2005-2006
LOCAL DRAINAGE MASTER PLAN PROJECT

PREPARED FOR:

HENDERSON, NEVADA

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VOLUME 2 of 3 - Report

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1.0 INTRODUCTION

1.1 STUDY OVERVIEW AND PURPOSE

This Local Drainage Master Plan study has been prepared for the City of Henderson to provide a comprehensive plan for local and regional drainage facilities within an approximately 16.5 square mile study area located on the east side of the City of Henderson. The study area covers 24 sections that consist primarily of older residential development and infrastructure combined with newer development, also there are plans for future redevelopment. The Clark County Regional Flood Control District's 2002 Master Plan Update (2002 MPU) HEC-1 analysis was used as the base for the hydrologic analysis performed for this study. The 2002 MPU subbasin boundaries were not modified for this study. However, the 2002 MPU subbasins were subdivided in order to provide a more detailed analysis of the study area. The land uses that were used for the 2002 MPU analysis were compared to the October 2005 City of Henderson Land Use Plan; the land use that resulted in the highest curve number was used in the hydrologic analysis. An automated GIS methodology was established for the determination of the curve number and subbasin area parameters used in the HEC-1 models.

The purpose of this study is to provide a detailed analysis of the 10-yr and 100-yr flowrates for the existing drainage condition and the ultimate drainage condition for the study area in order to determine the necessary alignments for additional local storm drain facilities. The local facilities are laid out within the study area to create a drainage condition (ultimate) that meets CCRFCD drainage criteria and controls the existing flooding problems within the area.

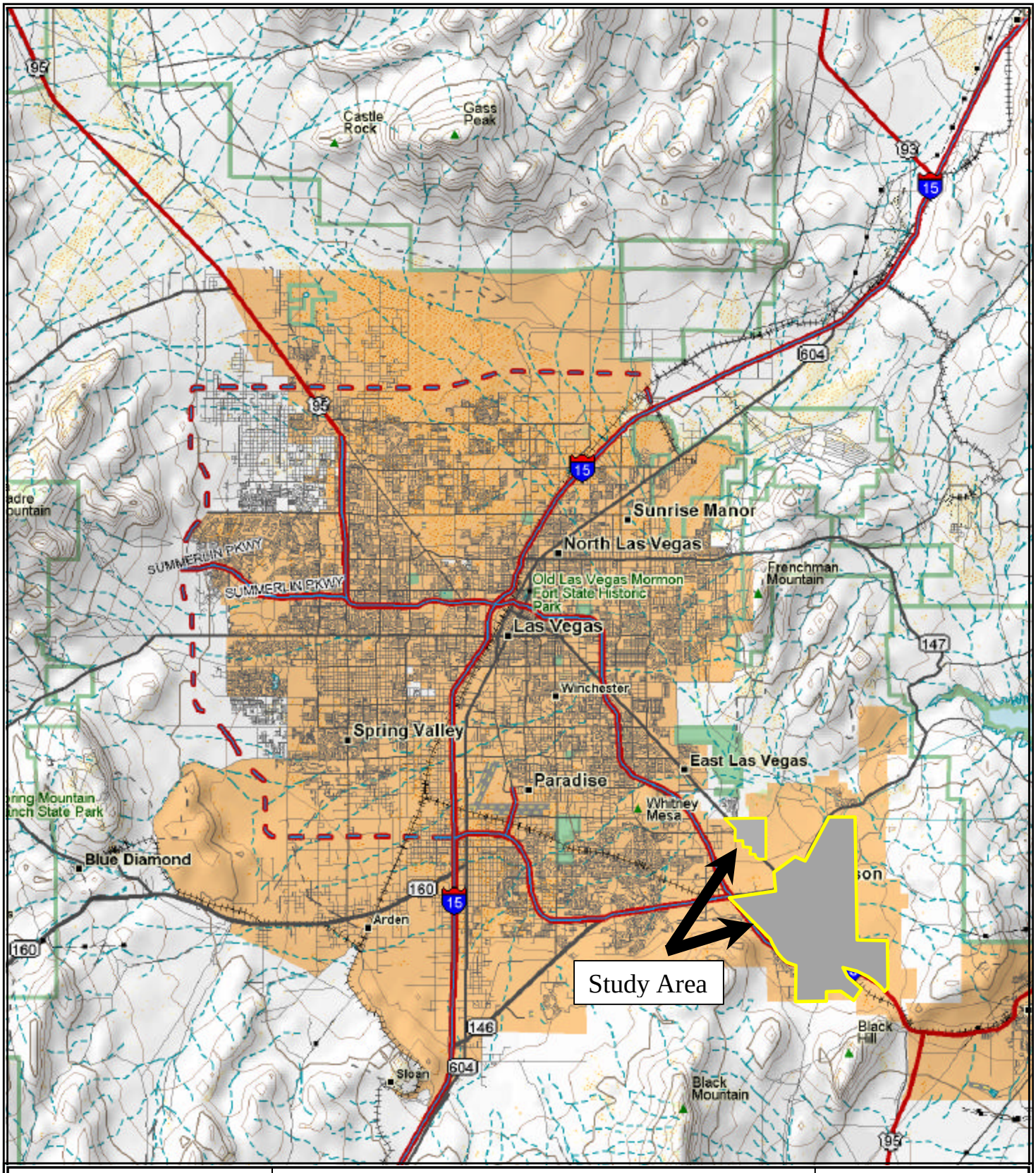
The main objectives of the Local Drainage Master Plan are as follows:

- Provide hydrologic analysis of an existing drainage condition and an ultimate drainage conditions for the study area. The existing drainage condition features ultimate development with existing storm drain facilities in place. The existing drainage condition assumes that regional facilities that are under construction or beyond the preliminary design stage are existing facilities. The Ultimate drainage condition features ultimate development with all local and regional (existing and proposed) storm drain facilities in place.
- Analyze the existing and ultimate drainage conditions for the 10-yr and 100-yr 6-hour storm events.

- Evaluate street flow and overland flows within the study area to determine if CCRFCD and COH criteria are met. [10-yr storm 12-ft dry lane criteria, (V x D) = 6 for the 10 year event, (V x D) = 8 for the 100 year event]
- In cases where the 10-yr and/or 100-yr street flow criteria are not met, determine the necessary measures to meet criteria (i.e. new storm drain facility in the street, or an upstream flow diversion, etc.)
- The storm drain facilities are all considered to be local facilities in this study. Some of the proposed facilities within the project area are good potential candidates for inclusion in the regional master plan. This will be determined at a later date.
- Identify potential utility conflicts along the proposed facility alignments based on the COH GIS utility database information.
- Provide cost estimates for the proposed facilities based on the 2002 MPU cost tool database.
- Develop 11"x17" maps (Volume I) for the existing and ultimate drainage conditions that show existing and proposed local and regional storm drain facilities and the 10-yr and 100-yr flowrates throughout the study area.
- Provide a discussion of the analysis performed for this study (Volume II) and the backup calculations and data for the study (Volume III).

1.2 STUDY AREA LOCATION

The Local Drainage Master Plan study area covers 24 sections on the east side of the City of Henderson. The study area includes portions of Sections 1, 2, 12, 13, 14, and 24 within Township 22 South, Range 62 East, M.D.M., Clark County, Nevada (Book 178). The study area also encompasses Sections 4, 9, 16, 17, 20, 21, 27, 29, and 32, and includes portions of Sections 5, 7, 8, 18, 19, 28, 30, 33, and 24 within Township 22 South, Range 63 East, M.D.M., Clark County, Nevada (Book 179). The study area was separated into two areas of interest. The smaller northern portion of the study area is an approximately 1.1 square mile triangular area that is bordered by Pabco Road on the east, Boulder Highway to the west, East Galleria Drive to the north, and Warm Springs Road to the south. The other larger portion of the study area is approximately 15.4 square miles and is bordered by Foothills Drive to the east, US 95 to the west, Athens Avenue to the north, and the existing C-1 Channel along Foxhall Road to the south (see Figure 1.1, *Vicinity Map* and Figure 1.2, *Section Map*).



Vicinity Map

2005-2006 LOCAL DRAINAGE MASTER PLAN PROJECT

Figure 1.1

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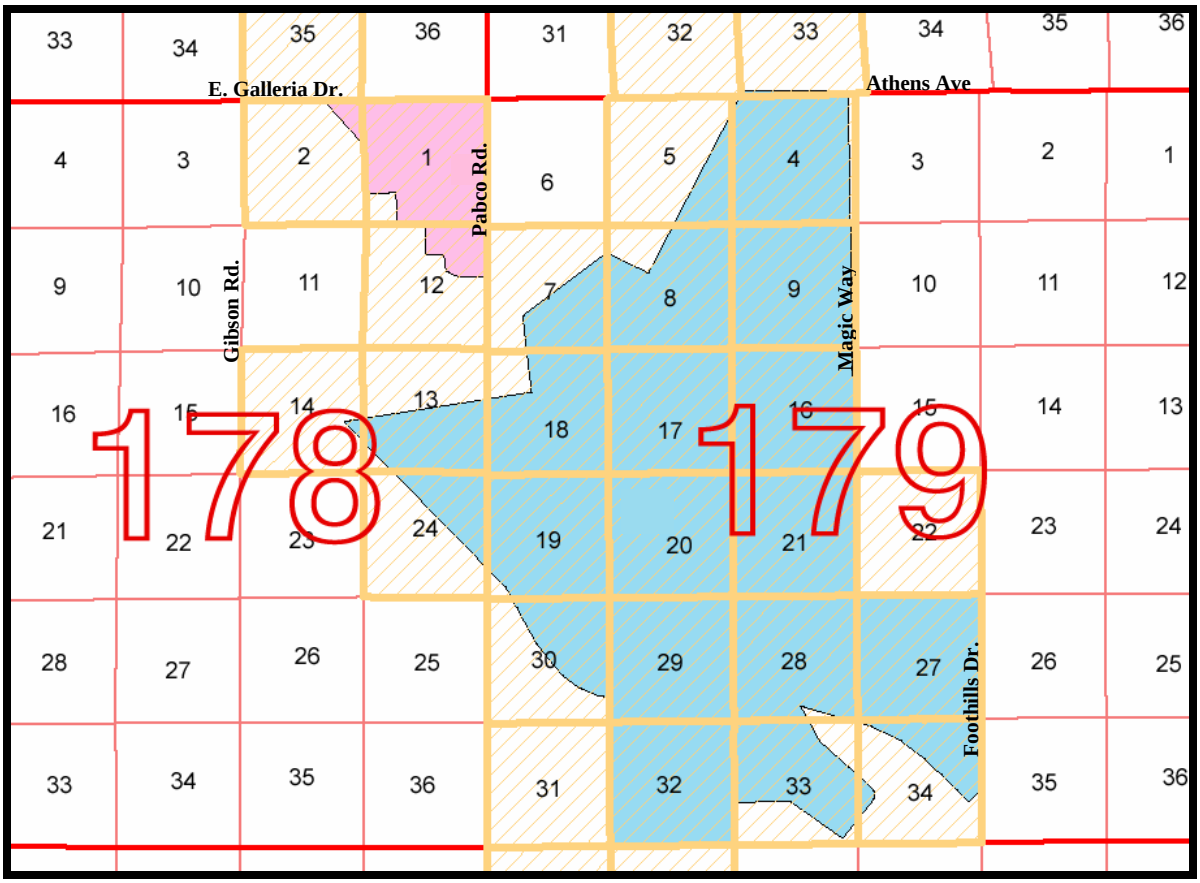
FIGURE 1.2 – SECTION MAP



1.3 STUDY AREA DESCRIPTION

The study area is located in a portion of the City of Henderson that is mostly developed. A large portion of the study area consists of single-family residential development with some multi-family residential, commercial, and industrial development, as well as the Black Mountain golf course and some undeveloped lots. The future planned development for the study area includes additional residential and commercial development, as well as redevelopment of the downtown area, and includes the Horizon and College Special Study areas. The portions of the watershed outside of the MPU's ultimate development boundary generally consist of arid rangeland with desert shrub vegetative cover (fair and poor hydrologic condition). The study area watershed generally slopes toward the Boulder Highway alignment and then slopes north-northwesterly toward the Las Vegas

Wash. The slopes throughout the study area watershed range from 29% in the upstream outlying mountains to 0.5% in the northern part of the study area.

1.4 FLOODPLAIN INFORMATION

The study area is covered by several Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs). The FIRM Community Panel Numbers that encompass the study area are 32003C2583 E, 32003C2585 E, 32003C2595 E, 32003C2605 E, 32003C2610 E, 32003C2615 E, 32003C2620 E, 32003C2955 E, and 32003C2975 E, Clark County, Nevada and Incorporated Areas, effective date August 16, 1995, and revised September 27, 2002. Refer to the FEMA Special Flood Hazard Areas exhibit in Volume I for an overview of the flood zones in the vicinity of the study area.

2.0 HYDROLOGIC CRITERIA

2.1 METHOD OF ANALYSIS

The hydrologic analysis developed for this Local Master Drainage Study utilized the SCS Unit Hydrograph Method in the HEC-1 computer program to determine the existing and ultimate drainage condition study area flowrates. The following is a summary of the design process followed to determine the flowrates at quarter mile intervals on streets with 60 ft right-of-ways or larger and at key design points throughout the Study Area. Volume I of this study graphically presents the results of the 10 and 100-yr models for both drainage conditions at these important design points.

The HEC-1 Flood Hydrograph Computer Model was developed by the U.S. Army Corps of Engineers Hydrologic Engineering Center in the late 1970's, and then adopted by the CCRFCD *Hydrologic Criteria and Drainage Design Manual* in 1999 for rainfall and runoff predictions. The model is used to simulate the surface runoff response of a watershed to a design rainfall event. Each subbasin in the watershed is described by a set of parameters that specify the subbasin drainage and storm characteristics. These basin parameters include precipitation, basin area, curve number, and lag time. The hydrologic parameters within the program were based on parameters established by the 2002 MPU Study. Modified hydrologic parameters were determined in accordance with the CCRFCD *Hydrologic Criteria and Drainage Design Manual.*

To use the HEC-1 computer model, the drainage system in a watershed is converted into node-link type of system. A node is placed at the subbasin outlet or at the design point along the water course. Links between nodes represent conveyance elements in the drainage system. Hydrographs are computed for each subbasin and are placed at the subbasin outlet node. These hydrographs are then routed and/or combined according to the drainage basin network configuration through links. A depth-area reduction factor (DARF) is determined at each design point and is used to determine the peak flow at the design point depending on the contributing area.

2.2 SUBBASIN DELINEATION

For the SCS unit hydrograph method adopted by the CCRFCD, the basin area is one of the four SCS unit hydrograph parameters input to the HEC-1 computer model. The 2002 MPU subbasin boundaries for the study area watershed were not modified for this Local Drainage Master Plan. The 2002 MPU subbasins were further subdivided in order to determine flowrates at ¼ mile intervals along 60 ft or greater street right-of-ways and at key locations throughout the watershed.

The 1996 version of the 5-foot contour topography obtained from Clark County was used to aid in the further delineation of the MPU subbasins. This version appears to provide more detailed contour information than the 2002 version. In addition to contour information, major and minor street alignments (existing and proposed), along with referenced hydrology studies of existing and proposed developments were used to delineate subbasins in the study area.

2.3 RAINFALL CALCULATIONS

According to Figure 513 of the CCRFCD *Hydrologic Criteria and Drainage Design Manual*, Sections 1 and 2 within Township 22 South, Range 62 East is within the McCarran Airport Rainfall Area. The remaining sections of the study area site fall outside of the McCarran Airport Rainfall Area. The precipitation values used for the study area basins were incorporated from the 2002 MPU model and verified using Figures 503 and 506 from the CCRFCD Manual. The following is a discussion of the method that was used for determining rainfall within the study area.

2.3.1 Point Precipitation Values

In accordance with the CCRFCD Manual, the 2002 MPU analysis used the Rainfall Depth-Duration-Frequency charts for the 100-Year, 6-Hour storm event (NOAA Atlas 2, Vol. VII Nevada 1973) along with the adjustment factors determined by USACE Los Angeles District (1988) to determine the rainfall depths that were used in the hydrologic analysis. The 2002 MPU 100-yr rainfall depths for each MPU subbasin within the study area watershed were not modified for this analysis. GIS software was used to determine the 10-yr rainfall depths by overlaying the study area subbasins on the NOAA Atlas map and applying the adjustment factor per the CCRFCD manual. The 100-year six-hour precipitation values and correlating multiplication factors can be found in Figure 506 and

Table 501, in the CCRFCD Manual. Likewise, the 10-year six-hour precipitation values can be found in Figure 503. Point precipitation values used in the 100-year analysis ranged throughout the watershed from 2.77 in the northwest portion of the study area to 3.43 inches in the southeast portion of the study area. The 10-year values ranged from 1.61 to 1.84 inches.

2.3.2 6-Hour Design Storm Distribution

According to the CCRFCD *Hydrologic Criteria and Drainage Design Manual,* there are three different 6-hour storm distributions that are used in the Las Vegas Valley. For those drainage facilities and key design points where the tributary watershed is less than eight square miles, the SDN3 distribution is used. The SDN5 distribution is used if the total area of the watershed exceeds 12 square miles, and the SDN4 distribution is used for tributary areas between 8.0-12.0 square miles.

2.3.3 Depth-Area Reduction

The point precipitation values are related to rainfall intensity at an isolated point. Since the rainfall occurs over an extensive area simultaneously, with the more intense rainfall occurring near the center of the storm, a reduction factor is used to adjust the point precipitation when modeling the rainfall decay characteristics over a large area. The National Oceanic and Atmospheric Administration (NOAA) developed the rainfall Depth Area Reduction Factors (DARF) for the purpose of converting a point precipitation depth to an average precipitation over the entire storm area, known as "Hydro 40". The USACE, Los Angeles District (1988) later compiled a series of DARF values that are almost the same as the NOAA values for tributary areas up to 30 mi^2, but are slightly different for areas greater than 30 mi^2, based on analysis of thunderstorms in the greater Las Vegas Area. The DARF factors presented in CCRFCD *Hydrologic Criteria and Drainage Design Manual* were obtained from the USACE, Los Angeles District (1988) values. The CCRFCD manual DARF ratios were used in this study. The methodology for DARF usage was kept consistent with the methodology used in the 2002 MPU. The Table below lists the DARF values used at study design points for each range of tributary area.

TABLE 2.3.3 – DEPTH AREA REDUCTION FACTORS

AREA (mi^2)	SDN 3	SDN 4	SDN 5
0≤Area<0.5	0.99	—	—
0.5≤Area<1	0.975	—	—
1≤Area<2	0.95	—	—
2≤Area<3	0.925	—	—
3≤Area<4	0.915	—	—
4≤Area<5	0.908	—	—
5≤Area<6	0.903	—	—
6≤Area<7	0.895	—	—
7≤Area<8	0.885	—	—
8≤Area<9	—	0.875	—
9≤Area<10	—	0.865	—
10≤Area<11	—	0.857	—
11≤Area<12	—	0.85	—
12≤Area<16	—	—	0.832
16≤Area<20	—	—	0.804
20≤Area<30	—	—	0.765

Note: Values taken from Table 4-1 in Volume 1 of the 2002 MPU

2.4 CURVE NUMBER DETERMINATION

Major precipitation losses consist of infiltration losses determined by the soil type and depression losses caused by land uses. Infiltration losses occur throughout the storm event, while depression losses only occur during the initial period of the storm. The difference between the total precipitation volume and the loss volume is the direct runoff volume.

The SCS curve number method was developed to compute both types of precipitation losses. This method uses a curve number (CN) index to relate precipitation losses to soil type, land use, and vegetative cover conditions. The method for curve number determination used in this study is similar to the methodology used in the 2002 MPU.

GIS software was used to determine a weighted curve number for each subbasin based on a curve number matrix modeled after the matrix used for the 2002 MPU, the soil type, and land use values.

The subbasin boundaries were plotted on top of a GIS soil layer and a GIS land use layer. This resulted in subbasin boundaries made up of multiple polygons with specific soil type and land use values. Each polygon within a subbasin was assigned a curve number based on the soil and land use components using the curve number matrix. The polygon curve number value were then multiplied by the spatial percentage relative to the overall subbasin, and the resulting values for each polygon in the subbasin were summed to get a weighted curve number for the subbasin. A table showing this process can be found in Volume III of this study.

2.4.1 Soil Survey

The study area is located in the southeast portion of the Las Vegas Valley and incorporates portions of the 2002 MPU Pittman and C-1 Watersheds. For the purpose of this hydrologic analysis, infiltration losses are related to the National Resource Conservation Service (NRCS), formerly the Soil Conservation Service (SCS), Soil Classifications. NRCS soils fall into four hydrologic soil groups: Group A, Group B, Group C, and Group D, which were developed based on infiltration rates. SCS Group A Soil has a high infiltration rate and a low potential for runoff, such as for sands and gravels. SCS Group D, on the other hand, has a low infiltration and a high runoff potential, such as for clay soil.

The NRCS Soil Survey of Las Vegas Valley Area, Clark County, Nevada was used to identify the soil map unit numbers within the study area watershed. Each soil map unit number is comprised of a specific portion of Hydrologic Soil Group A, B, C, and/or D. The hydrologic soil group proportions determined for the 2002 MPU study were used for this study.

A GIS soil layer was used along with a GIS land use layer for the determination of curve numbers for the study area subbasins. The GIS soil layer reflects the soil information provided in the NRCS Soil Survey of the Las Vegas Valley Area, as well as additional NRCS sources that provide soil map unit number information. The soils information provided in the July 1985 Soil Survey of the Las Vegas Valley Area, remains relatively unchanged. Any additional NRCS sources generally provide supplemental information for the outlying areas of the Valley that was not analyzed in the 1985 Report.

2.4.2 Land Use

The ultimate development condition was used for both the existing drainage condition and the ultimate drainage condition analysis performed for this study. Therefore, it was important to determine the anticipated future land use for the study area. The City of Henderson's October 2005 land use plan was used in this study. The plan consists of 50 different land use codes. For this Local Drainage Master Plan, the 50 land use codes were analyzed and combined into 17 different land use categories. An 18th category was added to account for the "Undeveloped Land, Open Desert" at the upstream end of the watershed outside of the ultimate development boundary. As in the 2002 MPU, each category was assigned a specific percentage of impervious ground, landscaped area in good condition, and amount of desert shrub in poor hydrologic condition.

The 2002 MPU used twelve different land use categories. The City categories do not necessarily correspond to the 2002 MPU categories and densities. For example: based on the densities assigned by the City to each land use code, the City land use category for "Low Density Residential" features the same percentages as the 2002 MPU land use category "High-Density Residential, 4-8 units per acre." As a result, the City land use categories were compared closely to the 2002 MPU categories, and the land uses from either plan that resulted in the highest curve number values were used.

In general, the City land uses resulted in higher curve numbers. The City GIS land use layer was used as the base for determining subbasin curve number values. However, the 2002 MPU did feature land uses in the study area that resulted in higher curve numbers than the City land use in a few small areas of the study area. For these areas, the MPU land use category was renamed to a City land use category with a similar density and, as a result, percentage breakout. The GIS land use layer was then modified to include the City land use category, based on the 2002 MPU land use, in the location where the MPU land use had resulted in a higher curve number. The modified GIS land use layer, along with the GIS soil layer, was then used to calculate a weighted curve number for each subbasin in the study area.

A list of the land use categories used for this study can be found in Table 2.4.2.

TABLE 2.4.2 – CITY OF HENDERSON LAND USE CATEGORIES

Land Use Classification Index Number	Henderson Land Use Code and Description		Directly Connected Impervious (%)	Open Landscaped Good Condition (%)	Open Desert Shrub Poor Condition (%)
1	BP	Business Park	90	10	0
	BP/GC	Business Park/General Commercial	90	10	0
	BP/NC	Business Park/Neighborhood Commercial	90	10	0
	CO/RD	Office/Research & Development	90	10	0
	COM	Commercial	90	10	0
	COM/BP	Commercial/Business Park	90	10	0
	COM/TC	Commercial/Tourist Commercial	90	10	0
	DC	Downtown Commercial	90	10	0
	DCC	Downtown Core Commercial	90	10	0
	DHC	Downtown Highway Commercial	90	10	0
	GC	General Commercial	90	10	0
	HC	Highway Commercial	90	10	0
	LBI	Light Business & Industry	90	10	0
	LBI/TC	Light Business & Industry/Tourist Commercial	90	10	0
	NC	Neighborhood Commercial	90	10	0
	TC	Tourist Commercial	90	10	0
	TC/BP	Tourist Commercial/Business Park	90	10	0
2	BI/HBI	Business & Industry/Heavy Business & Industry	90	5	5
	IP	Industrial Park	90	5	5
3	HDR/BP	High Density Residential/Business Park	88	12	0
	HDR/COM	High Density Residential/Commercial	88	12	0
	HDR/OFF	High Density Residential/Commercial Office	88	12	0
	HDR/TC	High Density Residential/Tourist Commercial	88	12	0
	HDR/TC/COM	High Density Residential/Tourist Commercial/Commercial	88	12	0
4	BI	Business & Industry	88	7	5
5	CNS	Community & Neighborhood Shopping	85	15	0
	LBI/PS	Light Business & Industry/Public/Semi-public	85	15	0
	MU	Gateway Mixed Use	85	15	0
	TOD	Transit-Oriented Development	85	15	0
6	LIBP	Light Industry & Business Park	85	10	5
	PC	Planned Community	85	10	5
7	IND	Industrial	85	8	7

TABLE 2.4.2 – CITY OF HENDERSON LAND USE CATEGORIES (cont.)

Land Use Classification Index Number	Henderson Land Use Code and Description		Directly Connected Impervious (%)	Open Landscaped Good Condition (%)	Open Desert Shrub Poor Condition (%)
8	DP	Downtown Public	80	20	0
	DRH	Downtown High-Density Residential	80	20	0
9	DRM	Downtown Medium-Density Residential	76	24	0
10	BP/MDR	Business Park/Medium Density Residential	75	25	0
	HDR	High Density Residential	75	25	0
	HDR-A	High Density Residential-Affordable	75	25	0
	HDR-C	High Density Residential-Conventional	75	25	0
	PS	Public/Semi-public	75	25	0
11	LDR/GC	Low Density Residential/General Commercial	73	27	0
12	DRL	Downtown Low-Density Residential	72	28	0
	MDR	Medium Density Residential	72	28	0
	PS/LDR	Public/Semi-public/Low Density Residential	72	28	0
13	LDR	Low Density Residential	69	31	0
14	VLDR/NC	Very-Low Density Residential/Neighborhood Commercial	40	35	25
15	RNP-2	Rural Neighborhood Preservation (max 2 du/acre)	25	40	35
	VLDR	Very-Low Density Residential	25	40	35
16	RNP-1	Rural Neighborhood Preservation (max 1 du/acre)	20	20	60
17	OS	Open Space	5	85	10
18	OD	Undeveloped Land, Open Desert	0	0	100

Once the soil type and land use category is determined, the information is input into the curve number matrix to determine the curve number of each soils/land use polygon. The curve number matrix used in this study is similar to the curve number matrix used in the 2002 MPU. The percentage of impervious ground, landscaped area in good condition, and desert shrub in poor hydrologic condition used for each soil map number in the 2002 MPU were not modified for this study. However, the land use categories for the matrix were updated based on the information above. The curve number table used for this Local Drainage Master Plan is presented in Table 2.4.3 below.

Table 2.4.3 Curve Number Matrix

MAP #	COMPONENTS			LAND USE CLASSIFICATION INDEX NUMBER																
	OPEN DESERT	OPEN GOOD	% IMP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	% --->			0	5	0	5	0	5	7	0	0	0	0	0	0	25	35	60	10	100
		% --->		10	5	12	7	15	10	8	20	24	25	27	28	31	35	40	20	85	0
			% --->	90	90	88	88	85	85	85	80	76	75	73	72	69	40	25	20	5	0
	CN	CN	CN	SOIL TYPE COMPOSITE CN FOR LAND USE TYPE																	
112	66	43	98	92.5	93.7	91.4	92.6	89.8	90.9	91.4	87.0	84.8	84.3	83.2	82.6	81.0	70.8	64.8	67.8	48.1	66.0
117	65	42	98	92.4	93.6	91.3	92.4	89.6	90.8	91.2	86.8	84.6	84.0	82.9	82.3	80.6	70.2	64.1	67.0	47.1	65.0
150	86	77	98	95.9	96.4	95.5	95.9	94.9	95.3	95.5	93.8	93.0	92.8	92.3	92.1	91.5	87.7	85.4	86.6	79.0	86.0
181	79	64	98	94.6	95.4	93.9	94.7	92.9	93.7	94.0	91.2	89.8	89.5	88.8	88.5	87.5	81.4	77.8	79.8	67.2	79.0
182	77	60	98	94.2	95.1	93.4	94.3	92.3	93.2	93.5	90.4	88.9	88.5	87.7	87.4	86.2	79.5	75.5	77.8	63.6	77.0
183	77	61	98	94.3	95.1	93.6	94.4	92.5	93.3	93.6	90.6	89.1	88.8	88.0	87.6	86.5	79.8	75.9	78.0	64.5	77.0
184	77	61	98	94.3	95.1	93.6	94.4	92.5	93.3	93.6	90.6	89.1	88.8	88.0	87.6	86.5	79.8	75.9	78.0	64.5	77.0
187	77	61	98	94.3	95.1	93.6	94.4	92.5	93.3	93.6	90.6	89.1	88.8	88.0	87.6	86.5	79.8	75.9	78.0	64.5	77.0
302	81	68	98	95.0	95.7	94.4	95.1	93.5	94.2	94.4	92.0	90.8	90.5	89.9	89.6	88.7	83.3	80.1	81.8	70.8	81.0
417	82	72	98	95.4	95.9	94.9	95.4	94.1	94.6	94.8	92.8	91.8	91.5	91.0	90.7	89.9	84.9	82.0	83.2	74.3	82.0
419	77	62	98	94.4	95.2	93.7	94.4	92.6	93.4	93.7	90.8	89.4	89.0	88.3	87.9	86.8	80.2	76.3	78.2	65.3	77.0
440	76	60	98	94.2	95.0	93.4	94.2	92.3	93.1	93.4	90.4	88.9	88.5	87.7	87.4	86.2	79.2	75.1	77.2	63.5	76.0
484	87	79	98	96.1	96.5	95.7	96.1	95.2	95.6	95.7	94.2	93.4	93.3	92.9	92.7	92.1	88.6	86.6	87.6	80.8	87.0
510	88	82	98	96.4	96.7	96.1	96.4	95.6	95.9	96.0	94.8	94.2	94.0	93.7	93.5	93.0	89.9	88.1	88.8	83.4	88.0
600	85	74	98	95.6	96.2	95.1	95.7	94.4	95.0	95.2	93.2	92.2	92.0	91.5	91.3	90.6	86.4	83.9	85.4	76.3	85.0
605	85	74	98	95.6	96.2	95.1	95.7	94.4	95.0	95.2	93.2	92.2	92.0	91.5	91.3	90.6	86.4	83.9	85.4	76.3	85.0
610	85	74	98	95.6	96.2	95.1	95.7	94.4	95.0	95.2	93.2	92.2	92.0	91.5	91.3	90.6	86.4	83.9	85.4	76.3	85.0
615	85	74	98	95.6	96.2	95.1	95.7	94.4	95.0	95.2	93.2	92.2	92.0	91.5	91.3	90.6	86.4	83.9	85.4	76.3	85.0
999	30	30	30	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
1141	86	79	98	96.1	96.5	95.7	96.1	95.2	95.5	95.6	94.2	93.4	93.3	92.9	92.7	92.1	88.4	86.2	87.0	80.7	86.0
1380	65	43	98	92.5	93.6	91.4	92.5	89.8	90.9	91.3	87.0	84.8	84.3	83.2	82.6	81.0	70.5	64.5	67.2	48.0	65.0
1511	87	78	98	96.0	96.5	95.6	96.1	95.0	95.5	95.6	94.0	93.2	93.0	92.6	92.4	91.8	88.3	86.2	87.4	79.9	87.0
1674	81	69	98	95.1	95.7	94.5	95.1	93.7	94.3	94.5	92.2	91.0	90.8	90.2	89.9	89.0	83.6	80.5	82.0	71.7	81.0
2450	65	42	98	92.4	93.6	91.3	92.4	89.6	90.8	91.2	86.8	84.6	84.0	82.9	82.3	80.6	70.2	64.1	67.0	47.1	65.0
2541	88	81	98	96.3	96.7	96.0	96.3	95.5	95.8	95.9	94.6	93.9	93.8	93.4	93.2	92.7	89.6	87.7	88.6	82.6	88.0
2662	83	71	98	95.3	95.9	94.8	95.4	94.0	94.6	94.8	92.6	91.5	91.3	90.7	90.4	89.6	84.8	82.0	83.6	73.6	83.0

2.5 LAG TIMES

Lag times for each subbasin were calculated using the procedure outlined in the CCRFCD *Hydrologic Criteria and Drainage Design Manual*. The Bureau of Reclamation Method was used to calculate lag times for subbasins over 1 square mile. The Time of Concentration method was used to calculate lag times for subbasins that are less than 1 square mile. The Time of Concentration method calculations were determined for this watershed using a modified CCRFCD Standard Form 4.

The USBR Method for subbasins over 1 square mile is as follows:

$$T_{lag} = 20\ K_n(L\ L_c/S^{1/2})^{1/3}$$

Where:

Tlag = Lag Time (hours)

L = Watershed length, length of longest watercourse (miles)

Lc = Length along longest watercourse measured upstream to a point opposite the centroid of the basin (miles)

S = Average slope of the longest watercourse (feet/mile)

Kn = Manning's roughness for the basin channels. As in the 2002 MPU, this value is 0.050 for this Local Drainage Master Plan

The Time of Concentration method for subbasins with less than 1 square mile is as follows:

$$T_{lag} = 0.6\ T_c \text{ (hours)}$$

$$T_c = T_i + T_t$$

Where:

T_c = Time of concentration (minutes)

T_i = Initial, inlet, or overland flow time (minutes)

T_t = Travel time in the ditch, gutter, etc. (minutes)

$$T_i = 1.8(1.1 - K)L_o^{1/2}/S^{1/3}$$

Where:

K = 0.0132 * CN – 0.39

CN = Curve Number

Lo = Length of overland flow (maximum 500 feet for rural areas, 300 foot maximum for urban areas)

S = Average subbasin slope (percent)

$$T_t = 500/(60\ V1) + (Lt-500)/(60\ V2)$$

Where:

Lt = Travel length (feet)

V1 = Average velocity of flow for the initial travel distance (feet/second)

V2 = Average velocity of flow for the remaining travel distance (feet/second)

The travel time velocities within the modified Standard Form 4 were calculated using a generalized form of the Manning's equation, $V=C(S/100)^{1/2}$ taken from Section 602.1 of the CCRFCD *Hydrologic Criteria and Drainage Design Manual*. In accordance with the Manual, the coefficient "C" was set to 14.8 for V1 and 29.4 for V2 to represent flow in a wide channel under non-urbanized conditions. The slopes were determined from the existing topography of the areas. Developed basin travel time velocities were determined by the same equation with "C" equal to 20.2 for V1 and 30.6 for V2 for flow in a roadway as suggested in the HCDDM.

For developed areas, the time of concentration calculated by the above method is compared to the equation $T_c = (L/180)+10$, where Tc is the time of concentration at the first point in an urban subbasin, and L is the total travel distance through the subbasin in feet. The smaller of the two T_c values should be used to determine the T_{lag} for the subbasin.

2.6 FLOW SPLIT CALCULATIONS

A flow split methodology based on Manning's equation was used to resolve flow splits at street intersections with different right-of-way widths and slopes. Flow split ratios at street intersections were determined for a range of flows. The ratios were then input into the HEC-1 models. For this analysis, flows were assumed to be contained within road right-of-ways. The following is a brief description of this method:

$$Q = [(1.49/ n) (A)(R^{2/3})(S^{1/2})] \quad (1)$$

$$Q_{total} = Q_1 + Q_2 \quad (2)$$

$$Q_1 / Q_2 = [(1.49/ n_1)A_1(R_1^{2/3})(S_1^{1/2})]/[(1.49/ n_2)A_2(R_2^{2/3})(S_2^{1/2})] \quad (3)$$

$$D_1 = D_2 = D \text{ (assumed)} \quad (4)$$

Where:

Q = Flow (cfs)
Q_{total} = Total flow at intersection (cfs)
Q_1 = Flow in street one after flow split (cfs)
Q_2 = Flow in street two after flow split (cfs)
n = Manning's Coefficient
A = Flow Area (ft^2)
R = Hydraulic Radius (ft) = A/Wp, Wp = Wetted Perimeter (ft)
S = Slope of street (ft/ft)
A_1 = Flow area in street one after flow split (ft^2)
R_1 = Hydraulic Radius in street one after flow split (ft)
S_1 = Slope of street one downstream of intersection (ft/ft)
A_2 = Flow area in street two after flow split (ft^2)
R_2 = Hydraulic Radius in street two after flow split (ft)
S_2 = Slope of street two downstream of intersection (ft/ft)
D_1 = Depth in street one (ft)
D_2 = Depth in street two (ft)
D = Average Depth of street one and street two (ft)

Inflow ratios for each street intersection were developed for input into the HEC-1 models by solving for Q_1 and Q_2 at several different flow rates. Q_{total} values of 100, 200, 500, and 1000 cfs were used to determine the flow split ratios.

The first step in this flow split methodology is to determine a depth (D) in Street 1 and Street 2. These depths must be established before A_1, R_1, A_2, and R_2 can be calculated. It is assumed that the depth in Street 1 (D_1) and the depth in Street 2 (D_2) at the downstream side of the intersection are equal (Equation 3: $D_1 = D_2 = D$). To find an approximate depth (D), half of total flow at the intersection is used to calculate a depth in Street 1 (D_1) and 2 (D_2). The average of D_1 and D_2 is then calculated to get D, which is then used to calculate A_1, R_1, A_2 and R_2. Using the approximate depth in this step is possible because the ratios of A_1/A_2 and R_1/R_2 will not vary significantly with small changes in depth. Now Equation 1 can be solved for Q_1 and Q_2. A spreadsheet was developed to perform flow split calculations at street intersections. This spreadsheet is included in Volume III of this study.

There are a number of variables that must be considered when developing a flow split methodology that is applicable to a wide range of intersection designs. This methodology provides adequate results for the broad range of intersection configurations that are experienced throughout the project area. A large number of the flow splits that were analyzed are in areas where the streets have not yet been developed. Therefore, it is very difficult to determine whether or not one of the streets will have significantly more flow in it than the other. The proposed right-of-way widths and existing grades were used to determine flow splits in these locations.

2.7 STORM CENTERING ANALYSIS

Storm centering analysis similar to the 2002 MPU was performed for this Local Drainage Master Plan. This study includes Series A and Series B storm centering analysis for the portions of the Pittman Watershed and the C-1 Watershed that are tributary to the study area.

A Series A storm centering covers the entire watershed. Series A storm centering analyses were performed for the existing and ultimate drainage conditions with SDN3, SDN4, and SDN5 storm distributions. A Series B storm centering is similar to a Series A storm centering except that the outfall from all detention basin facilities is diverted out of the HEC-1 model. The Series B storm centering was used, for the most part, to provide peak flowrates for the portions of the study area that are directly downstream of the detention basins within the area.

2.8 MASTER PLAN FACILITY FLOWRATES

This Local Drainage Master Plan study does not modify the subbasin boundaries used in the 2002 MPU hydrology model. However, in order to analyze the study area on a local drainage level, the MPU subbasins were subdivided, the land uses were modified to accommodate the October 2005 City of Henderson Land Use Plan, subbasin lag times were adjusted to reflect the smaller subbasin sizes, and runoff routings were analyzed within the 2002 MPU subbasin boundaries. As a result, the flowrates from hydrologic analysis in this study differ from the accepted Master Plan flowrates at the Master Plan facilities alignments. Therefore, the 100-yr Master Planned flows from the 2002 MPU, the June 2005 *Amendment to the 2002 MPU Master Plan Update for the C-1 Channel – Ithaca and Drake Branches*, by G.C. Wallace, Inc., or the March 2006 *Change to the 2002 Master Plan Update for the C-1 Channel – Lake Mead Branch*, by PBS&J have been shown in the Master Planned facilities in Volume I of this study. Table 2.8.1 provides a comparison of the flowrates between this Local Drainage Master Plan Study and the Master Plan studies at the Master Planned facilities within the study area. A more detailed comparison has been provided in Volume III of this study.

TABLE 2.8.1 – REGIONAL AND LOCAL MASTER PLAN FLOW COMPARISON

MPU ID / River Mile	Status	Facility Description	Cross Streets	Master Plan 100-YR Flow in the Facility (cfs)	Local Master Drainage Study 100-YR Flow in the Facility (cfs)
PTPA		**PITTMAN PABCO**			
0000	P1	Conc Chnl 30'W 6.5'D 2:1 SS	Pabco at Galleria	2,251	1,038
0000	P1	Conc Chnl 30'W 6.5'D 2:1 SS	Pabco at Sunset	2,251	756
0000	P1	Conc Chnl 30'W 6.5'D 2:1 SS	Pabco at Bassett	2,251	764
0000	P1	Conc Chnl 30'W 6.5'D 2:1 SS	Pabco at Rolly	2,251	763
0264	E	2: 6' X 4' RCBC Outlet	Pabco at Boulder	302	310
0266	P1	53 ac-ft Pabco Detention Basin	Pabco at Boulder	1,026	1,525
PTBR		**PITTMAN BURNS**			
0091	E	Conc Chnl 25'W 9'D 2:1 SS	Burns at Galleria	5,448	5,498
0140	E	Conc Chnl 25'W 9'D 2:1 SS	Galleria, West of Burns	5,254	5,337
0160	E	Conc Chnl10'W 8'D 2:1 SS	Galleria at Boulder	2,881	2,928

See continuation of Table on next page

TABLE 2.8.1 – REGIONAL AND LOCAL MASTER PLAN FLOW COMPARISON (cont.)

MPU ID / River Mile	Status	Facility Description	Cross Streets	Master Plan 100-YR Flow in the Facility (cfs)	Local Master Drainage Study 100-YR Flow in the Facility (cfs)
PTRR		**PITTMAN RAILROAD**			
0027	P2	14' X 8' RCB	UPRR at US95	1,092	1,621
0035	P2	Conc Chnl 10'W 6'D 2:1 SS	UPRR at Janice	1,092	1,502
0035	P2	Conc Chnl 10'W 6'D 2:1 SS	UPRR at Tiger Lily	1,092	1,265
0115	P2	12' X 6' RCB	UPRR at Crestway	563	1,251
0116	P2	Conc Chnl 10'W 5'D 2:1 SS	UPRR at Blackridge	563	943
0116	P2	Conc Chnl 10'W 5'D 2:1 SS	UPRR at Ocean	563	450
C1BH		**C-1 CHANNEL - BOULDER HWY**			
0040	P1	3: 15' X 6' RCBC @ Horizon Dr	Boulder Hwy at Racetrack	3,194	3,387
0042	P1	Conc Chnl 30'W 6'D 2:1 SS	Boulder Hwy at Equestrian	3,194	3,142
0071	P1	3: 14' X 6' RCBC @ Equestrian Dr	Boulder Hwy at Equestrian	2,842	3,063
0073	P1	Conc Chnl 30'W 6'D 2:1 SS	Boulder Hwy at Museum	2,842	2,557
0111	P1	Conc Chnl 20'W 6'D 2:1 SS	Boulder Hwy at Hermosa	1,937	1,961
0111	P1	Conc Chnl 20'W 6'D 2:1 SS	Boulder Hwy at Magic	1,937	1,887
0148	E	5: 8' X 4' RCBC @ Robert Way	Boulder Hwy at Roberts	1,832	1,832
C1CH		**C-1 CHANNEL**			
0161	P0	Conc Chnl 40'W 8'D 0:1 SS	Lake Mead at Athens	7,324	7,750
0220	E	Conc Chnl 15'W 9'D 1:1 SS: West Floodwall	Pueblo at Cadiz	7,324	7,750
0284	E	Conc Chnl 15'W 9'D 1:1 SS: West Floodwall	Pueblo at Ithaca	7,324	7,750
0346	E	Conc Chnl 40'W 6'D 2:1 SS: West Floodwall	Pueblo at Warm Springs	7,324	7,665
0398	E	Junction Structure	Pueblo at Drake	6,961	7,357
0408	E	Conc Chnl 25'W 9'D 2:1 SS	Pueblo at Aloha	5,919	6,512
0439	E	Single Span Bridge @ Burkholder Blvd	Pueblo at Burkholder	5,919	6,488
0455	E	Conc Chnl 25'W 7.5'D 2:1 SS	Pueblo at La Jolla	5,666	6,326
0502	E	Conc Chnl 25'W 7'D 2:1 SS	Pueblo at Newport	5,666	6,226
0554	E	3: 20' X 7' RCBC @ Boulder Hwy	Pueblo at Boulder Hwy	4,828	5,202
0600	E	3: 10' X 7' RCBC @ Horizon Dr	College at Horizon	1,765	1,938
0641	P3	Conc Chnl 12.5'W 5'D 2:1 SS	College at Country Canyon	1,641	1,804
0641	P3	Conc Chnl 12.5'W 5'D 2:1 SS	College at Heather	1,641	1,735
0672	E	4: 10' X 5' RCBC @ Vermillion Dr	College at Vermillion	1,641	1,350
0742	E	10' X 8' RCBC @ Mission Dr	College at Mission	425	497

See continuation of Table on next page

TABLE 2.8.1 – REGIONAL AND LOCAL MASTER PLAN FLOW COMPARISON (cont.)

MPU ID / River Mile	Status	Facility Description	Cross Streets	Master Plan 100-YR Flow in the Facility (cfs)	Local Master Drainage Study 100-YR Flow in the Facility (cfs)
C1DC		**C-1 CHANNEL - DRAKE CHANNEL**			
0000	E	Conc Chnl 25'W 5'-14'D 0:1 SS	Drake at Pueblo	668	1,316
0045	E	Junction Structure	Drake at Racetrack	668	1,216
0051	E	Earth Chnl 20'-50'W 20'-10'D 2:1 SS w Drops	Drake at Magic	303	603
0051	E	Earth Chnl 20'-50'W 20'-10'D 2:1 SS w Drops	Drake at Magic	303	533
C1E1		**C-1 CHANNEL - EQUESTRIAN TRIBUTARY 1**			
0002	P1	Conc Chnl 10'W 4.5'D 2:1 SS	Equestrian at Appaloosa	688	1,101
0002	P1	Conc Chnl 10'W 4.5'D 2:1 SS	Equestrian at Appaloosa	688	1,045
0002	P1	Conc Chnl 10'W 4.5'D 2:1 SS	Equestrian at Appaloosa	688	612
C1EQ		**C-1 CHANNEL - EQUESTRIAN D.B. OUTFALL**			
0000	P1	Conc Chnl 10'W 5.5'D 2:1 SS	Burkholder at Cloudcrest	1,097	1,674
0000	P1	Conc Chnl 10'W 5.5'D 2:1 SS	Cloudcrest at Warsaw	1,097	1,628
0074	E	9: 45" X 29" HERCP	Racetrack at Newport	679	1,581
0112	E	Earth Chnl 45'-80'W 4'D 2:1 SS with Drops	Atticus at Camp Hill	679	680
0152	E	Earth Chnl 45'-80'W 4'D 2:1 SS with Drops	Magic at Richard Bunker	224	227
C1GW		**C-1 CHANNEL - GREENWAY**			
0037	E	2: 12' X 4' RCBC	Greenway at Boulder Hwy	920	1,231
0047	E	2: 12' X 4' RCBC @ Mona Ln	Greenway at Mona	568	902
0081	E	3: 9.5' X 6.5' CMAP @ UPRR	Greenway at UPRR	568	848
C1IT		**C-1 CHANNEL - ITHACA**			
0000	P1	48" RCP OUTLET	Ithaca at Magic Way	285	286
0000	P1	48" RCP OUTLET	Ithaca at Milan	285	287
0000	P1	48" RCP OUTLET	Ithaca at Racetrack	285	307
0000	P1	48" RCP OUTLET	Ithaca at Emden	285	349
C1LM		**C-1 CHANNEL - LAKE MEAD**			
0006	P1	14' x 7' RCB	Lake Mead at Cadiz	1,290	1,766
0047	P1	14' x 7' RCB	Lake Mead at Mohawk	1,289	1,703
0056	P1	14' x 7' RCB	Lake Mead at Pawnee	1,257	1,653
0084	P1	14' x 7' RCB	Lake Mead at Navajo	1,184	1,577
0125	P1	10' x 6' RCB	Lake Mead at Warm Springs	641	733
0144	P1	Conc Chnl 10'W 4.5'D 2:1 SS	Lake Mead at Ash	682	734
0158	P1	Conc Chnl 10'W 4.5'D 2:1 SS	Lake Mead at Ivy	682	661
0184	P1	Conc Chnl 10'W 4.5'D 2:1 SS	Lake Mead at Burkholder	682	471

See continuation of Table on next page

TABLE 2.8.1 – REGIONAL AND LOCAL MASTER PLAN FLOW COMPARISON (cont.)

MPU ID / River Mile	Status	Facility Description	Cross Streets	Master Plan 100-YR Flow in the Facility (cfs)	Local Master Drainage Study 100-YR Flow in the Facility (cfs)
C1US		**C1 CHANNEL - US95**			
0003	P1	Conc Chnl 20'W 4'D 2:1 SS	US95 at College	900	862
0003	P1	Conc Chnl 20'W 4'D 2:1 SS	US95 at Elite	900	784
0003	P1	Conc Chnl 20'W 4'D 2:1 SS	US95 at Landmark	900	616
0003	P1	Conc Chnl 20'W 4'D 2:1 SS	US95 at Hunters Run	900	568

3.0 PROPOSED DRAINAGE FACILITIES

3.1 GENERAL DESCRIPTION

The Local Drainage Master Plan study area was analyzed in the existing and ultimate drainage conditions to determine the flowrates throughout the study area. These flowrates were then analyzed to determine where additional flood control facilities would be warranted in order to meet CCRFCD and City of Henderson drainage criteria. The proposed drainage facilities fall into two categories: local 10-yr drainage facilities and local 100-yr drainage facilities. The methodology for determining the need for a drainage facility at any location is similar for both categories. A drainage facility has been designated as a local 100-yr facility if the potential exists for the facility to become a Regional facility at some time in the future.

3.2 STREET FLOW CRITERIA

Drainage facilities have been proposed in roadways for three reasons: failure to meet the RTC 10-yr dry lane criterion, failure to meet the 100-yr velocity times depth (V x D) criterion, or failure to meet the maximum depth of flow in the street criterion. Streets throughout the study area were analyzed to determine if the flow criteria were met.

The street flow criteria were developed using to the Clark County Regional Flood Control District's *Hydraulic Criteria and Drainage Design Manual* for the maximum street flow and maximum flow heights for uniform street cross-sections (Figures 901 through 906). The CCRFCD's HCDDM states the velocity multiplied by the normal depth has to be less than or equal to six for the 10 year storm event ((V x D) = 6), and for the 100 year storm event the resultant of the velocity and the normal depth had be less than or equal to eight ((V x D) = 8). Figures 901 through 906 show street capacity curves for different street right-of-ways and were used whenever possible.

Non-uniform street cross-sections were modeled using Haestad Methods, Inc. FlowMaster v. 2005 to determine maximum flow heights and maximum street flows to meet the dry lane and/or V times D criteria. The non-uniform streets were analyzed by inputting various roadway slopes and varying the flow height (D) to determine the street flow capacity with a 12-ft dry lane and to determine the product of velocity and depth equal six or eight to establish the 10-yr and 100-yr,

respectively, maximum flow values for each street configuration. The street capacity spreadsheets can be found following this discussion. The spreadsheets show the results of both the HCDDM graphical interpretations and the non-uniform street section FlowMaster analysis.

The 12-ft dry lane criterion was used for right-of-ways greater than 60 feet. Per the HCDDM, the 12-ft dry lane was accommodated for on both sides of the roadway. For street cross-sections that include a center double turn lane, the turn lane was not factored into the dry lane calculations. The street capacity analysis using both the HCDDM figures and the FlowMaster program was performed for street slopes at 0.5% intervals, and then linearly interpolated to provide 0.05% intervals.

The street capacity values were then used to check flowrates in specific streets throughout the study area. The "Street Flow Capacity Check/Proposed Facilities" table following the Street Flow Criteria table features a list of streets within the study area that were determined to convey significant flows in the 10-yr and 100-yr storm events. The Street Flow Capacity Check/Proposed Facilities table lists the street name that is conveying the flow, cross street name, street cross-section, street slope, street flows according to this local master plan study, street allowable flows per the Street Flow Criteria table, and a resolution if street flows exceed the allowable flows.

3.3 FACILITY SIZING

For this Local Drainage Master Plan study, the proposed facilities were sized using the Haestad Methods, Inc. FlowMaster v. 2005 software. The allowable street capacities for streets within the study area were determined in the Street Flow Capacity Check table discussed above. Based on these results, the necessary amount of flow that a facility would be required to convey in order for the street to meet criteria was determined. The facility within the street was assumed to have the same slope as the roadway, and sized using Manning's equation within FlowMaster.

Proposed facilities were separated into two categories: Local 10-year and Local 100-year facilities. Facilities that have the potential to become future Regional facilities have been designated as 100-yr facilities for this study. The local 100-year facilities have been sized to convey the ultimate condition flows so that the flows are contained along the facility alignments and not allowed to split off on the alignment. Refer to the "Facility Sizing – FlowMaster Summary" table following this page. Following the FlowMaster Summary is a "Facility Summary Table". This table lists the

STREET FLOW CRITERIA TABLES

COH NEIGHBORHOOD STUDY
48' ROW
CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Velocity for Max vd=6 (fps)	Full Street Max Flow vd=6 (cfs)	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
0.50%	1.120	5.357	194.0	97.0	1.300	6.154	277.0	138.5
0.55%	1.103	5.440	192.6	96.3	1.279	6.255	275.0	137.5
0.60%	1.086	5.525	191.2	95.6	1.258	6.359	273.0	136.5
0.65%	1.069	5.613	189.8	94.9	1.237	6.467	271.0	135.5
0.70%	1.052	5.703	188.4	94.2	1.216	6.579	269.0	134.5
0.75%	1.035	5.797	187.0	93.5	1.195	6.695	267.0	133.5
0.80%	1.018	5.894	185.6	92.8	1.174	6.814	265.0	132.5
0.85%	1.001	5.994	184.2	92.1	1.153	6.938	263.0	131.5
0.90%	0.984	6.098	182.8	91.4	1.132	7.067	261.0	130.5
0.95%	0.967	6.205	181.4	90.7	1.111	7.201	259.0	129.5
1.00%	0.950	6.316	180.0	90.0	1.090	7.339	257.0	128.5
1.05%	0.941	6.376	178.7	89.4	1.080	7.407	255.9	128.0
1.10%	0.932	6.438	177.4	88.7	1.070	7.477	254.8	127.4
1.15%	0.923	6.501	176.1	88.1	1.060	7.547	253.7	126.9
1.20%	0.914	6.565	174.8	87.4	1.050	7.619	252.6	126.3
1.25%	0.905	6.630	173.5	86.8	1.040	7.692	251.5	125.8
1.30%	0.896	6.696	172.2	86.1	1.030	7.767	250.4	125.2
1.35%	0.887	6.764	170.9	85.5	1.020	7.843	249.3	124.7
1.40%	0.878	6.834	169.6	84.8	1.010	7.921	248.2	124.1
1.45%	0.869	6.904	168.3	84.2	1.000	8.000	247.1	123.6
1.50%	0.860	6.977	167.0	83.5	0.990	8.081	246.0	123.0
1.55%	0.855	7.018	166.4	83.2	0.983	8.138	244.7	122.4
1.60%	0.850	7.059	165.8	82.9	0.976	8.197	243.4	121.7
1.65%	0.845	7.101	165.2	82.6	0.969	8.256	242.1	121.1
1.70%	0.840	7.143	164.6	82.3	0.962	8.316	240.8	120.4
1.75%	0.835	7.186	164.0	82.0	0.955	8.377	239.5	119.8
1.80%	0.830	7.229	163.4	81.7	0.948	8.439	238.2	119.1
1.85%	0.825	7.273	162.8	81.4	0.941	8.502	236.9	118.5
1.90%	0.820	7.317	162.2	81.1	0.934	8.565	235.6	117.8
1.95%	0.815	7.362	161.6	80.8	0.927	8.630	234.3	117.2
2.00%	0.810	7.407	161.0	80.5	0.920	8.696	233.0	116.5
2.05%	0.806	7.444	160.3	80.2	0.916	8.734	232.7	116.4
2.10%	0.802	7.481	159.6	79.8	0.912	8.772	232.4	116.2
2.15%	0.798	7.519	158.9	79.5	0.908	8.811	232.1	116.1
2.20%	0.794	7.557	158.2	79.1	0.904	8.850	231.8	115.9
2.25%	0.790	7.595	157.5	78.8	0.900	8.889	231.5	115.8
2.30%	0.786	7.634	156.8	78.4	0.896	8.929	231.2	115.6
2.35%	0.782	7.673	156.1	78.1	0.892	8.969	230.9	115.5
2.40%	0.778	7.712	155.4	77.7	0.888	9.009	230.6	115.3
2.45%	0.774	7.752	154.7	77.4	0.884	9.050	230.3	115.2

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 901 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY
48' ROW
CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Velocity for Max vd=6 (fps)	Full Street Max Flow vd=6 (cfs)	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
2.50%	0.770	7.792	154.0	77.0	0.880	9.091	230.0	115.0
2.55%	0.767	7.823	153.4	76.7	0.876	9.132	229.0	114.5
2.60%	0.764	7.853	152.8	76.4	0.872	9.174	228.0	114.0
2.65%	0.761	7.884	152.2	76.1	0.868	9.217	227.0	113.5
2.70%	0.758	7.916	151.6	75.8	0.864	9.259	226.0	113.0
2.75%	0.755	7.947	151.0	75.5	0.860	9.302	225.0	112.5
2.80%	0.743	8.075	148.6	74.3	0.844	9.479	221.0	110.5
2.85%	0.749	8.011	149.8	74.9	0.852	9.390	223.0	111.5
2.90%	0.746	8.043	149.2	74.6	0.848	9.434	222.0	111.0
2.95%	0.743	8.075	148.6	74.3	0.844	9.479	221.0	110.5
3.00%	0.740	8.108	148.0	74.0	0.840	9.524	220.0	110.0
3.05%	0.738	8.130	147.8	73.9	0.837	9.558	219.3	109.7
3.10%	0.736	8.152	147.6	73.8	0.834	9.592	218.6	109.3
3.15%	0.734	8.174	147.4	73.7	0.831	9.627	217.9	109.0
3.20%	0.732	8.197	147.2	73.6	0.828	9.662	217.2	108.6
3.25%	0.730	8.219	147.0	73.5	0.825	9.697	216.5	108.3
3.30%	0.728	8.242	146.8	73.4	0.822	9.732	215.8	107.9
3.35%	0.726	8.264	146.6	73.3	0.819	9.768	215.1	107.6
3.40%	0.724	8.287	146.4	73.2	0.816	9.804	214.4	107.2
3.45%	0.722	8.310	146.2	73.1	0.813	9.840	213.7	106.9
3.50%	0.720	8.333	146.0	73.0	0.810	9.877	213.0	106.5
3.55%	0.718	8.357	145.6	72.8	0.808	9.901	212.8	106.4
3.60%	0.716	8.380	145.2	72.6	0.806	9.926	212.6	106.3
3.65%	0.714	8.403	144.8	72.4	0.804	9.950	212.4	106.2
3.70%	0.712	8.427	144.4	72.2	0.802	9.975	212.2	106.1
3.75%	0.710	8.451	144.0	72.0	0.800	10.000	212.0	106.0
3.80%	0.708	8.475	143.6	71.8	0.798	10.025	211.8	105.9
3.85%	0.706	8.499	143.2	71.6	0.796	10.050	211.6	105.8
3.90%	0.704	8.523	142.8	71.4	0.794	10.076	211.4	105.7
3.95%	0.702	8.547	142.4	71.2	0.792	10.101	211.2	105.6
4.00%	0.700	8.571	142.0	71.0	0.790	10.127	211.0	105.5
4.05%	0.698	8.596	141.4	70.7	0.788	10.152	210.5	105.3
4.10%	0.696	8.621	140.8	70.4	0.786	10.178	210.0	105.0
4.15%	0.694	8.646	140.2	70.1	0.784	10.204	209.5	104.8
4.20%	0.692	8.671	139.6	69.8	0.782	10.230	209.0	104.5
4.25%	0.690	8.696	139.0	69.5	0.780	10.256	208.5	104.3
4.30%	0.688	8.721	138.4	69.2	0.778	10.283	208.0	104.0
4.35%	0.686	8.746	137.8	68.9	0.776	10.309	207.5	103.8
4.40%	0.684	8.772	137.2	68.6	0.774	10.336	207.0	103.5
4.45%	0.682	8.798	136.6	68.3	0.772	10.363	206.5	103.3

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 901 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY
48' ROW
CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Velocity for Max vd=6 (fps)	Full Street Max Flow vd=6 (cfs)	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
4.50%	0.680	8.824	136.0	68.0	0.770	10.390	206.0	103.0
4.55%	0.679	8.837	136.0	68.0	0.768	10.417	205.4	102.7
4.60%	0.678	8.850	136.0	68.0	0.766	10.444	204.8	102.4
4.65%	0.677	8.863	136.0	68.0	0.764	10.471	204.2	102.1
4.70%	0.676	8.876	136.0	68.0	0.762	10.499	203.6	101.8
4.75%	0.675	8.889	136.0	68.0	0.760	10.526	203.0	101.5
4.80%	0.674	8.902	136.0	68.0	0.758	10.554	202.4	101.2
4.85%	0.673	8.915	136.0	68.0	0.756	10.582	201.8	100.9
4.90%	0.672	8.929	136.0	68.0	0.754	10.610	201.2	100.6
4.95%	0.671	8.942	136.0	68.0	0.752	10.638	200.6	100.3
5.00%	0.670	8.955	136.0	68.0	0.750	10.667	200.0	100.0
5.05%	0.668	8.982	135.1	67.6	0.749	10.681	199.6	99.8
5.10%	0.666	9.009	134.2	67.1	0.748	10.695	199.2	99.6
5.15%	0.664	9.036	133.3	66.7	0.747	10.710	198.8	99.4
5.20%	0.662	9.063	132.4	66.2	0.746	10.724	198.4	99.2
5.25%	0.660	9.091	131.5	65.8	0.745	10.738	198.0	99.0
5.30%	0.658	9.119	130.6	65.3	0.744	10.753	197.6	98.8
5.35%	0.656	9.146	129.7	64.9	0.743	10.767	197.2	98.6
5.40%	0.654	9.174	128.8	64.4	0.742	10.782	196.8	98.4
5.45%	0.652	9.202	127.9	64.0	0.741	10.796	196.4	98.2
5.50%	0.650	9.231	127.0	63.5	0.740	10.811	196.0	98.0
5.55%	0.649	9.245	126.8	63.4	0.738	10.840	195.5	97.8
5.60%	0.648	9.259	126.6	63.3	0.736	10.870	195.0	97.5
5.65%	0.647	9.274	126.4	63.2	0.734	10.899	194.5	97.3
5.70%	0.646	9.288	126.2	63.1	0.732	10.929	194.0	97.0
5.75%	0.645	9.302	126.0	63.0	0.730	10.959	193.5	96.8
5.80%	0.644	9.317	125.8	62.9	0.728	10.989	193.0	96.5
5.85%	0.643	9.331	125.6	62.8	0.726	11.019	192.5	96.3
5.90%	0.642	9.346	125.4	62.7	0.724	11.050	192.0	96.0
5.95%	0.641	9.360	125.2	62.6	0.722	11.080	191.5	95.8
6.00%	0.640	9.375	125.0	62.5	0.720	11.111	191.0	95.5

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 901 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

51' ROW

CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow					Criteria for 100 Year Flow		
Street Slope (%)	Depth for Max vd=6 (ft)	Velocity for Max vd=6 (fps)	Full Street Max Flow vd=6 (cfs)	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
0.50%	1.120	5.357	214.0	107.0	1.290	6.202	298.0	149.0
0.55%	1.102	5.445	212.0	106.0	1.269	6.304	295.8	147.9
0.60%	1.084	5.535	210.0	105.0	1.248	6.410	293.6	146.8
0.65%	1.066	5.629	208.0	104.0	1.227	6.520	291.4	145.7
0.70%	1.048	5.725	206.0	103.0	1.206	6.633	289.2	144.6
0.75%	1.030	5.825	204.0	102.0	1.185	6.751	287.0	143.5
0.80%	1.012	5.929	202.0	101.0	1.164	6.873	284.8	142.4
0.85%	0.994	6.036	200.0	100.0	1.143	6.999	282.6	141.3
0.90%	0.976	6.148	198.0	99.0	1.122	7.130	280.4	140.2
0.95%	0.958	6.263	196.0	98.0	1.101	7.266	278.2	139.1
1.00%	0.940	6.383	194.0	97.0	1.080	7.407	276.0	138.0
1.05%	0.931	6.445	192.6	96.3	1.070	7.477	274.9	137.5
1.10%	0.922	6.508	191.2	95.6	1.060	7.547	273.8	136.9
1.15%	0.913	6.572	189.8	94.9	1.050	7.619	272.7	136.4
1.20%	0.904	6.637	188.4	94.2	1.040	7.692	271.6	135.8
1.25%	0.895	6.704	187.0	93.5	1.030	7.767	270.5	135.3
1.30%	0.886	6.772	185.6	92.8	1.020	7.843	269.4	134.7
1.35%	0.877	6.842	184.2	92.1	1.010	7.921	268.3	134.2
1.40%	0.868	6.912	182.8	91.4	1.000	8.000	267.2	133.6
1.45%	0.859	6.985	181.4	90.7	0.990	8.081	266.1	133.1
1.50%	0.850	7.059	180.0	90.0	0.980	8.163	265.0	132.5
1.55%	0.845	7.101	179.4	89.7	0.973	8.222	263.6	131.8
1.60%	0.840	7.143	178.8	89.4	0.966	8.282	262.2	131.1
1.65%	0.835	7.186	178.2	89.1	0.959	8.342	260.8	130.4
1.70%	0.830	7.229	177.6	88.8	0.952	8.403	259.4	129.7
1.75%	0.825	7.273	177.0	88.5	0.945	8.466	258.0	129.0
1.80%	0.820	7.317	176.4	88.2	0.938	8.529	256.6	128.3
1.85%	0.815	7.362	175.8	87.9	0.931	8.593	255.2	127.6
1.90%	0.810	7.407	175.2	87.6	0.924	8.658	253.8	126.9
1.95%	0.805	7.453	174.6	87.3	0.917	8.724	252.4	126.2
2.00%	0.800	7.500	174.0	87.0	0.910	8.791	251.0	125.5
2.05%	0.796	7.538	173.3	86.7	0.906	8.830	250.7	125.4
2.10%	0.792	7.576	172.6	86.3	0.902	8.869	250.4	125.2
2.15%	0.788	7.614	171.9	86.0	0.898	8.909	250.1	125.1
2.20%	0.784	7.653	171.2	85.6	0.894	8.949	249.8	124.9
2.25%	0.780	7.692	170.5	85.3	0.890	8.989	249.5	124.8
2.30%	0.776	7.732	169.8	84.9	0.886	9.029	249.2	124.6
2.35%	0.772	7.772	169.1	84.6	0.882	9.070	248.9	124.5
2.40%	0.768	7.813	168.4	84.2	0.878	9.112	248.6	124.3
2.45%	0.764	7.853	167.7	83.9	0.874	9.153	248.3	124.2

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 902 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

51' ROW

CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow					Criteria for 100 Year Flow		
Street Slope (%)	Depth for Max vd=6 (ft)	Velocity for Max vd=6 (fps)	Full Street Max Flow vd=6 (cfs)	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
2.50%	0.760	7.895	167.0	83.5	0.870	9.195	248.0	124.0
2.55%	0.757	7.926	166.4	83.2	0.866	9.238	247.0	123.5
2.60%	0.754	7.958	165.8	82.9	0.862	9.281	246.0	123.0
2.65%	0.751	7.989	165.2	82.6	0.858	9.324	245.0	122.5
2.70%	0.748	8.021	164.6	82.3	0.854	9.368	244.0	122.0
2.75%	0.745	8.054	164.0	82.0	0.850	9.412	243.0	121.5
2.80%	0.733	8.186	161.6	80.8	0.834	9.592	239.0	119.5
2.85%	0.739	8.119	162.8	81.4	0.842	9.501	241.0	120.5
2.90%	0.736	8.152	162.2	81.1	0.838	9.547	240.0	120.0
2.95%	0.733	8.186	161.6	80.8	0.834	9.592	239.0	119.5
3.00%	0.730	8.219	161.0	80.5	0.830	9.639	238.0	119.0
3.05%	0.728	8.242	160.8	80.4	0.827	9.674	237.2	118.6
3.10%	0.726	8.264	160.6	80.3	0.824	9.709	236.4	118.2
3.15%	0.724	8.287	160.4	80.2	0.821	9.744	235.6	117.8
3.20%	0.722	8.310	160.2	80.1	0.818	9.780	234.8	117.4
3.25%	0.720	8.333	160.0	80.0	0.815	9.816	234.0	117.0
3.30%	0.718	8.357	159.8	79.9	0.812	9.852	233.2	116.6
3.35%	0.716	8.380	159.6	79.8	0.809	9.889	232.4	116.2
3.40%	0.714	8.403	159.4	79.7	0.806	9.926	231.6	115.8
3.45%	0.712	8.427	159.2	79.6	0.803	9.963	230.8	115.4
3.50%	0.710	8.451	159.0	79.5	0.800	10.000	230.0	115.0
3.55%	0.708	8.475	158.5	79.3	0.798	10.025	229.8	114.9
3.60%	0.706	8.499	158.0	79.0	0.796	10.050	229.6	114.8
3.65%	0.704	8.523	157.5	78.8	0.794	10.076	229.4	114.7
3.70%	0.702	8.547	157.0	78.5	0.792	10.101	229.2	114.6
3.75%	0.700	8.571	156.5	78.3	0.790	10.127	229.0	114.5
3.80%	0.698	8.596	156.0	78.0	0.788	10.152	228.8	114.4
3.85%	0.696	8.621	155.5	77.8	0.786	10.178	228.6	114.3
3.90%	0.694	8.646	155.0	77.5	0.784	10.204	228.4	114.2
3.95%	0.692	8.671	154.5	77.3	0.782	10.230	228.2	114.1
4.00%	0.690	8.696	154.0	77.0	0.780	10.256	228.0	114.0
4.05%	0.688	8.721	153.4	76.7	0.778	10.283	227.2	113.6
4.10%	0.686	8.746	152.8	76.4	0.776	10.309	226.4	113.2
4.15%	0.684	8.772	152.2	76.1	0.774	10.336	225.6	112.8
4.20%	0.682	8.798	151.6	75.8	0.772	10.363	224.8	112.4
4.25%	0.680	8.824	151.0	75.5	0.770	10.390	224.0	112.0
4.30%	0.678	8.850	150.4	75.2	0.768	10.417	223.2	111.6
4.35%	0.676	8.876	149.8	74.9	0.766	10.444	222.4	111.2
4.40%	0.674	8.902	149.2	74.6	0.764	10.471	221.6	110.8
4.45%	0.672	8.929	148.6	74.3	0.762	10.499	220.8	110.4

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 902 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

51' ROW

CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow					Criteria for 100 Year Flow		
Street Slope (%)	Depth for Max vd=6 (ft)	Velocity for Max vd=6 (fps)	Full Street Max Flow vd=6 (cfs)	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
4.50%	0.670	8.955	148.0	74.0	0.760	10.526	220.0	110.0
4.55%	0.669	8.969	147.6	73.8	0.758	10.554	218.4	109.2
4.60%	0.668	8.982	147.2	73.6	0.756	10.582	216.8	108.4
4.65%	0.667	8.996	146.8	73.4	0.754	10.610	215.2	107.6
4.70%	0.666	9.009	146.4	73.2	0.752	10.638	213.6	106.8
4.75%	0.665	9.023	146.0	73.0	0.750	10.667	212.0	106.0
4.80%	0.664	9.036	145.6	72.8	0.748	10.695	210.4	105.2
4.85%	0.663	9.050	145.2	72.6	0.746	10.724	208.8	104.4
4.90%	0.662	9.063	144.8	72.4	0.744	10.753	207.2	103.6
4.95%	0.661	9.077	144.4	72.2	0.742	10.782	205.6	102.8
5.00%	0.660	9.091	144.0	72.0	0.740	10.811	204.0	102.0
5.05%	0.658	9.119	143.5	71.8	0.739	10.825	203.6	101.8
5.10%	0.656	9.146	143.0	71.5	0.738	10.840	203.2	101.6
5.15%	0.654	9.174	142.5	71.3	0.737	10.855	202.8	101.4
5.20%	0.652	9.202	142.0	71.0	0.736	10.870	202.4	101.2
5.25%	0.650	9.231	141.5	70.8	0.735	10.884	202.0	101.0
5.30%	0.648	9.259	141.0	70.5	0.734	10.899	201.6	100.8
5.35%	0.646	9.288	140.5	70.3	0.733	10.914	201.2	100.6
5.40%	0.644	9.317	140.0	70.0	0.732	10.929	200.8	100.4
5.45%	0.642	9.346	139.5	69.8	0.731	10.944	200.4	100.2
5.50%	0.640	9.375	139.0	69.5	0.730	10.959	200.0	100.0
5.55%	0.639	9.390	138.7	69.4	0.728	10.989	199.8	99.9
5.60%	0.638	9.404	138.4	69.2	0.726	11.019	199.6	99.8
5.65%	0.637	9.419	138.1	69.1	0.724	11.050	199.4	99.7
5.70%	0.636	9.434	137.8	68.9	0.722	11.080	199.2	99.6
5.75%	0.635	9.449	137.5	68.8	0.720	11.111	199.0	99.5
5.80%	0.634	9.464	137.2	68.6	0.718	11.142	198.8	99.4
5.85%	0.633	9.479	136.9	68.5	0.716	11.173	198.6	99.3
5.90%	0.632	9.494	136.6	68.3	0.714	11.204	198.4	99.2
5.95%	0.631	9.509	136.3	68.2	0.712	11.236	198.2	99.1
6.00%	0.630	9.524	136.0	68.0	0.710	11.268	198.0	99.0

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 902 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

60' ROW

CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Velocity for Max vd=6 (fps)	Full Street Max Flow vd=6 (cfs)	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
0.40%	1.210	4.959	240.0	120.0	1.400	5.714	343.0	171.5
0.50%	1.140	5.263	231.0	115.5	1.320	6.061	333.0	166.5
0.55%	1.123	5.343	228.9	114.5	1.299	6.159	330.1	165.1
0.60%	1.106	5.425	226.8	113.4	1.278	6.260	327.2	163.6
0.65%	1.089	5.510	224.7	112.4	1.257	6.364	324.3	162.2
0.70%	1.072	5.597	222.6	111.3	1.236	6.472	321.4	160.7
0.75%	1.055	5.687	220.5	110.3	1.215	6.584	318.5	159.3
0.80%	1.038	5.780	218.4	109.2	1.194	6.700	315.6	157.8
0.85%	1.021	5.877	216.3	108.2	1.173	6.820	312.7	156.4
0.90%	1.004	5.976	214.2	107.1	1.152	6.944	309.8	154.9
0.95%	0.987	6.079	212.1	106.1	1.131	7.073	306.9	153.5
1.00%	0.970	6.186	210.0	105.0	1.110	7.207	304.0	152.0
1.05%	0.962	6.237	208.9	104.5	1.100	7.273	302.4	151.2
1.10%	0.954	6.289	207.8	103.9	1.090	7.339	300.8	150.4
1.15%	0.946	6.342	206.7	103.4	1.080	7.407	299.2	149.6
1.20%	0.938	6.397	205.6	102.8	1.070	7.477	297.6	148.8
1.25%	0.930	6.452	204.5	102.3	1.060	7.547	296.0	148.0
1.30%	0.922	6.508	203.4	101.7	1.050	7.619	294.4	147.2
1.35%	0.914	6.565	202.3	101.2	1.040	7.692	292.8	146.4
1.40%	0.906	6.623	201.2	100.6	1.030	7.767	291.2	145.6
1.45%	0.898	6.682	200.1	100.1	1.020	7.843	289.6	144.8
1.50%	0.890	6.742	199.0	99.5	1.010	7.921	288.0	144.0
1.55%	0.884	6.787	197.5	98.8	1.004	7.968	287.2	143.6
1.60%	0.878	6.834	196.0	98.0	0.998	8.016	286.4	143.2
1.65%	0.872	6.881	194.5	97.3	0.992	8.065	285.6	142.8
1.70%	0.866	6.928	193.0	96.5	0.986	8.114	284.8	142.4
1.75%	0.860	6.977	191.5	95.8	0.980	8.163	284.0	142.0
1.80%	0.854	7.026	190.0	95.0	0.974	8.214	283.2	141.6
1.85%	0.848	7.075	188.5	94.3	0.968	8.264	282.4	141.2
1.90%	0.842	7.126	187.0	93.5	0.962	8.316	281.6	140.8
1.95%	0.836	7.177	185.5	92.8	0.956	8.368	280.8	140.4
2.00%	0.830	7.229	184.0	92.0	0.950	8.421	280.0	140.0
2.05%	0.826	7.264	183.0	91.5	0.945	8.466	278.6	139.3
2.10%	0.822	7.299	182.0	91.0	0.940	8.511	277.2	138.6
2.15%	0.818	7.335	181.0	90.5	0.935	8.556	275.8	137.9
2.20%	0.814	7.371	180.0	90.0	0.930	8.602	274.4	137.2
2.25%	0.810	7.407	179.0	89.5	0.925	8.649	273.0	136.5
2.30%	0.806	7.444	178.0	89.0	0.920	8.696	271.6	135.8
2.35%	0.802	7.481	177.0	88.5	0.915	8.743	270.2	135.1
2.40%	0.798	7.519	176.0	88.0	0.910	8.791	268.8	134.4
2.45%	0.794	7.557	175.0	87.5	0.905	8.840	267.4	133.7

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 903 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

60' ROW

CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Velocity for Max vd=6 (fps)	Full Street Max Flow vd=6 (cfs)	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
2.50%	0.790	7.595	174.0	87.0	0.900	8.889	266.0	133.0
2.55%	0.787	7.624	173.3	86.7	0.896	8.929	264.7	132.4
2.60%	0.784	7.653	172.6	86.3	0.892	8.969	263.4	131.7
2.65%	0.781	7.682	171.9	86.0	0.888	9.009	262.1	131.1
2.70%	0.778	7.712	171.2	85.6	0.884	9.050	260.8	130.4
2.75%	0.775	7.742	170.5	85.3	0.880	9.091	259.5	129.8
2.80%	0.763	7.864	167.7	83.9	0.864	9.259	254.3	127.2
2.85%	0.769	7.802	169.1	84.6	0.872	9.174	256.9	128.5
2.90%	0.766	7.833	168.4	84.2	0.868	9.217	255.6	127.8
2.95%	0.763	7.864	167.7	83.9	0.864	9.259	254.3	127.2
3.00%	0.760	7.895	167.0	83.5	0.860	9.302	253.0	126.5
3.05%	0.758	7.916	166.6	83.3	0.857	9.335	252.0	126.0
3.10%	0.756	7.937	166.2	83.1	0.854	9.368	251.0	125.5
3.15%	0.754	7.958	165.8	82.9	0.851	9.401	250.0	125.0
3.20%	0.752	7.979	165.4	82.7	0.848	9.434	249.0	124.5
3.25%	0.750	8.000	165.0	82.5	0.845	9.467	248.0	124.0
3.30%	0.748	8.021	164.6	82.3	0.842	9.501	247.0	123.5
3.35%	0.746	8.043	164.2	82.1	0.839	9.535	246.0	123.0
3.40%	0.744	8.065	163.8	81.9	0.836	9.569	245.0	122.5
3.45%	0.742	8.086	163.4	81.7	0.833	9.604	244.0	122.0
3.50%	0.740	8.108	163.0	81.5	0.830	9.639	243.0	121.5
3.55%	0.738	8.130	162.4	81.2	0.828	9.662	242.7	121.4
3.60%	0.736	8.152	161.8	80.9	0.826	9.685	242.4	121.2
3.65%	0.734	8.174	161.2	80.6	0.824	9.709	242.1	121.1
3.70%	0.732	8.197	160.6	80.3	0.822	9.732	241.8	120.9
3.75%	0.730	8.219	160.0	80.0	0.820	9.756	241.5	120.8
3.80%	0.728	8.242	159.4	79.7	0.818	9.780	241.2	120.6
3.85%	0.726	8.264	158.8	79.4	0.816	9.804	240.9	120.5
3.90%	0.724	8.287	158.2	79.1	0.814	9.828	240.6	120.3
3.95%	0.722	8.310	157.6	78.8	0.812	9.852	240.3	120.2
4.00%	0.720	8.333	157.0	78.5	0.810	9.877	240.0	120.0
4.05%	0.719	8.345	156.7	78.4	0.808	9.901	239.4	119.7
4.10%	0.718	8.357	156.4	78.2	0.806	9.926	238.8	119.4
4.15%	0.717	8.368	156.1	78.1	0.804	9.950	238.2	119.1
4.20%	0.716	8.380	155.8	77.9	0.802	9.975	237.6	118.8
4.25%	0.715	8.392	155.5	77.8	0.800	10.000	237.0	118.5
4.30%	0.714	8.403	155.2	77.6	0.798	10.025	236.4	118.2
4.35%	0.713	8.415	154.9	77.5	0.796	10.050	235.8	117.9
4.40%	0.712	8.427	154.6	77.3	0.794	10.076	235.2	117.6
4.45%	0.711	8.439	154.3	77.2	0.792	10.101	234.6	117.3

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 903 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

60' ROW

CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Velocity for Max vd=6 (fps)	Full Street Max Flow vd=6 (cfs)	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
4.50%	0.710	8.451	154.0	77.0	0.790	10.127	234.0	117.0
4.55%	0.708	8.475	153.4	76.7	0.788	10.152	233.1	116.6
4.60%	0.706	8.499	152.8	76.4	0.786	10.178	232.2	116.1
4.65%	0.704	8.523	152.2	76.1	0.784	10.204	231.3	115.7
4.70%	0.702	8.547	151.6	75.8	0.782	10.230	230.4	115.2
4.75%	0.700	8.571	151.0	75.5	0.780	10.256	229.5	114.8
4.80%	0.698	8.596	150.4	75.2	0.778	10.283	228.6	114.3
4.85%	0.696	8.621	149.8	74.9	0.776	10.309	227.7	113.9
4.90%	0.694	8.646	149.2	74.6	0.774	10.336	226.8	113.4
4.95%	0.692	8.671	148.6	74.3	0.772	10.363	225.9	113.0
5.00%	0.690	8.696	148.0	74.0	0.770	10.390	225.0	112.5
5.05%	0.689	8.708	147.9	74.0	0.769	10.403	225.0	112.5
5.10%	0.688	8.721	147.8	73.9	0.768	10.417	225.0	112.5
5.15%	0.687	8.734	147.7	73.9	0.767	10.430	225.0	112.5
5.20%	0.686	8.746	147.6	73.8	0.766	10.444	225.0	112.5
5.25%	0.685	8.759	147.5	73.8	0.765	10.458	225.0	112.5
5.30%	0.684	8.772	147.4	73.7	0.764	10.471	225.0	112.5
5.35%	0.683	8.785	147.3	73.7	0.763	10.485	225.0	112.5
5.40%	0.682	8.798	147.2	73.6	0.762	10.499	225.0	112.5
5.45%	0.681	8.811	147.1	73.6	0.761	10.512	225.0	112.5
5.50%	0.680	8.824	147.0	73.5	0.760	10.526	225.0	112.5
5.55%	0.679	8.837	146.7	73.4	0.759	10.540	224.9	112.5
5.60%	0.678	8.850	146.4	73.2	0.758	10.554	224.8	112.4
5.65%	0.677	8.863	146.1	73.1	0.757	10.568	224.7	112.4
5.70%	0.676	8.876	145.8	72.9	0.756	10.582	224.6	112.3
5.75%	0.675	8.889	145.5	72.8	0.755	10.596	224.5	112.3
5.80%	0.674	8.902	145.2	72.6	0.754	10.610	224.4	112.2
5.85%	0.673	8.915	144.9	72.5	0.753	10.624	224.3	112.2
5.90%	0.672	8.929	144.6	72.3	0.752	10.638	224.2	112.1
5.95%	0.671	8.942	144.3	72.2	0.751	10.652	224.1	112.1
6.00%	0.670	8.955	144.0	72.0	0.750	10.667	224.0	112.0

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 903 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

80' ROW

CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow (cfs) with 12' Dry Lane	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
0.40%	0.420	14.286	18.1	9.1	1.400	5.714	428.0	214.0
0.50%	0.420	14.286	20.3	10.1	1.320	6.061	413.0	206.5
0.55%	0.420	14.286	21.1	10.5	1.304	6.135	408.6	204.3
0.60%	0.420	14.286	21.9	11.0	1.288	6.211	404.2	202.1
0.65%	0.420	14.286	22.8	11.4	1.272	6.289	399.8	199.9
0.70%	0.420	14.286	23.6	11.8	1.256	6.369	395.4	197.7
0.75%	0.420	14.286	24.5	12.2	1.240	6.452	391.0	195.5
0.80%	0.420	14.286	25.3	12.6	1.224	6.536	386.6	193.3
0.85%	0.420	14.286	26.1	13.1	1.208	6.623	382.2	191.1
0.90%	0.420	14.286	27.0	13.5	1.192	6.711	377.8	188.9
0.95%	0.420	14.286	27.8	13.9	1.176	6.803	373.4	186.7
1.00%	0.420	14.286	28.7	14.3	1.160	6.897	369.0	184.5
1.05%	0.420	14.286	29.3	14.6	1.149	6.963	366.5	183.3
1.10%	0.420	14.286	29.9	15.0	1.138	7.030	364.0	182.0
1.15%	0.420	14.286	30.6	15.3	1.127	7.098	361.5	180.8
1.20%	0.420	14.286	31.2	15.6	1.116	7.168	359.0	179.5
1.25%	0.420	14.286	31.9	15.9	1.105	7.240	356.5	178.3
1.30%	0.420	14.286	32.5	16.3	1.094	7.313	354.0	177.0
1.35%	0.420	14.286	33.2	16.6	1.083	7.387	351.5	175.8
1.40%	0.420	14.286	33.8	16.9	1.072	7.463	349.0	174.5
1.45%	0.420	14.286	34.4	17.2	1.061	7.540	346.5	173.3
1.50%	0.420	14.286	35.1	17.5	1.050	7.619	344.0	172.0
1.55%	0.420	14.286	35.6	17.8	1.043	7.670	342.5	171.3
1.60%	0.420	14.286	36.2	18.1	1.036	7.722	341.0	170.5
1.65%	0.420	14.286	36.7	18.4	1.029	7.775	339.5	169.8
1.70%	0.420	14.286	37.3	18.6	1.022	7.828	338.0	169.0
1.75%	0.420	14.286	37.8	18.9	1.015	7.882	336.5	168.3
1.80%	0.420	14.286	38.3	19.2	1.008	7.937	335.0	167.5
1.85%	0.420	14.286	38.9	19.4	1.001	7.992	333.5	166.8
1.90%	0.420	14.286	39.4	19.7	0.994	8.048	332.0	166.0
1.95%	0.420	14.286	40.0	20.0	0.987	8.105	330.5	165.3
2.00%	0.420	14.286	40.5	20.3	0.980	8.163	329.0	164.5
2.05%	0.420	14.286	41.0	20.5	0.975	8.205	327.0	163.5
2.10%	0.420	14.286	41.5	20.7	0.970	8.247	325.0	162.5
2.15%	0.420	14.286	42.0	21.0	0.965	8.290	323.0	161.5
2.20%	0.420	14.286	42.4	21.2	0.960	8.333	321.0	160.5
2.25%	0.420	14.286	42.9	21.5	0.955	8.377	319.0	159.5
2.30%	0.420	14.286	43.4	21.7	0.950	8.421	317.0	158.5
2.35%	0.420	14.286	43.9	21.9	0.945	8.466	315.0	157.5
2.40%	0.420	14.286	44.3	22.2	0.940	8.511	313.0	156.5
2.45%	0.420	14.286	44.8	22.4	0.935	8.556	311.0	155.5

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 904 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

80' ROW

CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow (cfs) with 12' Dry Lane	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
2.50%	0.420	14.286	45.3	22.7	0.930	8.602	309.0	154.5
2.55%	0.420	14.286	45.7	22.9	0.926	8.639	308.3	154.2
2.60%	0.420	14.286	46.2	23.1	0.922	8.677	307.6	153.8
2.65%	0.420	14.286	46.6	23.3	0.918	8.715	306.9	153.5
2.70%	0.420	14.286	47.0	23.5	0.914	8.753	306.2	153.1
2.75%	0.420	14.286	47.5	23.7	0.910	8.791	305.5	152.8
2.80%	0.420	14.286	49.2	24.6	0.894	8.949	302.7	151.4
2.85%	0.420	14.286	48.3	24.2	0.902	8.869	304.1	152.1
2.90%	0.420	14.286	48.8	24.4	0.898	8.909	303.4	151.7
2.95%	0.420	14.286	49.2	24.6	0.894	8.949	302.7	151.4
3.00%	0.420	14.286	49.6	24.8	0.890	8.989	302.0	151.0
3.05%	0.420	14.286	50.0	25.0	0.887	9.019	300.6	150.3
3.10%	0.420	14.286	50.4	25.2	0.884	9.050	299.2	149.6
3.15%	0.420	14.286	50.8	25.4	0.881	9.081	297.8	148.9
3.20%	0.420	14.286	51.2	25.6	0.878	9.112	296.4	148.2
3.25%	0.420	14.286	51.6	25.8	0.875	9.143	295.0	147.5
3.30%	0.420	14.286	52.0	26.0	0.872	9.174	293.6	146.8
3.35%	0.420	14.286	52.4	26.2	0.869	9.206	292.2	146.1
3.40%	0.420	14.286	52.8	26.4	0.866	9.238	290.8	145.4
3.45%	0.420	14.286	53.2	26.6	0.863	9.270	289.4	144.7
3.50%	0.420	14.286	53.6	26.8	0.860	9.302	288.0	144.0
3.55%	0.420	14.286	54.0	27.0	0.859	9.313	287.4	143.7
3.60%	0.420	14.286	54.3	27.2	0.858	9.324	286.8	143.4
3.65%	0.420	14.286	54.7	27.4	0.857	9.335	286.2	143.1
3.70%	0.420	14.286	55.1	27.5	0.856	9.346	285.6	142.8
3.75%	0.420	14.286	55.5	27.7	0.855	9.357	285.0	142.5
3.80%	0.420	14.286	55.8	27.9	0.854	9.368	284.4	142.2
3.85%	0.420	14.286	56.2	28.1	0.853	9.379	283.8	141.9
3.90%	0.420	14.286	56.6	28.3	0.852	9.390	283.2	141.6
3.95%	0.420	14.286	56.9	28.5	0.851	9.401	282.6	141.3
4.00%	0.420	14.286	57.3	28.7	0.850	9.412	282.0	141.0
4.05%	0.420	14.286	57.6	28.8	0.847	9.445	281.1	140.6
4.10%	0.420	14.286	58.0	29.0	0.844	9.479	280.2	140.1
4.15%	0.420	14.286	58.3	29.2	0.841	9.512	279.3	139.7
4.20%	0.420	14.286	58.7	29.3	0.838	9.547	278.4	139.2
4.25%	0.420	14.286	59.0	29.5	0.835	9.581	277.5	138.8
4.30%	0.420	14.286	59.4	29.7	0.832	9.615	276.6	138.3
4.35%	0.420	14.286	59.7	29.9	0.829	9.650	275.7	137.9
4.40%	0.420	14.286	60.1	30.0	0.826	9.685	274.8	137.4
4.45%	0.420	14.286	60.4	30.2	0.823	9.721	273.9	137.0

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 904 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

80' ROW

CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow (cfs) with 12' Dry Lane	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
4.50%	0.420	14.286	60.8	30.4	0.820	9.756	273.0	136.5
4.55%	0.420	14.286	61.1	30.6	0.818	9.780	272.0	136.0
4.60%	0.420	14.286	61.4	30.7	0.816	9.804	271.0	135.5
4.65%	0.420	14.286	61.8	30.9	0.814	9.828	270.0	135.0
4.70%	0.420	14.286	62.1	31.0	0.812	9.852	269.0	134.5
4.75%	0.420	14.286	62.4	31.2	0.810	9.877	268.0	134.0
4.80%	0.420	14.286	62.8	31.4	0.808	9.901	267.0	133.5
4.85%	0.420	14.286	63.1	31.5	0.806	9.926	266.0	133.0
4.90%	0.420	14.286	63.4	31.7	0.804	9.950	265.0	132.5
4.95%	0.420	14.286	63.7	31.9	0.802	9.975	264.0	132.0
5.00%	0.420	14.286	64.1	32.0	0.800	10.000	263.0	131.5
5.05%	0.420	14.286	64.4	32.2	0.798	10.025	262.1	131.1
5.10%	0.420	14.286	64.7	32.3	0.796	10.050	261.2	130.6
5.15%	0.420	14.286	65.0	32.5	0.794	10.076	260.3	130.2
5.20%	0.420	14.286	65.3	32.7	0.792	10.101	259.4	129.7
5.25%	0.420	14.286	65.6	32.8	0.790	10.127	258.5	129.3
5.30%	0.420	14.286	65.9	33.0	0.788	10.152	257.6	128.8
5.35%	0.420	14.286	66.3	33.1	0.786	10.178	256.7	128.4
5.40%	0.420	14.286	66.6	33.3	0.784	10.204	255.8	127.9
5.45%	0.420	14.286	66.9	33.4	0.782	10.230	254.9	127.5
5.50%	0.420	14.286	67.2	33.6	0.780	10.256	254.0	127.0
5.55%	0.420	14.286	67.5	33.7	0.779	10.270	252.9	126.5
5.60%	0.420	14.286	67.8	33.9	0.778	10.283	251.8	125.9
5.65%	0.420	14.286	68.1	34.0	0.777	10.296	250.7	125.4
5.70%	0.420	14.286	68.4	34.2	0.776	10.309	249.6	124.8
5.75%	0.420	14.286	68.7	34.3	0.775	10.323	248.5	124.3
5.80%	0.420	14.286	69.0	34.5	0.774	10.336	247.4	123.7
5.85%	0.420	14.286	69.3	34.6	0.773	10.349	246.3	123.2
5.90%	0.420	14.286	69.6	34.8	0.772	10.363	245.2	122.6
5.95%	0.420	14.286	69.9	34.9	0.771	10.376	244.1	122.1
6.00%	0.420	14.286	70.2	35.1	0.770	10.390	243.0	121.5

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 904 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

80' ROW WITH 12' CENTER TURNING LANE

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
0.40%	0.300	20.000	10.1	5.1	1.356	5.900	482.2	241.1
0.50%	0.300	20.000	11.3	5.7	1.276	6.270	471.1	235.6
0.55%	0.300	20.000	11.8	5.9	1.255	6.375	467.9	233.9
0.60%	0.300	20.000	12.3	6.2	1.234	6.483	464.6	232.3
0.65%	0.300	20.000	12.8	6.4	1.213	6.595	461.4	230.7
0.70%	0.300	20.000	13.3	6.7	1.192	6.711	458.2	229.1
0.75%	0.300	20.000	13.8	6.9	1.171	6.832	454.9	227.5
0.80%	0.300	20.000	14.3	7.2	1.150	6.957	451.7	225.8
0.85%	0.300	20.000	14.8	7.4	1.129	7.086	448.4	224.2
0.90%	0.300	20.000	15.3	7.7	1.108	7.220	445.2	222.6
0.95%	0.300	20.000	15.8	7.9	1.087	7.360	441.9	221.0
1.00%	0.300	20.000	16.3	8.2	1.066	7.505	438.7	219.3
1.05%	0.300	20.000	16.6	8.3	1.056	7.578	436.6	218.3
1.10%	0.300	20.000	17.0	8.5	1.045	7.653	434.5	217.3
1.15%	0.300	20.000	17.3	8.6	1.035	7.729	432.4	216.2
1.20%	0.300	20.000	17.6	8.8	1.025	7.806	430.3	215.2
1.25%	0.300	20.000	18.0	9.0	1.015	7.886	428.2	214.1
1.30%	0.300	20.000	18.3	9.1	1.004	7.967	426.1	213.1
1.35%	0.300	20.000	18.6	9.3	0.994	8.049	424.0	212.0
1.40%	0.300	20.000	19.0	9.5	0.984	8.133	421.9	211.0
1.45%	0.300	20.000	19.3	9.6	0.973	8.219	419.9	209.9
1.50%	0.300	20.000	19.6	9.8	0.963	8.307	417.8	208.9
1.55%	0.300	20.000	19.9	10.0	0.956	8.365	416.1	208.1
1.60%	0.300	20.000	20.2	10.1	0.950	8.423	414.5	207.2
1.65%	0.300	20.000	20.5	10.3	0.943	8.482	412.8	206.4
1.70%	0.300	20.000	20.8	10.4	0.937	8.542	411.2	205.6
1.75%	0.300	20.000	21.2	10.6	0.930	8.602	409.5	204.8
1.80%	0.300	20.000	21.5	10.7	0.923	8.664	407.9	203.9
1.85%	0.300	20.000	21.8	10.9	0.917	8.726	406.2	203.1
1.90%	0.300	20.000	22.1	11.0	0.910	8.789	404.6	202.3
1.95%	0.300	20.000	22.4	11.2	0.904	8.853	402.9	201.5
2.00%	0.300	20.000	22.7	11.3	0.897	8.919	401.3	200.6
2.05%	0.300	20.000	22.9	11.5	0.892	8.967	399.8	199.9
2.10%	0.300	20.000	23.2	11.6	0.887	9.015	398.4	199.2
2.15%	0.300	20.000	23.5	11.7	0.883	9.064	397.0	198.5
2.20%	0.300	20.000	23.7	11.9	0.878	9.114	395.5	197.8
2.25%	0.300	20.000	24.0	12.0	0.873	9.164	394.1	197.0
2.30%	0.300	20.000	24.3	12.1	0.868	9.214	392.7	196.3
2.35%	0.300	20.000	24.5	12.3	0.863	9.266	391.2	195.6
2.40%	0.300	20.000	24.8	12.4	0.859	9.317	389.8	194.9
2.45%	0.300	20.000	25.1	12.5	0.854	9.370	388.3	194.2

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

80' ROW WITH 12' CENTER TURNING LANE

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
2.50%	0.300	20.000	25.4	12.7	0.849	9.423	386.9	193.5
2.55%	0.300	20.000	25.6	12.8	0.846	9.462	385.9	193.0
2.60%	0.300	20.000	25.8	12.9	0.842	9.501	384.9	192.5
2.65%	0.300	20.000	26.1	13.0	0.839	9.541	383.9	192.0
2.70%	0.300	20.000	26.3	13.2	0.835	9.581	383.0	191.5
2.75%	0.300	20.000	26.6	13.3	0.832	9.621	382.0	191.0
2.80%	0.300	20.000	27.5	13.8	0.818	9.786	378.0	189.0
2.85%	0.300	20.000	27.0	13.5	0.825	9.703	380.0	190.0
2.90%	0.300	20.000	27.3	13.6	0.821	9.744	379.0	189.5
2.95%	0.300	20.000	27.5	13.8	0.818	9.786	378.0	189.0
3.00%	0.300	20.000	27.8	13.9	0.814	9.828	377.0	188.5
3.05%	0.300	20.000	28.0	14.0	0.811	9.863	376.0	188.0
3.10%	0.300	20.000	28.2	14.1	0.808	9.899	375.1	187.5
3.15%	0.300	20.000	28.4	14.2	0.805	9.934	374.1	187.0
3.20%	0.300	20.000	28.7	14.3	0.802	9.970	373.1	186.5
3.25%	0.300	20.000	28.9	14.4	0.800	10.006	372.1	186.1
3.30%	0.300	20.000	29.1	14.6	0.797	10.043	371.1	185.6
3.35%	0.300	20.000	29.3	14.7	0.794	10.079	370.1	185.1
3.40%	0.300	20.000	29.5	14.8	0.791	10.116	369.2	184.6
3.45%	0.300	20.000	29.8	14.9	0.788	10.154	368.2	184.1
3.50%	0.300	20.000	30.0	15.0	0.785	10.191	367.2	183.6
3.55%	0.300	20.000	30.2	15.1	0.783	10.222	366.3	183.2
3.60%	0.300	20.000	30.4	15.2	0.780	10.254	365.4	182.7
3.65%	0.300	20.000	30.6	15.3	0.778	10.285	364.6	182.3
3.70%	0.300	20.000	30.8	15.4	0.775	10.317	363.7	181.8
3.75%	0.300	20.000	31.0	15.5	0.773	10.349	362.8	181.4
3.80%	0.300	20.000	31.2	15.6	0.771	10.382	361.9	181.0
3.85%	0.300	20.000	31.4	15.7	0.768	10.414	361.0	180.5
3.90%	0.300	20.000	31.6	15.8	0.766	10.447	360.1	180.1
3.95%	0.300	20.000	31.9	15.9	0.763	10.479	359.3	179.6
4.00%	0.300	20.000	32.1	16.0	0.761	10.512	358.4	179.2
4.05%	0.300	20.000	32.3	16.1	0.759	10.540	357.6	178.8
4.10%	0.300	20.000	32.5	16.2	0.757	10.568	356.9	178.4
4.15%	0.300	20.000	32.6	16.3	0.755	10.596	356.1	178.1
4.20%	0.300	20.000	32.8	16.4	0.753	10.624	355.4	177.7
4.25%	0.300	20.000	33.0	16.5	0.751	10.652	354.7	177.3
4.30%	0.300	20.000	33.2	16.6	0.749	10.681	353.9	177.0
4.35%	0.300	20.000	33.4	16.7	0.747	10.710	353.2	176.6
4.40%	0.300	20.000	33.6	16.8	0.745	10.738	352.4	176.2
4.45%	0.300	20.000	33.8	16.9	0.743	10.767	351.7	175.8

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

80' ROW WITH 12' CENTER TURNING LANE

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
4.50%	0.300	20.000	34.0	17.0	0.741	10.796	351.0	175.5
4.55%	0.300	20.000	34.2	17.1	0.739	10.823	350.2	175.1
4.60%	0.300	20.000	34.4	17.2	0.737	10.849	349.4	174.7
4.65%	0.300	20.000	34.6	17.3	0.736	10.875	348.6	174.3
4.70%	0.300	20.000	34.7	17.4	0.734	10.902	347.8	173.9
4.75%	0.300	20.000	34.9	17.5	0.732	10.929	347.0	173.5
4.80%	0.300	20.000	35.1	17.6	0.730	10.956	346.2	173.1
4.85%	0.300	20.000	35.3	17.6	0.728	10.983	345.5	172.7
4.90%	0.300	20.000	35.5	17.7	0.727	11.010	344.7	172.3
4.95%	0.300	20.000	35.7	17.8	0.725	11.038	343.9	171.9
5.00%	0.300	20.000	35.9	17.9	0.723	11.065	343.1	171.6
5.05%	0.300	20.000	36.0	18.0	0.722	11.088	342.5	171.3
5.10%	0.300	20.000	36.2	18.1	0.720	11.111	341.9	171.0
5.15%	0.300	20.000	36.4	18.2	0.719	11.134	341.3	170.7
5.20%	0.300	20.000	36.6	18.3	0.717	11.158	340.7	170.4
5.25%	0.300	20.000	36.7	18.4	0.716	11.181	340.1	170.1
5.30%	0.300	20.000	36.9	18.5	0.714	11.204	339.5	169.8
5.35%	0.300	20.000	37.1	18.5	0.713	11.228	338.9	169.5
5.40%	0.300	20.000	37.3	18.6	0.711	11.252	338.3	169.2
5.45%	0.300	20.000	37.4	18.7	0.710	11.276	337.7	168.9
5.50%	0.300	20.000	37.6	18.8	0.708	11.299	337.1	168.6
5.55%	0.300	20.000	37.8	18.9	0.707	11.322	336.4	168.2
5.60%	0.300	20.000	37.9	19.0	0.705	11.344	335.8	167.9
5.65%	0.300	20.000	38.1	19.1	0.704	11.367	335.1	167.5
5.70%	0.300	20.000	38.3	19.1	0.702	11.390	334.4	167.2
5.75%	0.300	20.000	38.4	19.2	0.701	11.412	333.7	166.9
5.80%	0.300	20.000	38.6	19.3	0.700	11.435	333.1	166.5
5.85%	0.300	20.000	38.8	19.4	0.698	11.458	332.4	166.2
5.90%	0.300	20.000	38.9	19.5	0.697	11.481	331.7	165.9
5.95%	0.300	20.000	39.1	19.6	0.695	11.504	331.0	165.5
6.00%	0.300	20.000	39.3	19.6	0.694	11.527	330.4	165.2

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

80' ROW WITH 16' TRAIL

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
0.40%	0.280	21.429	6.6	3.3	1.467	5.453	495.2	247.6
0.50%	0.280	21.429	7.3	3.7	1.380	5.797	485.6	242.8
0.55%	0.280	21.429	7.6	3.8	1.357	5.896	482.5	241.3
0.60%	0.280	21.429	7.9	4.0	1.334	5.999	479.5	239.7
0.65%	0.280	21.429	8.2	4.1	1.310	6.105	476.4	238.2
0.70%	0.280	21.429	8.5	4.3	1.287	6.215	473.3	236.6
0.75%	0.280	21.429	8.9	4.4	1.264	6.329	470.2	235.1
0.80%	0.280	21.429	9.2	4.6	1.241	6.447	467.1	233.5
0.85%	0.280	21.429	9.5	4.7	1.218	6.570	464.0	232.0
0.90%	0.280	21.429	9.8	4.9	1.194	6.698	460.9	230.4
0.95%	0.280	21.429	10.1	5.0	1.171	6.831	457.8	228.9
1.00%	0.280	21.429	10.4	5.2	1.148	6.969	454.7	227.4
1.05%	0.280	21.429	10.6	5.3	1.137	7.039	452.7	226.3
1.10%	0.280	21.429	10.8	5.4	1.125	7.110	450.6	225.3
1.15%	0.280	21.429	11.1	5.5	1.114	7.183	448.6	224.3
1.20%	0.280	21.429	11.3	5.7	1.102	7.257	446.5	223.3
1.25%	0.280	21.429	11.5	5.8	1.091	7.333	444.5	222.3
1.30%	0.280	21.429	11.8	5.9	1.080	7.410	442.5	221.2
1.35%	0.280	21.429	12.0	6.0	1.068	7.489	440.4	220.2
1.40%	0.280	21.429	12.2	6.1	1.057	7.570	438.4	219.2
1.45%	0.280	21.429	12.5	6.2	1.045	7.653	436.3	218.2
1.50%	0.280	21.429	12.7	6.4	1.034	7.737	434.3	217.2
1.55%	0.280	21.429	12.9	6.4	1.027	7.792	432.7	216.3
1.60%	0.280	21.429	13.1	6.5	1.019	7.848	431.1	215.5
1.65%	0.280	21.429	13.3	6.6	1.012	7.904	429.5	214.7
1.70%	0.280	21.429	13.5	6.7	1.005	7.962	427.9	213.9
1.75%	0.280	21.429	13.7	6.8	0.998	8.020	426.3	213.1
1.80%	0.280	21.429	13.8	6.9	0.990	8.079	424.7	212.3
1.85%	0.280	21.429	14.0	7.0	0.983	8.139	423.0	211.5
1.90%	0.280	21.429	14.2	7.1	0.976	8.200	421.4	210.7
1.95%	0.280	21.429	14.4	7.2	0.968	8.262	419.8	209.9
2.00%	0.280	21.429	14.6	7.3	0.961	8.325	418.2	209.1
2.05%	0.280	21.429	14.8	7.4	0.956	8.369	417.0	208.5
2.10%	0.280	21.429	15.0	7.5	0.951	8.414	415.9	207.9
2.15%	0.280	21.429	15.1	7.6	0.946	8.459	414.7	207.4
2.20%	0.280	21.429	15.3	7.7	0.941	8.505	413.5	206.8
2.25%	0.280	21.429	15.5	7.8	0.936	8.552	412.4	206.2
2.30%	0.280	21.429	15.7	7.8	0.930	8.598	411.2	205.6
2.35%	0.280	21.429	15.9	7.9	0.925	8.646	410.0	205.0
2.40%	0.280	21.429	16.0	8.0	0.920	8.694	408.8	204.4
2.45%	0.280	21.429	16.2	8.1	0.915	8.742	407.7	203.8

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

80' ROW WITH 16' TRAIL

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
2.50%	0.280	21.429	16.4	8.2	0.910	8.791	406.5	203.3
2.55%	0.280	21.429	16.6	8.3	0.906	8.830	405.4	202.7
2.60%	0.280	21.429	16.7	8.4	0.902	8.869	404.3	202.1
2.65%	0.280	21.429	16.9	8.4	0.898	8.909	403.2	201.6
2.70%	0.280	21.429	17.0	8.5	0.894	8.949	402.1	201.0
2.75%	0.280	21.429	17.2	8.6	0.890	8.989	401.0	200.5
2.80%	0.280	21.429	17.8	8.9	0.874	9.153	396.5	198.3
2.85%	0.280	21.429	17.5	8.7	0.882	9.070	398.7	199.4
2.90%	0.280	21.429	17.7	8.8	0.878	9.112	397.6	198.8
2.95%	0.280	21.429	17.8	8.9	0.874	9.153	396.5	198.3
3.00%	0.280	21.429	18.0	9.0	0.870	9.195	395.4	197.7
3.05%	0.280	21.429	18.1	9.1	0.867	9.229	394.4	197.2
3.10%	0.280	21.429	18.3	9.1	0.864	9.264	393.5	196.7
3.15%	0.280	21.429	18.4	9.2	0.860	9.298	392.5	196.3
3.20%	0.280	21.429	18.5	9.3	0.857	9.333	391.6	195.8
3.25%	0.280	21.429	18.7	9.3	0.854	9.368	390.6	195.3
3.30%	0.280	21.429	18.8	9.4	0.851	9.403	389.6	194.8
3.35%	0.280	21.429	19.0	9.5	0.848	9.438	388.7	194.3
3.40%	0.280	21.429	19.1	9.6	0.844	9.474	387.7	193.9
3.45%	0.280	21.429	19.3	9.6	0.841	9.510	386.8	193.4
3.50%	0.280	21.429	19.4	9.7	0.838	9.547	385.8	192.9
3.55%	0.280	21.429	19.5	9.8	0.835	9.576	385.0	192.5
3.60%	0.280	21.429	19.7	9.8	0.833	9.606	384.2	192.1
3.65%	0.280	21.429	19.8	9.9	0.830	9.636	383.4	191.7
3.70%	0.280	21.429	19.9	10.0	0.828	9.667	382.6	191.3
3.75%	0.280	21.429	20.1	10.0	0.825	9.697	381.8	190.9
3.80%	0.280	21.429	20.2	10.1	0.822	9.728	381.1	190.5
3.85%	0.280	21.429	20.3	10.2	0.820	9.758	380.3	190.1
3.90%	0.280	21.429	20.5	10.2	0.817	9.790	379.5	189.7
3.95%	0.280	21.429	20.6	10.3	0.815	9.821	378.7	189.3
4.00%	0.280	21.429	20.8	10.4	0.812	9.852	377.9	188.9
4.05%	0.280	21.429	20.9	10.4	0.810	9.880	377.0	188.5
4.10%	0.280	21.429	21.0	10.5	0.807	9.908	376.2	188.1
4.15%	0.280	21.429	21.1	10.6	0.805	9.937	375.4	187.7
4.20%	0.280	21.429	21.3	10.6	0.803	9.965	374.5	187.3
4.25%	0.280	21.429	21.4	10.7	0.801	9.994	373.7	186.8
4.30%	0.280	21.429	21.5	10.8	0.798	10.023	372.8	186.4
4.35%	0.280	21.429	21.6	10.8	0.796	10.052	372.0	186.0
4.40%	0.280	21.429	21.8	10.9	0.794	10.081	371.1	185.6
4.45%	0.280	21.429	21.9	10.9	0.791	10.110	370.3	185.1

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

80' ROW WITH 16' TRAIL

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
4.50%	0.280	21.429	22.0	11.0	0.789	10.139	369.5	184.7
4.55%	0.280	21.429	22.1	11.1	0.787	10.164	368.8	184.4
4.60%	0.280	21.429	22.2	11.1	0.785	10.188	368.1	184.1
4.65%	0.280	21.429	22.4	11.2	0.783	10.213	367.5	183.7
4.70%	0.280	21.429	22.5	11.2	0.781	10.238	366.8	183.4
4.75%	0.280	21.429	22.6	11.3	0.780	10.263	366.2	183.1
4.80%	0.280	21.429	22.7	11.4	0.778	10.288	365.5	182.8
4.85%	0.280	21.429	22.8	11.4	0.776	10.313	364.9	182.4
4.90%	0.280	21.429	23.0	11.5	0.774	10.339	364.2	182.1
4.95%	0.280	21.429	23.1	11.5	0.772	10.364	363.6	181.8
5.00%	0.280	21.429	23.2	11.6	0.770	10.390	362.9	181.5
5.05%	0.280	21.429	23.3	11.7	0.768	10.411	362.4	181.2
5.10%	0.280	21.429	23.4	11.7	0.767	10.433	361.9	180.9
5.15%	0.280	21.429	23.5	11.8	0.765	10.455	361.4	180.7
5.20%	0.280	21.429	23.6	11.8	0.764	10.477	360.9	180.4
5.25%	0.280	21.429	23.8	11.9	0.762	10.499	360.4	180.2
5.30%	0.280	21.429	23.9	11.9	0.760	10.521	359.9	179.9
5.35%	0.280	21.429	24.0	12.0	0.759	10.543	359.4	179.7
5.40%	0.280	21.429	24.1	12.1	0.757	10.565	358.9	179.4
5.45%	0.280	21.429	24.2	12.1	0.756	10.588	358.3	179.2
5.50%	0.280	21.429	24.3	12.2	0.754	10.610	357.8	178.9
5.55%	0.280	21.429	24.4	12.2	0.753	10.631	357.3	178.6
5.60%	0.280	21.429	24.5	12.3	0.751	10.652	356.7	178.3
5.65%	0.280	21.429	24.7	12.3	0.750	10.674	356.1	178.0
5.70%	0.280	21.429	24.8	12.4	0.748	10.695	355.5	177.7
5.75%	0.280	21.429	24.9	12.4	0.747	10.717	354.9	177.4
5.80%	0.280	21.429	25.0	12.5	0.745	10.738	354.3	177.2
5.85%	0.280	21.429	25.1	12.5	0.744	10.760	353.7	176.9
5.90%	0.280	21.429	25.2	12.6	0.742	10.782	353.1	176.6
5.95%	0.280	21.429	25.3	12.6	0.741	10.804	352.5	176.3
6.00%	0.280	21.429	25.4	12.7	0.739	10.825	351.9	176.0

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

80' ROW, W/ 50' TRAVELWAY AND 30' OF TRAILS

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Velocity for Max vd=6 (fps)	Full Street Max Flow vd=6 (cfs)	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
0.40%	1.272	4.717	350.4	175.2	1.484	5.391	491.5	245.7
0.50%	1.199	5.004	342.3	171.2	1.397	5.727	482.3	241.1
0.55%	1.180	5.087	339.6	169.8	1.374	5.824	479.1	239.6
0.60%	1.160	5.172	337.0	168.5	1.350	5.925	476.0	238.0
0.65%	1.141	5.261	334.3	167.2	1.327	6.030	472.9	236.4
0.70%	1.121	5.352	331.7	165.8	1.303	6.138	469.7	234.9
0.75%	1.102	5.447	329.0	164.5	1.280	6.250	466.6	233.3
0.80%	1.082	5.545	326.4	163.2	1.257	6.366	463.4	231.7
0.85%	1.063	5.647	323.7	161.9	1.233	6.487	460.3	230.2
0.90%	1.043	5.753	321.1	160.5	1.210	6.613	457.2	228.6
0.95%	1.024	5.862	318.4	159.2	1.186	6.743	454.0	227.0
1.00%	1.004	5.976	315.8	157.9	1.163	6.879	450.9	225.5
1.05%	0.994	6.034	314.0	157.0	1.152	6.947	448.8	224.4
1.10%	0.985	6.093	312.3	156.1	1.140	7.018	446.8	223.4
1.15%	0.975	6.153	310.5	155.3	1.129	7.089	444.7	222.4
1.20%	0.966	6.214	308.8	154.4	1.117	7.162	442.7	221.3
1.25%	0.956	6.276	307.0	153.5	1.106	7.237	440.6	220.3
1.30%	0.946	6.340	305.3	152.6	1.094	7.313	438.5	219.3
1.35%	0.937	6.405	303.5	151.7	1.083	7.390	436.5	218.2
1.40%	0.927	6.471	301.7	150.9	1.071	7.470	434.4	217.2
1.45%	0.918	6.539	300.0	150.0	1.060	7.551	432.4	216.2
1.50%	0.908	6.608	298.2	149.1	1.048	7.634	430.3	215.2
1.55%	0.902	6.653	296.9	148.5	1.041	7.687	428.7	214.4
1.60%	0.896	6.698	295.6	147.8	1.033	7.741	427.2	213.6
1.65%	0.890	6.744	294.3	147.1	1.026	7.797	425.6	212.8
1.70%	0.884	6.790	292.9	146.5	1.019	7.852	424.0	212.0
1.75%	0.878	6.838	291.6	145.8	1.012	7.909	422.5	211.2
1.80%	0.871	6.885	290.3	145.1	1.004	7.967	420.9	210.4
1.85%	0.865	6.934	289.0	144.5	0.997	8.025	419.3	209.7
1.90%	0.859	6.983	287.6	143.8	0.990	8.084	417.7	208.9
1.95%	0.853	7.033	286.3	143.1	0.982	8.144	416.2	208.1
2.00%	0.847	7.084	285.0	142.5	0.975	8.205	414.6	207.3
2.05%	0.843	7.120	284.0	142.0	0.970	8.249	413.4	206.7
2.10%	0.838	7.156	282.9	141.5	0.965	8.294	412.1	206.1
2.15%	0.834	7.193	281.9	141.0	0.959	8.339	410.9	205.4
2.20%	0.830	7.231	280.9	140.4	0.954	8.384	409.6	204.8
2.25%	0.826	7.268	279.9	139.9	0.949	8.430	408.4	204.2
2.30%	0.821	7.306	278.9	139.4	0.944	8.476	407.1	203.6
2.35%	0.817	7.345	277.8	138.9	0.939	8.523	405.9	202.9
2.40%	0.813	7.384	276.8	138.4	0.933	8.571	404.6	202.3
2.45%	0.808	7.423	275.8	137.9	0.928	8.619	403.4	201.7

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

80' ROW, W/ 50' TRAVELWAY AND 30' OF TRAILS

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Velocity for Max vd=6 (fps)	Full Street Max Flow vd=6 (cfs)	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
2.50%	0.804	7.463	274.8	137.4	0.923	8.667	402.1	201.1
2.55%	0.801	7.493	273.9	137.0	0.919	8.705	401.0	200.5
2.60%	0.797	7.524	273.1	136.5	0.915	8.743	400.0	200.0
2.65%	0.794	7.556	272.2	136.1	0.911	8.782	398.9	199.4
2.70%	0.791	7.587	271.3	135.7	0.907	8.820	397.8	198.9
2.75%	0.788	7.619	270.4	135.2	0.903	8.859	396.7	198.4
2.80%	0.774	7.749	267.0	133.5	0.887	9.019	392.4	196.2
2.85%	0.781	7.683	268.7	134.4	0.895	8.939	394.6	197.3
2.90%	0.778	7.716	267.8	133.9	0.891	8.979	393.5	196.7
2.95%	0.774	7.749	267.0	133.5	0.887	9.019	392.4	196.2
3.00%	0.771	7.782	266.1	133.1	0.883	9.060	391.3	195.7
3.05%	0.768	7.809	265.3	132.6	0.880	9.093	390.4	195.2
3.10%	0.766	7.837	264.5	132.2	0.877	9.126	389.4	194.7
3.15%	0.763	7.865	263.7	131.8	0.873	9.160	388.5	194.3
3.20%	0.760	7.893	262.8	131.4	0.870	9.193	387.6	193.8
3.25%	0.758	7.921	262.0	131.0	0.867	9.227	386.6	193.3
3.30%	0.755	7.949	261.2	130.6	0.864	9.261	385.7	192.8
3.35%	0.752	7.978	260.4	130.2	0.861	9.296	384.8	192.4
3.40%	0.749	8.006	259.6	129.8	0.857	9.331	383.8	191.9
3.45%	0.747	8.035	258.8	129.4	0.854	9.365	382.9	191.4
3.50%	0.744	8.065	257.9	129.0	0.851	9.401	382.0	191.0
3.55%	0.742	8.088	257.3	128.6	0.848	9.431	381.1	190.5
3.60%	0.740	8.112	256.6	128.3	0.846	9.461	380.2	190.1
3.65%	0.737	8.137	255.9	127.9	0.843	9.491	379.3	189.6
3.70%	0.735	8.161	255.2	127.6	0.840	9.522	378.4	189.2
3.75%	0.733	8.186	254.5	127.3	0.838	9.552	377.5	188.7
3.80%	0.731	8.210	253.8	126.9	0.835	9.583	376.6	188.3
3.85%	0.729	8.235	253.1	126.6	0.832	9.614	375.7	187.8
3.90%	0.726	8.260	252.4	126.2	0.829	9.646	374.8	187.4
3.95%	0.724	8.285	251.8	125.9	0.827	9.677	373.9	186.9
4.00%	0.722	8.310	251.1	125.5	0.824	9.709	373.0	186.5
4.05%	0.720	8.331	250.5	125.3	0.822	9.735	372.3	186.1
4.10%	0.718	8.352	250.0	125.0	0.820	9.761	371.6	185.8
4.15%	0.717	8.373	249.4	124.7	0.817	9.787	370.9	185.4
4.20%	0.715	8.394	248.9	124.4	0.815	9.814	370.2	185.1
4.25%	0.713	8.415	248.3	124.2	0.813	9.840	369.5	184.7
4.30%	0.711	8.436	247.8	123.9	0.811	9.867	368.8	184.4
4.35%	0.709	8.458	247.2	123.6	0.809	9.894	368.1	184.1
4.40%	0.708	8.479	246.7	123.4	0.806	9.921	367.4	183.7
4.45%	0.706	8.501	246.2	123.1	0.804	9.948	366.7	183.4

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COH NEIGHBORHOOD STUDY

80' ROW, W/ 50' TRAVELWAY AND 30' OF TRAILS

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Velocity for Max vd=6 (fps)	Full Street Max Flow vd=6 (cfs)	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
4.50%	0.704	8.523	245.6	122.8	0.802	9.975	366.0	183.0
4.55%	0.702	8.542	245.1	122.5	0.800	10.000	365.2	182.6
4.60%	0.701	8.562	244.5	122.3	0.798	10.025	364.5	182.2
4.65%	0.699	8.581	244.0	122.0	0.796	10.050	363.7	181.9
4.70%	0.698	8.601	243.4	121.7	0.794	10.076	362.9	181.5
4.75%	0.696	8.621	242.9	121.4	0.792	10.101	362.2	181.1
4.80%	0.694	8.641	242.3	121.2	0.790	10.127	361.4	180.7
4.85%	0.693	8.661	241.8	120.9	0.788	10.152	360.6	180.3
4.90%	0.691	8.681	241.2	120.6	0.786	10.178	359.9	179.9
4.95%	0.690	8.701	240.7	120.3	0.784	10.204	359.1	179.5
5.00%	0.688	8.721	240.1	120.1	0.782	10.230	358.3	179.2
5.05%	0.687	8.739	239.6	119.8	0.780	10.252	357.7	178.8
5.10%	0.685	8.757	239.1	119.5	0.779	10.275	357.0	178.5
5.15%	0.684	8.774	238.6	119.3	0.777	10.297	356.4	178.2
5.20%	0.682	8.792	238.1	119.0	0.775	10.320	355.8	177.9
5.25%	0.681	8.811	237.6	118.8	0.774	10.343	355.1	177.6
5.30%	0.680	8.829	237.1	118.5	0.772	10.365	354.5	177.2
5.35%	0.678	8.847	236.6	118.3	0.770	10.388	353.9	176.9
5.40%	0.677	8.865	236.1	118.0	0.768	10.411	353.2	176.6
5.45%	0.675	8.884	235.6	117.8	0.767	10.434	352.6	176.3
5.50%	0.674	8.902	235.1	117.5	0.765	10.458	352.0	176.0
5.55%	0.673	8.918	234.6	117.3	0.764	10.478	317.8	158.9
5.60%	0.672	8.934	234.2	117.1	0.762	10.499	283.7	141.8
5.65%	0.670	8.950	233.8	116.9	0.761	10.519	249.6	124.8
5.70%	0.669	8.966	233.4	116.7	0.759	10.540	215.4	107.7
5.75%	0.668	8.982	233.0	116.5	0.758	10.561	181.3	90.7
5.80%	0.667	8.998	232.5	116.3	0.756	10.582	147.2	73.6
5.85%	0.666	9.014	232.1	116.1	0.755	10.603	113.0	56.5
5.90%	0.664	9.031	231.7	115.9	0.753	10.624	78.9	39.5
5.95%	0.663	9.047	231.3	115.6	0.752	10.645	44.8	22.4
6.00%	0.662	9.063	230.9	115.4	0.750	10.667	10.7	5.3

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

100' ROW

CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow (cfs) with 12' Dry Lane	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
0.40%	0.620	9.677	53.2	26.6	1.350	5.926	492.0	246.0
0.50%	0.620	9.677	59.4	29.7	1.330	6.015	471.0	235.5
0.55%	0.620	9.677	61.9	31.0	1.317	6.074	465.8	232.9
0.60%	0.620	9.677	64.4	32.2	1.304	6.135	460.6	230.3
0.65%	0.620	9.677	66.8	33.4	1.291	6.197	455.4	227.7
0.70%	0.620	9.677	69.3	34.6	1.278	6.260	450.2	225.1
0.75%	0.620	9.677	71.8	35.9	1.265	6.324	445.0	222.5
0.80%	0.620	9.677	74.2	37.1	1.252	6.390	439.8	219.9
0.85%	0.620	9.677	76.7	38.3	1.239	6.457	434.6	217.3
0.90%	0.620	9.677	79.1	39.6	1.226	6.525	429.4	214.7
0.95%	0.620	9.677	81.6	40.8	1.213	6.595	424.2	212.1
1.00%	0.620	9.677	84.1	42.0	1.200	6.667	419.0	209.5
1.05%	0.620	9.677	85.9	43.0	1.190	6.723	415.5	207.8
1.10%	0.620	9.677	87.8	43.9	1.180	6.780	412.0	206.0
1.15%	0.620	9.677	89.7	44.9	1.170	6.838	408.5	204.3
1.20%	0.620	9.677	91.6	45.8	1.160	6.897	405.0	202.5
1.25%	0.620	9.677	93.5	46.8	1.150	6.957	401.5	200.8
1.30%	0.620	9.677	95.4	47.7	1.140	7.018	398.0	199.0
1.35%	0.620	9.677	97.3	48.6	1.130	7.080	394.5	197.3
1.40%	0.620	9.677	99.2	49.6	1.120	7.143	391.0	195.5
1.45%	0.620	9.677	101.1	50.5	1.110	7.207	387.5	193.8
1.50%	0.620	9.677	103.0	51.5	1.100	7.273	384.0	192.0
1.55%	0.620	9.677	104.5	52.3	1.094	7.313	381.8	190.9
1.60%	0.620	9.677	106.1	53.1	1.088	7.353	379.6	189.8
1.65%	0.620	9.677	107.7	53.9	1.082	7.394	377.4	188.7
1.70%	0.620	9.677	109.3	54.7	1.076	7.435	375.2	187.6
1.75%	0.620	9.677	110.9	55.5	1.070	7.477	373.0	186.5
1.80%	0.620	9.677	112.5	56.3	1.064	7.519	370.8	185.4
1.85%	0.620	9.677	114.1	57.1	1.058	7.561	368.6	184.3
1.90%	0.620	9.677	115.7	57.8	1.052	7.605	366.4	183.2
1.95%	0.620	9.677	117.3	58.6	1.046	7.648	364.2	182.1
2.00%	0.620	9.677	118.9	59.4	1.040	7.692	362.0	181.0
2.05%	0.620	9.677	120.3	60.1	1.034	7.737	359.1	179.6
2.10%	0.620	9.677	121.7	60.8	1.028	7.782	356.2	178.1
2.15%	0.620	9.677	123.1	61.5	1.022	7.828	353.3	176.7
2.20%	0.620	9.677	124.5	62.2	1.016	7.874	350.4	175.2
2.25%	0.620	9.677	125.9	62.9	1.010	7.921	347.5	173.8
2.30%	0.620	9.677	127.3	63.6	1.004	7.968	344.6	172.3
2.35%	0.620	9.677	128.7	64.3	0.998	8.016	341.7	170.9
2.40%	0.620	9.677	130.1	65.0	0.992	8.065	338.8	169.4
2.45%	0.620	9.677	131.5	65.7	0.986	8.114	335.9	168.0

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 905 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

100' ROW

CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow (cfs) with 12' Dry Lane	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
2.50%	0.620	9.677	132.9	66.5	0.980	8.163	333.0	166.5
2.55%	0.620	9.677	134.2	67.1	0.976	8.197	330.6	165.3
2.60%	0.620	9.677	135.4	67.7	0.972	8.230	328.2	164.1
2.65%	0.620	9.677	136.7	68.4	0.968	8.264	325.8	162.9
2.70%	0.620	9.677	138.0	69.0	0.964	8.299	323.4	161.7
2.75%	0.620	9.677	139.2	69.6	0.960	8.333	321.0	160.5
2.80%	0.620	9.677	144.3	72.2	0.944	8.475	311.4	155.7
2.85%	0.620	9.677	141.8	70.9	0.952	8.403	316.2	158.1
2.90%	0.620	9.677	143.1	71.5	0.948	8.439	313.8	156.9
2.95%	0.620	9.677	144.3	72.2	0.944	8.475	311.4	155.7
3.00%	0.620	9.677	145.6	72.8	0.940	8.511	309.0	154.5
3.05%	0.620	9.677	146.8	73.4	0.936	8.547	308.1	154.1
3.10%	0.620	9.677	147.9	74.0	0.932	8.584	307.2	153.6
3.15%	0.620	9.677	149.1	74.5	0.928	8.621	306.3	153.2
3.20%	0.620	9.677	150.3	75.1	0.924	8.658	305.4	152.7
3.25%	0.620	9.677	151.4	75.7	0.920	8.696	304.5	152.3
3.30%	0.620	9.677	152.6	76.3	0.916	8.734	303.6	151.8
3.35%	0.620	9.677	153.8	76.9	0.912	8.772	302.7	151.4
3.40%	0.620	9.677	154.9	77.5	0.908	8.811	301.8	150.9
3.45%	0.620	9.677	156.1	78.0	0.904	8.850	300.9	150.5
3.50%	0.620	9.677	157.3	78.6	0.900	8.889	300.0	150.0
3.55%	0.620	9.677	158.3	79.2	0.897	8.919	298.7	149.4
3.60%	0.620	9.677	159.4	79.7	0.894	8.949	297.4	148.7
3.65%	0.620	9.677	160.5	80.3	0.891	8.979	296.1	148.1
3.70%	0.620	9.677	161.6	80.8	0.888	9.009	294.8	147.4
3.75%	0.620	9.677	162.7	81.3	0.885	9.040	293.5	146.8
3.80%	0.620	9.677	163.8	81.9	0.882	9.070	292.2	146.1
3.85%	0.620	9.677	164.9	82.4	0.879	9.101	290.9	145.5
3.90%	0.620	9.677	165.9	83.0	0.876	9.132	289.6	144.8
3.95%	0.620	9.677	167.0	83.5	0.873	9.164	288.3	144.2
4.00%	0.620	9.677	168.1	84.1	0.870	9.195	287.0	143.5
4.05%	0.620	9.677	169.1	84.6	0.866	9.238	285.4	142.7
4.10%	0.620	9.677	170.2	85.1	0.862	9.281	283.8	141.9
4.15%	0.620	9.677	171.2	85.6	0.858	9.324	282.2	141.1
4.20%	0.620	9.677	172.2	86.1	0.854	9.368	280.6	140.3
4.25%	0.620	9.677	173.2	86.6	0.850	9.412	279.0	139.5
4.30%	0.620	9.677	174.2	87.1	0.846	9.456	277.4	138.7
4.35%	0.620	9.677	175.3	87.6	0.842	9.501	275.8	137.9
4.40%	0.620	9.677	176.3	88.1	0.838	9.547	274.2	137.1
4.45%	0.620	9.677	177.3	88.6	0.834	9.592	272.6	136.3

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 905 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

100' ROW

CCRFCD STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max vd=6 (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow (cfs) with 12' Dry Lane	Half Street Max Flow vd=6 (cfs)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
4.50%	0.620	9.677	178.3	89.2	0.830	9.639	271.0	135.5
4.55%	0.620	9.677	179.3	89.6	0.828	9.662	270.2	135.1
4.60%	0.620	9.677	180.2	90.1	0.826	9.685	269.4	134.7
4.65%	0.620	9.677	181.2	90.6	0.824	9.709	268.6	134.3
4.70%	0.620	9.677	182.2	91.1	0.822	9.732	267.8	133.9
4.75%	0.620	9.677	183.1	91.6	0.820	9.756	267.0	133.5
4.80%	0.620	9.677	184.1	92.1	0.818	9.780	266.2	133.1
4.85%	0.620	9.677	185.1	92.5	0.816	9.804	265.4	132.7
4.90%	0.620	9.677	186.0	93.0	0.814	9.828	264.6	132.3
4.95%	0.620	9.677	187.0	93.5	0.812	9.852	263.8	131.9
5.00%	0.620	9.677	188.0	94.0	0.810	9.877	263.0	131.5
5.05%	0.620	9.677	188.9	94.4	0.807	9.913	262.1	131.1
5.10%	0.620	9.677	189.8	94.9	0.804	9.950	261.2	130.6
5.15%	0.620	9.677	190.7	95.4	0.801	9.988	260.3	130.2
5.20%	0.620	9.677	191.6	95.8	0.798	10.025	259.4	129.7
5.25%	0.620	9.677	192.5	96.3	0.795	10.063	258.5	129.3
5.30%	0.620	9.677	193.5	96.7	0.792	10.101	257.6	128.8
5.35%	0.620	9.677	194.4	97.2	0.789	10.139	256.7	128.4
5.40%	0.620	9.677	195.3	97.6	0.786	10.178	255.8	127.9
5.45%	0.620	9.677	196.2	98.1	0.783	10.217	254.9	127.5
5.50%	0.620	9.677	197.1	98.6	0.780	10.256	254.0	127.0
5.55%	0.619	9.687	198.0	99.0	0.778	10.283	252.9	126.5
5.60%	0.619	9.696	198.9	99.4	0.776	10.309	251.8	125.9
5.65%	0.618	9.706	199.8	99.9	0.774	10.336	250.7	125.4
5.70%	0.618	9.715	200.6	100.3	0.772	10.363	249.6	124.8
5.75%	0.617	9.724	201.5	100.8	0.770	10.390	248.5	124.3
5.80%	0.616	9.734	202.4	101.2	0.768	10.417	247.4	123.7
5.85%	0.616	9.743	203.3	101.6	0.766	10.444	246.3	123.2
5.90%	0.615	9.753	204.1	102.1	0.764	10.471	245.2	122.6
5.95%	0.615	9.762	205.0	102.5	0.762	10.499	244.1	122.1
6.00%	0.614	9.772	205.9	103.0	0.760	10.526	243.0	121.5

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 905 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

100' ROW W/MEDIAN

CCRFCD FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
0.40%	0.480	12.500	25.9	12.9	1.350	5.926	465.0	232.5
0.50%	0.480	12.500	28.9	14.5	1.330	6.015	452.0	226.0
0.55%	0.480	12.500	30.1	15.1	1.317	6.074	445.9	223.0
0.60%	0.480	12.500	31.3	15.7	1.304	6.135	439.8	219.9
0.65%	0.480	12.500	32.5	16.3	1.291	6.197	433.7	216.9
0.70%	0.480	12.500	33.7	16.9	1.278	6.260	427.6	213.8
0.75%	0.480	12.500	34.9	17.5	1.265	6.324	421.5	210.8
0.80%	0.480	12.500	36.1	18.1	1.252	6.390	415.4	207.7
0.85%	0.480	12.500	37.3	18.7	1.239	6.457	409.3	204.7
0.90%	0.480	12.500	38.5	19.3	1.226	6.525	403.2	201.6
0.95%	0.480	12.500	39.7	19.9	1.213	6.595	397.1	198.6
1.00%	0.480	12.500	40.9	20.5	1.200	6.667	391.0	195.5
1.05%	0.480	12.500	41.8	20.9	1.190	6.723	388.3	194.2
1.10%	0.480	12.500	42.7	21.4	1.180	6.780	385.6	192.8
1.15%	0.480	12.500	43.7	21.8	1.170	6.838	382.9	191.5
1.20%	0.480	12.500	44.6	22.3	1.160	6.897	380.2	190.1
1.25%	0.480	12.500	45.5	22.8	1.150	6.957	377.5	188.8
1.30%	0.480	12.500	46.4	23.2	1.140	7.018	374.8	187.4
1.35%	0.480	12.500	47.3	23.7	1.130	7.080	372.1	186.1
1.40%	0.480	12.500	48.3	24.1	1.120	7.143	369.4	184.7
1.45%	0.480	12.500	49.2	24.6	1.110	7.207	366.7	183.4
1.50%	0.480	12.500	50.1	25.1	1.100	7.273	364.0	182.0
1.55%	0.480	12.500	50.9	25.4	1.095	7.306	361.2	180.6
1.60%	0.480	12.500	51.7	25.8	1.090	7.339	358.4	179.2
1.65%	0.480	12.500	52.4	26.2	1.085	7.373	355.6	177.8
1.70%	0.480	12.500	53.2	26.6	1.080	7.407	352.8	176.4
1.75%	0.480	12.500	54.0	27.0	1.075	7.442	350.0	175.0
1.80%	0.480	12.500	54.8	27.4	1.070	7.477	347.2	173.6
1.85%	0.480	12.500	55.5	27.8	1.065	7.512	344.4	172.2
1.90%	0.480	12.500	56.3	28.2	1.060	7.547	341.6	170.8
1.95%	0.480	12.500	57.1	28.5	1.055	7.583	338.8	169.4
2.00%	0.480	12.500	57.9	28.9	1.050	7.619	336.0	168.0
2.05%	0.480	12.500	58.5	29.3	1.040	7.692	334.9	167.5
2.10%	0.480	12.500	59.2	29.6	1.030	7.767	333.8	166.9
2.15%	0.480	12.500	59.9	29.9	1.020	7.843	332.7	166.4
2.20%	0.480	12.500	60.6	30.3	1.010	7.921	331.6	165.8
2.25%	0.480	12.500	61.3	30.6	1.000	8.000	330.5	165.3
2.30%	0.480	12.500	61.9	31.0	0.990	8.081	329.4	164.7
2.35%	0.480	12.500	62.6	31.3	0.980	8.163	328.3	164.2
2.40%	0.480	12.500	63.3	31.7	0.970	8.247	327.2	163.6
2.45%	0.480	12.500	64.0	32.0	0.960	8.333	326.1	163.1

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 906 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

100' ROW W/MEDIAN

CCRFCD FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
2.50%	0.480	12.500	64.7	32.3	0.950	8.421	325.0	162.5
2.55%	0.480	12.500	65.3	32.6	0.946	8.457	323.0	161.5
2.60%	0.480	12.500	65.9	33.0	0.942	8.493	321.0	160.5
2.65%	0.480	12.500	66.5	33.3	0.938	8.529	319.0	159.5
2.70%	0.480	12.500	67.1	33.6	0.934	8.565	317.0	158.5
2.75%	0.480	12.500	67.8	33.9	0.930	8.602	315.0	157.5
2.80%	0.480	12.500	70.2	35.1	0.914	8.753	307.0	153.5
2.85%	0.480	12.500	69.0	34.5	0.922	8.677	311.0	155.5
2.90%	0.480	12.500	69.6	34.8	0.918	8.715	309.0	154.5
2.95%	0.480	12.500	70.2	35.1	0.914	8.753	307.0	153.5
3.00%	0.480	12.500	70.9	35.4	0.910	8.791	305.0	152.5
3.05%	0.480	12.500	71.4	35.7	0.905	8.840	304.7	152.4
3.10%	0.480	12.500	72.0	36.0	0.900	8.889	304.4	152.2
3.15%	0.480	12.500	72.5	36.3	0.895	8.939	304.1	152.1
3.20%	0.480	12.500	73.1	36.6	0.890	8.989	303.8	151.9
3.25%	0.480	12.500	73.7	36.8	0.885	9.040	303.5	151.8
3.30%	0.480	12.500	74.2	37.1	0.880	9.091	303.2	151.6
3.35%	0.480	12.500	74.8	37.4	0.875	9.143	302.9	151.5
3.40%	0.480	12.500	75.4	37.7	0.870	9.195	302.6	151.3
3.45%	0.480	12.500	75.9	38.0	0.865	9.249	302.3	151.2
3.50%	0.480	12.500	76.5	38.3	0.860	9.302	302.0	151.0
3.55%	0.480	12.500	77.0	38.5	0.857	9.335	300.5	150.3
3.60%	0.480	12.500	77.6	38.8	0.854	9.368	299.0	149.5
3.65%	0.480	12.500	78.1	39.0	0.851	9.401	297.5	148.8
3.70%	0.480	12.500	78.6	39.3	0.848	9.434	296.0	148.0
3.75%	0.480	12.500	79.2	39.6	0.845	9.467	294.5	147.3
3.80%	0.480	12.500	79.7	39.8	0.842	9.501	293.0	146.5
3.85%	0.480	12.500	80.2	40.1	0.839	9.535	291.5	145.8
3.90%	0.480	12.500	80.7	40.4	0.836	9.569	290.0	145.0
3.95%	0.480	12.500	81.3	40.6	0.833	9.604	288.5	144.3
4.00%	0.480	12.500	81.8	40.9	0.830	9.639	287.0	143.5
4.05%	0.480	12.500	82.3	41.2	0.828	9.662	285.4	142.7
4.10%	0.480	12.500	82.8	41.4	0.826	9.685	283.8	141.9
4.15%	0.480	12.500	83.3	41.7	0.824	9.709	282.2	141.1
4.20%	0.480	12.500	83.8	41.9	0.822	9.732	280.6	140.3
4.25%	0.480	12.500	84.3	42.1	0.820	9.756	279.0	139.5
4.30%	0.480	12.500	84.8	42.4	0.818	9.780	277.4	138.7
4.35%	0.480	12.500	85.3	42.6	0.816	9.804	275.8	137.9
4.40%	0.480	12.500	85.8	42.9	0.814	9.828	274.2	137.1
4.45%	0.480	12.500	86.3	43.1	0.812	9.852	272.6	136.3

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 906 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

100' ROW W/MEDIAN

CCRFCD FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
4.50%	0.480	12.500	86.8	43.4	0.810	9.877	271.0	135.5
4.55%	0.480	12.500	87.2	43.6	0.809	9.889	270.2	135.1
4.60%	0.480	12.500	87.7	43.9	0.808	9.901	269.4	134.7
4.65%	0.480	12.500	88.2	44.1	0.807	9.913	268.6	134.3
4.70%	0.480	12.500	88.7	44.3	0.806	9.926	267.8	133.9
4.75%	0.480	12.500	89.1	44.6	0.805	9.938	267.0	133.5
4.80%	0.480	12.500	89.6	44.8	0.804	9.950	266.2	133.1
4.85%	0.480	12.500	90.1	45.0	0.803	9.963	265.4	132.7
4.90%	0.480	12.500	90.5	45.3	0.802	9.975	264.6	132.3
4.95%	0.480	12.500	91.0	45.5	0.801	9.988	263.8	131.9
5.00%	0.480	12.500	91.5	45.7	0.800	10.000	263.0	131.5
5.05%	0.480	12.500	91.9	46.0	0.799	10.019	262.1	131.1
5.10%	0.480	12.500	92.4	46.2	0.797	10.038	261.2	130.6
5.15%	0.480	12.500	92.8	46.4	0.796	10.057	260.3	130.2
5.20%	0.480	12.500	93.3	46.6	0.794	10.076	259.4	129.7
5.25%	0.480	12.500	93.7	46.9	0.793	10.095	258.5	129.3
5.30%	0.480	12.500	94.2	47.1	0.791	10.114	257.6	128.8
5.35%	0.480	12.500	94.6	47.3	0.790	10.133	256.7	128.4
5.40%	0.480	12.500	95.0	47.5	0.788	10.152	255.8	127.9
5.45%	0.480	12.500	95.5	47.7	0.787	10.172	254.9	127.5
5.50%	0.480	12.500	95.9	48.0	0.785	10.191	254.0	127.0
5.55%	0.480	12.500	96.4	48.2	0.784	10.211	252.9	126.5
5.60%	0.480	12.500	96.8	48.4	0.782	10.230	251.8	125.9
5.65%	0.480	12.500	97.2	48.6	0.781	10.250	250.7	125.4
5.70%	0.480	12.500	97.6	48.8	0.779	10.270	249.6	124.8
5.75%	0.480	12.500	98.1	49.0	0.778	10.289	248.5	124.3
5.80%	0.480	12.500	98.5	49.2	0.776	10.309	247.4	123.7
5.85%	0.480	12.500	98.9	49.5	0.775	10.329	246.3	123.2
5.90%	0.480	12.500	99.3	49.7	0.773	10.349	245.2	122.6
5.95%	0.480	12.500	99.8	49.9	0.772	10.369	244.1	122.1
6.00%	0.480	12.500	100.2	50.1	0.770	10.390	243.0	121.5

THE HALF STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE FROM FIGURE 906 OF THE HCCDM
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

110' ROW WITH 2 X 9' TRAILS

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
0.40%	0.300	20.000	7.4	3.7	1.528	5.236	616.3	308.1
0.50%	0.300	20.000	8.3	4.1	1.445	5.536	603.2	301.6
0.55%	0.300	20.000	8.6	4.3	1.422	5.626	597.9	298.9
0.60%	0.300	20.000	8.9	4.5	1.399	5.719	592.5	296.3
0.65%	0.300	20.000	9.3	4.6	1.376	5.815	587.1	293.6
0.70%	0.300	20.000	9.6	4.8	1.353	5.915	581.8	290.9
0.75%	0.300	20.000	10.0	5.0	1.330	6.017	576.4	288.2
0.80%	0.300	20.000	10.3	5.2	1.306	6.124	571.1	285.5
0.85%	0.300	20.000	10.6	5.3	1.283	6.234	565.7	282.8
0.90%	0.300	20.000	11.0	5.5	1.260	6.348	560.3	280.2
0.95%	0.300	20.000	11.3	5.7	1.237	6.467	555.0	277.5
1.00%	0.300	20.000	11.7	5.8	1.214	6.590	549.6	274.8
1.05%	0.300	20.000	11.9	6.0	1.203	6.652	546.2	273.1
1.10%	0.300	20.000	12.2	6.1	1.191	6.715	542.7	271.4
1.15%	0.300	20.000	12.5	6.2	1.180	6.779	539.3	269.7
1.20%	0.300	20.000	12.7	6.4	1.169	6.845	535.9	267.9
1.25%	0.300	20.000	13.0	6.5	1.158	6.911	532.4	266.2
1.30%	0.300	20.000	13.2	6.6	1.146	6.980	529.0	264.5
1.35%	0.300	20.000	13.5	6.8	1.135	7.049	525.6	262.8
1.40%	0.300	20.000	13.8	6.9	1.124	7.120	522.1	261.1
1.45%	0.300	20.000	14.0	7.0	1.112	7.192	518.7	259.4
1.50%	0.300	20.000	14.3	7.1	1.101	7.266	515.3	257.6
1.55%	0.300	20.000	14.5	7.3	1.088	7.354	511.2	255.6
1.60%	0.300	20.000	14.7	7.4	1.075	7.443	507.1	253.6
1.65%	0.300	20.000	15.0	7.5	1.062	7.535	503.1	251.5
1.70%	0.300	20.000	15.2	7.6	1.049	7.629	499.0	249.5
1.75%	0.300	20.000	15.4	7.7	1.036	7.726	494.9	247.5
1.80%	0.300	20.000	15.6	7.8	1.022	7.825	490.9	245.4
1.85%	0.300	20.000	15.8	7.9	1.009	7.926	486.8	243.4
1.90%	0.300	20.000	16.1	8.0	0.996	8.031	482.7	241.4
1.95%	0.300	20.000	16.3	8.1	0.983	8.138	478.7	239.3
2.00%	0.300	20.000	16.5	8.3	0.970	8.247	474.6	237.3
2.05%	0.300	20.000	16.7	8.3	0.965	8.291	473.0	236.5
2.10%	0.300	20.000	16.9	8.4	0.960	8.335	471.4	235.7
2.15%	0.300	20.000	17.1	8.5	0.955	8.380	469.7	234.9
2.20%	0.300	20.000	17.3	8.6	0.950	8.425	468.1	234.1
2.25%	0.300	20.000	17.5	8.7	0.945	8.470	466.5	233.2
2.30%	0.300	20.000	17.7	8.8	0.939	8.516	464.9	232.4
2.35%	0.300	20.000	17.9	8.9	0.934	8.563	463.3	231.6
2.40%	0.300	20.000	18.1	9.0	0.929	8.610	461.6	230.8
2.45%	0.300	20.000	18.3	9.1	0.924	8.657	460.0	230.0

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

110' ROW WITH 2 X 9' TRAILS

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
2.50%	0.300	20.000	18.5	9.2	0.919	8.705	458.4	229.2
2.55%	0.300	20.000	18.6	9.3	0.915	8.742	457.0	228.5
2.60%	0.300	20.000	18.8	9.4	0.911	8.780	455.7	227.8
2.65%	0.300	20.000	19.0	9.5	0.907	8.817	454.3	227.1
2.70%	0.300	20.000	19.2	9.6	0.903	8.855	452.9	226.5
2.75%	0.300	20.000	19.3	9.7	0.900	8.894	451.6	225.8
2.80%	0.300	20.000	20.0	10.0	0.884	9.051	446.1	223.0
2.85%	0.300	20.000	19.7	9.8	0.892	8.972	448.8	224.4
2.90%	0.300	20.000	19.9	9.9	0.888	9.011	447.4	223.7
2.95%	0.300	20.000	20.0	10.0	0.884	9.051	446.1	223.0
3.00%	0.300	20.000	20.2	10.1	0.880	9.091	444.7	222.4
3.05%	0.300	20.000	20.4	10.2	0.877	9.123	443.5	221.8
3.10%	0.300	20.000	20.5	10.3	0.874	9.155	442.4	221.2
3.15%	0.300	20.000	20.7	10.3	0.871	9.188	441.2	220.6
3.20%	0.300	20.000	20.9	10.4	0.868	9.221	440.1	220.0
3.25%	0.300	20.000	21.0	10.5	0.865	9.254	438.9	219.5
3.30%	0.300	20.000	21.2	10.6	0.861	9.287	437.8	218.9
3.35%	0.300	20.000	21.3	10.7	0.858	9.321	436.6	218.3
3.40%	0.300	20.000	21.5	10.8	0.855	9.355	435.4	217.7
3.45%	0.300	20.000	21.7	10.8	0.852	9.389	434.3	217.1
3.50%	0.300	20.000	21.8	10.9	0.849	9.423	433.1	216.6
3.55%	0.300	20.000	22.0	11.0	0.846	9.452	432.0	216.0
3.60%	0.300	20.000	22.1	11.1	0.844	9.481	431.0	215.5
3.65%	0.300	20.000	22.3	11.1	0.841	9.510	429.9	214.9
3.70%	0.300	20.000	22.4	11.2	0.839	9.540	428.8	214.4
3.75%	0.300	20.000	22.6	11.3	0.836	9.569	427.7	213.9
3.80%	0.300	20.000	22.7	11.4	0.833	9.599	426.6	213.3
3.85%	0.300	20.000	22.9	11.4	0.831	9.629	425.5	212.8
3.90%	0.300	20.000	23.0	11.5	0.828	9.660	424.5	212.2
3.95%	0.300	20.000	23.2	11.6	0.826	9.690	423.4	211.7
4.00%	0.300	20.000	23.3	11.7	0.823	9.721	422.3	211.2
4.05%	0.300	20.000	23.5	11.7	0.821	9.745	421.3	210.7
4.10%	0.300	20.000	23.6	11.8	0.819	9.770	420.3	210.2
4.15%	0.300	20.000	23.8	11.9	0.817	9.796	419.4	209.7
4.20%	0.300	20.000	23.9	12.0	0.815	9.821	418.4	209.2
4.25%	0.300	20.000	24.0	12.0	0.813	9.846	417.4	208.7
4.30%	0.300	20.000	24.2	12.1	0.810	9.872	416.4	208.2
4.35%	0.300	20.000	24.3	12.2	0.808	9.897	415.5	207.7
4.40%	0.300	20.000	24.5	12.2	0.806	9.923	414.5	207.2
4.45%	0.300	20.000	24.6	12.3	0.804	9.949	413.5	206.7

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

110' ROW WITH 2 X 9' TRAILS

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
4.50%	0.300	20.000	24.8	12.4	0.802	9.975	412.5	206.3
4.55%	0.300	20.000	25.9	12.9	0.800	10.000	411.6	205.8
4.60%	0.300	20.000	27.0	13.5	0.798	10.025	410.7	205.4
4.65%	0.300	20.000	28.2	14.1	0.796	10.050	409.8	204.9
4.70%	0.300	20.000	29.3	14.6	0.794	10.076	409.0	204.5
4.75%	0.300	20.000	30.4	15.2	0.792	10.101	408.1	204.0
4.80%	0.300	20.000	31.6	15.8	0.790	10.127	407.2	203.6
4.85%	0.300	20.000	32.7	16.3	0.788	10.152	406.3	203.1
4.90%	0.300	20.000	33.8	16.9	0.786	10.178	405.4	202.7
4.95%	0.300	20.000	35.0	17.5	0.784	10.204	404.5	202.2
5.00%	0.300	20.000	36.1	18.0	0.782	10.230	403.6	201.8
5.05%	0.300	20.000	35.2	17.6	0.780	10.251	402.9	201.4
5.10%	0.300	20.000	34.3	17.2	0.779	10.272	402.2	201.1
5.15%	0.300	20.000	33.5	16.7	0.777	10.293	401.5	200.7
5.20%	0.300	20.000	32.6	16.3	0.776	10.315	400.7	200.4
5.25%	0.300	20.000	31.7	15.9	0.774	10.336	400.0	200.0
5.30%	0.300	20.000	30.9	15.4	0.772	10.357	399.3	199.7
5.35%	0.300	20.000	30.0	15.0	0.771	10.379	398.6	199.3
5.40%	0.300	20.000	29.1	14.6	0.769	10.400	397.9	198.9
5.45%	0.300	20.000	28.2	14.1	0.768	10.422	397.2	198.6
5.50%	0.300	20.000	27.4	13.7	0.766	10.444	396.5	198.2
5.55%	0.300	20.000	27.5	13.7	0.765	10.464	395.7	197.8
5.60%	0.300	20.000	27.6	13.8	0.763	10.485	394.9	197.4
5.65%	0.300	20.000	27.7	13.9	0.762	10.506	394.1	197.0
5.70%	0.300	20.000	27.9	13.9	0.760	10.526	393.3	196.6
5.75%	0.300	20.000	28.0	14.0	0.759	10.547	392.5	196.2
5.80%	0.300	20.000	28.1	14.0	0.757	10.568	391.7	195.8
5.85%	0.300	20.000	28.2	14.1	0.756	10.589	390.9	195.4
5.90%	0.300	20.000	28.3	14.2	0.754	10.610	390.1	195.0
5.95%	0.300	20.000	28.5	14.2	0.753	10.631	389.3	194.6
6.00%	0.300	20.000	28.6	14.3	0.751	10.652	388.5	194.2

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

100' ROW WITH 2 X 11' TRAILS

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
0.40%	0.280	21.429	6.6	3.3	1.518	5.270	567.9	283.9
0.50%	0.280	21.429	7.3	3.7	1.432	5.587	533.4	266.7
0.55%	0.280	21.429	7.6	3.8	1.409	5.678	530.7	265.3
0.60%	0.280	21.429	7.9	4.0	1.386	5.772	527.9	264.0
0.65%	0.280	21.429	8.2	4.1	1.363	5.869	525.2	262.6
0.70%	0.280	21.429	8.5	4.3	1.340	5.970	522.5	261.2
0.75%	0.280	21.429	8.9	4.4	1.317	6.074	519.7	259.9
0.80%	0.280	21.429	9.2	4.6	1.294	6.182	517.0	258.5
0.85%	0.280	21.429	9.5	4.7	1.271	6.294	514.2	257.1
0.90%	0.280	21.429	9.8	4.9	1.248	6.410	511.5	255.7
0.95%	0.280	21.429	10.1	5.0	1.225	6.531	508.7	254.4
1.00%	0.280	21.429	10.4	5.2	1.202	6.656	506.0	253.0
1.05%	0.280	21.429	10.6	5.3	1.191	6.718	503.0	251.5
1.10%	0.280	21.429	10.8	5.4	1.180	6.782	500.0	250.0
1.15%	0.280	21.429	11.1	5.5	1.168	6.847	497.0	248.5
1.20%	0.280	21.429	11.3	5.7	1.157	6.913	494.0	247.0
1.25%	0.280	21.429	11.5	5.8	1.146	6.981	491.0	245.5
1.30%	0.280	21.429	11.8	5.9	1.135	7.050	488.0	244.0
1.35%	0.280	21.429	12.0	6.0	1.124	7.120	485.0	242.5
1.40%	0.280	21.429	12.2	6.1	1.112	7.192	482.0	241.0
1.45%	0.280	21.429	12.5	6.2	1.101	7.265	479.0	239.5
1.50%	0.280	21.429	12.7	6.4	1.090	7.339	476.0	238.0
1.55%	0.280	21.429	12.9	6.4	1.076	7.432	472.0	236.0
1.60%	0.280	21.429	13.1	6.5	1.063	7.527	467.9	234.0
1.65%	0.280	21.429	13.3	6.6	1.049	7.625	463.9	231.9
1.70%	0.280	21.429	13.5	6.7	1.036	7.725	459.9	229.9
1.75%	0.280	21.429	13.7	6.8	1.022	7.828	455.8	227.9
1.80%	0.280	21.429	13.8	6.9	1.008	7.933	451.8	225.9
1.85%	0.280	21.429	14.0	7.0	0.995	8.042	447.7	223.9
1.90%	0.280	21.429	14.2	7.1	0.981	8.153	443.7	221.8
1.95%	0.280	21.429	14.4	7.2	0.968	8.268	439.6	219.8
2.00%	0.280	21.429	14.6	7.3	0.954	8.386	435.6	217.8
2.05%	0.280	21.429	14.8	7.4	0.949	8.431	434.2	217.1
2.10%	0.280	21.429	15.0	7.5	0.944	8.476	432.7	216.4
2.15%	0.280	21.429	15.1	7.6	0.939	8.522	431.3	215.6
2.20%	0.280	21.429	15.3	7.7	0.934	8.569	429.9	214.9
2.25%	0.280	21.429	15.5	7.8	0.929	8.616	428.4	214.2
2.30%	0.280	21.429	15.7	7.8	0.923	8.664	427.0	213.5
2.35%	0.280	21.429	15.9	7.9	0.918	8.712	425.6	212.8
2.40%	0.280	21.429	16.0	8.0	0.913	8.760	424.1	212.1
2.45%	0.280	21.429	16.2	8.1	0.908	8.810	422.7	211.4

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

100' ROW WITH 2 X 11' TRAILS

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
2.50%	0.280	21.429	16.4	8.2	0.903	8.859	421.3	210.6
2.55%	0.280	21.429	16.6	8.3	0.899	8.898	420.1	210.0
2.60%	0.280	21.429	16.7	8.4	0.895	8.937	418.9	209.4
2.65%	0.280	21.429	16.9	8.4	0.891	8.976	417.6	208.8
2.70%	0.280	21.429	17.0	8.5	0.887	9.015	416.4	208.2
2.75%	0.280	21.429	17.2	8.6	0.884	9.055	415.2	207.6
2.80%	0.280	21.429	17.8	8.9	0.868	9.218	410.4	205.2
2.85%	0.280	21.429	17.5	8.7	0.876	9.136	412.8	206.4
2.90%	0.280	21.429	17.7	8.8	0.872	9.176	411.6	205.8
2.95%	0.280	21.429	17.8	8.9	0.868	9.218	410.4	205.2
3.00%	0.280	21.429	18.0	9.0	0.864	9.259	409.2	204.6
3.05%	0.280	21.429	18.1	9.1	0.861	9.293	408.1	204.1
3.10%	0.280	21.429	18.3	9.1	0.858	9.326	407.1	203.6
3.15%	0.280	21.429	18.4	9.2	0.855	9.360	406.1	203.0
3.20%	0.280	21.429	18.5	9.3	0.852	9.394	405.1	202.5
3.25%	0.280	21.429	18.7	9.3	0.849	9.428	404.0	202.0
3.30%	0.280	21.429	18.8	9.4	0.845	9.463	403.0	201.5
3.35%	0.280	21.429	19.0	9.5	0.842	9.498	402.0	201.0
3.40%	0.280	21.429	19.1	9.6	0.839	9.533	401.0	200.5
3.45%	0.280	21.429	19.3	9.6	0.836	9.568	399.9	200.0
3.50%	0.280	21.429	19.4	9.7	0.833	9.604	398.9	199.5
3.55%	0.280	21.429	19.5	9.8	0.830	9.634	398.0	199.0
3.60%	0.280	21.429	19.7	9.8	0.828	9.664	397.0	198.5
3.65%	0.280	21.429	19.8	9.9	0.825	9.695	396.0	198.0
3.70%	0.280	21.429	19.9	10.0	0.823	9.725	395.1	197.5
3.75%	0.280	21.429	20.1	10.0	0.820	9.756	394.1	197.1
3.80%	0.280	21.429	20.2	10.1	0.817	9.787	393.1	196.6
3.85%	0.280	21.429	20.3	10.2	0.815	9.818	392.2	196.1
3.90%	0.280	21.429	20.5	10.2	0.812	9.850	391.2	195.6
3.95%	0.280	21.429	20.6	10.3	0.810	9.881	390.3	195.1
4.00%	0.280	21.429	20.8	10.4	0.807	9.913	389.3	194.6
4.05%	0.280	21.429	20.9	10.4	0.805	9.940	388.4	194.2
4.10%	0.280	21.429	21.0	10.5	0.803	9.968	387.6	193.8
4.15%	0.280	21.429	21.1	10.6	0.800	9.995	386.7	193.3
4.20%	0.280	21.429	21.3	10.6	0.798	10.023	385.8	192.9
4.25%	0.280	21.429	21.4	10.7	0.796	10.050	385.0	192.5
4.30%	0.280	21.429	21.5	10.8	0.794	10.078	384.1	192.0
4.35%	0.280	21.429	21.6	10.8	0.792	10.106	383.2	191.6
4.40%	0.280	21.429	21.8	10.9	0.789	10.134	382.4	191.2
4.45%	0.280	21.429	21.9	10.9	0.787	10.163	381.5	190.7

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

100' ROW WITH 2 X 11' TRAILS

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
4.50%	0.280	21.429	22.0	11.0	0.785	10.191	380.6	190.3
4.55%	0.280	21.429	22.1	11.1	0.783	10.216	379.8	189.9
4.60%	0.280	21.429	22.2	11.1	0.781	10.241	379.0	189.5
4.65%	0.280	21.429	22.4	11.2	0.779	10.266	378.3	189.1
4.70%	0.280	21.429	22.5	11.2	0.777	10.291	377.5	188.7
4.75%	0.280	21.429	22.6	11.3	0.776	10.316	376.7	188.3
4.80%	0.280	21.429	22.7	11.4	0.774	10.341	375.9	187.9
4.85%	0.280	21.429	22.8	11.4	0.772	10.367	375.1	187.5
4.90%	0.280	21.429	23.0	11.5	0.770	10.392	374.3	187.2
4.95%	0.280	21.429	23.1	11.5	0.768	10.418	373.5	186.8
5.00%	0.280	21.429	23.2	11.6	0.766	10.444	372.7	186.4
5.05%	0.280	21.429	23.3	11.7	0.764	10.466	372.1	186.0
5.10%	0.280	21.429	23.4	11.7	0.763	10.488	371.5	185.7
5.15%	0.280	21.429	23.5	11.8	0.761	10.510	370.8	185.4
5.20%	0.280	21.429	23.6	11.8	0.760	10.532	370.2	185.1
5.25%	0.280	21.429	23.8	11.9	0.758	10.554	369.6	184.8
5.30%	0.280	21.429	23.9	11.9	0.756	10.576	368.9	184.5
5.35%	0.280	21.429	24.0	12.0	0.755	10.599	368.3	184.1
5.40%	0.280	21.429	24.1	12.1	0.753	10.621	367.7	183.8
5.45%	0.280	21.429	24.2	12.1	0.752	10.644	367.0	183.5
5.50%	0.280	21.429	24.3	12.2	0.750	10.667	366.4	183.2
5.55%	0.280	21.429	24.4	12.2	0.749	10.687	365.8	182.9
5.60%	0.280	21.429	24.5	12.3	0.747	10.707	365.3	182.6
5.65%	0.280	21.429	24.7	12.3	0.746	10.727	364.7	182.4
5.70%	0.280	21.429	24.8	12.4	0.744	10.747	364.2	182.1
5.75%	0.280	21.429	24.9	12.4	0.743	10.767	363.6	181.8
5.80%	0.280	21.429	25.0	12.5	0.742	10.787	363.1	181.5
5.85%	0.280	21.429	25.1	12.5	0.740	10.808	362.5	181.2
5.90%	0.280	21.429	25.2	12.6	0.739	10.828	361.9	181.0
5.95%	0.280	21.429	25.3	12.6	0.737	10.849	361.4	180.7
6.00%	0.280	21.429	25.4	12.7	0.736	10.870	360.8	180.4

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

100' ROW WITH 50' OF TRAVELWAY AND 50' OF TRAILS

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
0.40%	0.260	23.077	5.0	2.5	1.525	5.246	602.7	301.3
0.50%	0.260	23.077	5.6	2.8	1.436	5.571	590.8	295.4
0.55%	0.260	23.077	5.9	2.9	1.412	5.665	586.8	293.4
0.60%	0.260	23.077	6.1	3.0	1.389	5.761	582.7	291.4
0.65%	0.260	23.077	6.3	3.2	1.365	5.861	578.7	289.3
0.70%	0.260	23.077	6.6	3.3	1.341	5.965	574.6	287.3
0.75%	0.260	23.077	6.8	3.4	1.318	6.072	570.6	285.3
0.80%	0.260	23.077	7.0	3.5	1.294	6.183	566.5	283.3
0.85%	0.260	23.077	7.3	3.6	1.270	6.299	562.5	281.2
0.90%	0.260	23.077	7.5	3.7	1.246	6.418	558.4	279.2
0.95%	0.260	23.077	7.7	3.9	1.223	6.543	554.4	277.2
1.00%	0.260	23.077	8.0	4.0	1.199	6.672	550.3	275.2
1.05%	0.260	23.077	8.1	4.1	1.187	6.738	547.6	273.8
1.10%	0.260	23.077	8.3	4.2	1.176	6.805	544.9	272.5
1.15%	0.260	23.077	8.5	4.2	1.164	6.873	542.2	271.1
1.20%	0.260	23.077	8.7	4.3	1.152	6.943	539.5	269.7
1.25%	0.260	23.077	8.8	4.4	1.141	7.014	536.8	268.4
1.30%	0.260	23.077	9.0	4.5	1.129	7.087	534.0	267.0
1.35%	0.260	23.077	9.2	4.6	1.117	7.161	531.3	265.7
1.40%	0.260	23.077	9.4	4.7	1.105	7.237	528.6	264.3
1.45%	0.260	23.077	9.6	4.8	1.094	7.315	525.9	262.9
1.50%	0.260	23.077	9.7	4.9	1.082	7.394	523.2	261.6
1.55%	0.260	23.077	9.9	4.9	1.075	7.445	521.0	260.5
1.60%	0.260	23.077	10.0	5.0	1.067	7.498	518.9	259.4
1.65%	0.260	23.077	10.2	5.1	1.060	7.551	516.7	258.4
1.70%	0.260	23.077	10.3	5.2	1.052	7.605	514.6	257.3
1.75%	0.260	23.077	10.5	5.2	1.045	7.659	512.5	256.2
1.80%	0.260	23.077	10.6	5.3	1.037	7.715	510.3	255.2
1.85%	0.260	23.077	10.8	5.4	1.030	7.771	508.2	254.1
1.90%	0.260	23.077	10.9	5.5	1.022	7.828	506.0	253.0
1.95%	0.260	23.077	11.1	5.5	1.015	7.886	503.9	251.9
2.00%	0.260	23.077	11.2	5.6	1.007	7.944	501.7	250.9
2.05%	0.260	23.077	11.4	5.7	1.002	7.986	500.1	250.0
2.10%	0.260	23.077	11.5	5.8	0.996	8.029	498.4	249.2
2.15%	0.260	23.077	11.6	5.8	0.991	8.072	496.8	248.4
2.20%	0.260	23.077	11.8	5.9	0.986	8.115	495.1	247.6
2.25%	0.260	23.077	11.9	6.0	0.981	8.159	493.5	246.7
2.30%	0.260	23.077	12.0	6.0	0.975	8.203	491.8	245.9
2.35%	0.260	23.077	12.2	6.1	0.970	8.248	490.1	245.1
2.40%	0.260	23.077	12.3	6.2	0.965	8.294	488.5	244.2
2.45%	0.260	23.077	12.4	6.2	0.959	8.339	486.8	243.4

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

100' ROW WITH 50' OF TRAVELWAY AND 50' OF TRAILS

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
2.50%	0.260	23.077	12.6	6.3	0.954	8.386	485.2	242.6
2.55%	0.260	23.077	12.7	6.3	0.950	8.421	483.9	241.9
2.60%	0.260	23.077	12.8	6.4	0.946	8.457	482.5	241.3
2.65%	0.260	23.077	12.9	6.5	0.942	8.493	481.2	240.6
2.70%	0.260	23.077	13.1	6.5	0.938	8.529	479.9	240.0
2.75%	0.260	23.077	13.2	6.6	0.934	8.565	478.6	239.3
2.80%	0.260	23.077	13.7	6.8	0.918	8.715	473.3	236.7
2.85%	0.260	23.077	13.4	6.7	0.926	8.639	476.0	238.0
2.90%	0.260	23.077	13.5	6.8	0.922	8.677	474.6	237.3
2.95%	0.260	23.077	13.7	6.8	0.918	8.715	473.3	236.7
3.00%	0.260	23.077	13.8	6.9	0.914	8.753	472.0	236.0
3.05%	0.260	23.077	13.9	6.9	0.911	8.784	470.7	235.4
3.10%	0.260	23.077	14.0	7.0	0.907	8.816	469.4	234.7
3.15%	0.260	23.077	14.1	7.1	0.904	8.849	468.1	234.1
3.20%	0.260	23.077	14.2	7.1	0.901	8.881	466.9	233.4
3.25%	0.260	23.077	14.3	7.2	0.898	8.914	465.6	232.8
3.30%	0.260	23.077	14.4	7.2	0.894	8.947	464.3	232.1
3.35%	0.260	23.077	14.5	7.3	0.891	8.980	463.0	231.5
3.40%	0.260	23.077	14.7	7.3	0.888	9.013	461.7	230.8
3.45%	0.260	23.077	14.8	7.4	0.884	9.047	460.4	230.2
3.50%	0.260	23.077	14.9	7.4	0.881	9.081	459.1	229.6
3.55%	0.260	23.077	15.0	7.5	0.878	9.109	458.0	229.0
3.60%	0.260	23.077	15.1	7.5	0.876	9.137	456.9	228.5
3.65%	0.260	23.077	15.2	7.6	0.873	9.165	455.8	227.9
3.70%	0.260	23.077	15.3	7.6	0.870	9.193	454.7	227.4
3.75%	0.260	23.077	15.4	7.7	0.868	9.222	453.6	226.8
3.80%	0.260	23.077	15.5	7.7	0.865	9.251	452.5	226.3
3.85%	0.260	23.077	15.6	7.8	0.862	9.280	451.4	225.7
3.90%	0.260	23.077	15.7	7.8	0.859	9.309	450.3	225.2
3.95%	0.260	23.077	15.8	7.9	0.857	9.338	449.2	224.6
4.00%	0.260	23.077	15.9	8.0	0.854	9.368	448.1	224.1
4.05%	0.260	23.077	16.0	8.0	0.852	9.392	447.3	223.6
4.10%	0.260	23.077	16.1	8.0	0.850	9.416	446.4	223.2
4.15%	0.260	23.077	16.2	8.1	0.847	9.441	445.6	222.8
4.20%	0.260	23.077	16.3	8.1	0.845	9.465	444.7	222.4
4.25%	0.260	23.077	16.4	8.2	0.843	9.490	443.9	222.0
4.30%	0.260	23.077	16.5	8.2	0.841	9.515	443.1	221.5
4.35%	0.260	23.077	16.6	8.3	0.839	9.540	442.2	221.1
4.40%	0.260	23.077	16.7	8.3	0.836	9.565	441.4	220.7
4.45%	0.260	23.077	16.8	8.4	0.834	9.590	440.5	220.3

THE FULL STREET MAX FLOW AND DEPTH VALUES FOR EACH 0.5% STREET SLOPE INCREMENT ARE CALCULATED FROM FLOWMASTER
ALL OTHER VALUES HAVE BEEN LINEARLLY INTERPOLATED AT EVERY 0.05% STREET SLOPE INCREMENTS

COH NEIGHBORHOOD STUDY

100' ROW WITH 50' OF TRAVELWAY AND 50' OF TRAILS

STREET FLOW CRITERIA

	Criteria for 10 Year Flow				Criteria for 100 Year Flow			
Street Slope (%)	Depth for Max with 12' Dry Lane (ft)	Max Velocity with 12' Dry Lane (fps)	Full Street Max Flow with 12' Dry Lane (cfs)	Half Street Max Flow with 12' Dry Lane (fps)	Depth for Max vd=8 (ft)	Velocity for Max vd=8 (fps)	Full Street Max Flow vd=8 (cfs)	Half Street Max Flow vd=8 (cfs)
4.50%	0.260	23.077	16.9	8.4	0.832	9.615	439.7	219.8
4.55%	0.260	23.077	17.0	8.5	0.830	9.639	438.7	219.4
4.60%	0.260	23.077	17.0	8.5	0.828	9.662	437.8	218.9
4.65%	0.260	23.077	17.1	8.6	0.826	9.685	436.8	218.4
4.70%	0.260	23.077	17.2	8.6	0.824	9.709	435.9	218.0
4.75%	0.260	23.077	17.3	8.7	0.822	9.732	435.0	217.5
4.80%	0.260	23.077	17.4	8.7	0.820	9.756	434.0	217.0
4.85%	0.260	23.077	17.5	8.7	0.818	9.780	433.1	216.5
4.90%	0.260	23.077	17.6	8.8	0.816	9.804	432.1	216.1
4.95%	0.260	23.077	17.7	8.8	0.814	9.828	431.2	215.6
5.00%	0.260	23.077	17.8	8.9	0.812	9.852	430.3	215.1
5.05%	0.260	23.077	17.9	8.9	0.810	9.873	429.5	214.7
5.10%	0.260	23.077	17.9	9.0	0.809	9.894	428.7	214.4
5.15%	0.260	23.077	18.0	9.0	0.807	9.914	427.9	214.0
5.20%	0.260	23.077	18.1	9.1	0.805	9.935	427.2	213.6
5.25%	0.260	23.077	18.2	9.1	0.804	9.956	426.4	213.2
5.30%	0.260	23.077	18.3	9.1	0.802	9.978	425.6	212.8
5.35%	0.260	23.077	18.4	9.2	0.800	9.999	424.8	212.4
5.40%	0.260	23.077	18.5	9.2	0.798	10.020	424.1	212.0
5.45%	0.260	23.077	18.6	9.3	0.797	10.041	423.3	211.6
5.50%	0.260	23.077	18.6	9.3	0.795	10.063	422.5	211.3
5.55%	0.276	21.739	18.7	9.4	0.794	10.082	421.8	210.9
5.60%	0.292	20.548	18.8	9.4	0.792	10.101	421.1	210.5
5.65%	0.308	19.481	18.9	9.4	0.791	10.120	420.4	210.2
5.70%	0.324	18.519	19.0	9.5	0.789	10.139	419.7	209.8
5.75%	0.340	17.647	19.1	9.5	0.788	10.159	419.0	209.5
5.80%	0.356	16.854	19.1	9.6	0.786	10.178	418.3	209.1
5.85%	0.372	16.129	19.2	9.6	0.785	10.198	417.6	208.8
5.90%	0.388	15.464	19.3	9.7	0.783	10.217	416.9	208.4
5.95%	0.404	14.851	19.4	9.7	0.782	10.237	416.2	208.1
6.00%	0.420	14.286	19.5	9.7	0.780	10.256	415.5	207.7

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STREET FLOW CAPACITY CHECK / PROPOSED FACILITIES

Street Flow Capacity Check / Proposed Facilities

PITTMAN WATERSHED

Subbasin	Figure in Volume I	Flow Street	Intersection	Street ROW (ft)	Street Slope %	Existing Flow		RTC 10 - Yr Max Flow (cfs)	CCRFCD 100 - Yr Max Flow (cfs)	Resolution
						10 - Yr Actual Flow (cfs)	100 - Yr Actual Flow (cfs)			
PPA020D	E-7, U-7	ATLANTIC AV	PACIFIC AV	60'	3.43%	18	39	163	244	
PPA010N	E-8, U-8	BOULDER HWY	MAJOR ST	300' STATE HWY	2.38%	74	183	NOTE 2	NOTE 2	
PPA010G	E-8, U-8	BOULDER HWY	BASIC RD	300' STATE HWY	1.94%	140	363	NOTE 2	NOTE 2	
PPA010F	E-5, U-5	BOULDER HWY	TEXAS AV	300' STATE HWY	2.41%	187	459	NOTE 2	NOTE 2	
PPA010C	E-5, U-5	BOULDER HWY	LAKE MEAD PKWY	300' STATE HWY	1.70%	267	635	NOTE 2	NOTE 2	
PPA030A	E-4, U-4	BOULDER HWY	LOWERY ST	300' STATE HWY	2.41%	297	712	NOTE 2	NOTE 2	
PPA030B	E-4, U-4	BOULDER HWY	WATER ST	300' STATE HWY	2.32%	308	752	NOTE 2	NOTE 2	
PPA030	E-4, U-4	BOULDER HWY	PROPOSED D.B.	300' STATE HWY	2.77%	462	1097	NOTE 2	NOTE 2	
PBR130A	E-1, U-1	BOULDER HWY	SUNSET RD	300' STATE HWY	0.50%	528	1339	NOTE 2	NOTE 2	
PLW040D	E-1, U-1	BURNS RD	SUNSET RD	100' W/MED	0.90%	193	499	39	403	BURNS2: 1800' 20'W 8'D Rect. Conc. Chnl along Burns Rd to Galleria reducing flow
PPD080A	E-11, U-11	CANYON RD	SEA BLUFF DR	60'	3.27%	33	85	165	248	
PPD090E	E-11, U-11	CANYON RD	HORIZON DR	60'	3.73%	66	183	160	242	
PPD090C	E-11, U-11	CANYON RD	DELAMAR DR	60'	3.70%	101	280	161	242	Total flow is divided between Blackridge, Canyon and Skyline
PPD090A	E-8, U-8	CANYON RD	COUNTRY CLUB DR	60'	3.72%	123	359	161	242	Total flow is divided between Blackridge, Canyon and Skyline
PPD090B	E-8, U-8	CECIL RD	COUNTRY CLUB DR	60'	3.55%	154	403	162	243	Total flow is divided between Skyline, Hilltop and Greenway
PPD110G	E-7, U-7	CRESTWAY RD	COUNTRY CLUB DR	60'	3.47%	25	65	163	244	
PPD110F	E-7, U-7	CRESTWAY RD	ROCHELL DR	60'	3.40%	64	160	164	245	
PLW040A	E-1, U-1	GALLERIA DR	WARD DR	100' W/MED	0.80%	153	349	36	415	BURNS2 & GALL1: Conc. Chnl will reduce 100 Yr flows, 1320' 48" RCP in Galleria from Ward to Moser will reduce 10 Yr flows
PLW050B	E-1, U-1	HAREN DR	SUNSET DR	60'	1.55%	0	264	198	287	
PPD090F	E-11, U-11	HILLTOP RD	HORIZON DR	60'	1.50%	80	205	199	288	
PPD090D	E-11, U-11	HILLTOP RD	DELAMAR DR	60'	3.74%	119	302	160	242	Total flow is divided between Skyline, Hilltop and Greenway
PPD180C	E-7, U-7	LAKE MEAD PKWY	BASIC RD	300' STATE HWY	0.06%	92	199	NOTE 2	NOTE 2	
PPA010M	E-8, U-8	MAJOR AV	WATER ST	80' C.T.L.	3.00%	45	112	28	377	Connect to proposed 24" RCP in Major Improvements project
PLW040E	E-1, U-1	MOSER DR	SUNSET DR	60'	1.20%	165	408	206	298	BURNS2: 20'W 8'D Rect. Conc. Chnl along Burns Rd to Galleria reducing flow to Moser
PPA010C	E-5, U-5	NEW MEXICO WY	PACIFIC AV	60'	2.81%	54	121	168	254	
PPD110D	E-7, U-7	OPAL DR	VIEWMONT DR	60'	3.40%	51	130	163	245	
PPA060B	E-1, U-1	PABCO RD	ROLLY ST	80' C.T.L.	2.00%	11	26	23	401	
PPA060A	E-1, U-1	PABCO RD	SUNSET RD	80' C.T.L.	1.25%	16	39	18	428	
PPA010D	E-8, U-8	PACIFIC AV	TEXAS AV	60'	2.34%	23	53	177	270	
PPA020D	E-7, U-7	PACIFIC AV	ATLANTIC AV	60'	2.60%	27	62	173	263	
PLW040H	E-1, U-1	PRICE ST	ROLLY ST	60'	1.15%	36	88	207	299	
PLW040G	E-1, U-1	PRICE ST	MOSER DR	60'	1.05%	76	189	209	302	

Street Flow Capacity Check / Proposed Facilities

	Subbasin	Figure in Volume I	Flow Street	Intersection	Street ROW (ft)	Street Slope %	Existing Flow		RTC 10 - Yr Max Flow (cfs)	CCRFCD 100 - Yr Max Flow (cfs)	Resolution
							10 - Yr Actual Flow (cfs)	100 - Yr Actual Flow (cfs)			
PITTMAN WATERSHED	PPD080D	E-11, U-11	SUMMERLAND DR	OAK SPRING CT	60'	3.97%	39	101	158	240	
	PPA060A	E-1, U-1	SUNSET RD	PABCO RD	100' W/MED	0.25%	9	22	Too Mild of a Slope		MPU PTPA0000: Pittman Pabco Channel will convey flow from this area
	PLW040E	E-1, U-1	SUNSET RD	MOSER DR	100' W/MED	0.55%	70	247	30	446	BURNS2: 20'W 8'D Rect. Conc. Chnl along Burns Rd to Galleria reducing flow along Sunset
	PLW040F	E-1, U-1	SUNSET RD	SUNSET CIRCLE	100' W/MED	0.75%	79	274	35	422	BURNS2: 20'W 8'D Rect. Conc. Chnl along Burns Rd to Galleria reducing flow along Sunset
	PLW040D	E-1, U-1	SUNSET RD	WARD DR	100' W/MED	1.05%	186	468	42	388	BURNS2: 20'W 8'D Rect. Conc. Chnl along Burns Rd to Galleria reducing flow along Sunset
	PLW040D	E-1, U-1	SUNSET RD	BURNS RD	100' W/MED	0.85%	275	689	37	409	BURNS2: 20'W 8'D Rect. Conc. Chnl along Burns Rd to Galleria reducing flow along Sunset
	PBR130A	E-1, U-1	SUNSET RD	BOULDER HWY	100' W/MED	1.40%	470	1198	48	369	BURNS1: 750' 2:10' x 7' RCB'S directing flow to BURNS2
	PPA010D	E-8, U-8	TEXAS AV	PACIFIC AV	60'	2.14%	27	62	181	276	
	PPD110B	E-7, U-7	TIGER LILY WY	VIEWMONT DR	60'	3.16%	103	264	166	250	TL1: Extend existing 18" RCP in Tiger Lily north 350' to Viewmont
	PPA020A	E-7, U-7	VICTORY RD	ATLANTIC AV	60'	0.91%	32	73	214	310	
	PPA020B	E-7, U-7	VICTORY RD	WATER ST	60'	0.57%	163	369	229	330	WATR1: 3050' 36" RCP in Water from Victory to Boulder
	PPD110D	E-7, U-7	VIEWMONT DR	JANICE DR	60'	1.24%	29	74	205	296	
	PLW040D	E-1, U-1	WARD DR	SUNSET RD	60'	1.25%	137	305	205	296	BURNS2: 20'W 8'D Rect. Conc. Chnl along Burns Rd to Galleria reducing flow to Ward
	PPA020E	E-8, U-8	WATER ST	ATLANTIC AV	100' W/MED	0.67%	54	119	33	434	Existing local facility conveys portion of the flow to BH3, 60" RCP
	PPA020C	E-7, U-7	WATER ST	PACIFIC AV	100' W/MED	3.98%	99	219	82	287	Existing local facility conveys portion of the flow to BH3, 60" RCP
	PPD100D	E-10, U-10	WEST PACIFIC AV	HORIZON DR	80' C.T.L.	1.71%	5	43	21	411	
	PPD090C	E-10, U-10	WEST PACIFIC AV	DELAMAR DR	80' C.T.L.	3.77%	25	107	31	363	
	PPD100B	E-7, U-7	WEST PACIFIC AV	COUNTRY CLUB DR	80' C.T.L.	3.88%	55	193	32	360	Total flow is divided between Mountain View, Ridgeway and Pacific
	PPD100A	E-7, U-7	WEST PACIFIC AV	ROCHELL DR	80' C.T.L.	3.37%	59	252	29	370	Total flow is divided between Mountain View, Ridgeway and Pacific
C-1 WATERSHED	C1-49A	E-8, U-8	ALBACATE ST	NEWPORT DR	60'	2.32%	80	228	178	272	
	C1-33C	E-15, U-15	APPALOOSA RD	WAGONWHEEL DR	80' 1X16' TRAIL	1.48%	61	280	13	434	APLSA2 & APLSA3: 2760' 60" RCP in Appaloosa from Wagonwheel to Palomino
	C1-33B	E-12, U-12	APPALOOSA RD	PALOMINO DR	80' 1X16' TRAIL	0.98%	83	359	10	455	APLSA4 & APLSA5: 66" RCP and 78" RCP in Appaloosa from Palomino to Equestrian
	C1-15C	E-11, U-11	ARROWHEAD TRL	GRAPEVINE AV	60'	3.00%	18	55	167	253	
	C1-15A	E-11, U-11	ARROWHEAD TRL	COUNTRY CANYON DR	60'	2.35%	75	212	177	270	
	C1-72G	E-5, U-5	ASH ST	CENTER ST	60'	1.00%	16	46	210	304	
	C1-71F	E-5, U-5	ASH ST	MAJOR ST	60'	1.50%	18	55	199	288	
	C1-77A	E-2, U-2	ATHENS AV	RACETRACK RD	80' MOD	1.18%	11	53	35	404	
	C1-77B	E-3, U-3	ATHENS AV	MILAN ST	80' MOD	1.53%	36	80	40	343	
	C1-49C/E	E-9, U-9	BLUE LANTERN DR	FEATHERWOOD AV	60'	0.95%	39	84	212	307	
	C1-49E	E-12, U-12	BLUE LANTERN DR	GREYHOUND LN	60'	1.40%	78	186	201	291	
	C1-28E	E-8, U-8	BOULDER HWY	COLLEGE DR	300' STATE HWY	1.43%	88	205	NOTE 2	NOTE 2	
	C1-68G	E-5, U-5	BURKHOLDER BLVD	BASIC RD	100' W/MED	0.95%	30	69	40	397	

Street Flow Capacity Check / Proposed Facilities

	Subbasin	Figure in Volume I	Flow Street	Intersection	Street ROW (ft)	Street Slope %	Existing Flow		RTC 10 - Yr Max Flow (cfs)	CCRFCD 100 - Yr Max Flow (cfs)	Resolution
							10 - Yr Actual Flow (cfs)	100 - Yr Actual Flow (cfs)			
C-1 WATERSHED	C1-68E	E-5, U-5	BURKHOLDER BLVD	DONDERO AV	100' W/MED	1.10%	55	128	43	386	Burkholder and Improvements currently being designed to meet street criteria
	C1-52D	E-9, U-9	BURKHOLDER BLVD	S. MAGIC WAY	100' 2X11' TRAILS	3.20%	181	437	19	405	BURK2: 1320' 48" RCP in Burkholder from Milan west to Racetrack
	C1-52A	E-9, U-9	BURKHOLDER BLVD	S. MILAN ST	100' 2X11' TRAILS	2.73%	202	503	17	415	BURK1: 1320' 42" RCP in Burkholder from Magic west to Milan
	C1-53A	E-8, U-8	BURKHOLDER BLVD	CLOUDCREST DR	100' W/MED	1.45%	239	600	49	367	MPU C1EQ0000: Burkholder Improvements currently being designed to meet street criteria
	C1-76B	E-3, U-3	CADIZ AV	MILAN ST	60'	2.76%	208	477	171	260	CADIZ2: 1320' 54" RCP in Cadiz from Milan to Racetrack
	C1-64B	E-2, U-2	CADIZ AV	RACETRACK RD	60'	2.61%	347	864	173	263	CADIZ3: 2630' 72" RCP in Cadiz from Racetrack to Pueblo
	C1-64A	E-2, U-2	CADIZ AV	EMDEM ST	60'	1.87%	356	895	189	282	CADIZ3: 2630' 72" RCP in Cadiz from Racetrack to Pueblo
	C1-49B/D	E-9, U-9	CAMPHILL RD	FEATHERWOOD AV	60'	0.86%	128	310	216	313	
	C1-72G	E-5, U-5	CENTER ST	ASH ST	100' W/MED	1.56%	19	54	51	361	
	C1-72H	E-5, U-5	CENTER ST	FIR ST	100' W/MED	1.45%	21	55	49	367	
	C1-34E	E-12, U-12	CHICKASAW DR	LATIGO DR	60'	1.52%	136	550	199	288	CHICK1: 660' 36" RCP in Chickasaw from Latigo to Colt
	C1-34A	E-12, U-12	CHICKASAW DR	COLT DR	60'	1.82%	182	648	190	283	CHICK2: 1300' 54" RCP in Chickasaw from Colt to Equestrian
	C1-68A	E-5, U-5	CHOLLA ST	LAKE MEAD PKWY	60'	2.87%	95	223	169	257	
	C1-58A	E-5, U-5	CLOUDCREST DR	S. END OF CLOUDCREST DR	60'	1.61%	9	24	196	284	
	C1-13A	E-14, U-14	COLLEGE DR	MISSION DR	100' 2X11' TRAILS	2.85%	17	47	18	413	
	C1-21C	E-14, U-14	COLLEGE DR	PARADISE HILLS DR	100' 2X11' TRAILS	2.14%	26	87	15	431	Flow is east of College Dr alignment in existing wash
	C1-13A	E-14, U-14	COLLEGE DR	PATTI ANN RD	100' 2X11' TRAILS	2.85%	35	135	18	413	Flow is east of College Dr alignment in existing wash
	C1-32B	E-12, U-12	COLT DR	ROAN RD	60'	2.44%	15	108	175	267	
	C1-50C	E-8, U-8	DURAN ST	NEWPORT	80' C.T.L.	2.24%	39	116	24	394	Existing facility conveys portion of 10-yr flow
	C1-63B	E-5, U-5	EMDEM ST	LONDON AV	60'	1.08%	4	17	208	301	
	C1-64F	E-2, U-2	EMDEM ST	GENEVA AV	60'	1.77%	5	19	192	284	
	C1-32A	E-12, U-12	EQUESTRIAN DR	ROAN RD	100' 2X11' TRAILS	4.06%	7	57	21	388	
	C1-33A	E-12, U-12	EQUESTRIAN DR	APPALOOSA RD	100' 2X11' TRAILS	3.01%	62	329	18	409	MPU Facility C1E10002: Conveys flows to Equestrian Detention Basin
	C1-34A/B	E-12, U-12	EQUESTRIAN DR	KENNEL CLUB DR	100' W/MED	1.02%	47	107	41	391	EQ1: 540' 24" RCP in Equestrian from Kennel Club to Saratoga Springs
	C1-23A	E-11, U-11	EQUESTRIAN DR	WEEKS BAY RIVER RD	100' W/MED	2.24%	84	213	61	331	Flow directed through Boulder Creek development northwest of Equestrian/Weeks Bay River
	C1-34C	E-12, U-12	EQUESTRIAN DR	S. MAGIC WAY	100' W/MED	0.46%	121	292	27	459	EQ2: Directs flow into Equestrian Detention Basin
	C1-34C	E-12, U-12	EQUESTRIAN DR	CHICKASAW DR	100' W/MED	1.85%	223	920	56	344	MPU Facility C1E10002: Conveys flows to Equestrian Detention Basin
	C1-34B	E-12, U-12	EQUESTRIAN DR	SARATOGA SPRINGS ST	100' W/MED	0.26%	238	969	26	465	EQ2: 800' 48" RCP in Equestrian from Saratoga Springs to Magic
	C1-64D	E-2, U-2	ESSEX AV	EMDEM ST	60'	2.31%	8	33	178	272	
	C1-64C	E-2, U-2	ESSEX AV	PUEBLO BLVD	60'	2.16%	20	78	181	276	

Street Flow Capacity Check / Proposed Facilities

	Subbasin	Figure in Volume I	Flow Street	Intersection	Street ROW (ft)	Street Slope %	Existing Flow		RTC 10 - Yr Max Flow (cfs)	CCRFCD 100 - Yr Max Flow (cfs)	Resolution
							10 - Yr Actual Flow (cfs)	100 - Yr Actual Flow (cfs)			
C-1 WATERSHED	C1-72H	E-5, U-5	FIR ST	CENTER ST	60'	1.50%	13	32	199	288	
	C1-13F	E-14, U-14	FOXHALL RD	PARADISE HILLS DR	60'	3.08%	13	66	166	251	
	C1-58C	E-5, U-5	FUTURE RD	CLOUDCREST DR	60'	1.75%	17	25	192	284	
	C1-59D	E-6, U-6	FUTURE ST	PARIS AV (FUTURE)	60'	1.15%	14	45	207	299	
	C1-64F	E-2, U-2	GENEVA AV	EMDEM ST	60'	1.87%	6	23	189	282	
	C1-64E	E-2, U-2	GENEVA AV	PUEBLO BLVD	60'	2.01%	15	65	184	280	
	C1-76E	E-3, U-3	GENEVA AV	MILAN ST	60'	1.94%	82	185	186	281	
	C1-27A	E-11, U-11	GREENWAY RD	DELAMAR DR	80' C.T.L.	2.63%	41	100	26	384	Flow is east of Greenway, in golf course
	C1-68B	E-8, U-8	HARRIS ST	DONDERO AV	60'	2.20%	44	107	180	274	
	C1-26C	E-11, U-11	HORIZON DR	HIDDEN VALLEY DR	100' W/MED	1.08%	0	87	43	386	
	C1-26A	E-11, U-11	HORIZON DR	MONA LANE	100' W/MED	0.95%	48	92	40	397	HRZN1: 1200' 18" RCP in Horizon from Mosswood east to College
	C1-62B	E-3, U-3	ITHACA AV	MAGIC WY	80' 1X16' TRAIL	1.64%	190	287	13	430	MPU Facility C1T0000: C-1 Channel - Ithaca, Drop Inlets for the 10-YR Flow
	C1-62A	E-3, U-3	ITHACA AV	MILAN ST	80' 1X16' TRAIL	1.72%	195	310	14	428	MPU Facility C1T0000: C-1 Channel - Ithaca, Drop Inlets for the 10-YR Flow
	C1-63B	E-2, U-2	ITHACA AV	RACETRACK RD	80' 1X16' TRAIL	1.87%	206	416	14	423	MPU Facility C1T0000: C-1 Channel - Ithaca, Drop Inlets for the 10-YR Flow
	C1-63A	E-2, U-2	ITHACA AV	EMDEM ST	80' 1X16' TRAIL	2.99%	209	443	18	395	MPU Facility C1T0000: C-1 Channel - Ithaca, Drop Inlets for the 10-YR Flow
	C1-13F	E-14, U-14	JESSE RD	PARADISE HILLS DR	60'	2.61%	45	103	173	263	
	C1-70C	E-8, U-8	LA JOLLA DR	PALO VERDE DR	51'	0.50%	37	73	214	298	
	C1-74A	E-2, U-2	LAKE MEAD PKWY	PUEBLO BLVD	300' STATE HWY	1.34%	104	1022	NOTE 2	NOTE 2	
	C1-74B	E-2, U-2	LAKE MEAD PKWY	PAWNEE ST	300' STATE HWY	0.79%	140	1049	NOTE 2	NOTE 2	
	C1-73E	E-2, U-2	LAKE MEAD PKWY	NAVAJO DR	300' STATE HWY	1.26%	180	1058	NOTE 2	NOTE 2	
	C1-68C	E-5, U-5	LAKE MEAD PKWY	BURKHOLDER BLVD	300' STATE HWY	1.20%	207	471	NOTE 2	NOTE 2	
	C1-72B	E-5, U-5	LAKE MEAD PKWY	WARM SPRINGS RD	300' STATE HWY	1.16%	248	1001	NOTE 2	NOTE 2	
	C1-72A	E-5, U-5	LAKE MEAD PKWY	IVY ST	300' STATE HWY	0.99%	292	689	NOTE 2	NOTE 2	
	C1-73D	E-2, U-2	LAKE MEAD PKWY	CENTER ST	300' STATE HWY	0.94%	391	1245	NOTE 2	NOTE 2	
	C1-63D	E-5, U-5	LONDON AV	EMDEM ST	60'	2.46%	6	25	175	267	
	C1-62D	E-6, U-6	LONDON AV	MILAN ST	60'	2.39%	16	54	176	269	
	C1-63C	E-5, U-5	LONDON AV	PUEBLO BLVD	60'	2.24%	19	73	179	273	
	C1-62F	E-6, U-6	LONDON AV	MAGIC WY	60'	1.49%	20	55	199	288	
	C1-62F	E-6, U-6	MAGIC WY	LONDON AV	100' W/MED	1.92%	18	49	57	342	
	C1-59C	E-6, U-6	MAGIC WY	PARIS AV	60'	1.15%	65	170	207	299	
	C1-70E	E-5, U-5	MAJOR AV	BURKHOLDER BLVD	80' C.T.L.	2.19%	30	122	24	396	Burkholder and Major Improvements currently being designed to meet street criteria

Street Flow Capacity Check / Proposed Facilities

	Subbasin	Figure in Volume I	Flow Street	Intersection	Street ROW (ft)	Street Slope %	Existing Flow		RTC 10 - Yr Max Flow (cfs)	CCRFCD 100 - Yr Max Flow (cfs)	Resolution
							10 - Yr Actual Flow (cfs)	100 - Yr Actual Flow (cfs)			
C-1 WATERSHED	C1-70A	E-8, U-8	MAJOR AV	CORONADO DR	80' C.T.L.	2.55%	61	187	26	386	CNTR2: 1400' 42" RCP in Major from Coronado to Burkholder
	C1-71D	E-5, U-5	MAJOR AV	PALO VERDE DR	80' C.T.L.	1.32%	116	348	18	426	Burkholder and Major Improvements currently being designed to meet street criteria
	C1-60D	E-6, U-6	MILAN ST	PARIS AV	60'	0.92%	4	17	214	310	
	C1-62B	E-6, U-6	MILAN ST	LONDON AV	60'	1.77%	13	44	192	284	
	C1-77C	E-3, U-3	MILAN ST	ATHENS AV	60'	1.54%	15	34	198	287	
	C1-76E	E-3, U-3	MILAN ST	GENEVA AV	60'	1.69%	40	89	193	285	
	C1-12B	E-14, U-14	MISSION DR	GREENWAY RD	100' 2X11' TRAILS	1.97%	35	95	14	440	Flow reaching Mission between Greenway and College crosses through culverts (6'x4' RCB, 42" RCP, 7'x4' RCB, and another 42" RCP)
	C1-21A	E-14, U-14	MISSION DR	SAN JACINTO ST	80' 1X16' TRAIL	0.86%	33	115	10	464	MISS1: 1700' 30" RCP in Mission from San Jacinto east to UPRR
	C1-27D	E-11, U-11	MONA LANE	HORIZON DR	60'	2.86%	0	165	169	257	
	C1-28C	E-8, U-8	MONA LANE	GREENWAY RD	60'	2.88%	34	88	168	256	
	C1-26C	E-11, U-11	MOSSWOOD DR	SUMMIT DR	60'	2.97%	38	92	168	254	
	C1-52D	E-9, U-9	NEWPORT DR	S. MAGIC WAY	80'	3.20%	146	389	51	296	NWPT1: 1320' 36" RCP in Newport from Magic west to Milan
	C1-52C	E-9, U-9	NEWPORT DR	S. MILAN ST	80'	2.40%	172	453	44	313	NWPT2: 1320' 42" RCP in Newport from Milan west to Racetrack
	C1-30A	E-15, U-15	OLD VEGAS TRAIL	PISTOL PERRY PKWY	80' C.T.L.	2.43%	39	88	25	388	APLSA1: Conveys flow away from from area in 400' 42" RCP
	C1-31A	E-12, U-12	PALAMINO DR	ROAN RD	80' C.T.L.	1.36%	6	87	19	424	
	C1-71B	E-5, U-5	PALO VERDE DR	ALOHA DR	80' C.T.L.	1.38%	54	132	19	422	Burkholder Improvements currently being designed to meet street criteria
	C1-71C	E-5, U-5	PALO VERDE DR	DRAKE ST	80' C.T.L.	1.88%	62	156	22	405	Burkholder Improvements currently being designed to meet street criteria
	C1-12E	E-14, U-14	PARADISE HILLS DR	GREENWAY RD	100' 2X11' TRAILS	3.90%	29	72	21	391	Flow conveyed across Paradise Hills in existing wash
	C1-13B	E-14, U-14	PARADISE HILLS DR	GREENWAY RD	100' 2X11' TRAILS	0.63%	43	106	8	525	Flow conveyed across Paradise Hills in existing wash
	C1-60D	E-6, U-6	PARIS AV	MILAN ST	60'	1.87%	7	29	189	282	
	C1-59D	E-6, U-6	PARIS AV (FUTURE)	FUTURE ST	60'	2.91%	22	56	168	256	
	C1-12B	E-14, U-14	PATTIANN DR	GREENWAY RD	60'	2.47%	60	169	175	267	
	C1-12C	E-14, U-14	PATTIANN DR	COLLEGE DR	60'	1.71%	70	195	193	285	
	C1-12D	E-14, U-14	PATTIANN DR	COLLEGE DR	60'	1.15%	104	259	207	299	
	C1-70C	E-8, U-8	PIONEER ST	McKENZIE DR	60'	2.17%	66	142	181	276	
	C1-60C	E-5, U-5	RACETRACK RD	ANCHOR DR	80' 1X16' TRAIL	1.35%	20	76	12	440	RCTRK3: 1320' 24" RCP in Racetrack from Anchor to Warm Springs
	C1-62D	E-5, U-5	RACETRACK RD	LONDON AV	80' 1X16' TRAIL	1.15%	28	99	11	449	Total flow is divided between Racetrack and Jena
	C1-67D	E-2, U-2	RACETRACK RD	GENEVA AV	80' 1X16' TRAIL	1.54%	86	223	13	433	RCTRK1 & RCTRK2: 1310' 42" RCP in Racetrack from Geneva to Essex and 1310' 48" RCP in Racetrack from Essex to Cadiz
	C1-67B	E-2, U-2	RACETRACK RD	ESSEX AV	80' 1X16' TRAIL	1.54%	146	372	13	433	RCTRK1 & RCTRK2: 1310' 42" RCP in Racetrack from Geneva to Essex and 1310' 48" RCP in Racetrack from Essex to Cadiz
	C1-31B	E-12, U-12	ROAN RD	SUNDOWN DR	60'	2.36%	3	23	177	273	
	C1-32C	E-12, U-12	ROAN RD	PALOMINO DR	60'	2.09%	5	40	182	277	
	C1-49E	E-12, U-12	S. MAGIC WAY	GREYHOUND LN	100' W/MED	0.69%	26	69	34	428	

Street Flow Capacity Check / Proposed Facilities

C-1 WATERSHED

Subbasin	Figure in Volume I	Flow Street	Intersection	Street ROW (ft)	Street Slope %	Existing Flow		RTC 10 - Yr Max Flow (cfs)	CCRFCD 100 - Yr Max Flow (cfs)	Resolution
						10 - Yr Actual Flow (cfs)	100 - Yr Actual Flow (cfs)			
C1-34B	E-12, U-12	S. MAGIC WAY	COLT DR	100' W/MED	2.08%	53	111	59	334	
C1-70B	E-8, U-8	MALIBU DR	SAUSILITO DR	51'	2.00%	37	73	174	254	
C1-57A	E-6, U-6	S. MILAN ST	SEVILLE RD	60'	1.79%	36	93	190	283	
C1-23C	E-11, U-11	SAN CARLOS CREEK LA	BLUE CRYSTAL CREEK RD	60'	1.08%	49	132	208	301	
C1-20C	E-14, U-14	SAN EDUARDO AV	SAN MIGUEL AV	60'	1.59%	50	191	196	286	
C1-21B	E-14, U-14	SAN JACINTO ST	SAN EDUARDO AV	60'	2.72%	28	114	171	261	
C1-21B	E-14, U-14	SAN JACINTO ST	MISSION DR	60'	2.72%	46	212	171	261	
C1-20C	E-15, U-15	SAN MIGUEL AV	SANTA HELENA AV	60'	3.24%	16	68	165	248	
C1-20E	E-15, U-15	SANTA HELENA AV	SAN MIGUEL AV	60'	2.07%	11	45	182	279	
C1-21B	E-14, U-14	SCHOLAR ST	SAN GABRIEL AV	60'	2.38%	48	160	176	268	
C1-57C	E-6, U-6	SEVILLE RD	S. MILAN ST	60'	2.35%	54	143	177	270	
C1-56A	E-6, U-6	S. MAGIC WAY	DRAKE ST	100' W/MED	1.00%	140	371	41	391	MGC1: 1400' Riprap Levee 4' High along Magic from Seville north to Drake Channel
C1-72F	E-5, U-5	WARM SPRINGS RD	CENTER ST	100' W/MED	1.53%	0	244	51	361	
C1-59B	E-6, U-6	WARM SPRINGS RD	FUTURE ST	100' 2X11' TRAILS	3.43%	26	73	19	400	WS1: 2420' 24" RCP in Warm Springs from Future St. to Magic
C1-61B	E-5, U-5	WARM SPRINGS RD	GLASGOW ST	100' W/MED	1.49%	60	326	50	364	ASH1: 2010' 48" RCP in Ash from Major to Center
C1-71G	E-5, U-5	WARM SPRINGS RD	PALO VERDE DR	100' W/MED	1.96%	60	331	57	339	FIR1 & FIR2: 540' 48" RCP in Palo Verde from Forest to Fir and 1890' 48" RCP in Fir from Palo Verde to Center
C1-61B	E-5, U-5	WARM SPRINGS RD	EMDEM ST	100' W/MED	1.27%	71	351	46	378	WS3 & Existing 48" RCP Local Storm Drain
C1-61A	E-5, U-5	WARM SPRINGS RD	PUEBLO BLVD	100' W/MED	2.61%	80	390	66	321	WS3 & Existing 48" RCP Local Storm Drain
C1-59A	E-6, U-6	WARM SPRINGS RD	MAGIC WY	100' 2X11' TRAILS	1.87%	121	339	14	447	WS2: 1320' 36" RCP in Warm Springs from Magic to Milan
C1-60B	E-6, U-6	WARM SPRINGS RD	MILAN ST	100' 2X11' TRAILS	2.46%	140	399	16	423	WS3: 1310' 42" RCP in Warm Springs from Milan to Racetrack
C1-60A	E-5, U-5	WARM SPRINGS RD	RACETRACK RD	100' 2X11' TRAILS	2.31%	158	482	16	427	WS3 & Existing 48" RCP Local Storm Drain
C1-26B	E-11, U-11	WINCHESTER DR	SUMMIT DR	60'	3.79%	46	123	159	241	

EXISTING FLOW GREATER THAN ALLOWABLE - SEE RESOLUTION

NOTE 1: 10 YEAR AND 100 YEAR MAX FLOWS WERE DETERMINED ACCORDING TO CRITERIA FROM CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICTS HYDRAULIC CRITERIA AND DRAINAGE DESIGN MANUAL.

THE NON-UNIFORM CROSS SECTIONS WERE MODELED USING FLOWMASTER 2005. PER CCRFCD CRITERIA, IF ROW WAS GREATER THAN 60 FT, A 12' DRY LANE WAS USED FOR ANALYSIS; IF ROW WAS LESS THAN OR EQUAL TO 60 FT, (V x D) = 6 WAS USED FOR ANALYSIS

NOTE 2: BOULDER HWY AND LAKE MEAD PKWY ARE STATE HWYS AND WERE NOT ANALYZED IN THIS STUDY

PROPOSED FACILITY SIZING - MANNING'S EQUATION - FLOWMASTER SUMMARY

Proposed Facility Sizing - Manning's Equation - FlowMaster Summary

Rect. Channel and Boxes

Watershed	Facility ID	Street - Intersection to Intersections	Facility Type	Manning n	Slope %	Normal Depth (ft)	Bottom Width (ft)	Discharge (cfs)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)	Critical Depth (ft)	Critical Slope %	Velocity (fps)	Froude Number	Flow Type
Pittman	BH5	Boulder HWY - Lake Mead to Water	RCB	0.013	2.20%	3.20	8.00	636.00	25.57	14.39	8.00	5.81	0.45%	24.87	2.45	Supercritical
Pittman	BH6	Boulder HWY - Water to Pittman Pabco	RCB	0.013	2.40%	3.73	10.00	1095.00	37.28	17.46	10.00	7.20	0.42%	29.37	2.68	Supercritical
Pittman	BURNS1	Boulder HWY - Sunset and Burns	RCB	0.013	0.77%	5.31	20.00	2442.00	106.24	30.62	20.00	7.74	0.27%	22.99	1.76	Supercritical
Pittman	BURNS2	Burns - Boulder to Galleria	Rect. Channel	0.013	0.77%	5.62	20.00	2645.00	112.34	31.23	20.00	8.16	0.27%	23.54	1.75	Supercritical
C1	CNTR6	Center - Warm Springs to Fullerton	RCB	0.013	1.70%	3.13	10.00	722.00	31.31	16.26	10.00	5.45	0.37%	23.06	2.30	Supercritical
C1	CNTR7	Center - Fullerton to Lake Mead	RCB	0.013	1.70%	3.59	8.00	654.00	28.70	15.17	8.00	5.92	0.46%	22.79	2.12	Supercritical

Pipes

Watershed	Facility ID	Street - Intersection to Intersections	Facility Type	Manning n	Slope %	Normal Depth (ft)	Diameter (ft)	Discharge (cfs)	Flow Area (ft^2)	Wetted Perimeter (ft)	Critical Depth (ft)	Critical Slope %	Velocity (fps)	Max Discharge (cfs)	Discharge Full (cfs)	Flow Type
Pittman	BH1	Boulder - Major to Ocean	RCP	0.013	2.30%	3.09	4.00	205.00	10.40	8.58	3.86	1.78%	19.71	234.33	217.83	SuperCritical
Pittman	BH2	Boulder - Ocean to Basic	RCP	0.013	2.30%	3.47	4.50	281.00	13.18	9.66	4.35	1.79%	21.32	320.79	298.22	SuperCritical
Pittman	BH3	Boulder - Basic to Texas	RCP	0.013	2.30%	3.78	5.00	363.00	15.91	10.53	4.83	1.70%	22.82	424.86	394.96	SuperCritical
Pittman	BH4	Boulder - Texas to Lake Mead	RCP	0.013	2.30%	3.75	6.00	459.00	18.59	10.94	5.56	1.02%	24.68	690.87	642.25	SuperCritical
Pittman	CC1	Country Club - Skyline to Canyon	RCP	0.013	0.50%	3.50	3.50	71.14	9.62	11.00	2.64	0.59%	7.39	76.52	71.14	SubCritical
Pittman	CC2	Country Club - Canyon to Blackridge	RCP	0.013	0.87%	3.15	3.50	100.00	9.12	8.74	3.07	0.89%	10.97	100.94	93.84	SubCritical
Pittman	CC3	Blackridge - Country Club to Rochell	RCP	0.013	3.50%	1.81	3.50	100.00	5.04	5.63	3.07	0.89%	19.86	202.46	188.21	SuperCritical
Pittman	CC4	Blackridge - Rochell to UPRR	RCP	0.013	3.50%	1.81	3.50	100.00	5.04	5.63	3.07	0.89%	19.86	202.46	188.21	SuperCritical
Pittman	GALL1	Galleria - Ward to Moser	RCP	0.013	0.60%	3.83	4.00	119.31	12.38	10.91	3.29	0.69%	9.64	119.68	111.26	SubCritical
Pittman	GALL2	Galleria - Moser to Haren	RCP	0.013	0.60%	4.70	5.00	216.99	19.15	13.23	4.18	0.67%	11.33	217.00	201.73	SubCritical
Pittman	TL1	Tiger Lily - Viewmont to Existing 18"	RCP	0.013	3.00%	1.50	1.50	18.19	1.77	4.71	1.45	2.64%	10.30	19.57	18.19	SubCritical
Pittman	WATR1	Water - Victory to Boulder	RCP	0.013	2.80%	3.00	3.00	111.60	7.07	9.42	2.93	2.49%	15.79	120.05	111.60	SubCritical
Pittman	MAJ1	Hazel - Hazel to Major	RCP	0.013	0.50%	1.02	1.50	6.00	1.28	2.91	0.95	62.20%	4.68	7.99	7.43	SuperCritical
Pittman	MAJ2	Major -Hazel to Boulder HWY	RCP	0.013	2.60%	0.55	2.00	6.00	0.70	2.20	0.87	0.46%	8.57	39.24	36.48	SuperCritical
C-1	APLSA1	Wagonwheel - Old Vegas to Appaloosa	RCP	0.013	1.50%	2.84	3.50	122.00	8.36	7.85	3.26	1.27%	14.60	132.54	123.21	SuperCritical
C-1	APLSA2	Appaloosa - Colt to Equestrian	RCP	0.013	1.20%	4.97	6.50	535.00	27.21	13.83	5.95	0.91%	19.66	617.76	574.29	SuperCritical
C-1	APLSA3	Appaloosa - Palomino to Colt	RCP	0.013	1.30%	4.87	5.50	405.00	22.25	13.48	5.21	1.26%	18.20	411.85	382.86	SuperCritical
C-1	APLSA4	Appaloosa - Sundown to Palomino	RCP	0.013	1.70%	4.05	5.00	336.00	17.04	11.20	4.78	1.45%	19.71	365.26	339.56	SuperCritical
C-1	APLSA5	Appaloosa - Wagonwheel to Sundown	RCP	0.013	1.50%	3.47	5.00	264.00	14.54	9.85	4.51	0.90%	18.16	343.11	318.96	SubCritical
C-1	ASH1	Ash - Major to Center	RCP	0.013	1.20%	2.17	4.00	90.00	6.95	6.62	2.88	0.52%	12.94	169.26	157.34	SuperCritical
C-1	BURK1	Burkholder - Magic to Milan	RCP	0.013	3.00%	3.50	3.50	174.25	9.62	11.00	3.44	2.70%	18.11	187.44	174.25	SubCritical
C-1	BURK2	Burkholder - Milan to Racetrack	RCP	0.013	2.30%	3.04	4.00	202.00	10.26	8.48	3.85	1.73%	19.68	234.33	217.83	SubCritical
C-1	BURK3	Burkholder - Palo Verde to Center	RCP	0.013	1.80%	3.00	3.00	89.48	7.07	9.42	2.84	1.56%	12.66	96.25	89.48	SubCritical
C-1	CADIZ1	Cadiz - Magic to Milan	RCP	0.013	2.00%	6.00	6.00	598.90	28.27	18.85	5.83	1.77%	21.18	644.24	598.90	SuperCritical
C-1	CADIZ2	Cadiz - Milan to Racetrack	RCP	0.013	3.20%	4.50	4.50	351.76	15.90	14.14	4.44	2.91%	22.12	378.39	351.76	SuperCritical
C-1	CADIZ3	Cadiz - Racetrack to Pueblo	RCP	0.013	2.05%	5.60	6.00	652.00	27.48	15.73	5.88	2.12%	23.73	652.08	606.19	SuperCritical
C-1	CHICK1	Chickasaw Latigo to Colt	RCP	0.013	1.40%	2.43	3.00	78.00	6.13	6.71	2.75	1.19%	12.73	84.89	78.91	SubCritical
C-1	CHICK2	Chickasaw Colt to Equestrian	RCP	0.013	1.40%	4.05	4.50	248.00	15.08	11.24	4.27	1.38%	16.45	250.28	232.67	SubCritical
C-1	CHLLA1	Cholla - Dondero to Metropolitan	RCP	0.013	2.10%	3.00	3.00	96.65	7.07	9.42	2.88	1.83%	13.67	103.97	96.65	SubCritical
C-1	CNTR1	Major - Harris to Cornado	RCP	0.013	2.35%	3.00	3.00	102.26	7.07	9.42	2.87	2.07%	14.47	110.00	102.26	SubCritical
C-1	CNTR2	Major - Cornado to Burkholder	RCP	0.013	2.30%	3.50	3.50	152.57	9.62	11.00	3.39	2.02%	15.86	164.12	152.57	SuperCritical
C-1	CNTR3	Center - Burkholder to fir	RCP	0.013	2.30%	3.43	4.50	277.00	13.01	9.55	4.35	1.74%	21.30	320.79	298.22	SuperCritical
C-1	CNTR4	Center - Fir to Ash	RCP	0.013	2.70%	4.64	5.00	460.00	19.01	13.00	4.93	2.84%	24.20	460.32	427.93	SubCritical
C-1	CNTR5	Center - Ash to Warm Springs	RCP	0.013	1.80%	5.46	6.00	608.00	27.01	15.19	5.84	1.82%	22.51	611.18	568.17	SubCritical
C-1	EQ1	Equestrian - Kennel Club to Saratoga Springs	RCP	0.013	0.50%	2.00	2.00	16.00	3.14	6.28	1.44	0.66%	5.09	17.21	16.00	SuperCritical
C-1	EQ2	Equestrian - Saratoga Springs to Magic	RCP	0.013	0.60%	4.00	4.00	111.26	12.57	12.57	3.19	0.63%	8.85	119.68	111.26	SuperCritical
C-1	FIR1	Palo Verde - Forest to Fir	RCP	0.013	2.00%	2.20	4.00	119.00	7.08	6.68	3.29	0.68%	16.80	218.51	203.13	SubCritical
C-1	FIR2	Fir - Palo Verde to Center	RCP	0.013	0.80%	3.04	4.00	119.00	10.25	8.47	3.29	0.68%	11.61	138.20	128.47	SubCritical
C-1	HRZN1	Horizon - Mosswood to College	RCP	0.013	1.00%	1.50	1.50	10.50	1.77	4.71	1.25	0.98%	5.94	11.30	10.50	SubCritical
C-1	MISS1	Mission - San Jacinto to UPRR	RCP	0.013	0.60%	2.50	2.50	31.77	4.91	7.85	1.92	0.68%	6.47	34.18	31.77	SubCritical
C-1	MLBU1	Malibu - Sausalito to Palo Verde	RCP	0.013	0.80%	3.50	3.50	89.98	9.62	11.00	2.94	0.77%	9.35	96.80	89.98	SubCritical
C-1	MLBU2	La Jolla - Palo Verde to Pueblo	RCP	0.013	0.80%	3.50	3.50	89.98	9.62	11.00	2.94	0.77%	9.35	96.80	89.98	SuperCritical
C-1	NWPT1	Newport - Magic to Milan	RCP	0.013	3.20%	3.00	3.00	119.31	7.07	9.42	2.95	2.88%	16.88	128.34	119.31	SubCritical
C-1	NWPT2	Newport - Milan to Racetrack	RCP	0.013	2.40%	2.85	3.50	155.00	8.39	7.88	3.40	2.09%	18.47	167.65	155.86	SubCritical
C-1	RCTRK1	Racetrack - Geneva to Essex	RCP	0.013	2.10%	3.50	3.50	145.79	9.62	11.00	3.37	1.84%	15.15	156.83	145.79	SubCritical
C-1	RCTRK2	Racetrack - Essex to Cadiz	RCP	0.013	2.35%	4.00	4.00	220.19	12.57	12.57	3.89	2.08%	17.52	236.86	220.19	SubCritical
C-1	RCTRK3	Racetrack - Anchor to Warm Springs	RCP	0.013	1.70%	2.00	2.00	29.49	3.14	6.28	1.85	1.47%	9.39	31.73	29.49	SubCritical
C-1	WS1	Warm Springs - Future St to Magic	RCP	0.013	2.70%	2.00	2.00	37.17	3.14	6.28	1.94	2.37%	11.83	39.98	37.17	SubCritical
C-1	WS2	Warm Spings - Magic to Milan	RCP	0.013	2.70%	3.00	3.00	109.59	7.07	9.42	2.93	2.40%	15.50	117.89	109.59	SubCritical
C-1	WS3	Warm Springs - Milan to Racetrack	RCP	0.013	2.70%	3.50	3.50	165.31	9.62	11.00	3.42	2.41%	17.18	177.82	165.31	SuperCritical

FACILITY SUMMARY

Local Drainage Master Plan -Facility Summary

Facility Watershed	Facility ID	Facility Designation	Roadway	Cross Streets	Figure in Volume 1	Facility Description	Length (ft.)	Local Master Drainage Study 100-YR Flow in the Facility (cfs)	COH HEC-1 Node	COH Tributary Area (sq.mi.)	Channel Slope (%)
Pittman	BH1	100-yr Local	Boulder Highway	Major to Ocean	U-8	48" RCP	700	205	CP4	0.24	2.3
	BH2	100-yr Local	Boulder Highway	Ocean to Basic	U-8	54" RCP	880	281	CP5	0.30	2.3
	BH3	100-yr Local	Boulder Highway	Basic to Texas	U-8	60" RCP	1780	363	CP7	0.42	2.3
	BH4	100-yr Local	Boulder Highway	Texas to Lake Mead	U-5 & U-8	72" RCP	1370	459	CP9	0.52	2.3
	BH5	100-yr Local	Boulder Highway	Lake Mead to Water	U-4	Conc Box 8.0'W 5.0'D	3000	636	CP11	0.62	2.2
	BH6	100-yr Local	Boulder Highway	Water to Pittman Pabco	U-4	Conc Box 10.0'W 5.0'D	2000	1095	CP17	0.90	2.4
Pittman	BURNS1	100-yr Local	Boulder Highway	Sunset to Burns	U-1	Conc Box 2:10.0'W 7.0'D	750	2442	CPBR130A	2.15	0.8
	BURNS2	100-yr Local	Burns Rd	Boulder to Galleria	U-1	Conc Chnl 20.0'W 8.0'D 0:1 SS	1800	2645	CPBR145	2.36	0.8
Pittman	CC1	10-yr Local	Country Club	Skyline to Canyon	U-8	42" RCP	650	60	CC1	0.21	0.5
	CC2	10-yr Local	Country Club	Canyon to Blackridge	U-7 & U-8	42" RCP	650	100	CCC2	0.28	0.9
	CC3	10-yr Local	Blackridge	Country Club to Rochell	U-7	42" RCP	1320	100	CCC2	0.28	3.5
	CC4	10-yr Local	Blackridge	Rochell to UPRR	U-7	42" RCP	1300	100	CCC2	0.28	3.5
Pittman	GALL1	10-yr Local	Galleria Dr	Ward to Moser	U-1	48" RCP	1320	100	CPLW040A	0.07	0.6
	GALL2	10-yr Local	Galleria Dr	Moser to Haren	U-1	60" RCP	840	200	CPLW040B	0.44	0.6
Pittman	MAJ1	10-yr Local	Hazel	Hazel to Major	U-8	18" RCP	370	6	PPA010M	0.005	0.5
	MAJ2	10-yr Local	Major	Hazel to Boulder Highway	U-8	24" RCP	1330	6	PPA010M	0.005	2.6
Pittman	TL1	10-yr Local	Tiger Lily	Viewmont to Existing 18"	U-7	18" RCP	350	15	CPPD-110F	0.22	3.0
Pittman	WATR1	10-yr Local	Water	Victory to Boulder	U-4 & U-7	36" RCP	3050	70	CP16	0.27	2.8
C-1	APLSA1	100-yr Local	Wagonwheel	Old Vegas to Appaloosa	U-15	42" RCP	400	122	DTPA	0.15	1.5
	APLSA2	100-yr Local	Appaloosa	Wagonwheel to Sundown	U-12 & U-15	60" RCP	1460	264	CC1-30A	0.26	1.5
	APLSA3	100-yr Local	Appaloosa	Sundown to Palomino	U-12	60" RCP	1300	336	CC1-31C	0.42	1.7
	APLSA4	100-yr Local	Appaloosa	Palomino to Colt	U-12	66" RCP	1320	405	CC1-31A	0.58	1.5
	APLSA5	100-yr Local	Appaloosa	Colt to Equestrian	U-12	78" RCP	1300	535	CC1-32C	0.75	1.2
C-1	ASH1	10-yr Local	Ash	Major to Center	U-5	48" RCP	2010	90	CP35	0.65	1.2
C-1	BURK1	10-yr Local	Burkholder	Magic to Milan	U-9	42" RCP	1320	174	BURK1	0.34	3.0
	BURK2	10-yr Local	Burkholder	Milan to Racetrack	U-8 & U-9	48" RCP	1320	202	CBURK2	0.40	2.3
C-1	BURK3	10-yr Local	Burkholder	Palo Verde to Center	U-5	36" RCP	1280	59	C1-71A	0.07	1.8
C-1	CADIZ1	10-yr Local	Cadiz	Magic to Milan	U-3	48" RCP	1300	136	C1-76D	0.17	5.0
	CADIZ2	10-yr Local	Cadiz	Milan to Racetrack	U-2 & U-3	54" RCP	1320	289	CP21-1	0.31	3.2
	CADIZ3	100-yr Local	Cadiz	Racetrack to Pueblo	U-2	72" RCP	2630	652	CP22	0.74	2.0
C-1	CHICK1	10-yr Local	Chickasaw	Latigo to Colt	U-12	36" RCP	660	78	CHICK1	0.25	1.4
	CHICK2	10-yr Local	Chickasaw	Colt to Equestrian	U-12	54" RCP	1300	248	CCHICK2	0.36	1.6
C-1	CHLLA1	10-yr Local	Cholla	Dondero to Metropolitan	U-5	36" RCP	1410	43	CP42	0.09	2.1
C-1	CNTR1	10-yr Local	Major	Harris to Coronado	U-8	36" RCP	760	110	CP28-1	0.22	2.4
	CNTR2	10-yr Local	Major	Coronado to Burkholder	U-5 & U-8	42" RCP	1400	221	CP46-1	0.29	2.3
	CNTR3	100-yr Local	Center	Burkholder to Fir	U-5	54" RCP	2580	277	CP45-2	0.35	2.3
	CNTR4	100-yr Local	Center	Fir to Ash	U-5	60" RCP	1230	460	CP46-3	0.59	2.7
	CNTR5	100-yr Local	Center	Ash to Warm Springs	U-5	72" RCP	610	608	CP46-4	0.65	1.8
	CNTR6	100-yr Local	Center	Warm Springs to Fullerton	U-5	Conc Box 8.0'W 5.0'D	820	654	CP46-5	0.69	1.4
	CNTR7	100-yr Local	Center	Fullerton to Lake Mead Pkwy	U-2 & U-5	Conc Box 10.0'W 5.0'D	1100	722	CP46-6	0.84	1.8
C-1	EQ1	10-yr Local	Equestrian	Kennel Club to Saratoga Springs	U-12	24" RCP	540	16	C1-34A	0.06	0.5
	EQ2	10-yr Local	Equestrian	Saratoga Springs to Magic	U-12	48" RCP	800	110	CC1-34B	0.17	0.6

Local Drainage Master Plan -Facility Summary

Facility Watershed	Facility ID	Facility Designation	Roadway	Cross Streets	Figure in Volume 1	Facility Description	Length (ft.)	Local Master Drainage Study 100-YR Flow in the Facility (cfs)	COH HEC-1 Node	COH Tributary Area (sq.mi.)	Channel Slope (%)
C-1	FIR1	10-yr Local	Palo Verde	Forest to Fir	U-5	48" RCP	540	119	CP34	0.19	2.0
	FIR2	10-yr Local	Fir	Palo Verde to Center	U-5	48" RCP	1890	119	CP34	0.19	0.8
C-1	HRZN1	10-yr Local	Horizon	Mosswood to College	U-11	18" RCP	1200	10	CC1-26CE	0.25	1.0
C-1	MGC1	10-yr Local	Magic	Seville to Drake Channel	U-6	4'H Levee	1400	289	C1-56B	0.24	1.0
C-1	MISS1	10-yr Local	Mission	San Jacinto to UPRR	U-14	30" RCP	1700	30	CC1-21BE	0.31	0.6
C-1	MLBU1	10-yr Local	Malibu	Sausalito to Palo Verde	U-8	42" RCP	950	59	C1-70B	0.05	0.8
	MLBU2	10-yr Local	La Jolla	Palo Verde to Pueblo	U-8	42" RCP	1280	86	C1-29B	0.05	0.8
C-1	NWPT1	10-yr Local	Newport	Magic to Milan	U-9	36" RCP	1320	120	NWPT1	0.30	3.2
	NWPT2	10-yr Local	Newport	Milan to Racetrack	U-8 & U-9	42" RCP	1320	155	CNWPT2	0.36	2.4
	RCTRK1	100-yr Local	Racetrack	Geneva to Essex	U-2	42" RCP	1310	90	CP20	0.06	2.1
C-1	RCTRK2	100-yr Local	Racetrack	Essex to Cadiz	U-2	48" RCP	1310	190	CP21	0.37	2.4
C-1	RCTRK3	10-yr Local	Racetrack	Anchor to Warm Springs	U-5	24" RCP	1320	30	CP5	0.06	1.7
C-1	WS1	10-yr Local	Warm Springs	Future Street to Magic	U-6	24" RCP	2420	30	CP1	0.12	2.7
	WS2	10-yr Local	Warm Springs	Magic to Milan	U-6	36" RCP	1320	105	CP3	0.31	2.7
	WS3	10-yr Local	Warm Springs	Milan to Racetrack	U-5 & U-6	42" RCP	1310	205	CP4	0.43	2.7

location of each facility within the study area, the location of the facility in Volume 1 of this study, facility size, facility designation (10-year facility or 100-year facility), reference to the applicable combination points in the HEC-1 analysis, and some additional information about the facility.

3.4 EXISTING WATER AND SEWER UTILITIES

The study area encompasses a mostly developed portion of the City of Henderson. As a result, there are a significant number of existing water and sewer utilities in the roadways. Table 3.4.1 is a Utility Conflict Matrix that shows the known water and sewer facilities, available from the Clark County GIS Management Office (GISMO) information, that fall along the proposed storm drain facility alignments. This table is not a complete account of all utilities in the study area and should be used only as a guide.

Table 3.4.1 Utility Conflict Matrix

	FACILITY ID	FIGURE NO.	STREET	STORM DRAIN SIZE	LOCATION	EXISTING UTILITY SIZE AND TYPE
PITTMAN WATERSHED	BH1	U-8	BOULDER HIGHWAY	48" RCP	OCEAN	24" WATER
	BH2	U-8	BOULDER HIGHWAY	54" RCP	BASIC	8" WATER
	BH3	U-8	BOULDER HIGHWAY	60" RCP	ATLANTIC	18" WATER
	BH4	U-8	BOULDER HIGHWAY	72" RCP	LAKE MEAD PARKWAY	8" SEWER
	BH5	U-5	BOULDER HIGHWAY	8' X 5' RCB	WEST OF LAKE MEAD PARKWAY	12" SEWER
	BH5	U-4	BOULDER HIGHWAY	8' X 5' RCB	STURM	8" WATER
	BH5	U-4	BOULDER HIGHWAY	8' X 5' RCB	STURM	8" SEWER
	BH5	U-4	BOULDER HIGHWAY	8' X 5' RCB	NORTH OF STURM	8" SEWER
	BH6	U-4	BOULDER HIGHWAY	10' X 5' RCB	WATER	12" SEWER
	BURNS1	U-1	BOULDER	2:10' X 7' RCB	SUNSET	6" SEWER
	BURNS2	U-1	BURNS	20' X 8' RECT. CHNL	SUNSET	6" SEWER
	BURNS2	U-1	BURNS	20' X 8' RECT. CHNL	SUNSET	6" WATER
	BURNS2	U-1	BURNS	20' X 8' RECT. CHNL	SUNSET	6" WATER
	BURNS2	U-1	BURNS	20' X 8' RECT. CHNL	GALLERIA	14" WATER
	BURNS2	U-1	BURNS	20' X 8' RECT. CHNL	GALLERIA	8" WATER
	BURNS2	U-1	BURNS	20' X 8' RECT. CHNL	GALLERIA	36" WATER
	BURNS2	U-1	BURNS	20' X 8' RECT. CHNL	GALLERIA	8" SEWER
	BURNS2	U-1	BURNS	20' X 8' RECT. CHNL	GALLERIA	48" SEWER
	CC1	U-8	COUNTRY CLUB	42" RCP	SKYLINE TO CANYON	8" WATER
	CC1	U-8	COUNTRY CLUB	42" RCP	SKYLINE TO CANYON	6" SEWER
	CC1	U-8	COUNTRY CLUB	42" RCP	CANYON	8" WATER
	CC1	U-8	COUNTRY CLUB	42" RCP	CANYON	8" SEWER
	CC2	U-7 & U-8	COUNTRY CLUB	42" RCP	CANYON TO BLACKRIDGE	8" WATER
	CC2	U-7 & U-8	COUNTRY CLUB	42" RCP	CANYON TO BLACKRIDGE	6" SEWER
	CC2	U-7 & U-8	COUNTRY CLUB	42" RCP	BLACKRIDGE	8" WATER
	CC2	U-7 & U-8	COUNTRY CLUB	42" RCP	BLACKRIDGE	8" SEWER
	CC3	U-7	BLACKRIDGE	42" RCP	COUNTRY CLUB TO ROCHELL	8" WATER
	CC3	U-7	BLACKRIDGE	42" RCP	COUNTRY CLUB TO ROCHELL	6" SEWER
	CC3	U-7	BLACKRIDGE	42" RCP	HIGHLAND	6" WATER
	CC3	U-7	BLACKRIDGE	42" RCP	HIGHLAND	8" SEWER
	CC3	U-7	BLACKRIDGE	42" RCP	CYPRESS	8" WATER
	CC3	U-7	BLACKRIDGE	42" RCP	MULBERRY	6" WATER
	CC3	U-7	BLACKRIDGE	42" RCP	MULBERRY	8" SEWER
	CC3	U-7	BLACKRIDGE	42" RCP	ROCHELL	8" WATER
	CC3	U-7	BLACKRIDGE	42" RCP	ROCHELL	6" SEWER
	CC4	U-7	BLACKRIDGE	42" RCP	ROCHELL TO UPRR	10" WATER
	CC4	U-7	BLACKRIDGE	42" RCP	ROCHELL TO UPRR	8" SEWER
	CC4	U-7	BLACKRIDGE	42" RCP	SHERWOOD	8" WATER
	CC4	U-7	BLACKRIDGE	42" RCP	LAVAL	8" WATER
	CC4	U-7	BLACKRIDGE	42" RCP	LAVAL	8" SEWER
	CC4	U-7	BLACKRIDGE	42" RCP	FAIRWAY	8" WATER
	CC4	U-7	BLACKRIDGE	42" RCP	FAIRWAY	8" SEWER
	GALL1	U-1	GALLERIA	42" RCP	WARD TO MOSER	14" WATER
	GALL1	U-1	GALLERIA	42" RCP	WARD TO MOSER	8" WATER
	GALL1	U-1	GALLERIA	42" RCP	WARD TO MOSER	30" SEWER
	GALL1	U-1	GALLERIA	42" RCP	WARD TO MOSER	48" SEWER

Table 3.4.1 Utility Conflict Matrix

	FACILITY ID	FIGURE NO.	STREET	STORM DRAIN SIZE	LOCATION	EXISTING UTILITY SIZE AND TYPE
PITTMAN WATERSHED	GALL2	U-1	GALLERIA	60" RCP	MOSER TO HAREN	36" SEWER
	GALL2	U-1	GALLERIA	60" RCP	MOSER TO HAREN	48" SEWER
	GALL2	U-1	GALLERIA	60" RCP	MOSER TO HAREN	24" SEWER
	GALL2	U-1	GALLERIA	60" RCP	MOSER TO HAREN	8" WATER
	GALL2	U-1	GALLERIA	60" RCP	MOSER	8" WATER
	TL1	U-7	TIGER LILY	18" RCP	VIEWMONT TO EXISTING 18"	8" WATER
	TL1	U-7	TIGER LILY	18" RCP	VIEWMONT TO EXISTING 18"	12" SEWER
	TL1	U-7	TIGER LILY	18" RCP	VIEWMONT TO EXISTING 18"	8" WATER
	TL1	U-7	TIGER LILY	18" RCP	VIEWMONT	8" WATER
	TL1	U-7	TIGER LILY	18" RCP	VIEWMONT	8" WATER
	TL1	U-7	TIGER LILY	18" RCP	VIEWMONT	8" SEWER
	TL1	U-7	TIGER LILY	18" RCP	WATERWHEEL FALLS	8" WATER
	TL1	U-7	TIGER LILY	18" RCP	WATERWHEEL FALLS	8" WATER
	TL1	U-7	TIGER LILY	18" RCP	WATERWHEEL FALLS	8" SEWER
	WATR1	U-4	WATER	36" RCP	LAKE MEAD PARKWAY	8" WATER
	WATR1	U-4	WATER	36" RCP	LAKE MEAD PARKWAY	8" SEWER
	WATR1	U-4	WATER	36" RCP	LAKE MEAD PARKWAY	8" SEWER
	WATR1	U-4	WATER	36" RCP	LAKE MEAD PARKWAY	10" WATER
	WATR1	U-7	WATER	36" RCP	VICTORY	8" SEWER
	WATR1	U-7	WATER	36" RCP	VICTORY	12" SEWER
	WATR1	U-4	WATER	36" RCP	BOULDER HIGHWAY	8" SEWER
C-1 WATERSHED	APLSA1	U-12 & U-15	APPALOOSA	42" RCP	OLD VEGAS TO WAGONWHEEL	10" WATER
	APLSA1	U-12 & U-15	APPALOOSA	42" RCP	OLD VEGAS TO WAGONWHEEL	10" SEWER
	APLSA2	U-12 & U-15	APPALOOSA	60" RCP	WAGONWHEEL TO SUNDOWN	10" WATER
	APLSA2	U-12 & U-15	APPALOOSA	60" RCP	WAGONWHEEL TO SUNDOWN	18" SEWER
	APLSA2	U-12 & U-15	APPALOOSA	60" RCP	WAGONWHEEL	8" WATER
	APLSA2	U-12 & U-15	APPALOOSA	60" RCP	WAGONWHEEL	8" SEWER
	APLSA2	U-12 & U-15	APPALOOSA	60" RCP	TURF	8" SEWER
	APLSA2	U-12 & U-15	APPALOOSA	60" RCP	TUMBLEWEED	6" WATER
	APLSA2	U-12 & U-15	APPALOOSA	60" RCP	TUMBLEWEED	8" SEWER
	APLSA2	U-12 & U-15	APPALOOSA	60" RCP	STIRRUP	8" WATER
	APLSA2	U-12 & U-15	APPALOOSA	60" RCP	STIRRUP	8" SEWER
	APLSA2	U-12 & U-15	APPALOOSA	60" RCP	SUNDOWN	8" WATER
	APLSA2	U-12 & U-15	APPALOOSA	60" RCP	SUNDOWN	8" SEWER
	APLSA3	U-12	APPALOOSA	60" RCP	SUNDOWN TO PALOMINO	10" WATER
	APLSA3	U-12	APPALOOSA	60" RCP	SUNDOWN TO PALOMINO	15" SEWER
	APLSA3	U-12	APPALOOSA	60" RCP	ROCKINGHORSE	8" WATER
	APLSA3	U-12	APPALOOSA	60" RCP	ROCKINGHORSE	8" SEWER
	APLSA3	U-12	APPALOOSA	60" RCP	RAWHIDE	8" SEWER
	APLSA3	U-12	APPALOOSA	60" RCP	QUARTERHORSE	10" WATER
	APLSA3	U-12	APPALOOSA	60" RCP	QUARTERHORSE	8" SEWER
	APLSA3	U-12	APPALOOSA	60" RCP	PALOMINO	10" WATER
	APLSA3	U-12	APPALOOSA	60" RCP	PALOMINO	8" SEWER
	APLSA4	U-12	APPALOOSA	66" RCP	PALOMINO TO LATIGO	10" WATER
	APLSA4	U-12	APPALOOSA	66" RCP	PALOMINO TO COLT	18" SEWER
	APLSA4	U-12	APPALOOSA	66" RCP	MUSTANG	8" WATER

Table 3.4.1 Utility Conflict Matrix

	FACILITY ID	FIGURE NO.	STREET	STORM DRAIN SIZE	LOCATION	EXISTING UTILITY SIZE AND TYPE
C-1 WATERSHED	APLSA4	U-12	APPALOOSA	66" RCP	MUSTANG	8" SEWER
	APLSA4	U-12	APPALOOSA	66" RCP	LATIGO	8" WATER
	APLSA4	U-12	APPALOOSA	66" RCP	LATIGO	6" SEWER
	APLSA4	U-12	APPALOOSA	66" RCP	DERBY	8" SEWER
	APLSA4	U-12	APPALOOSA	66" RCP	COLT	8" WATER
	APLSA4	U-12	APPALOOSA	66" RCP	COLT	8" SEWER
	APLSA5	U-12	APPALOOSA	78" RCP	COLT TO EQUESTRIAN	8" WATER
	APLSA5	U-12	APPALOOSA	78" RCP	COLT TO EQUESTRIAN	18" SEWER
	APLSA5	U-12	APPALOOSA	78" RCP	BRIDLE	8" SEWER
	APLSA5	U-12	APPALOOSA	78" RCP	ARABIAN	8" SEWER
	APLSA5	U-12	APPALOOSA	78" RCP	ALBINO	8" SEWER
	APLSA5	U-12	APPALOOSA	78" RCP	EQUESTRIAN	24" WATER
	APLSA5	U-12	APPALOOSA	78" RCP	EQUESTRIAN	8" WATER
	APLSA5	U-12	APPALOOSA	78" RCP	EQUESTRIAN	8" SEWER
	ASH1	U-5	CENTER	48" RCP	ASH	21"SEWER
	ASH1	U-5	CENTER	48" RCP	ASH	12" WATER
	ASH1	U-5	CENTER	48" RCP	ASH	6" WATER
	ASH1	U-5	MAJOR	48" RCP	ASH	40" WATER
	ASH1	U-5	MAJOR	48" RCP	ASH	36" WATER
	ASH1	U-5	MAJOR	48" RCP	ASH	8" WATER
	ASH1	U-5	MAJOR	48" RCP	ASH	8" SEWER
	BURK2	U-8 & U-9	BURKHOLDER	48" RCP	RACETRACK	8" WATER
	BURK3	U-5	BURKHOLDER	36" RCP	MAJOR	40" WATER
	BURK3	U-5	BURKHOLDER	36" RCP	MAJOR	36" WATER
	BURK3	U-5	BURKHOLDER	36" RCP	MAJOR	14" WATER
	BURK3	U-5	BURKHOLDER	36" RCP	MAJOR	8" WATER
	BURK3	U-5	BURKHOLDER	36" RCP	CENTER	21" SEWER
	BURK3	U-5	BURKHOLDER	36" RCP	CENTER	15" SEWER
	BURK3	U-5	BURKHOLDER	36" RCP	CABRILLO	8" WATER
	BURK3	U-5	BURKHOLDER	36" RCP	PALO VERDE	8" WATER
	BURK3	U-5	BURKHOLDER	36" RCP	PALO VERDE	10" WATER
	BURK3	U-5	BURKHOLDER	36" RCP	PALO VERDE	10" SEWER
	BURK3	U-5	BURKHOLDER	36" RCP	CENTER	15" SEWER
	CADIZ1	U-3	CADIZ	48" RCP	ORLEANS	8" WATER
	CADIZ2	U-2	CADIZ	54" RCP	BETWEEN KIEL AND RACETRACK	40" WATER
	CADIZ2	U-2	CADIZ	54" RCP	BETWEEN KIEL AND RACETRACK	36" WATER
	CADIZ2	U-2	CADIZ	54" RCP	KIEL	8" WATER
	CADIZ2	U-3	CADIZ	54" RCP	BETWEEN KIEL AND MILAN	8" SEWER
	CADIZ2	U-3	CADIZ	54" RCP	MILAN	8" WATER
	CADIZ3	U-2	CADIZ	72" RCP	BETWEEN PUEBLO AND DAKAR	8" WATER
	CADIZ3	U-2	CADIZ	72" RCP	EMDEN	8" WATER
	CADIZ3	U-2	CADIZ	72" RCP	FIFE	8" WATER
	CADIZ3	U-2	CADIZ	72" RCP	HULL	8" WATER
	CADIZ3	U-2	CADIZ	72" RCP	RACETRACK	8" WATER
	CHICK1	U-12	CHICKASAW	36" RCP	LATIGO TO COLT	2-8" WATER
	CHICK1	U-12	CHICKASAW	36" RCP	LATIGO TO COLT	2-8" SEWER

Table 3.4.1 Utility Conflict Matrix

	FACILITY ID	FIGURE NO.	STREET	STORM DRAIN SIZE	LOCATION	EXISTING UTILITY SIZE AND TYPE
C-1 WATERSHED	CHICK1	U-12	CHICKASAW	36" RCP	LATIGO	8" WATER
	CHICK1	U-12	CHICKASAW	36" RCP	LATIGO	8" SEWER
	CHICK1	U-12	CHICKASAW	36" RCP	COLT	3-8" WATER
	CHICK1	U-12	CHICKASAW	36" RCP	COLT	2-8" SEWER
	CHICK2	U-12	CHICKASAW	54" RCP	COLT TO EQUESTRIAN	8" WATER
	CHICK2	U-12	CHICKASAW	54" RCP	COLT TO EQUESTRIAN	8" SEWER
	CHICK2	U-12	CHICKASAW	54" RCP	BURGUNDY	8" WATER
	CHICK2	U-12	CHICKASAW	54" RCP	EQUESTRIAN	24" WATER
	CHICK2	U-12	CHICKASAW	54" RCP	EQUESTRIAN	10" WATER
	CHICK2	U-12	CHICKASAW	54" RCP	EQUESTRIAN	18" SEWER
	CHICK2	U-12	CHICKASAW	54" RCP	EQUESTRIAN	8" SEWER
	CHLLA1	U-5	CHOLLA	36" RCP	NORTH OF DONDERO	8" SEWER
	CNTR1	U-8	MAJOR	36" RCP	HARRIS	10" WATER
	CNTR1	U-8	MAJOR	36" RCP	CORONADO	40" WATER
	CNTR1	U-8	MAJOR	36" RCP	CORONADO	36" WATER
	CNTR1	U-8	MAJOR	36" RCP	CORONADO	14" WATER
	CNTR1	U-8	MAJOR	36" RCP	CORONADO	8" SEWER
	CNTR1	U-5	CENTER	36" RCP	MAJOR	8" WATER
	CNTR1	U-5	CENTER	36" RCP	MAJOR	18" WATER
	CNTR1	U-5	CENTER	36" RCP	MAJOR	12" WATER
	CNTR2	U-8	MAJOR	42" RCP	CORONADO	14" SEWER
	CNTR2 / 3	U-5	CENTER	42" RCP	BURKHOLDER	14" WATER
	CNTR4	U-5	CENTER	60" RCP	FIR	10" WATER
	CNTR4	U-5	CENTER	60" RCP	ASH	8" WATER
	CNTR5	U-5	CENTER	72" RCP	WARM SPRINGS	8" WATER
	CNTR5	U-5	CENTER	72" RCP	WARM SPRINGS	18" WATER
	CNTR7	U-2	CENTER	10' X 5' RCB	FULLERTON	21" SEWER
	EQ1	U-12	EQUESTRIAN	24" RCP	NNEL CLUB TO SARATOGA SPRIN	24" WATER
	EQ1	U-12	EQUESTRIAN	24" RCP	SARATOGA SPRINGS	8" WATER
	EQ2	U-12	EQUESTRIAN	48" RCP	SARATOGA SPRINGS TO MAGIC	24" WATER
	FIR2	U-5	FIR	48" RCP	CENTER	21" SEWER
	FIR2	U-5	FIR	48" RCP	CENTER	8" WATER
	FIR2	U-5	FIR	48" RCP	PONDEROSA	8" WATER
	FIR2	U-5	FIR	48" RCP	PALO VERDE	8" WATER
	HRZN1	U-11	HORIZON	18" RCP	MOSSWOOD TO COLLEGE	10" WATER
	HRZN1	U-11	HORIZON	18" RCP	MOSSWOOD	8" WATER
	HRZN1	U-11	HORIZON	18" RCP	MOSSWOOD	10" SEWER
	HRZN1	U-11	HORIZON	18" RCP	TRUFFLES	6", 8" WATER
	HRZN1	U-11	HORIZON	18" RCP	REBEL	8" WATER
	HRZN1	U-11	HORIZON	18" RCP	REBEL TO COLLEGE	10" WATER
	HRZN1	U-11	HORIZON	18" RCP	REBEL TO COLLEGE	8" SEWER
	HRZN1	U-11	HORIZON	18" RCP	BETWEEN REBEL AND COLLEGE	6" WATER
	HRZN1	U-11	HORIZON	18" RCP	COLLEGE	8" WATER
	HRZN1	U-11	HORIZON	18" RCP	COLLEGE	12" SEWER
	MAJ1	U-8	HAZEL	18"RCP	HAZEL	8" SEWER
	MAJ1	U-8	HAZEL	18"RCP	MAJOR	8" SEWER

Table 3.4.1 Utility Conflict Matrix

	FACILITY ID	FIGURE NO.	STREET	STORM DRAIN SIZE	LOCATION	EXISTING UTILITY SIZE AND TYPE
C-1 WATERSHED	MAJ2	U-8	MAJOR	24" RCP	WATER	8" WATER
	MAJ2	U-8	MAJOR	24" RCP	NATIONAL	8" WATER
	MAJ2	U-8	MAJOR	24" RCP	FEDERAL	8" WATER
	MAJ2	U-8	MAJOR	24" RCP	HAYNES	8" SEWER
	MAJ2	U-8	MAJOR	24" RCP	HAYNES	12" WATER
	MAJ2	U-8	MAJOR	24" RCP	HAYNES	24" WATER
	MISS1	U-14	MISSION	30" RCP	SAN JACINTO TO UPRR	8" WATER
	MISS1	U-14	MISSION	30" RCP	SAN JACINTO TO UPRR	15" SEWER
	MISS1	U-14	MISSION	30" RCP	SAN JACINTO TO ABILENE	8" WATER
	MISS1	U-14	MISSION	30" RCP	SAN JACINTO	10" WATER
	MISS1	U-14	MISSION	30" RCP	SAN JACINTO	8" SEWER
	MISS1	U-14	MISSION	30" RCP	BILLINGS	8" WATER
	MISS1	U-14	MISSION	30" RCP	DODGE	8" WATER
	MISS1	U-14	MISSION	30" RCP	ABILENE TO UPRR	10" WATER
	MISS1	U-14	MISSION	30" RCP	ABILENE	8" WATER
	MISS1	U-14	MISSION	30" RCP	ABILENE	8" SEWER
	MISS1	U-14	MISSION	30" RCP	BIG HORN	8" WATER
	MISS1	U-14	MISSION	30" RCP	PLAINS	8" WATER
	MISS1	U-14	MISSION	30" RCP	UPRR	8" SEWER
	MISS1	U-14	MISSION	30" RCP	UPRR	15" SEWER
	MLBU1	U-8	MALIBU	42" RCP	LIDO	8" WATER
	MLBU1	U-8	MALIBU	42" RCP	LIDO	8" SEWER
	MLBU1	U-8	MALIBU	42" RCP	PALO VERDE	8" WATER
	MLBU1	U-8	MALIBU	42" RCP	PALO VERDE	10" WATER
	MLBU1	U-8	MALIBU	42" RCP	PALO VERDE	8" SEWER
	MLBU2	U-8	LA JOLLA	42" RCP	PUEBLO	8" WATER
	MLBU2	U-8	LA JOLLA	42" RCP	PUEBLO	8" SEWER
	NWPT1	U-9	NEWPORT	36" RCP	MAGIC TO MILAN	10" WATER
	NWPT1	U-9	NEWPORT	36" RCP	MAGIC	16" WATER
	NWPT1	U-9	NEWPORT	36" RCP	BET TWICE	8" WATER
	NWPT2	U-8 & U-9	NEWPORT	42" RCP	PINCAY	8" WATER
	NWPT2	U-8 & U-9	NEWPORT	42" RCP	DURAN	8" WATER
	NWPT2	U-8 & U-9	NEWPORT	42" RCP	RACETRACK	10" WATER
	NWPT2	U-8 & U-9	NEWPORT	42" RCP	RACETRACK	18" SEWER
	NWPT2	U-8 & U-9	NEWPORT	42" RCP	RACETRACK	10" SEWER
	RCTRK1	U-2	RACETRACK	42" RCP	FIRTH	8" WATER
	RCTRK1	U-2	RACETRACK	42" RCP	GENEVA	8" WATER
	RCTRK2	U-2	RACETRACK	48" RCP	CADIZ	8" WATER
	RCTRK2	U-2	RACETRACK	48" RCP	BETWEEN ESSEX AND DUBLIN	40" WATER
	RCTRK2	U-2	RACETRACK	48" RCP	BETWEEN ESSEX AND DUBLIN	36" WATER
	RCTRK2	U-2	RACETRACK	48" RCP	ESSEX	10" WATER
	RCTRK3	U-5	RACETRACK	24" RCP	WARM SPRINGS	8" WATER
	WS3	U-5	WARM SPRINGS	42" RCP	KIEL	8" WATER
	WS3	U-5	WARM SPRINGS	42" RCP	BETWEEN KIEL AND MILAN	8" SEWER
	WS3	U-6	WARM SPRINGS	42" RCP	MILAN	8" WATER
	WS3	U-5	WARM SPRINGS	42" RCP	RACETRACK	12" WATER

3.5 FACILITY COST ANALYSIS

Facility cost analysis for this Local Drainage Master Plan study was performed using the CCRFCD cost tool. Refer to the CD included in Volume 1 of this study to see the cost tool program used for this cost analysis. The cost tool program is set up to estimate the facility cost as well as the associated "minor component" costs such as mobilization, traffic control, quality control, utility relocation, structure removal, reinforced concrete, type II aggregate, soil cement, gabions, riprap, basin excavation, channel excavation, chainlink fencing, manholes drop inlets, lateral pipe, roadway replacement, and safety rail. A summary of the results has been presented below in Table 3.5.1. Refer to Table 3.5.3 for a detailed breakout of facility costs.

TABLE 3.5.1 – FACILITY COST ANALYSIS

Facility ID	Roadway	Cross Streets	Facility Description	Length (ft.)	100-YR Flow in the Facility (cfs)	Total Facility Cost ($ x 1,000)
PITTMAN WATERSHED						
BH1	Boulder Highway	Major to Ocean	48" RCP	700	205	307
BH2	Boulder Highway	Ocean to Basic	54" RCP	880	281	415
BH3	Boulder Highway	Basic to Texas	60" RCP	1,780	363	914
BH4	Boulder Highway	Texas to Lake Mead	72" RCP	1,370	459	832
BH5	Boulder Highway	Lake Mead to Water	Conc Box 8.0'W 5.0'D	3,000	636	3,254
BH6	Boulder Highway	Water to Pittman Pabco	Conc Box 10.0'W 5.0'D	2,000	1095	2,410
BURNS1	Burns Rd	Sunset to Burns	Conc Box 2:10.0'W 7.0'D	750	2442	1,496
BURNS2	Country Club	Boulder to Galleria	Conc Chnl 20.0'W 8.0'D 0:1 SS	1,800	2645	1,504
CC1	Country Club	Skyline to Canyon	42" RCP	650	60	267
CC2	Blackridge	Canyon to Blackridge	42" RCP	650	100	267
CC3	Blackridge	Country Club to Rochell	42" RCP	1,320	100	533
CC4	Galleria Dr	Rochell to UPRR	42" RCP	1,300	100	524
GALL1	Galleria Dr	Ward to Moser	48" RCP	1,320	100	577
GALL2	Hazel	Moser to Haren	60" RCP	840	200	433
MAJ1	Major	Hazel to Major	18" RCP	370	6	118
MAJ2	Tiger Lily	Hazel to Boulder Highway	24" RCP	1,330	6	439
TL1	Water	Viewmont to Existing 18"	18" RCP	350	15	110
WATR1	Boulder Highway	Victory to Boulder	36" RCP	3,050	70	1,150
C-1 WATERSHED						
APLSA1	Wagonwheel	Old Vegas to Appaloosa	42" RCP	400	122	160
APLSA2	Appaloosa	Wagonwheel to Sundown	60" RCP	1,460	264	756

TABLE 3.5.1 – FACILITY COST ANALYSIS (cont.)

Facility ID	Roadway	Cross Streets	Facility Description	Length (ft.)	100-YR Flow in the Facility (cfs)	Total Facility Cost ($ x 1,000)
APLSA3	Appaloosa	Sundown to Palomino	60" RCP	1,300	336	668
APLSA4	Appaloosa	Palomino to Colt	66" RCP	1,320	405	737
APLSA5	Appaloosa	Colt to Equestrian	78" RCP	1,300	535	861
ASH1	Ash	Major to Center	48" RCP	2,010	90	880
BURK1	Burkholder	Magic to Milan	42" RCP	1,320	174	533
BURK2	Burkholder	Milan to Racetrack	48" RCP	1,320	202	577
BURK3	Burkholder	Palo Verde to Center	36" RCP	1,280	59	480
CADIZ1	Cadiz	Magic to Milan	48" RCP	1,300	136	566
CADIZ2	Cadiz	Milan to Racetrack	54" RCP	1,320	289	624
CADIZ3	Cadiz	Racetrack to Pueblo	72" RCP	2,630	652	1,606
CHICK1	Chickasaw	Latigo to Colt	36" RCP	660	78	251
CHICK2	Chickasaw	Colt to Equestrian	54" RCP	1,300	248	613
CHLLA1	Cholla	Dondero to Metropolitan	36" RCP	1,410	43	532
CNTR1	Major	Harris to Coronado	36" RCP	760	110	287
CNTR2	Major	Coronado to Burkholder	42" RCP	1,400	221	570
CNTR3	Center	Burkholder to Fir	54" RCP	2,580	277	1,219
CNTR4	Center	Fir to Ash	60" RCP	1,230	460	633
CNTR5	Center	Ash to Warm Springs	72" RCP	610	608	375
CNTR6	Center	Warm Springs to Fullerton	Conc Box 8.0'W 5.0'D	820	654	889
CNTR7	Center	Fullerton to Lake Mead Pkwy	Conc Box 10.0'W 5.0'D	1,100	722	1,327
EQ1	Equestrian	Kennel Club to Saratoga Springs	24" RCP	540	16	177
EQ2	Equestrian	Saratoga Springs to Magic	48" RCP	800	110	350
FIR1	Palo Verde	Forest to Fir	48" RCP	540	119	233
FIR2	Fir	Palo Verde to Center	48" RCP	1,890	119	828
HRZN1	Horizon	Mosswood to College	18" RCP	1,200	10	381
MGC1	Magic	Seville to Drake Channel	4'H Levee	1,400	289	152
MISS1	Mission	San Jacinto to UPRR	30" RCP	1,700	30	599
MLBU1	Malibu	Sausalito to Palo Verde	42" RCP	950	59	381
MLBU2	La Jolla	Palo Verde to Pueblo	42" RCP	1,280	86	516
NWPT1	Newport	Magic to Milan	36" RCP	1,320	120	496
NWPT2	Newport	Milan to Racetrack	42" RCP	1,320	155	533
RCTRK1	Racetrack	Geneva to Essex	42" RCP	1,310	90	528

TABLE 3.5.1 – FACILITY COST ANALYSIS (cont.)

Facility ID	Roadway	Cross Streets	Facility Description	Length (ft.)	100-YR Flow in the Facility (cfs)	Total Facility Cost ($ x 1,000)
RCTRK2	Racetrack	Essex to Cadiz	48" RCP	1,310	190	528
RCTRK3	Racetrack	Anchor to Warm Springs	24" RCP	1,320	30	436
WS1	Warm Springs	Future Street to Magic	24" RCP	2,420	30	803
WS2	Warm Springs	Magic to Milan	36" RCP	1,320	105	496
WS3	Warm Springs	Milan to Racetrack	42" RCP	1,310	205	528

TABLE 3.5.2 – FACILITY COST TOTALS

Watershed	Total Cost of Proposed Facilities		
	Design and Admin	Construction Cost	Total
C-1 Watershed	$3,049,000	$20,060,000	$23,109,000
Pittman Watershed	$2,054,000	$13,496,000	$15,550,000

Note: values determined per the 2002 MPU cost tool

Table 3.5.3 – Cost Tool Results on the next pages shows a breakout of the costs associated with the major and minor components of each of the storm drain facilities proposed with this study. This table gives a more detailed look at the total cost for each facility.

TABLE 3.5.3 - COST TOOL RESULTS

PITTMAN WATERSHED

BH1	48" RCP on Boulder Highway	Planning Level	17	RCP Storm Drain Circular	
2002 MPU					
Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	700	lf	157	$109,773.00
1	Mobilization	202998	%	0.07	$14,209.86
2	Traffic Control	202998	%	0.02	$4,059.96
3	Quality Control	202998	%	0.02	$3,044.97
4	Utility Relocation	202998	%	0.06	$12,179.88
5	Structure Removal	202998	%	0.05	$10,149.90
17	Manholes	2	ea	4,000.00	$8,000.00
18	Drop Inlets	70	lf	750.00	$52,500.00
19	Lateral Pipes - 18" to 36"	175	lf	103.00	$18,025.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	9800	sf	1.50	$14,700.00
101	Design and Administration	202998	%	0.20	$40,599.60
104	Contingency	202998	%	0.10	$20,299.80
					$307,541.97

PITTMAN WATERSHED

BH2	54" RCP on Boulder Highway	Planning Level	17	RCP Storm Drain Circular	
2002 MPU					
Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	880	lf	180	$158,738.31
1	Mobilization	274538.3125	%	0.07	$19,217.68
2	Traffic Control	274538.3125	%	0.02	$5,490.77
3	Quality Control	274538.3125	%	0.02	$4,118.07
4	Utility Relocation	274538.3125	%	0.06	$16,472.30
5	Structure Removal	274538.3125	%	0.05	$13,726.92
17	Manholes	2	ea	4,000.00	$8,000.00
18	Drop Inlets	88	lf	750.00	$66,000.00
19	Lateral Pipes - 18" to 36"	220	lf	103.00	$22,660.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	12760	sf	1.50	$19,140.00
101	Design and Administration	274538.3125	%	0.20	$54,907.66
104	Contingency	274538.3125	%	0.10	$27,453.83
					$415,925.54

PITTMAN WATERSHED

BH3	60" RCP on Boulder Highway	Planning Level	17	RCP Storm Drain Circular	
2002 MPU					
Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1780	lf	207	$367,966.54
1	Mobilization	603351.5625	%	0.07	$42,234.61
2	Traffic Control	603351.5625	%	0.02	$12,067.03
3	Quality Control	603351.5625	%	0.02	$9,050.27
4	Utility Relocation	603351.5625	%	0.06	$36,201.09
5	Structure Removal	603351.5625	%	0.05	$30,167.58
17	Manholes	4	ea	4,000.00	$16,000.00
18	Drop Inlets	178	lf	750.00	$133,500.00
19	Lateral Pipes - 18" to 36"	445	lf	103.00	$45,835.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	26700	sf	1.50	$40,050.00
101	Design and Administration	603351.5625	%	0.20	$120,670.31
104	Contingency	603351.5625	%	0.10	$60,335.16
					$914,077.59

PITTMAN WATERSHED

BH4	72" RCP on Boulder Highway	Planning Level	17	RCP Storm Drain Circular	
2002 MPU					
Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1370	lf	268	$366,772.01
1	Mobilization	549679.5	%	0.07	$38,477.57
2	Traffic Control	549679.5	%	0.02	$10,993.59
3	Quality Control	549679.5	%	0.02	$8,245.19
4	Utility Relocation	549679.5	%	0.06	$32,980.77
5	Structure Removal	549679.5	%	0.05	$27,483.98
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	137	lf	750.00	$102,750.00
19	Lateral Pipes - 18" to 36"	342.5	lf	103.00	$35,277.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	21920	sf	1.50	$32,880.00
101	Design and Administration	549679.5	%	0.20	$109,935.90
104	Contingency	549679.5	%	0.10	$54,967.95
					$832,764.46

PITTMAN WATERSHED

BH5	Conc Box 8'W x 5'D on Boulder Highway	Planning Level	26	RCB Storm Drain	
2002 MPU					
Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	3000	lf	578	$1,732,949.60
1	Mobilization	2148199.5	%	0.07	$150,373.97
2	Traffic Control	2148199.5	%	0.02	$42,963.99
3	Quality Control	2148199.5	%	0.02	$32,222.99
4	Utility Relocation	2148199.5	%	0.06	$128,891.97
5	Structure Removal	2148199.5	%	0.05	$107,409.98
17	Manholes	8	ea	4,000.00	$32,000.00
18	Drop Inlets	300	lf	750.00	$225,000.00
19	Lateral Pipes - 18" to 36"	750	lf	103.00	$77,250.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	54000	sf	1.50	$81,000.00
101	Design and Administration	2148199.5	%	0.20	$429,639.93
104	Contingency	2148199.5	%	0.10	$214,819.96
					$3,254,522.39

TABLE 3.5.3 - COST TOOL RESULTS

PITTMAN WATERSHED

BH6	Conc Box 10'W x 5'D on Boulder Highway	Planning Level	26	RCB Storm Drain	
2002 MPU					
Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	2000	lf	655	$1,309,074.25
1	Mobilization	1590574.25	%	0.07	$111,340.20
2	Traffic Control	1590574.25	%	0.02	$31,811.48
3	Quality Control	1590574.25	%	0.02	$23,858.61
4	Utility Relocation	1590574.25	%	0.06	$95,434.45
5	Structure Removal	1590574.25	%	0.05	$79,528.71
17	Manholes	5	ea	4,000.00	$20,000.00
18	Drop Inlets	200	lf	750.00	$150,000.00
19	Lateral Pipes - 18" to 36"	500	lf	103.00	$51,500.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	40000	sf	1.50	$60,000.00
101	Design and Administration	1590574.25	%	0.20	$318,114.85
104	Contingency	1590574.25	%	0.10	$159,057.43
					$2,409,719.98

PITTMAN WATERSHED

BURNS1	Conc Box 2:10'W x 7'D on Boulder Highway	Planning Level	26	RCB Storm Drain	
2002 MPU					
Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	750	lf	1,165	$873,783.91
1	Mobilization	987846.4375	%	0.07	$69,149.25
2	Traffic Control	987846.4375	%	0.02	$19,756.93
3	Quality Control	987846.4375	%	0.02	$14,817.70
4	Utility Relocation	987846.4375	%	0.06	$59,270.78
5	Structure Removal	987846.4375	%	0.05	$49,392.32
17	Manholes	4	ea	4,000.00	$16,000.00
18	Drop Inlets	75	lf	750.00	$56,250.00
19	Lateral Pipes - 18" to 36"	187.5	lf	103.00	$19,312.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	15000	sf	1.50	$22,500.00
101	Design and Administration	987846.4375	%	0.20	$197,569.29
104	Contingency	987846.4375	%	0.10	$98,784.64
					$1,496,587.32

PITTMAN WATERSHED

BURNS2	Conc Chnl 20'W x 8'D 0:1 SS on Burns Rd	Planning Level	2	Concrete Channel Rectangular	
2002 MPU					
Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1800	sf	447	$804,240.00
1	Mobilization	992773.3125	%	0.07	$69,494.13
2	Traffic Control	992773.3125	%	0.02	$19,855.47
3	Quality Control	992773.3125	%	0.02	$14,891.60
4	Utility Relocation	992773.3125	%	0.06	$59,566.40
5	Structure Removal	992773.3125	%	0.05	$49,638.67
15	Channel Excavation	10666.66699	cy	3.50	$37,333.34
16	Fencing	3600	lf	10.00	$36,000.00
23	Safety Rail	3600	lf	32.00	$115,200.00
101	Design and Administration	992773.3125	%	0.20	$198,554.67
104	Contingency	992773.3125	%	0.10	$99,277.34
					$1,504,051.62

PITTMAN WATERSHED

CC1	42" RCP on Country Club	Planning Level	17	RCP Storm Drain Circular	
2002 MPU					
Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	650	lf	136	$88,416.35
1	Mobilization	175066.3594	%	0.07	$12,254.64
2	Traffic Control	175066.3594	%	0.02	$3,501.33
3	Quality Control	175066.3594	%	0.02	$2,626.00
4	Utility Relocation	175066.3594	%	0.06	$10,503.98
5	Structure Removal	175066.3594	%	0.05	$8,753.32
17	Manholes	2	ea	4,000.00	$8,000.00
18	Drop Inlets	65	lf	750.00	$48,750.00
19	Lateral Pipes - 18" to 36"	162.5	lf	103.00	$16,737.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	8775	sf	1.50	$13,162.50
101	Design and Administration	175066.3594	%	0.20	$35,013.27
104	Contingency	175066.3594	%	0.10	$17,506.64
					$265,225.53

PITTMAN WATERSHED

CC2	42" RCP on Country Club	Planning Level	17	RCP Storm Drain Circular	
2002 MPU					
Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	650	lf	136.03	$88,416.35
1	Mobilization	175066.3594	%	0.07	$12,254.64
2	Traffic Control	175066.3594	%	0.02	$3,501.33
3	Quality Control	175066.3594	%	0.02	$2,626.00
4	Utility Relocation	175066.3594	%	0.06	$10,503.98
5	Structure Removal	175066.3594	%	0.05	$8,753.32
17	Manholes	2	ea	4,000.00	$8,000.00
18	Drop Inlets	65	lf	750.00	$48,750.00
19	Lateral Pipes - 18" to 36"	162.5	lf	103.00	$16,737.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	8775	sf	1.50	$13,162.50
101	Design and Administration	175066.3594	%	0.20	$35,013.27
104	Contingency	175066.3594	%	0.10	$17,506.64
					$265,225.53

TABLE 3.5.3 - COST TOOL RESULTS

PITTMAN WATERSHED

CC3	42" RCP on Blackridge	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1320	lf	136	$179,553.21
1	Mobilization	351273.2188	%	0.07	$24,589.12
2	Traffic Control	351273.2188	%	0.02	$7,025.46
3	Quality Control	351273.2188	%	0.02	$5,269.10
4	Utility Relocation	351273.2188	%	0.06	$21,076.39
5	Structure Removal	351273.2188	%	0.05	$17,563.66
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	132	lf	750.00	$99,000.00
19	Lateral Pipes - 18" to 36"	330	lf	103.00	$33,990.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	17820	sf	1.50	$26,730.00
101	Design and Administration	351273.2188	%	0.20	$70,254.64
104	Contingency	351273.2188	%	0.10	$35,127.32
					$532,178.90

PITTMAN WATERSHED

CC4	42" RCP on Blackridge	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1300	lf	136	$176,832.71
1	Mobilization	346132.7188	%	0.07	$24,229.29
2	Traffic Control	346132.7188	%	0.02	$6,922.65
3	Quality Control	346132.7188	%	0.02	$5,191.99
4	Utility Relocation	346132.7188	%	0.06	$20,767.96
5	Structure Removal	346132.7188	%	0.05	$17,306.64
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	130	lf	750.00	$97,500.00
19	Lateral Pipes - 18" to 36"	325	lf	103.00	$33,475.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	17550	sf	1.50	$26,325.00
101	Design and Administration	346132.7188	%	0.20	$69,226.54
104	Contingency	346132.7188	%	0.10	$34,613.27
					$524,391.05

PITTMAN WATERSHED

GALL1	48" RCP on Galleria Dr	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1320	lf	157	$207,000.52
1	Mobilization	379710.5313	%	0.07	$26,579.74
2	Traffic Control	379710.5313	%	0.02	$7,594.21
3	Quality Control	379710.5313	%	0.02	$5,695.66
4	Utility Relocation	379710.5313	%	0.06	$22,782.63
5	Structure Removal	379710.5313	%	0.05	$18,985.53
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	132	lf	750.00	$99,000.00
19	Lateral Pipes - 18" to 36"	330	lf	103.00	$33,990.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	18480	sf	1.50	$27,720.00
101	Design and Administration	379710.5313	%	0.20	$75,942.11
104	Contingency	379710.5313	%	0.10	$37,971.05
					$575,261.45

PITTMAN WATERSHED

GALL2	60" RCP on Galleria Dr	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	840	lf	207	$173,647.13
1	Mobilization	285177.125	%	0.07	$19,962.40
2	Traffic Control	285177.125	%	0.02	$5,703.54
3	Quality Control	285177.125	%	0.02	$4,277.66
4	Utility Relocation	285177.125	%	0.06	$17,110.63
5	Structure Removal	285177.125	%	0.05	$14,258.86
17	Manholes	2	ea	4,000.00	$8,000.00
18	Drop Inlets	84	lf	750.00	$63,000.00
19	Lateral Pipes - 18" to 36"	210	lf	103.00	$21,630.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	12600	sf	1.50	$18,900.00
101	Design and Administration	285177.125	%	0.20	$57,035.43
104	Contingency	285177.125	%	0.10	$28,517.71
					$432,043.36

PITTMAN WATERSHED

MAJ1	18" RCP on Hazel	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	370	lf	81	$29,813.14
1	Mobilization	77473.14063	%	0.07	$5,423.12
2	Traffic Control	77473.14063	%	0.02	$1,549.46
3	Quality Control	77473.14063	%	0.02	$1,162.10
4	Utility Relocation	77473.14063	%	0.06	$4,648.39
5	Structure Removal	77473.14063	%	0.05	$3,873.66
17	Manholes	1	ea	4,000.00	$4,000.00
18	Drop Inlets	37	lf	750.00	$27,750.00
19	Lateral Pipes - 18" to 36"	92.5	lf	103.00	$9,527.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	4255	sf	1.50	$6,382.50
101	Design and Administration	77473.14063	%	0.20	$15,494.63
104	Contingency	77473.14063	%	0.10	$7,747.31
					$117,371.81

TABLE 3.5.3 - COST TOOL RESULTS

PITTMAN WATERSHED

MAJ2	24" RCP on Major	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1330	lf	90	$120,071.93
1	Mobilization	290009.4375	%	0.07	$20,300.66
2	Traffic Control	290009.4375	%	0.02	$5,800.19
3	Quality Control	290009.4375	%	0.02	$4,350.14
4	Utility Relocation	290009.4375	%	0.06	$17,400.57
5	Structure Removal	290009.4375	%	0.05	$14,500.47
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	133	lf	750.00	$99,750.00
19	Lateral Pipes - 18" to 36"	332.5	lf	103.00	$34,247.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	15960	sf	1.50	$23,940.00
101	Design and Administration	290009.4375	%	0.20	$58,001.89
104	Contingency	290009.4375	%	0.10	$29,000.94
					$439,364.29

PITTMAN WATERSHED

TL1	18" RCP on Tiger Lily	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	350	lf	81	$28,201.62
1	Mobilization	73501.61719	%	0.07	$5,145.11
2	Traffic Control	73501.61719	%	0.02	$1,470.03
3	Quality Control	73501.61719	%	0.02	$1,102.52
4	Utility Relocation	73501.61719	%	0.06	$4,410.10
5	Structure Removal	73501.61719	%	0.05	$3,675.08
17	Manholes	1	ea	4,000.00	$4,000.00
18	Drop Inlets	35	lf	750.00	$26,250.00
19	Lateral Pipes - 18" to 36"	87.5	lf	103.00	$9,012.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	4025	sf	1.50	$6,037.50
101	Design and Administration	73501.61719	%	0.20	$14,700.32
104	Contingency	73501.61719	%	0.10	$7,350.16
					$111,354.94

PITTMAN WATERSHED

WATR1	36" RCP on Water	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	3050	lf	118	$359,912.81
1	Mobilization	758675.3125	%	0.07	$53,107.27
2	Traffic Control	758675.3125	%	0.02	$15,173.51
3	Quality Control	758675.3125	%	0.02	$11,380.13
4	Utility Relocation	758675.3125	%	0.06	$45,520.52
5	Structure Removal	758675.3125	%	0.05	$37,933.77
17	Manholes	8	ea	4,000.00	$32,000.00
18	Drop Inlets	305	lf	750.00	$228,750.00
19	Lateral Pipes - 18" to 36"	762.5	lf	103.00	$78,537.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	39650	sf	1.50	$59,475.00
101	Design and Administration	758675.3125	%	0.20	$151,735.06
104	Contingency	758675.3125	%	0.10	$75,867.53
					$1,149,393.10

C-1 WATERSHED

APLSA1	42" RCP on Wagonwheel	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	400	lf	136	$54,410.06
1	Mobilization	106810.0625	%	0.07	$7,476.70
2	Traffic Control	106810.0625	%	0.02	$2,136.20
3	Quality Control	106810.0625	%	0.02	$1,602.15
4	Utility Relocation	106810.0625	%	0.06	$6,408.60
5	Structure Removal	106810.0625	%	0.05	$5,340.50
17	Manholes	1	ea	4,000.00	$4,000.00
18	Drop Inlets	40	lf	750.00	$30,000.00
19	Lateral Pipes - 18" to 36"	100	lf	103.00	$10,300.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	5400	sf	1.50	$8,100.00
101	Design and Administration	106810.0625	%	0.20	$21,362.01
104	Contingency	106810.0625	%	0.10	$10,681.01
					$161,817.23

C-1 WATERSHED

APLSA2	60" RCP on Appaloosa	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1460	lf	207	$301,815.25
1	Mobilization	497760.25	%	0.07	$34,843.22
2	Traffic Control	497760.25	%	0.02	$9,955.20
3	Quality Control	497760.25	%	0.02	$7,466.40
4	Utility Relocation	497760.25	%	0.06	$29,865.61
5	Structure Removal	497760.25	%	0.05	$24,888.01
17	Manholes	4	ea	4,000.00	$16,000.00
18	Drop Inlets	146	lf	750.00	$109,500.00
19	Lateral Pipes - 18" to 36"	365	lf	103.00	$37,595.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	21900	sf	1.50	$32,850.00
101	Design and Administration	497760.25	%	0.20	$99,552.05
104	Contingency	497760.25	%	0.10	$49,776.03
					$754,106.77

TABLE 3.5.3 - COST TOOL RESULTS

C-1 WATERSHED

APLSA3	60" RCP on Appaloosa	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1300	lf	207	$268,739.61
1	Mobilization	440964.5938	%	0.07	$30,867.52
2	Traffic Control	440964.5938	%	0.02	$8,819.29
3	Quality Control	440964.5938	%	0.02	$6,614.47
4	Utility Relocation	440964.5938	%	0.06	$26,457.88
5	Structure Removal	440964.5938	%	0.05	$22,048.23
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	130	lf	750.00	$97,500.00
19	Lateral Pipes - 18" to 36"	325	lf	103.00	$33,475.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	19500	sf	1.50	$29,250.00
101	Design and Administration	440964.5938	%	0.20	$88,192.92
104	Contingency	440964.5938	%	0.10	$44,096.46
					$668,061.38

C-1 WATERSHED

APLSA4	66" RCP on Appaloosa	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1320	lf	236	$311,300.30
1	Mobilization	486980.3125	%	0.07	$34,088.62
2	Traffic Control	486980.3125	%	0.02	$9,739.61
3	Quality Control	486980.3125	%	0.02	$7,304.70
4	Utility Relocation	486980.3125	%	0.06	$29,218.82
5	Structure Removal	486980.3125	%	0.05	$24,349.02
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	132	lf	750.00	$99,000.00
19	Lateral Pipes - 18" to 36"	330	lf	103.00	$33,990.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	20460	sf	1.50	$30,690.00
101	Design and Administration	486980.3125	%	0.20	$97,396.06
104	Contingency	486980.3125	%	0.10	$48,698.03
					$737,775.16

C-1 WATERSHED

APLSA5	78" RCP on Appaloosa	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1300	lf	302	$393,084.24
1	Mobilization	568234.25	%	0.07	$39,776.40
2	Traffic Control	568234.25	%	0.02	$11,364.68
3	Quality Control	568234.25	%	0.02	$8,523.51
4	Utility Relocation	568234.25	%	0.06	$34,094.05
5	Structure Removal	568234.25	%	0.05	$28,411.71
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	130	lf	750.00	$97,500.00
19	Lateral Pipes - 18" to 36"	325	lf	103.00	$33,475.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	21450	sf	1.50	$32,175.00
101	Design and Administration	568234.25	%	0.20	$113,646.85
104	Contingency	568234.25	%	0.10	$56,823.42
					$860,874.86

C-1 WATERSHED

ASH1	48" RCP on Ash	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	2010	lf	157	$315,205.34
1	Mobilization	579922.8125	%	0.07	$40,594.60
2	Traffic Control	579922.8125	%	0.02	$11,598.46
3	Quality Control	579922.8125	%	0.02	$8,698.84
4	Utility Relocation	579922.8125	%	0.06	$34,795.37
5	Structure Removal	579922.8125	%	0.05	$28,996.14
17	Manholes	5	ea	4,000.00	$20,000.00
18	Drop Inlets	201	lf	750.00	$150,750.00
19	Lateral Pipes - 18" to 36"	502.5	lf	103.00	$51,757.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	28140	sf	1.50	$42,210.00
101	Design and Administration	579922.8125	%	0.20	$115,984.57
104	Contingency	579922.8125	%	0.10	$57,992.28
					$878,583.10

C-1 WATERSHED

BURK1	42" RCP on Burkholder	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1320	lf	136	$179,553.21
1	Mobilization	351273.2188	%	0.07	$24,589.12
2	Traffic Control	351273.2188	%	0.02	$7,025.46
3	Quality Control	351273.2188	%	0.02	$5,269.10
4	Utility Relocation	351273.2188	%	0.06	$21,076.39
5	Structure Removal	351273.2188	%	0.05	$17,563.66
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	132	lf	750.00	$99,000.00
19	Lateral Pipes - 18" to 36"	330	lf	103.00	$33,990.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	17820	sf	1.50	$26,730.00
101	Design and Administration	351273.2188	%	0.20	$70,254.64
104	Contingency	351273.2188	%	0.10	$35,127.32
					$532,178.90

TABLE 3.5.3 - COST TOOL RESULTS

C-1 WATERSHED

BURK2	48" RCP on Burkholder	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1320	lf	157	$207,000.52
1	Mobilization	379710.5313	%	0.07	$26,579.74
2	Traffic Control	379710.5313	%	0.02	$7,594.21
3	Quality Control	379710.5313	%	0.02	$5,695.66
4	Utility Relocation	379710.5313	%	0.06	$22,782.63
5	Structure Removal	379710.5313	%	0.05	$18,985.53
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	132	lf	750.00	$99,000.00
19	Lateral Pipes - 18" to 36"	330	lf	103.00	$33,990.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	18480	sf	1.50	$27,720.00
101	Design and Administration	379710.5313	%	0.20	$75,942.11
104	Contingency	379710.5313	%	0.10	$37,971.05
					$575,261.45

C-1 WATERSHED

BURK3	36" RCP on Burkholder	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1280	lf	118	$151,045.38
1	Mobilization	316965.375	%	0.07	$22,187.58
2	Traffic Control	316965.375	%	0.02	$6,339.31
3	Quality Control	316965.375	%	0.02	$4,754.48
4	Utility Relocation	316965.375	%	0.06	$19,017.92
5	Structure Removal	316965.375	%	0.05	$15,848.27
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	128	lf	750.00	$96,000.00
19	Lateral Pipes - 18" to 36"	320	lf	103.00	$32,960.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	16640	sf	1.50	$24,960.00
101	Design and Administration	316965.375	%	0.20	$63,393.08
104	Contingency	316965.375	%	0.10	$31,696.54
					$480,202.56

C-1 WATERSHED

CADIZ1	48" RCP on Cadiz	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1300	lf	157	$203,864.15
1	Mobilization	374139.1563	%	0.07	$26,189.74
2	Traffic Control	374139.1563	%	0.02	$7,482.78
3	Quality Control	374139.1563	%	0.02	$5,612.09
4	Utility Relocation	374139.1563	%	0.06	$22,448.35
5	Structure Removal	374139.1563	%	0.05	$18,706.96
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	130	lf	750.00	$97,500.00
19	Lateral Pipes - 18" to 36"	325	lf	103.00	$33,475.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	18200	sf	1.50	$27,300.00
101	Design and Administration	374139.1563	%	0.20	$74,827.83
104	Contingency	374139.1563	%	0.10	$37,413.92
					$566,820.82

C-1 WATERSHED

CADIZ2	54" RCP on Cadiz	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1320	lf	180	$238,107.47
1	Mobilization	411807.4688	%	0.07	$28,826.52
2	Traffic Control	411807.4688	%	0.02	$8,236.15
3	Quality Control	411807.4688	%	0.02	$6,177.11
4	Utility Relocation	411807.4688	%	0.06	$24,708.45
5	Structure Removal	411807.4688	%	0.05	$20,590.37
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	132	lf	750.00	$99,000.00
19	Lateral Pipes - 18" to 36"	330	lf	103.00	$33,990.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	19140	sf	1.50	$28,710.00
101	Design and Administration	411807.4688	%	0.20	$82,361.50
104	Contingency	411807.4688	%	0.10	$41,180.75
					$623,888.32

C-1 WATERSHED

CADIZ3	72" RCP on Cadiz	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	2630	lf	268	$704,095.18
1	Mobilization	1060187.625	%	0.07	$74,213.14
2	Traffic Control	1060187.625	%	0.02	$21,203.75
3	Quality Control	1060187.625	%	0.02	$15,902.81
4	Utility Relocation	1060187.625	%	0.06	$63,611.26
5	Structure Removal	1060187.625	%	0.05	$53,009.38
17	Manholes	7	ea	4,000.00	$28,000.00
18	Drop Inlets	263	lf	750.00	$197,250.00
19	Lateral Pipes - 18" to 36"	657.5	lf	103.00	$67,722.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	42080	sf	1.50	$63,120.00
101	Design and Administration	1060187.625	%	0.20	$212,037.54
104	Contingency	1060187.625	%	0.10	$106,018.77
					$1,606,184.33

TABLE 3.5.3 - COST TOOL RESULTS

C-1 WATERSHED

CHICK1	36" RCP on Chickasaw	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	660	lf	118	$77,882.77
1	Mobilization	165247.7656	%	0.07	$11,567.34
2	Traffic Control	165247.7656	%	0.02	$3,304.96
3	Quality Control	165247.7656	%	0.02	$2,478.72
4	Utility Relocation	165247.7656	%	0.06	$9,914.87
5	Structure Removal	165247.7656	%	0.05	$8,262.39
17	Manholes	2	ea	4,000.00	$8,000.00
18	Drop Inlets	66	lf	750.00	$49,500.00
19	Lateral Pipes - 18" to 36"	165	lf	103.00	$16,995.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	8580	sf	1.50	$12,870.00
101	Design and Administration	165247.7656	%	0.20	$33,049.55
104	Contingency	165247.7656	%	0.10	$16,524.78
					$250,350.38

C-1 WATERSHED

CHICK2	54" RCP on Chickasaw	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1300	lf	180	$234,499.78
1	Mobilization	405749.7813	%	0.07	$28,402.48
2	Traffic Control	405749.7813	%	0.02	$8,115.00
3	Quality Control	405749.7813	%	0.02	$6,086.25
4	Utility Relocation	405749.7813	%	0.06	$24,344.99
5	Structure Removal	405749.7813	%	0.05	$20,287.49
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	130	lf	750.00	$97,500.00
19	Lateral Pipes - 18" to 36"	325	lf	103.00	$33,475.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	18850	sf	1.50	$28,275.00
101	Design and Administration	405749.7813	%	0.20	$81,149.96
104	Contingency	405749.7813	%	0.10	$40,574.98
					$614,710.93

C-1 WATERSHED

CHLLA1	36" RCP on Cholla	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1410	lf	118	$166,385.92
1	Mobilization	351938.4063	%	0.07	$24,635.69
2	Traffic Control	351938.4063	%	0.02	$7,038.77
3	Quality Control	351938.4063	%	0.02	$5,279.08
4	Utility Relocation	351938.4063	%	0.06	$21,116.30
5	Structure Removal	351938.4063	%	0.05	$17,596.92
17	Manholes	4	ea	4,000.00	$16,000.00
18	Drop Inlets	141	lf	750.00	$105,750.00
19	Lateral Pipes - 18" to 36"	352.5	lf	103.00	$36,307.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	18330	sf	1.50	$27,495.00
101	Design and Administration	351938.4063	%	0.20	$70,387.69
104	Contingency	351938.4063	%	0.10	$35,193.84
					$533,186.71

C-1 WATERSHED

CNTR1	36" RCP on Major	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	760	lf	118	$89,683.19
1	Mobilization	189073.1875	%	0.07	$13,235.12
2	Traffic Control	189073.1875	%	0.02	$3,781.46
3	Quality Control	189073.1875	%	0.02	$2,836.10
4	Utility Relocation	189073.1875	%	0.06	$11,344.39
5	Structure Removal	189073.1875	%	0.05	$9,453.66
17	Manholes	2	ea	4,000.00	$8,000.00
18	Drop Inlets	76	lf	750.00	$57,000.00
19	Lateral Pipes - 18" to 36"	190	lf	103.00	$19,570.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	9880	sf	1.50	$14,820.00
101	Design and Administration	189073.1875	%	0.20	$37,814.64
104	Contingency	189073.1875	%	0.10	$18,907.32
					$286,445.88

C-1 WATERSHED

CNTR2	42" RCP on Major	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1400	lf	136	$190,435.22
1	Mobilization	375835.2188	%	0.07	$26,308.47
2	Traffic Control	375835.2188	%	0.02	$7,516.70
3	Quality Control	375835.2188	%	0.02	$5,637.53
4	Utility Relocation	375835.2188	%	0.06	$22,550.11
5	Structure Removal	375835.2188	%	0.05	$18,791.76
17	Manholes	4	ea	4,000.00	$16,000.00
18	Drop Inlets	140	lf	750.00	$105,000.00
19	Lateral Pipes - 18" to 36"	350	lf	103.00	$36,050.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	18900	sf	1.50	$28,350.00
101	Design and Administration	375835.2188	%	0.20	$75,167.05
104	Contingency	375835.2188	%	0.10	$37,583.52
					$569,390.36

TABLE 3.5.3 - COST TOOL RESULTS

C-1 WATERSHED

CNTR3	54" RCP on Center	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	2580	lf	180	$465,391.88
1	Mobilization	805441.875	%	0.07	$56,380.93
2	Traffic Control	805441.875	%	0.02	$16,108.84
3	Quality Control	805441.875	%	0.02	$12,081.63
4	Utility Relocation	805441.875	%	0.06	$48,326.51
5	Structure Removal	805441.875	%	0.05	$40,272.09
17	Manholes	6	ea	4,000.00	$24,000.00
18	Drop Inlets	258	lf	750.00	$193,500.00
19	Lateral Pipes - 18" to 36"	645	lf	103.00	$66,435.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	37410	sf	1.50	$56,115.00
101	Design and Administration	805441.875	%	0.20	$161,088.38
104	Contingency	805441.875	%	0.10	$80,544.19
					$1,220,244.45

C-1 WATERSHED

CNTR4	60" RCP on Center	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1230	lf	207	$254,269.01
1	Mobilization	417866.5	%	0.07	$29,250.66
2	Traffic Control	417866.5	%	0.02	$8,357.33
3	Quality Control	417866.5	%	0.02	$6,268.00
4	Utility Relocation	417866.5	%	0.06	$25,071.99
5	Structure Removal	417866.5	%	0.05	$20,893.33
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	123	lf	750.00	$92,250.00
19	Lateral Pipes - 18" to 36"	307.5	lf	103.00	$31,672.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	18450	sf	1.50	$27,675.00
101	Design and Administration	417866.5	%	0.20	$83,573.30
104	Contingency	417866.5	%	0.10	$41,786.65
					$633,067.77

C-1 WATERSHED

CNTR5	72" RCP on Center	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	610	lf	268	$163,307.25
1	Mobilization	247404.75	%	0.07	$17,318.33
2	Traffic Control	247404.75	%	0.02	$4,948.09
3	Quality Control	247404.75	%	0.02	$3,711.07
4	Utility Relocation	247404.75	%	0.06	$14,844.28
5	Structure Removal	247404.75	%	0.05	$12,370.24
17	Manholes	2	ea	4,000.00	$8,000.00
18	Drop Inlets	61	lf	750.00	$45,750.00
19	Lateral Pipes - 18" to 36"	152.5	lf	103.00	$15,707.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	9760	sf	1.50	$14,640.00
101	Design and Administration	247404.75	%	0.20	$49,480.95
104	Contingency	247404.75	%	0.10	$24,740.48
					$374,818.19

C-1 WATERSHED

CNTR6	Conc Box 8.0'W X 5.0'D on Center	Planning Level	26	RCB Storm Drain	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	820	lf	578	$473,672.89
1	Mobilization	586427.875	%	0.07	$41,049.95
2	Traffic Control	586427.875	%	0.02	$11,728.56
3	Quality Control	586427.875	%	0.02	$8,796.42
4	Utility Relocation	586427.875	%	0.06	$35,185.67
5	Structure Removal	586427.875	%	0.05	$29,321.39
17	Manholes	2	ea	4,000.00	$8,000.00
18	Drop Inlets	82	lf	750.00	$61,500.00
19	Lateral Pipes - 18" to 36"	205	lf	103.00	$21,115.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	14760	sf	1.50	$22,140.00
101	Design and Administration	586427.875	%	0.20	$117,285.58
104	Contingency	586427.875	%	0.10	$58,642.79
					$888,438.25

C-1 WATERSHED

CNTR7	Conc Box 10.0'W X 5.0'D on Center	Planning Level	26	RCB Storm Drain	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1100	lf	655	$719,990.84
1	Mobilization	875815.8125	%	0.07	$61,307.11
2	Traffic Control	875815.8125	%	0.02	$17,516.32
3	Quality Control	875815.8125	%	0.02	$13,137.24
4	Utility Relocation	875815.8125	%	0.06	$52,548.95
5	Structure Removal	875815.8125	%	0.05	$43,790.79
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	110	lf	750.00	$82,500.00
19	Lateral Pipes - 18" to 36"	275	lf	103.00	$28,325.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	22000	sf	1.50	$33,000.00
101	Design and Administration	875815.8125	%	0.20	$175,163.17
104	Contingency	875815.8125	%	0.10	$87,581.58
					$1,326,861.00

TABLE 3.5.3 - COST TOOL RESULTS

C-1 WATERSHED

EQ1	24" RCP on Equestrian	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	540	lf	90	$48,751.01
1	Mobilization	116876.0078	%	0.07	$8,181.32
2	Traffic Control	116876.0078	%	0.02	$2,337.52
3	Quality Control	116876.0078	%	0.02	$1,753.14
4	Utility Relocation	116876.0078	%	0.06	$7,012.56
5	Structure Removal	116876.0078	%	0.05	$5,843.80
17	Manholes	1	ea	4,000.00	$4,000.00
18	Drop Inlets	54	lf	750.00	$40,500.00
19	Lateral Pipes - 18" to 36"	135	lf	103.00	$13,905.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	6480	sf	1.50	$9,720.00
101	Design and Administration	116876.0078	%	0.20	$23,375.20
104	Contingency	116876.0078	%	0.10	$11,687.60
					$177,067.15

C-1 WATERSHED

EQ2	48" RCP on Equestrian	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	800	lf	157	$125,454.86
1	Mobilization	230854.8594	%	0.07	$16,159.84
2	Traffic Control	230854.8594	%	0.02	$4,617.10
3	Quality Control	230854.8594	%	0.02	$3,462.82
4	Utility Relocation	230854.8594	%	0.06	$13,851.29
5	Structure Removal	230854.8594	%	0.05	$11,542.74
17	Manholes	2	ea	4,000.00	$8,000.00
18	Drop Inlets	80	lf	750.00	$60,000.00
19	Lateral Pipes - 18" to 36"	200	lf	103.00	$20,600.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	11200	sf	1.50	$16,800.00
101	Design and Administration	230854.8594	%	0.20	$46,170.97
104	Contingency	230854.8594	%	0.10	$23,085.49
					$349,745.11

C-1 WATERSHED

FIR1	48" RCP on Palo Verde	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	540	lf	0.00	$84,682.03
1	Mobilization	154427.0313	%	0.07	$10,809.89
2	Traffic Control	154427.0313	%	0.02	$3,088.54
3	Quality Control	154427.0313	%	0.02	$2,316.41
4	Utility Relocation	154427.0313	%	0.06	$9,265.62
5	Structure Removal	154427.0313	%	0.05	$7,721.35
17	Manholes	1	ea	4,000.00	$4,000.00
18	Drop Inlets	54	lf	750.00	$40,500.00
19	Lateral Pipes - 18" to 36"	135	lf	103.00	$13,905.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	7560	sf	1.50	$11,340.00
101	Design and Administration	154427.0313	%	0.20	$30,885.41
104	Contingency	154427.0313	%	0.10	$15,442.70
					$233,956.95

C-1 WATERSHED

FIR2	48" RCP on Fir	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1890	lf	157	$296,387.11
1	Mobilization	546494.625	%	0.07	$38,254.62
2	Traffic Control	546494.625	%	0.02	$10,929.89
3	Quality Control	546494.625	%	0.02	$8,197.42
4	Utility Relocation	546494.625	%	0.06	$32,789.68
5	Structure Removal	546494.625	%	0.05	$27,324.73
17	Manholes	5	ea	4,000.00	$20,000.00
18	Drop Inlets	189	lf	750.00	$141,750.00
19	Lateral Pipes - 18" to 36"	472.5	lf	103.00	$48,667.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	26460	sf	1.50	$39,690.00
101	Design and Administration	546494.625	%	0.20	$109,298.92
104	Contingency	546494.625	%	0.10	$54,649.46
					$827,939.33

C-1 WATERSHED

HRZN1	18" RCP on Horizon	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1200	lf	81	$96,691.26
1	Mobilization	250291.2656	%	0.07	$17,520.39
2	Traffic Control	250291.2656	%	0.02	$5,005.83
3	Quality Control	250291.2656	%	0.02	$3,754.37
4	Utility Relocation	250291.2656	%	0.06	$15,017.48
5	Structure Removal	250291.2656	%	0.05	$12,514.56
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	120	lf	750.00	$90,000.00
19	Lateral Pipes - 18" to 36"	300	lf	103.00	$30,900.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	13800	sf	1.50	$20,700.00
101	Design and Administration	250291.2656	%	0.20	$50,058.25
104	Contingency	250291.2656	%	0.10	$25,029.13
					$379,191.27

TABLE 3.5.3 - COST TOOL RESULTS

C-1 WATERSHED

MGC1	4'H Rip Rap Levee adjacent to Magic	Planning Level	6	Riprap Dike	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	2954.769775	cy	30	$88,824.99
1	Mobilization	109150.9141	%	0.07	$7,640.56
3	Quality Control	109150.9141	%	0.02	$1,637.26
15	Channel Excavation	5807.407227	cy	3.50	$20,325.93
101	Design and Administration	109150.9141	%	0.20	$21,830.18
104	Contingency	109150.9141	%	0.10	$10,915.09
					$151,174.01

C-1 WATERSHED

MISS1	30" RCP on Mission	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1700	lf	103	$174,684.68
1	Mobilization	393834.6875	%	0.07	$27,568.43
2	Traffic Control	393834.6875	%	0.02	$7,876.69
3	Quality Control	393834.6875	%	0.02	$5,907.52
4	Utility Relocation	393834.6875	%	0.06	$23,630.08
5	Structure Removal	393834.6875	%	0.05	$19,691.73
17	Manholes	4	ea	4,000.00	$16,000.00
18	Drop Inlets	170	lf	750.00	$127,500.00
19	Lateral Pipes - 18" to 36"	425	lf	103.00	$43,775.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	21250	sf	1.50	$31,875.00
101	Design and Administration	393834.6875	%	0.20	$78,766.94
104	Contingency	393834.6875	%	0.10	$39,383.47
					$596,659.54

C-1 WATERSHED

MLBU1	42" RCP on Malibu	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	950	lf	136	$129,223.90
1	Mobilization	252173.9063	%	0.07	$17,652.17
2	Traffic Control	252173.9063	%	0.02	$5,043.48
3	Quality Control	252173.9063	%	0.02	$3,782.61
4	Utility Relocation	252173.9063	%	0.06	$15,130.43
5	Structure Removal	252173.9063	%	0.05	$12,608.70
17	Manholes	2	ea	4,000.00	$8,000.00
18	Drop Inlets	95	lf	750.00	$71,250.00
19	Lateral Pipes - 18" to 36"	237.5	lf	103.00	$24,462.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	12825	sf	1.50	$19,237.50
101	Design and Administration	252173.9063	%	0.20	$50,434.78
104	Contingency	252173.9063	%	0.10	$25,217.39
					$382,043.46

C-1 WATERSHED

MLBU2	42" RCP on La Jolla	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1280	lf	136	$174,112.21
1	Mobilization	340992.2188	%	0.07	$23,869.45
2	Traffic Control	340992.2188	%	0.02	$6,819.84
3	Quality Control	340992.2188	%	0.02	$5,114.88
4	Utility Relocation	340992.2188	%	0.06	$20,459.53
5	Structure Removal	340992.2188	%	0.05	$17,049.61
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	128	lf	750.00	$96,000.00
19	Lateral Pipes - 18" to 36"	320	lf	103.00	$32,960.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	17280	sf	1.50	$25,920.00
101	Design and Administration	340992.2188	%	0.20	$68,198.44
104	Contingency	340992.2188	%	0.10	$34,099.22
					$516,603.18

C-1 WATERSHED

NWPT1	36" RCP on Newport	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1320	lf	118	$155,765.54
1	Mobilization	326495.5313	%	0.07	$22,854.69
2	Traffic Control	326495.5313	%	0.02	$6,529.91
3	Quality Control	326495.5313	%	0.02	$4,897.43
4	Utility Relocation	326495.5313	%	0.06	$19,589.73
5	Structure Removal	326495.5313	%	0.05	$16,324.78
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	132	lf	750.00	$99,000.00
19	Lateral Pipes - 18" to 36"	330	lf	103.00	$33,990.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	17160	sf	1.50	$25,740.00
101	Design and Administration	326495.5313	%	0.20	$65,299.11
104	Contingency	326495.5313	%	0.10	$32,649.55
					$494,640.74

TABLE 3.5.3 - COST TOOL RESULTS

C-1 WATERSHED

NWPT2	42" RCP on Newport	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1320	lf	136	$179,553.21
1	Mobilization	351273.2188	%	0.07	$24,589.12
2	Traffic Control	351273.2188	%	0.02	$7,025.46
3	Quality Control	351273.2188	%	0.02	$5,269.10
4	Utility Relocation	351273.2188	%	0.06	$21,076.39
5	Structure Removal	351273.2188	%	0.05	$17,563.66
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	132	lf	750.00	$99,000.00
19	Lateral Pipes - 18" to 36"	330	lf	103.00	$33,990.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	17820	sf	1.50	$26,730.00
101	Design and Administration	351273.2188	%	0.20	$70,254.64
104	Contingency	351273.2188	%	0.10	$35,127.32
					$532,178.90

C-1 WATERSHED

RCTRK1	42" RCP on Racetrack	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1310	lf	136	$178,192.96
1	Mobilization	348702.9688	%	0.07	$24,409.21
2	Traffic Control	348702.9688	%	0.02	$6,974.06
3	Quality Control	348702.9688	%	0.02	$5,230.54
4	Utility Relocation	348702.9688	%	0.06	$20,922.18
5	Structure Removal	348702.9688	%	0.05	$17,435.15
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	131	lf	750.00	$98,250.00
19	Lateral Pipes - 18" to 36"	327.5	lf	103.00	$33,732.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	17685	sf	1.50	$26,527.50
101	Design and Administration	348702.9688	%	0.20	$69,740.59
104	Contingency	348702.9688	%	0.10	$34,870.30
					$528,284.99

C-1 WATERSHED

RCTRK2	48" RCP on Racetrack	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1310	lf	136	$178,192.96
1	Mobilization	348702.9688	%	0.07	$24,409.21
2	Traffic Control	348702.9688	%	0.02	$6,974.06
3	Quality Control	348702.9688	%	0.02	$5,230.54
4	Utility Relocation	348702.9688	%	0.06	$20,922.18
5	Structure Removal	348702.9688	%	0.05	$17,435.15
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	131	lf	750.00	$98,250.00
19	Lateral Pipes - 18" to 36"	327.5	lf	103.00	$33,732.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	17685	sf	1.50	$26,527.50
101	Design and Administration	348702.9688	%	0.20	$69,740.59
104	Contingency	348702.9688	%	0.10	$34,870.30
					$528,284.99

C-1 WATERSHED

RCTRK3	24" RCP on Racetrack	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1320	lf	90	$119,169.13
1	Mobilization	287919.125	%	0.07	$20,154.34
2	Traffic Control	287919.125	%	0.02	$5,758.38
3	Quality Control	287919.125	%	0.02	$4,318.79
4	Utility Relocation	287919.125	%	0.06	$17,275.15
5	Structure Removal	287919.125	%	0.05	$14,395.96
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	132	lf	750.00	$99,000.00
19	Lateral Pipes - 18" to 36"	330	lf	103.00	$33,990.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	15840	sf	1.50	$23,760.00
101	Design and Administration	287919.125	%	0.20	$57,583.83
104	Contingency	287919.125	%	0.10	$28,791.91
					$436,197.49

C-1 WATERSHED

WS1	24" RCP on Warm Springs	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	2420	lf	90	$218,476.74
1	Mobilization	529851.75	%	0.07	$37,089.62
2	Traffic Control	529851.75	%	0.02	$10,597.03
3	Quality Control	529851.75	%	0.02	$7,947.78
4	Utility Relocation	529851.75	%	0.06	$31,791.10
5	Structure Removal	529851.75	%	0.05	$26,492.59
17	Manholes	6	ea	4,000.00	$24,000.00
18	Drop Inlets	242	lf	750.00	$181,500.00
19	Lateral Pipes - 18" to 36"	605	lf	103.00	$62,315.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	29040	sf	1.50	$43,560.00
101	Design and Administration	529851.75	%	0.20	$105,970.35
104	Contingency	529851.75	%	0.10	$52,985.17
					$802,725.38

TABLE 3.5.3 - COST TOOL RESULTS

C-1 WATERSHED

WS2	36" RCP on Warm Springs	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1320	lf	118	$155,765.54
1	Mobilization	326495.5313	%	0.07	$22,854.69
2	Traffic Control	326495.5313	%	0.02	$6,529.91
3	Quality Control	326495.5313	%	0.02	$4,897.43
4	Utility Relocation	326495.5313	%	0.06	$19,589.73
5	Structure Removal	326495.5313	%	0.05	$16,324.78
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	132	lf	750.00	$99,000.00
19	Lateral Pipes - 18" to 36"	330	lf	103.00	$33,990.00
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	17160	sf	1.50	$25,740.00
101	Design and Administration	326495.5313	%	0.20	$65,299.11
104	Contingency	326495.5313	%	0.10	$32,649.55
					$494,640.74

C-1 WATERSHED

WS3	42" RCP on Warm Springs	Planning Level	17	RCP Storm Drain Circular	
2002 MPU Minor Component ID	Component	Quantity	Units	Unit Cost	Cost
0	Basic Facility Cost	1310	lf	136	$178,192.96
1	Mobilization	348702.9688	%	0.07	$24,409.21
2	Traffic Control	348702.9688	%	0.02	$6,974.06
3	Quality Control	348702.9688	%	0.02	$5,230.54
4	Utility Relocation	348702.9688	%	0.06	$20,922.18
5	Structure Removal	348702.9688	%	0.05	$17,435.15
17	Manholes	3	ea	4,000.00	$12,000.00
18	Drop Inlets	131	lf	750.00	$98,250.00
19	Lateral Pipes - 18" to 36"	327.5	lf	103.00	$33,732.50
21	Roadway Replacement - Pipe, Box, Arch, Elliptical Pipe	17685	sf	1.50	$26,527.50
101	Design and Administration	348702.9688	%	0.20	$69,740.59
104	Contingency	348702.9688	%	0.10	$34,870.30
					$528,284.99

EXISTING DRAINAGE CONDITION FACILITIES MAP
Overall exhibit of information provided in VOLUME 1

ULTIMATE DRAINAGE CONDITION FACILITIES MAP
Overall exhibit of information provided in VOLUME 1