoff Pollutants** | 2<br>**Permanent Controls—Show on Drawings** | 3<br>**Permanent Controls—List in Table and Narrative** | 4<br>**Operational BMPs—Include in Table and Narrative** |
| ❑ **L.** Fuel Dispensing Areas<br>❑ Not Applicable | ❑ Fueling areas[1] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are (1) graded at the minimum slope necessary to prevent ponding; and (2) separated from the rest of the site by a grade break that prevents run-on of storm water to the MEP.<br>❑ Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area1.] The canopy [or cover] shall not drain onto the fueling area. | | ❑ The property owner shall dry sweep the fueling area routinely.<br>❑ See the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. |

1. The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

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|---|---|---|---|
| 1<br>**Potential Sources of Runoff Pollutants** | 2<br>**Permanent Controls—Show on Drawings** | 3<br>**Permanent Controls—List in Table and Narrative** | 4<br>**Operational BMPs—Include in Table and Narrative** |
| **M.** Loading Docks<br>☐ Not Applicable | ☒ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct storm water away from the loading area. Water from loading dock areas should be drained to the sanitary sewer where feasible. Direct connections to storm drains from depressed loading docks are prohibited.<br>☒ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.<br>☒ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer. | | ☒ Move loaded and unloaded items indoors as soon as possible.<br>☒ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. |

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|---|---|---|---|
| 1<br>**Potential Sources of Runoff Pollutants** | 2<br>**Permanent Controls—Show on Drawings** | 3<br>**Permanent Controls—List in Table and Narrative** | 4<br>**Operational BMPs—Include in Table and Narrative** |
| ☒ **N.** Fire Sprinkler Test Water<br>☐ Not Applicable | | ☒ Provide a means to drain fire sprinkler test water to the sanitary sewer. | ☒ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. |
| **O.** Miscellaneous Drain or Wash Water<br>☒ Boiler drain lines<br>☐ Condensate drain lines<br>☐ Rooftop equipment<br>☐ Drainage sumps<br>☒ Roofing, gutters, and trim<br>☐ Not Applicable | | ☒ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.<br>☐ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.<br>☐ Rooftop mounted equipment with potential to produce pollutants shall be roofed and/or have secondary containment.<br>☐ Any drainage sumps onsite shall feature a sediment sump to reduce the quantity of sediment in pumped water.<br>☒ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff. | |

| If These Sources Will Be on the Project Site … | … Then Your SWQMP shall consider These Source Control BMPs | | |
|---|---|---|---|
| 1<br>**Potential Sources of Runoff Pollutants** | 2<br>**Permanent Controls—Show on Drawings** | 3<br>**Permanent Controls—List in Table and Narrative** | 4<br>**Operational BMPs—Include in Table and Narrative** |
| ☒ **P.** Plazas, sidewalks, and parking lots.<br>☐ Not Applicable | | | ☒ Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris.<br><br>Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain. |

# Technical Memo

| | | | |
|---|---|---|---|
| To: | Edwin Medina<br>City of Oceanside | From: | Edward Perez<br>Stantec |
| File: | 2042217900 | Date: | August 12, 2024 |

**Reference: NCTD OCEANSIDE TRANSIT CENTER AT 235 SOUTH TREMONT STREET ASSESSMENT TO DIVERT PORTIONS OF THE CENTRAL TRIBUTARY TO THE NORTH**

## INTRODUCTION

The Project, a 10.3 acre site located at 235 South Tremont Street, will be developed as a transit-oriented development (TOD) with mixed-use program generally consisting of residential apartment units, hotel, NCTD office building, bus transit center, retail store front, and parking structures.

The City performed an analysis of their future CIP storm drain in North Cleveland Street and determined that an additional 10 cubic feet per second (CFS) can be diverted to this system.

As summarized in the section below, an assessment was completed to see how much of the project's central tributary area can be diverted to the future CIP storm drain in North Cleveland Street so that it receives the additional flow rate of 10 CFS.

## DRAINAGE ASSESSMENT

Based on updated hydrology calculations, it would take 2 acres to generate approximately 10 CFS of runoff for the 100-year storm. See Attachment 1 and 2 for interim condition hydrology exhibit and corresponding rational method calculations. The interim condition hydrology exhibit shows the portion of the central tributary shaded in dark blue that can be diverted to the north towards the future CIP storm drain in North Cleveland Street. To achieve this flow routing configuration, the project's proposed storm drain system will need to be re-designed to allow the dark blue area's flows to drain northerly towards the intersection of North Cleveland Street and Seagaze Drive and into the future CIP storm drain.

To comply with the project CEQA drainage analysis and mitigation measures developed in the project's EIR, the project cannot divert flows to the future CIP storm drain in North Cleveland Street until such a time when the CIP storm drain facility is constructed by the City to provide an increased flow capacity at the project's storm drain point of connection in North Cleveland Street. Therefore, in the interim condition prior to construction of the new CIP storm drain, the project's drainage configuration for the central tributary cannot change from the drainage concept presented in the proposed project condition hydrology map as presented in Stantec's hydrology report entitled, "Preliminary Hydrology Report for: NCTD Oceanside Transit Center" dated July 19, 2024, contained in the project EIR appendices.

To provide a 10 CFS diversion to meet the city's proposed condition of approval, the project will need to construct a flow diversion structure, immediately upstream of the underground Detention Basin #1 (DB1) structure within South Cleveland Street. The diversion structure will be designed to initially route flows from the 2 acre "dark blue" diversion area through DB1 to comply with the flow routing design in the proposed condition hydrology map and the EIR mitigation measures, so as not to increase discharge rates at the project's proposed point of connections on North Cleveland Street and Seagaze Drive and the existing 15" RCP under the railroad track. See Attachment 1 for interim condition flow routing. Once the City has constructed the new CIP Storm Drain in North Cleveland and 10 CFS of additional capacity is available at the project's storm drain point of connection, the diversion structure in South Cleveland Street constructed by the project can be field modified to cut off flow from the "dark blue" diversion area into DB1, and open a storm

**Reference: NCTD OCEANSIDE TRANSIT CENTER AT 235 SOUTH TREMONT STREET
ASSESSMENT TO DIVERT PORTIONS OF THE CENTRAL TRIBUTARY TO THE NORTH**

drain flow conduit into the South Cleveland Street storm drain system. See Attachment 3 for ultimate condition flow routing. The diversion cut over can be executed in the diversion structure manhole using a standard brick and mortar plug detail provided in the City's storm drain design standards. Once this diversion cut over is in place, the "dark blue" diversion area will route 10 CFS through the new CIP storm drain in North Cleveland Street and not through DB1 and the 15" RCP under the railroad tracks.

It shall be noted that the diversion of flows requested by the City's Engineering staff will result in the comingling of private and public flows in the privately maintained DB1 in the interim condition prior to construction of the CIP Storm Drain in North Cleveland Street. Once the modification to the proposed diversion structure is complete, all public flows upstream of DB1 will be routed to the North Cleveland Street storm drain system and will no longer be comingled with private flows in DB1. In prior screen check comments and design iterations of the detention basin systems for the project, the City's Engineering staff has raised concerns about commingling of public and private flows within a privately maintained detention basin system. To accommodate the City's request for the project to divert 10 CFS to the future North Clevland Street CIP storm drain, and not cause any delay to the project construction, an exception to the City's position on comingling of public and private flows will be necessary.

## PROPOSED CONDITION OF APPROVAL

To facilitate the City's request to divert 10 CFS of storm flow to the North Cleveland CIP storm drain, we propose the following condition of approval, a modification of the condition of approval proposed by the City's Engineering staff, be contained in the Cumulative Impacts section of the project EIR.

"Prior to issuance of the first grading permit, the project is conditioned to design and construct a diversion structure upstream of Detention Basin #1, designed with the ability to ultimately divert 2 acres of developed area, approximately equal to 10 CFS of storm flow, towards the South Cleveland Street storm drain system. Prior to construction of the new CIP storm drain system in North Cleveland Street, the diversion structure shall be designed to route the 2 acres of developed area (10 CFS) through Detention Basin #1. A detail shall be provided on the project's storm drain construction plans detailing how to convert the diversion structure to route flow into the S. Cleveland Street storm drain and cut off flow to Detention Basin #1. Upon final inspection and City of Oceanside acceptance of the new CIP Storm Drain facility in North Cleveland Street, the City shall provide written notice to NCTD confirming completion of the new CIP Storm Drain system and as a result increase the capacity to allow the 10 CFS diversion to take place. The written notice shall include City accepted "As-Built Plans" of the newly constructed CIP Storm Drain in North Cleveland Street. The written notice shall instruct NCTD to modify the diversion structure upstream of Detention Basin #1 to re-route flows to the South Cleveland Street storm drain system into the newly constructed CIP storm drain in North Cleveland Street. NCTD shall call for City of Oceanside for inspection of the modified diversion structure once it is completed. To accommodate this condition of approval, the City of Oceanside will accept "mixing" of public storm drain flow and private storm drain flow into the privately maintained Detention Basin #1 until the diversion structure modification is made and rerouting of public storm flow to the South Cleveland storm drain system is complete."

## CONCLUSION

We look forward to working with the City's Engineering staff to quickly gain concurrence on the solution provided above. We believe this solution addresses the City's latest review comment to establish the condition of approval for the diversion of flow. Time is of the essence on this issue to gain "deemed complete" status for the project's entitlement submittal, issue a draft EIR for public review, and move into the public review process as quickly as possible.

**Reference: NCTD OCEANSIDE TRANSIT CENTER AT 235 SOUTH TREMONT STREET ASSESSMENT TO DIVERT PORTIONS OF THE CENTRAL TRIBUTARY TO THE NORTH**

Thank you for your collaboration, help, and support of this important project.

Respectfully,

**Stantec Consulting Services Inc.**

**Edward Perez, PE**
Project Manager

Phone: (949) 923-6013
Edward.Perez@stantec.com

Attachments:
Attachment 1 – Interim Condition Hydrology and Flow Routing Exhibit (1 page)
Attachment 2 – Rational Method Calculations (2 pages)
Attachment 3 – Proposed Condition Hydrology and Flow Routing Exhibit (1 page)

c. Michael McCann, Toll Brothers, John Hyde, Toll Brothers; Kristen Bogue, Michael Baker International; Ted Grove, Stantec

# ATTACHMENT #1 INTERIM CONDITION

**IN THE INTERIM CONDITION PRIOR TO COMPLETION OF CIP STORM DRAIN IN NORTH CLEVELAND STREET, THERE WILL BE A COMINGLING OF PRIVATE AND PUBLIC FLOWS DRAINING INTO DETENTION BASIN #1.**

S. COAST HIGHWAY
SEAGAZE DR.
TOPEKA ST.
MICHIGAN AVE.
MISSOURI AVE.
S. TREMONT ST.
S. CLEVELAND ST.
AT&SF RAILWAY
S. MYERS ST.
1ST ST.
TYSON ST.
FIR ST.

200
202
204
206

DB1
DB2

PROPOSED FLOW DIVERSION STRUCTURE

BRICK AND MORTAR PLUG

FLOW ROUTED THROUGH DETENTION BASIN #1 PRIOR TO CONSTRUCTION OF CIP STORM DRAIN IN NORTH CLEVELAND STREET.

TRIBUTARY OUTFALL #1

TRIBUTARY OUTFALL #2

TRIBUTARY OUTFALL #3

EX CURB OUTLET
42.62 FL
$Q_{25-CURB\ OUTLET}$=8.36 CFS
$Q_{100-CURB\ OUTLET}$=10.66 CFS
$Q_{25-UPSTREAM\ ST\ FLOW}$=8.3 CFS
$Q_{100-UPSTREAM\ ST\ FLOW}$=11.18 CFS
$Q_{25-TOTAL\ ST\ FLOW}$=16.66 CFS
$Q_{100-TOTAL\ ST\ FLOW}$=21.84 CFS

Ex. 15" RCP

MATCHLINE - SEE SHEET 2 OF 2

## LEGEND

- EXISTING STORM DRAIN
- FINISH SURFACE ELEVATION — XX.XX FS — (XX) — NODE
- FLOW LINE LENGTH — XX.XX LF
- SUBAREA — XX
- ACREAGE — X.XX
- MAJOR HYDROLOGY BOUNDARY
- MINOR HYDROLOGY SUB-BOUNDARY
- CATCH BASIN
- PROPERTY LINE
- TRIBUTARY AREA TO OUTFALL #1
- TRIBUTARY AREA TO OUTFALL #2
- TRIBUTARY AREA TO OUTFALL #3
- TRIBUTARY AREA UPSTREAM OF SIDEWALK UNDER DRAIN IN MYERS STREET
- DRAINAGE FLOW DIRECTION

**NOTES:**

1. PIPE ELEVATIONS SHOWN HEREIN ARE BASED ON GIS METADATA AND AS-BUILT DRAWINGS. THE VERTICAL DATUM HAS NOT BEEN VERIFIED BY DESIGN ENGINEER.
2. FUTURE DESIGN SURVEYS SHALL INCLUDE DATA COLLECTION OF PIPE SIZES AND INVERT ELEVATIONS

GRAPHIC SCALE
50 0 25 50 100 400
( IN FEET )
1 inch = 50 ft.

Stantec

Toll Brothers APARTMENT LIVING

**NCTD OCEANSIDE TRANSIT CENTER TOD**
**235 S. TREMONT AVENUE**
**PROPOSED HYDROLOGY MAP**

PROJECT NO. 2042217900

SHEET 1 OF 2

JULY 19, 2024

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# ATTACHMENT #2 RATIONAL METHOD CALCULATIONS

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            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* OCEANSIDE TOD - TREMONT SITE                                             *
* ASSESSMENT TO DIVERT PORTIONS OF THE CENTRAL TRIBUTARY AREA TO THE NORTH *
* 100-YEAR STORM                                                           *
 ****************************************************************************

  FILE NAME: DIV100YR.DAT
  TIME/DATE OF STUDY: 07:24 08/09/2024
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   258.60
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.226
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    74.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.94

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    48.01
  FLOW LENGTH(FEET) =   456.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.16
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.94
  PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =    5.70
```

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 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     714.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.296
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    1.86   SUBAREA RUNOFF(CFS) =    8.90
 TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =       9.76
 TC(MIN.) =    5.70

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    48.01  DOWNSTREAM(FEET) =    47.31
 FLOW LENGTH(FEET) =   139.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.15
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.76
 PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    6.15
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     853.60 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      6.15
 PEAK FLOW RATE(CFS)   =       9.76
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

# ATTACHMENT #3 ULTIMATE CONDITION

**IN THE ULTIMATE CONDITION WHEN CONSTRUCTION IS COMPLETE FOR CIP STORM DRAIN IN NORTH CLEVELAND STREET, DIVERSION STRUCTURE WILL BE MODIFIED TO DIVERT DARKER BLUE AREAS OF THE CENTRAL TRIBUTARY TO THE NORTH.**

ONCE CONSTRUCTION IS COMPLETE FOR THE CIP STORM DRAIN IN NORTH CLEVELAND STREET, APPROXIMATELY 2 ACRES OF THE CENTRAL TRIBUTARY AREA WILL BE REROUTED WITH THE INSTALLATION OF BRICK AND MORTAR PLUG

BRICK AND MORTAR PLUG

PROPOSED FLOW DIVERSION STRUCTURE

S. COAST HIGHWAY

SEAGAZE DR.

TOPEKA ST.

MICHIGAN AVE.

MISSOURI AVE.

S. TREMONT ST.

S. CLEVELAND ST.

TRIBUTARY OUTFALL #1

TRIBUTARY OUTFALL #2

TRIBUTARY OUTFALL #3

AT&SF RAILWAY

1ST ST.

TYSON ST.

FIR ST.

S. MYERS ST.

MATCHLINE - SEE SHEET 2 OF 2

EX CURB OUTLET
42.62 FL
$Q_{25-CURB\ OUTLET}$=8.36 CFS
$Q_{100-CURB\ OUTLET}$=10.66 CFS
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$Q_{100-TOTAL\ ST\ FLOW}$=21.84 CFS

## LEGEND

- EXISTING STORM DRAIN
- FINISH SURFACE ELEVATION — XX.XX FS
- FLOW LINE LENGTH — XX.XX LF
- NODE (XX)
- SUBAREA — XX
- ACREAGE — X.XX
- MAJOR HYDROLOGY BOUNDARY
- MINOR HYDROLOGY SUB-BOUNDARY
- CATCH BASIN
- PROPERTY LINE
- TRIBUTARY AREA TO OUTFALL #1
- TRIBUTARY AREA TO OUTFALL #2
- TRIBUTARY AREA TO OUTFALL #3
- TRIBUTARY AREA UPSTREAM OF SIDEWALK UNDER DRAIN IN MYERS STREET
- DRAINAGE FLOW DIRECTION

**NOTES:**

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2. FUTURE DESIGN SURVEYS SHALL INCLUDE DATA COLLECTION OF PIPE SIZES AND INVERT ELEVATIONS

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( IN FEET )
1 inch = 50 ft.

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Toll Brothers APARTMENT LIVING

**NCTD OCEANSIDE TRANSIT CENTER TOD**
**235 S. TREMONT AVENUE**
**PROPOSED HYDROLOGY MAP**

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SHEET 1 OF 2

JULY 19, 2024

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