SUMMARY OF FINDINGS FOR THE ANNUAL DRAINAGE CHANNEL FIELD ASSESSMENT AND MAINTENANCE PRIORITIZATION PROJECT (PHASE 1) FOR THE CITY OF SAN DIEGO – MASTER STORM WATER SYSTEM MAINTENANCE PROGRAM (MMP) MAP 97A: SOUTH CHOLLAS CREEK CHANNEL

Job Number 17204-D
August 4, 2015

RICK ENGINEERING COMPANY

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Job Number 17204-D

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August 4, 2015

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1.0 Executive Summary

This report and preliminary analyses concludes that the Channel Prioritization Score for the South Chollas Creek Channel (MMP Map 97a) is **64.3 out of 100**. This score is average and indicates that the channel is recommended for maintenance. If the channel is maintained to reflect the as-built condition, the hydraulic capacity of the channel will increase from the current 2- to 5-year storm event capacity to a 10- to 25-year storm event capacity. In addition to the hydraulic capacity, the analyses considered other factors including water quality, community input and aesthetics. The analyses concluded that these other factors are generally in good condition and the benefits of maintaining the channel are mainly to reduce the flood risk.

2.0 Introduction

This report summarizes the findings for the Annual Drainage Channel Field Assessment and Maintenance Prioritization Project (Phase 1) for the City of San Diego for Master Storm Water System Maintenance Program (MMP), dated October 2011, Map 97a: South Chollas Creek Channel. Refer to Appendix A for the MMP Storm Water Facilities Key Map and Map 97a.

Purpose

As part of the Master Storm Water System Maintenance Program (MMP), the City of San Diego performed site visits to drainage channels within the MMP and designated several drainage channels as maintenance priorities. The purpose of Phase 1 of this project is to perform a desktop analysis to evaluate the drainage channels identified by the City of San Diego and rank them in order of significance for the purposes of City of San Diego maintenance activities.

3.0 Desktop Channel Maintenance Prioritization Analysis

The desktop channel maintenance prioritization analysis is based on the following items which were reviewed and evaluated to determine the maintenance priority:

- City of San Diego Operations and Maintenance (O&M) Channel Maintenance Inspection Forms completed for the channel by the City of San Diego (Refer to Appendix B)
- Site photos taken by the City of San Diego (Refer to Appendix B)
- Available as-built plans (Refer to Appendix G)
- Hydraulic Analysis (Refer to Section 5.0 and Appendix D for detailed output)

Section 5.1 of the MMP discusses the Annual Maintenance Needs Determination Process. As part of the determination process, the MMP recommends that certain factors be evaluated including flood risk to life and property, water quality, community input and aesthetics. These four factors were utilized for this channel maintenance prioritization analysis. For the purposes of prioritizing the channel for maintenance activities, each main factor is weighted as shown in Table 1 below:

Table 1

Channel Prioritization Assessment Factors and Weighting	
Factor	**Percent Weighted (%)**
Flood Risk	75
Water Quality	10
Community Input	10
Aesthetics	5

As part of the channel prioritization analysis, each of the main factors has been divided into sub-factors. To determine the Flood Risk factor, a basic hydraulic analysis was performed for the channel. The hydraulic analysis is described in more detail in the Hydraulic Analysis section (Section 5.0) of this report. The remaining factors, Water Quality, Community Input and Aesthetics were assessed based on the site photos and the information provided on the (O&M) Channel Maintenance Inspection Form completed for the channel provided by the City of San Diego. These factors and sub-factors and how they relate to the Channel Prioritization Score are shown in more detail on the Channel Prioritization Assessment Sheet located in Appendix E.

4.0 Hydrologic Summary

Federal Emergency Management Agency (FEMA) Peak Discharges

A drainage study for the channel was not available at the authorship of this report. The drainage channel is a Federal Emergency Management Agency (FEMA) defined channel. Peak flow rates for the channel are based on the FEMA Flood Insurance Study (FIS) for San Diego County dated May 16, 2012 (2012 San Diego FIS). The 10-, 50-, and 100-year storm event peak discharges used for the analysis were taken directly from the 2012 San Diego FIS. Estimates of the 2-, 5-, and 25-year storm event peak discharges were extrapolated from the FEMA discharges using logarithmic plotting paper. Hydrologic support material including excerpts from the 2012 San Diego FIS and an excerpt of the Flood Insurance Rate Map (FIRMette) showing the channel are located in Appendix C. A summary of the peak discharges are provided in Table 2 below:

Table 2

Summary of Peak Discharges						
Drainage Area: 10.9 square miles						
South Las Chollas Creek Above Confluence with Las Chollas Creek						
Frequency	2-yr[2]	5-yr[2]	10-yr[3]	25-yr[2]	50-yr[3]	100-yr[3]
Discharge (cfs)[1] at downstream point of channel assessment limit	540	1,250	2,000	3,000	3,900	5,300

1. cfs = cubic feet per second
2. Estimated based on extrapolation using logarithmic plotting paper
3. Peak Discharge also shown on available as-built plans

5.0 Hydraulic Analysis

A basic hydraulic analysis of the channel was performed to assess the Flood Risk factor. The channel assessment limits are shown on Map 97a located in Appendix A. Manning's equation was utilized to calculate the capacity of the channel under two conditions:

1. Post-Maintenance Conditions: based on the material and geometry as observed on a site visit conducted on July 20, 2015 along with City of San Diego's 1999 2-foot topography.
2. Current Conditions: based on the vegetation and sediment levels estimated from the site photos taken by the City of San Diego and information provided on the (O&M) Channel Maintenance Inspection Form prepared by the City of San Diego.

In the absence of As-Builts for this channel, a site visit on July 20, 2015 along with City of San Diego 1999 topography was used to obtain the geometry of the channel. This channel is entirely earthen and was measured using the 1999 topography to have a bottom width of approximately 20 feet and side slopes of approximately 2:1. The channel has an overall slope of approximately 0.007 ft/ft. These channel properties were used for hydraulic calculations of the Post-Maintenance Conditions.

Culvert crossings that may exist within the channel reach were not analyzed as part of this hydraulic analysis. Existing culverts may be inefficient or undersized, however the culvert hydraulics were not considered as part of this analysis.

The multiple storm event peak discharges previously calculated in Section 4.0 were evaluated under each condition to assess the capacity of the channel and evaluate the benefit of performing maintenance activities on the channel. See the table below for a summary of the hydraulic results and Appendix D for detailed hydraulic output.

Table 3

Summary of Hydraulic Analysis Results			
CURRENT CHANNEL CAPACITY		**AS-BUILT CHANNEL CAPACITY**	
Current Condition (cfs)	**Equivalent Storm Event (year)**	**As-built Condition (cfs)**	**Equivalent Storm Event (year)**
1019.1	2 to 5	2038.2	10 to 25

cfs = cubic feet per second

6.0 Other Channel Prioritization Factors

Sections 4.0 and 5.0 above discuss the determination process for the Flood Risk factor. For more information on the assessment of the Water Quality, Community Input, and Aesthetics factors please refer to the Channel Prioritization Assessment Sheet in Attachment E. The Channel Prioritization Assessment Sheet lists and describes the sub-factors that are considered in the determination of the four main channel assessment factors.

7.0 Summary of Findings and Recommendations

A summary of the Channel Assessment is shown in the table below:

Table 4

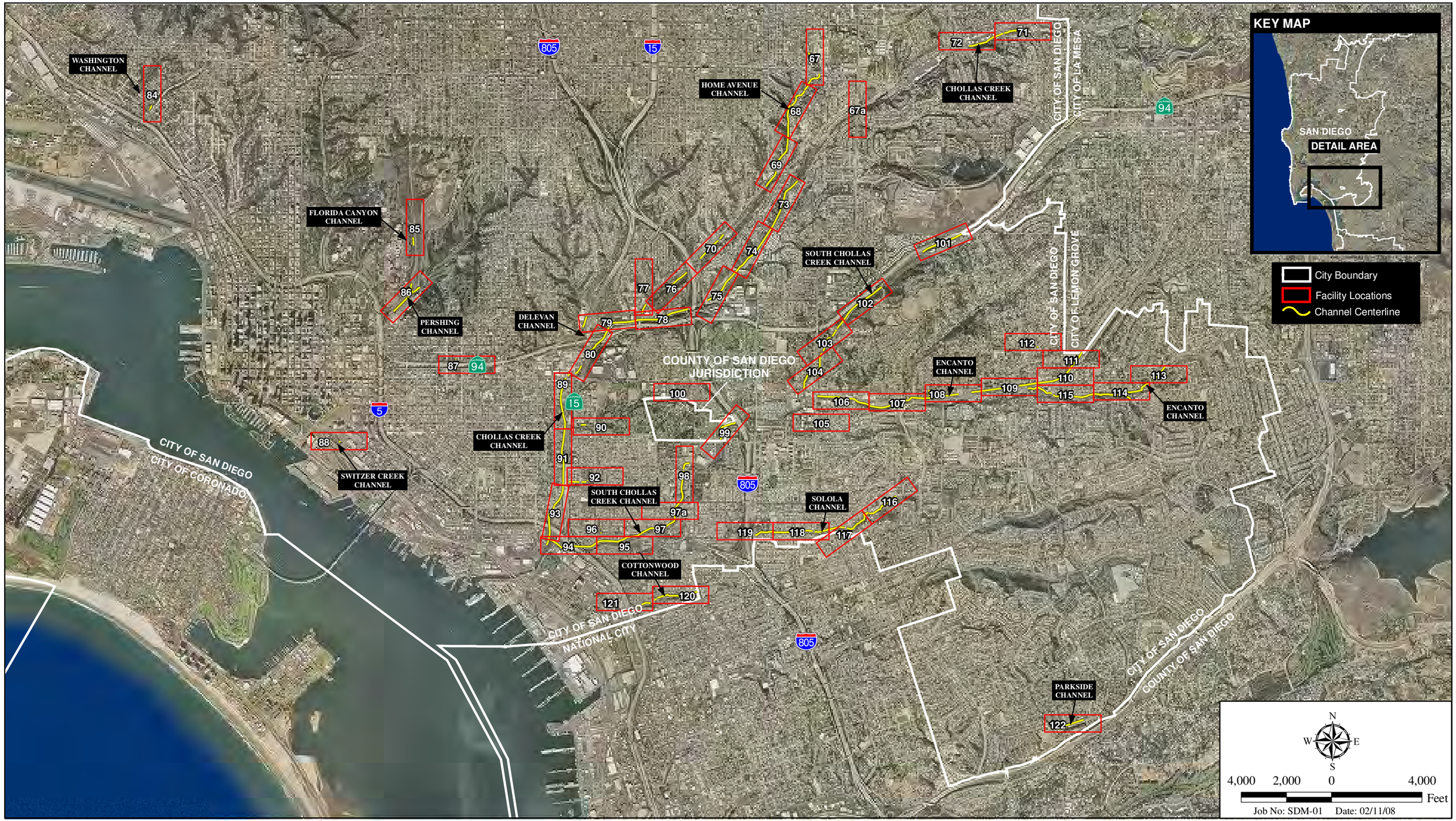
Channel Prioritization Assessment Scoring Summary		
Factor	**Percent Weighted (%)**	**Weighted Factor Score/Maximum**
Flood Risk	75	56.3/75
Water Quality	10	3/10
Community Input	10	5/10
Aesthetics	5	0/5
	Overall Channel	*64.3/100*

Based on the evaluation of the four weighted channel prioritization factors described in Section 3.0 of this report, the Channel Prioritization Score for MMP Map 97a: South Chollas Creek Channel is **64.3**. Refer to the Channel Prioritization Assessment Sheet located in Appendix E for details on the evaluation of the weighted factors and resulting score for this channel.

It is recommended that this drainage channel be maintained to increase the current capacity of the channel from a 2- to 5-year storm event back to a 10- to 25-year storm event capacity.

A summary of the channel including an aerial map, channel prioritization score, and other pertinent information is shown on the exhibit titled “Channel Maintenance Prioritization Summary Sheet” located in Appendix F.

Appendix A
Master Storm Water System Maintenance Program (MMP),
dated October 2011, Storm Water Facilities
Key Map and Map 97a: South Chollas Creek Channel



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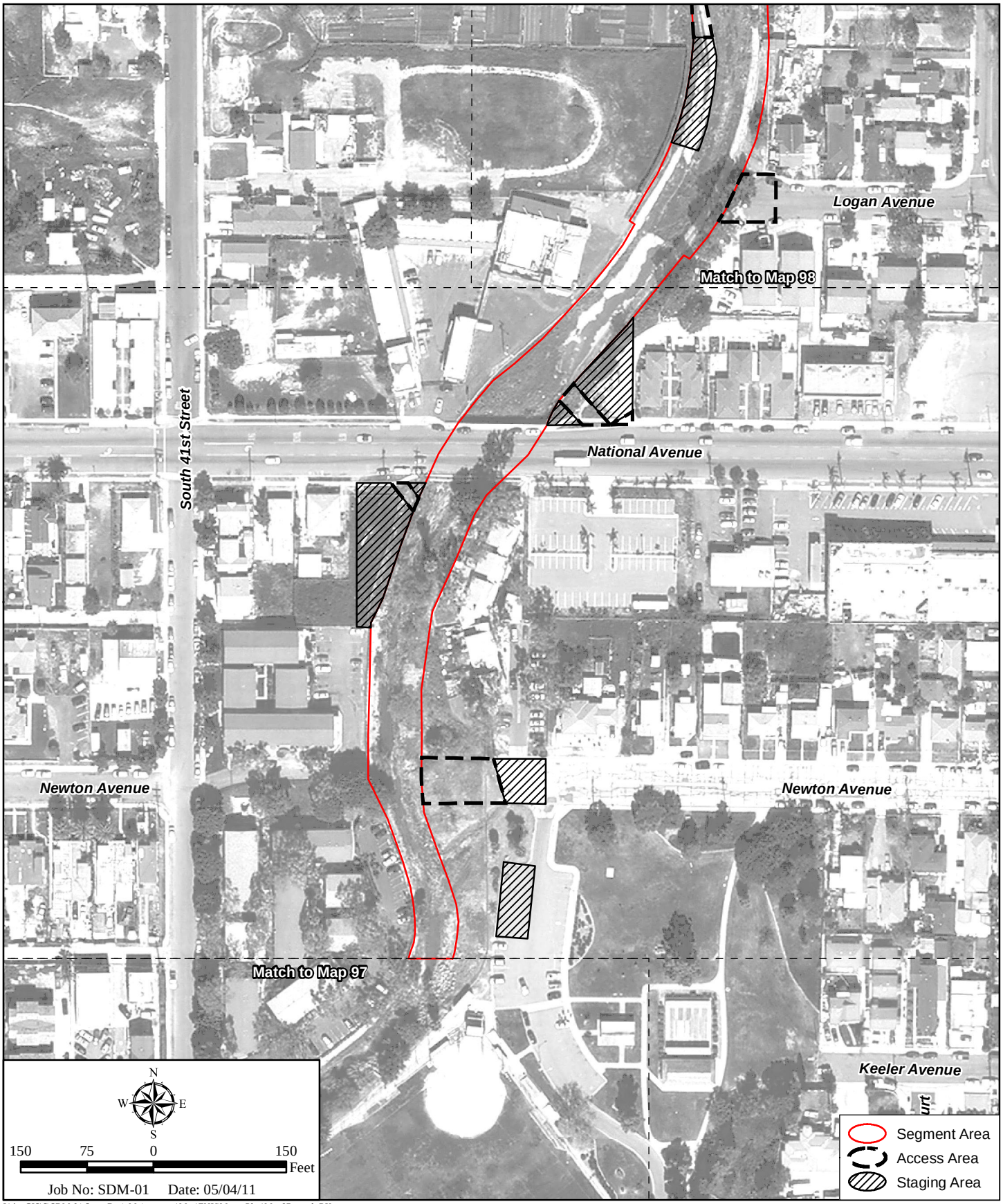
Stormwater Facilites - Central San Diego Area

CITY OF SAN DIEGO MASTER STORMWATER SYSTEM MAINTENANCE PROGRAM

HELIX

Figure 2d



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Access and Staging Areas

CITY OF SAN DIEGO MASTER STORMWATER SYSTEM MAINTENANCE PROGRAM

Map 97a

Appendix B
City of San Diego Operations and Maintenance (O&M)
Channel Maintenance Inspection Forms completed
for the channel and Site photos taken by the City of San Diego

Operations and Maintenance

Channel Maintenance Inspection Form

Date: 5/5/15 Time: Am

Channel Map No.: 97A Watershed: pueblo S.D

Inspector: Sam Richard Weather: cloudy

Initial Inspection yes Follow Up Inspection

A. Channel Condition

1=Poor Condition/Needs Immediate Attention

2= Moderate Condition

3= Good Condition

Item	Condition	Comments
1. Structure Condition	1 2 3 N/A	
2. Erosion	1 2 3 N/A	
3. Trash/Debris	1 2 3 N/A	Type of trash and source:
4. Water Conveyance/ Volume	1 2 3 N/A	
5. Standing Water	Y N	
A. Ponding	Y N	
B. Noticeable odors	Y N	
C. Algae	Y N	
6. Vegetation	1 2 3 N/A	Approx. Coverage/Density of Vegetation: 80 %
A. Invasive (Arundo)	1 2 3 N/A	
B. Native	1 2 3 N/A	
7. Sediment	1 2 3 N/A	Approx. Depth/Coverage of Sediment:
8. Transients/ encampments	Y N	

B. Culverts and Outfalls

1= Poor Condition/Needs Immediate Attention

2= Moderate Condition

3= Good Condition

Item	Condition	Comments
1. Structure Condition	1 2 3 N/A	
2. Trash/Debris/Sediment	1 2 3 N/A	
3. Clogging	1 2 3 N/A	

C. See Map Attached

-Identify Key Issues on Map

-Inspect and take photographs from vantage points identified on Map

Other Comments:

D. To Be Completed by Management

Follow Up Actions

1.

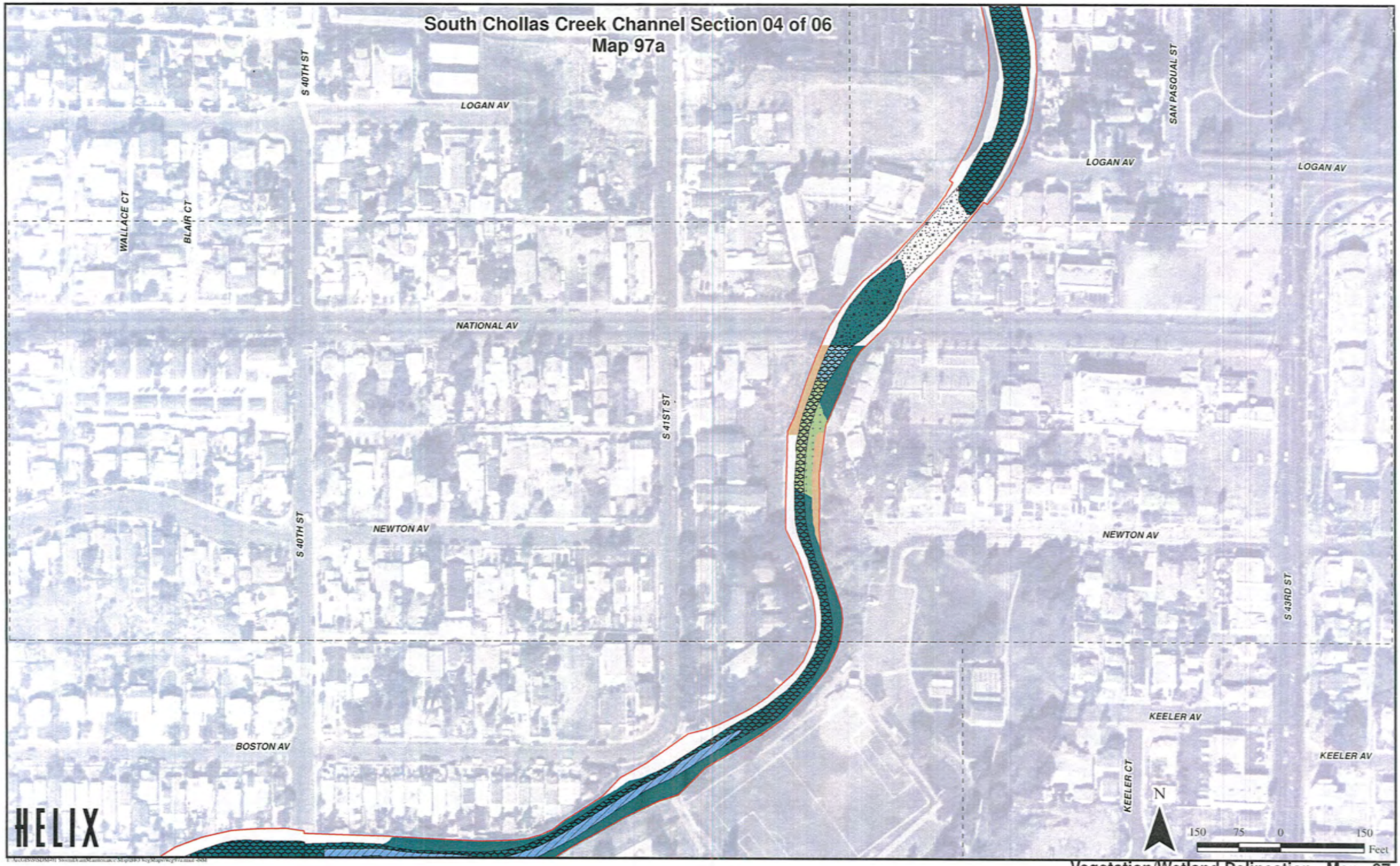
2.

3.

E. Infrastructure Failure Issues

Item	Condition	Comments
1. Broken Concrete/Gunite?	Y N N/A	
2. Broken/Missing Trash Fence?	Y N N/A	
3. Broken/Missing Poles/Supports?	Y N N/A	
4. Exposed Rebar?	Y N N/A	
5. Rock/Debris Accumulation?	Y N N/A	
6. Potential Flooding/Litigation?	Y N N/A	
7. Slope Failure?	Y N N/A	

Other Comments/Observations:



Vegetation/Wetland Delineation - Maps 97a

Vegetation/Wetland Delineation - Maps 97a

CITY OF SAN DIEGO MASTER STORMWATER SYSTEM MAINTENANCE PROGRAM

Appendix C
Hydrologic Support Material

FLOOD INSURANCE STUDY

SAN DIEGO COUNTY, CALIFORNIA

AND INCORPORATED AREAS

VOLUME 1 OF 11

Community Name	Community Number
SAN DIEGO COUNTY, UNINCORPORATED AREAS	060284
CARLSBAD, CITY OF	060285
CHULA VISTA, CITY OF	065021
CORONADO, CITY OF	060287
DEL MAR, CITY OF	060288
EL CAJON, CITY OF	060289
ENCINITAS, CITY OF	060726
ESCONDIDO, CITY OF	060290
IMPERIAL BEACH, CITY OF	060291
LA MESA, CITY OF	060292
LEMON GROVE, CITY OF	060723
NATIONAL CITY, CITY OF	060293
OCEANSIDE, CITY OF	060294
POWAY, CITY OF	060702
SAN DIEGO, CITY OF	060295
SAN MARCOS, CITY OF	060296
SANTEE, CITY OF	060703
SOLANA BEACH, CITY OF	060725
VISTA, CITY OF	060297

REVISED
May 16, 2012

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
06073CV001C

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TABLE 13 - FLOODWAY DATA

TABLE 8: SUMMARY OF PEAK DISCHARGES

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cubic feet per second) 10% Annual-Chance	2% Annual-Chance	1% Annual-Chance	0.2% Annual-Chance
0.3 Mile Above Mouth	7.1	1,200[1]	3,400	5,200[1]	10,400
At Oak Shadows Drive	4.3	700	2,100	3,200	6,500
South Las Chollas Creek					
Above Confluence with Las Chollas Creek	10.9	2,000	3,900	5,300	9,500
Above Confluence with Encanto Branch	3.3	730	1,400	1,900	3,400
At Kelton Road	2.6	580	1,100	1,500	2,700
South Tributary to Santa Maria Creek					
At Mouth	9.3	700	3,400	5,800	15,000
Spring Valley Creek					
Below Confluence with Casa de Oro Creek	7.1	1,300	2,600	3,600	9,300
Steele Canyon Creek					
At Mouth	2.7	--	--	2,980	--
Stevenson Creek					

[1] Flow Partially Controlled by Turner Dam
-- Data Not Available

South Las Chollas
Above confluence with Chollas
10.9 sq mi

EXCEEDENCE PER HUNDRED YEARS (ie. there is a 1% chance a 100-yr storm will occur in a year)

100 yr = 3500 cfs

25 yr = 3000 cfs

5 yr = 1250 cfs

2 yr = 540 cfs

10^3

10^2

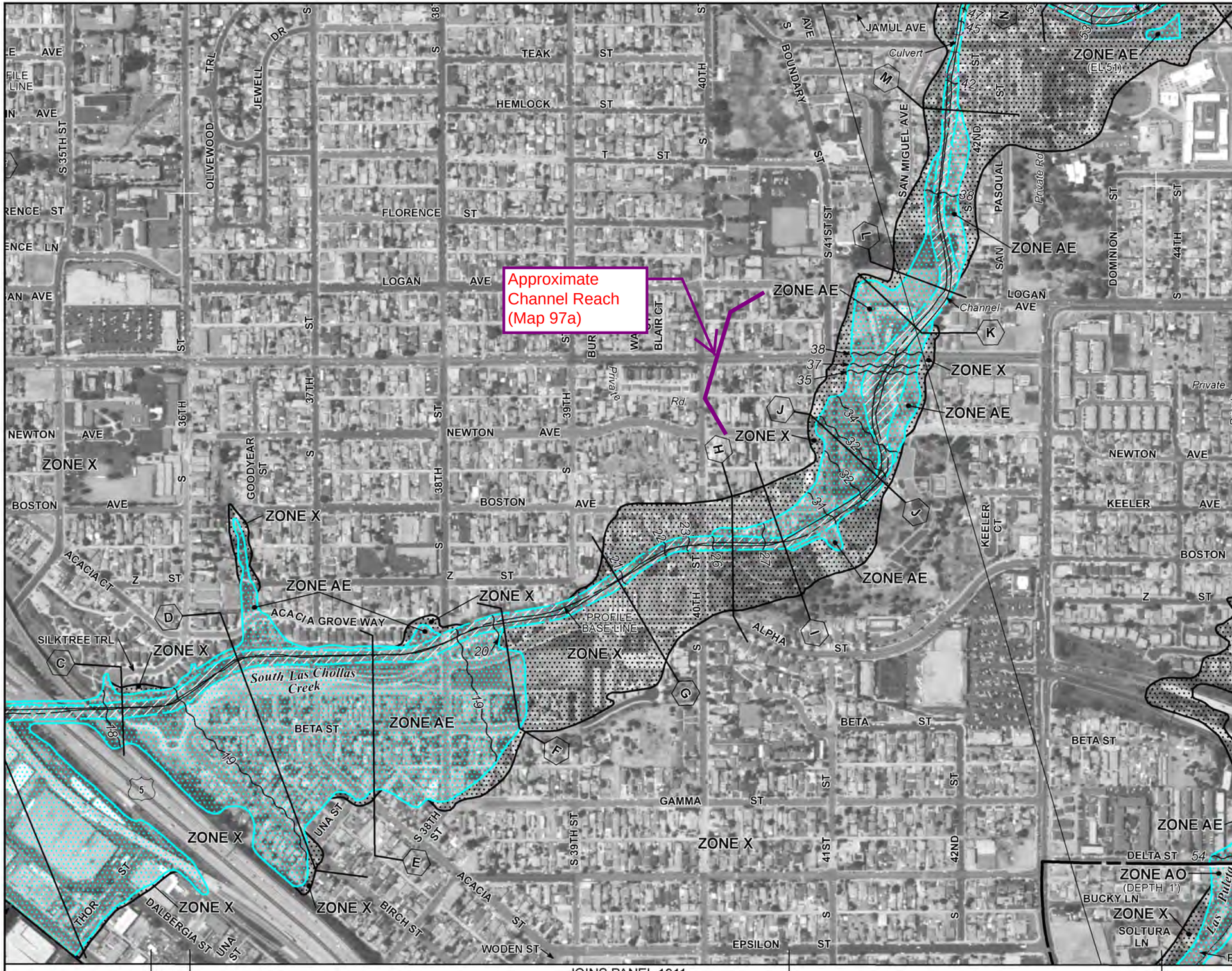
10^1

DISCHARGE IN C.F.S.

Exceedence Interval in Years

RICK ENGINEERING COMPANY
5620 Friars Road
San Diego
California 92110-2596
(619) 291-0707

EXCEEDENCE INTERVAL IN YEARS



e Program at 1-800-638-6620.

MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1903G

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 1903 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
NATIONAL CITY, CITY OF	060293	1903	G
SAN DIEGO COUNTY	060294	1903	G
SAN DIEGO, CITY OF	060295	1903	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06073C1903G

MAP REVISED
MAY 16, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Appendix D
Hydraulic Analysis Output

Hydraulic Analysis Report

Project Data

Project Title: Project - South Chollas Creek Map 97a

Designer: Rick Engineering Company J-17204-D

Project Date: Wednesday, July 22, 2015

Project Units: U.S. Customary Units

Channel Analysis: As-Built_South_Chollas_Map97a_10-25

Notes: In the absence of As-Builts for this channel, a site visit on July 20, 2015 along with City of San Diego 1999 topography was used to obtain the geometry of the channel. This channel is entirely earthen and was measured using the 1999 topography to have a bottom width of approximately 20 feet and side slopes of approximately 2:1. The channel has an overall slope of approximately 0.007 ft/ft. Pursuant to Table 1-104.14A of the City of San Diego Drainage Design Manual, dated April 1984, the roughness coefficient used for the channel side slopes and channel bottom is 0.03. This roughness coefficient is based on some weeds, little or no brush.

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 2.0000 (ft/ft)

Side Slope 2 (Z2): 2.0000 (ft/ft)

Channel Width: 20.0000 (ft)

Longitudinal Slope: 0.0070 (ft/ft)

Manning's n: 0.0300

Depth: 6.0000 (ft)

Result Parameters

Flow: 2038.2077 (cfs)

Area of Flow: 192.0000 (ft^2)

Wetted Perimeter: 46.8328 (ft)

Hydraulic Radius: 4.0997 (ft)

Average Velocity: 10.6157 (ft/s)

Top Width: 44.0000 (ft)

Froude Number: 0.8956

Critical Depth: 5.6425 (ft)

Critical Velocity: 11.5463 (ft/s)

Critical Slope: 0.0088 (ft/ft)

Critical Top Width: 42.5699 (ft)

Calculated Max Shear Stress: 2.6208 (lb/ft^2)

Calculated Avg Shear Stress: 1.7907 (lb/ft^2)

Channel Analysis: Current_Condition_South_Chollas_Map97a_2-5

Notes: In the absence of As-Builts for this channel, a site visit on July 20, 2015 along with City of San Diego 1999 topography was used to obtain the geometry of the channel. This channel is entirely earthen and was measured using the 1990 topography to have a bottom width of approximately 20 feet and side slopes of approximately 2:1. The channel has an overall slope of approximately 0.007 ft/ft. Pursuant to Table 1-104.14A of the City of San Diego Drainage Design Manual, dated April 1984, the roughness coefficient used for the channel side slopes and channel bottom is 0.06. This roughness coefficient is based on some weeds, heavy brush on banks.

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 2.0000 (ft/ft)

Side Slope 2 (Z2): 2.0000 (ft/ft)

Channel Width: 20.0000 (ft)

Longitudinal Slope: 0.0070 (ft/ft)

Manning's n: 0.0600

Depth: 6.0000 (ft)

Result Parameters

Flow: 1019.1039 (cfs)

Area of Flow: 192.0000 (ft^2)

Wetted Perimeter: 46.8328 (ft)

Hydraulic Radius: 4.0997 (ft)

Average Velocity: 5.3078 (ft/s)

Top Width: 44.0000 (ft)

Froude Number: 0.4478

Critical Depth: 3.7840 (ft)

Critical Velocity: 9.7692 (ft/s)

Critical Slope: 0.0390 (ft/ft)

Critical Top Width: 35.1361 (ft)

Calculated Max Shear Stress: 2.6208 (lb/ft^2)

Calculated Avg Shear Stress: 1.7907 (lb/ft^2)

CITY OF SAN DIEGO

DRAINAGE DESIGN MANUAL

APRIL • 1984

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TABLE 1-104.14A

DESIGN VALUES FOR MANNINGS ROUGHNESS COEFFICIENT (n)

TYPE OF CHANNEL	N VALUE
Unlined Channels:	
Clay Loam	0.023
Sand	0.020
Gravel	0.030
Rock	0.040
Lined Channels:	
Portland Cement Concrete	0.015
Air Blown Mortar	0.018
Asphalt Concrete	0.018
Grass Lined Channels: (Shallow depths)	
2 inch length	0.050
4 - 6 inch length	0.060
6 - 12 inch length	0.120
12 - 24 inch + length	0.200
Pavement and Gutters:	
Concrete	0.015
Asphalt Concrete	0.018
Natural Streams: (Less than 100 feet wide at flood stage)	
1. Regular section	
a. Some grass and weeds, little or no brush	0.030
b. Dense growth of weeds, depth of flow substantially greater than weed height	0.040
c. Some weeds, light brush on bank	0.040
d. Some weeds, heavy brush on banks	0.060
e. With trees in channel, branches submerged at flood stage, increase above values by	0.015

TABLE 1-104.14A (Continued)

2.	Irregular section, with pools, slight channel meander increase all values listed in 1. Regular Section, by	0.015

Flood Plains: (adjacent to natural streams)

1.	Pasture, no brush	
	a. Short grass	0.030
	b. High grass	0.040
2.	Cultivated areas	
	a. No crop	0.040
	b. Mature row crops	0.040
	c. Mature field crops	0.050
3.	Heavy weeds, scattered brush	0.050
4.	Light brush and trees	0.060
5.	Medium to dense brush	0.090
6.	Dense willows	0.170
7.	Cleared land with tree stumps, 100-150 per acre	0.060
8.	Heavy stand of timer, little undergrowth	
	a. Flood depth below branches	0.110
	b. Flood depth reaches branches	0.140

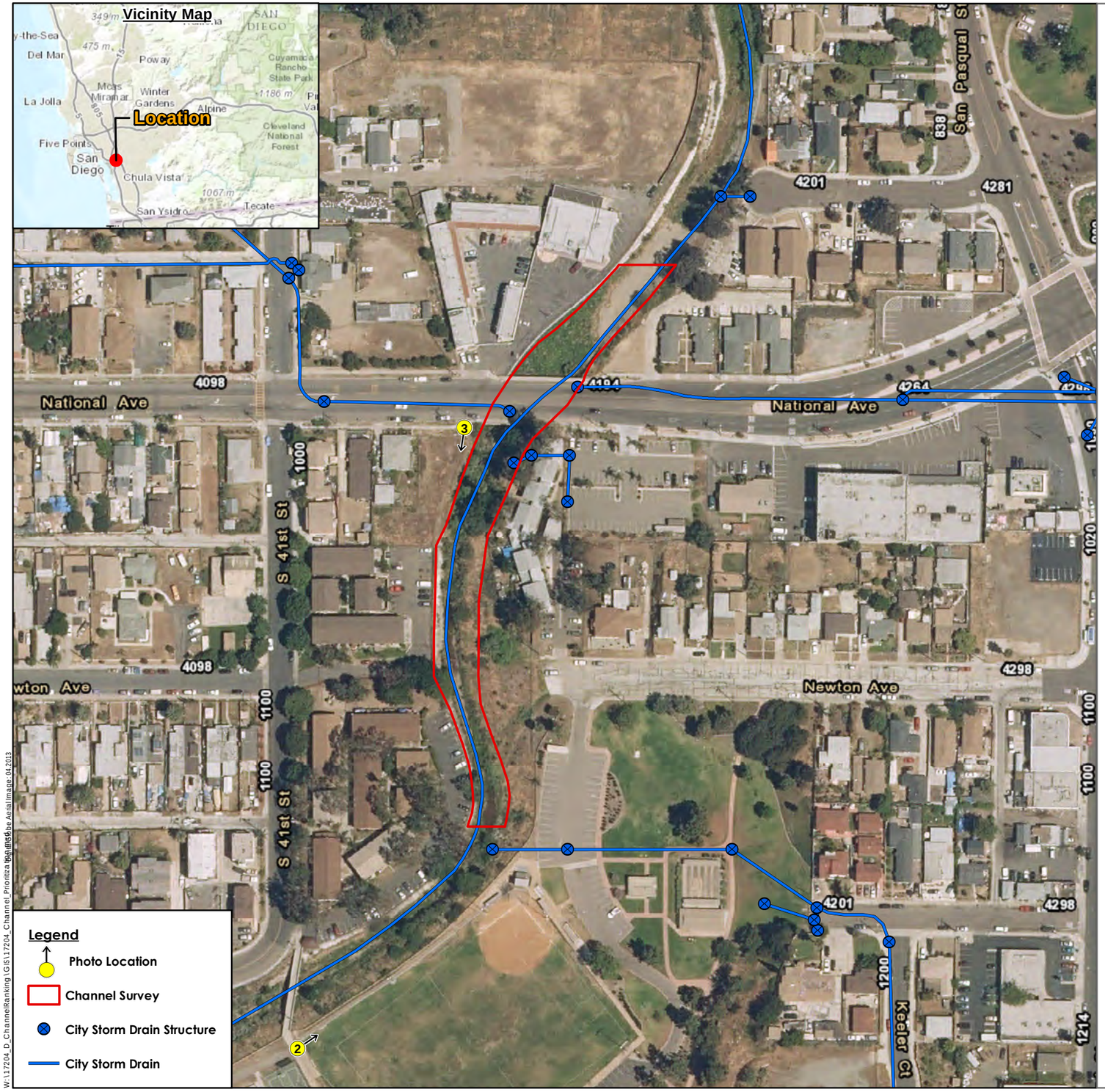
Appendix E
Channel Prioritization Assessment Sheet

Channel Prioritization Assesment Sheet for South Chollas Creek Channel MMP Map 97a				Total Channel Score:	64.3 /100	
Flood Hazard (75% of total weight)				**Score**	factor weight	Weighted Points
Δ capacity			**Sum of sub-factor a-c scores:**	**0**	*25%*	0
a. Risk of flooding	Current Channel Normal depth capacity[1]:	1019.1 cfs / 2- to 5 -yr. storm event	*2-yr.=score of 5; 5-yr.=score of 4; 10-yr.=score of 3; 25-yr.=score of 2; 50-yr.=score of 1; 100-yr.=score of 0*	(out of 15)		
b. Increase in storm event capacity	Channel As-Built normal depth capacity[1]:	2038.2 cfs / 10- to 25 -yr. storm event	*1 point given for every level increase in -year storm event capacity, post-maintenance*			
c. Net percent increase in channel capacity post-maintenance		100%	*Less than 100% = score of 0; 100%-199% = score of 1; 200%-299% = score of 2; 300%-399% = score of 3; 400%-500%= score of 4; Over 500% = score of 5*			
Consequence of flooding adjacent areas				0 1 2 3 **4**	50%	37.5
Surrounding area land use: (area within 100 feet of the channel or area in which more than 10,000 ft² is impacted from flooding.)		Residential	*Residential = score of 4; Commercial = score of 4; Roads = score of 2; Agriculture = score of 1; Other = score of 1*			
Is there open space surrounding the channel?		No	*If yes, subtract land use score by 1*			
Clogging Potential				0 1 2 3 **4**	25%	18.75
Are there trees/large debris that have potential to flow D/S and clog culverts/the channel?		Yes				
					Total Weighted Flood Hazard Points	**56.3**
Water Quality/Channel Condition (10% of total weight)						
Trash/Debris				0 1 **2** 3 4	20%	1
Type of trash and Source:	*Paper Trash*					
Standing water				**0** 1 2 3 4	15%	0
Ponding?		No				
Noticeable odors?		No				
Algae?		no				
Sediment				0 1 **2** 3 4	35%	2
Approx. sediment coverage: (Based on information provided on City of San Diego O&M Channel Maintenance Inspection Form)		Not indicated on inspection form. This is an earthen channel.				
Rock/debris Accumulation?		Yes				
Transients/encampments				**0** 1 2 3 4	10%	0
Culverts and Outfalls				**0** 1 2 3 4	10%	0
Culvert structure condition		Good				
Infrastructure Issues				**0** 1 2 3 4	10%	0
Broken concrete/gunite?		No				
Broken or missing trash fence/fence poles/supports?		No				
Slope failure?		no				
					Total Weighted Water Quality Points	**3.0**
Community Input (10% of total weight)						
Community Complaints Received				**YES** NO	50%	5
Community Outreach Input				**0** 1 2 3 4	50%	0
					Total Weighted Community Input Points	**5.0**
Aesthetics (5% of total weight)						
Aesthetics				**0** 1 2 3 4	100%	0
Are the aesthetics of the channel compromised?		No				
					Total Weighted Aesthetics Points	**0.0**

1. See appendix D for geometry parameters

Scoring Legend	
0	Factor is in good condition and does not need attention
1	Factor is in good condition, but will eventually need attention
2	Factor needs attention
3	Factor is in bad condition and needs attention
4	Factor is in severe condition and needs immediate attention

Appendix F
Channel Maintenance Prioritization Summary Sheet



Photos:

No Other Applicable Photo

No Other Applicable Photo

No Other Applicable Photo

Assessment Results

- **Channel Prioritization Score:** *64.3 out of 100*
  - **Flood Hazard Score:** *56.3 out of 75*
  - **Water Quality Score:** *3 out of 10*
  - **Community Input Score:** *5 out of 10*
  - **Aesthetics Score:** *0 out of 5*
- **Capacity Prior to Maintenance:** *2- to 5-year storm event*
- **Capacity After Maintenance (As-built Capacity) :** *10- to 25-year storm event*
- **Clogging Potential:** *MEDIUM*
- **Approximate Vegetation Coverage:** *HIGH*
- **Surrounding Area:** *Residential*
- **Infrastructure Failures:** *None*
- **Site Evaluation Date:** *May 5, 2015*
- **Notes/Comments:** *It was noted on the O&M Channel Maintenance Inspection Form that there is heavy vegetation in the majority of the channel reach. A high risk of vegetation flowing downstream and clogging the culvert exists.*

RICK ENGINEERING COMPANY

Scale in Feet: 0 140 280

North

Channel: South Chollas Creek **MMP Map # 97a** **Channel Maintenance Prioritization Summary Sheet**

17204-D

August 11, 2015

Appendix G
Available As-built plans

No Available As-built Plans

Appendix H
Compact Disc
PDF Version of Full Report