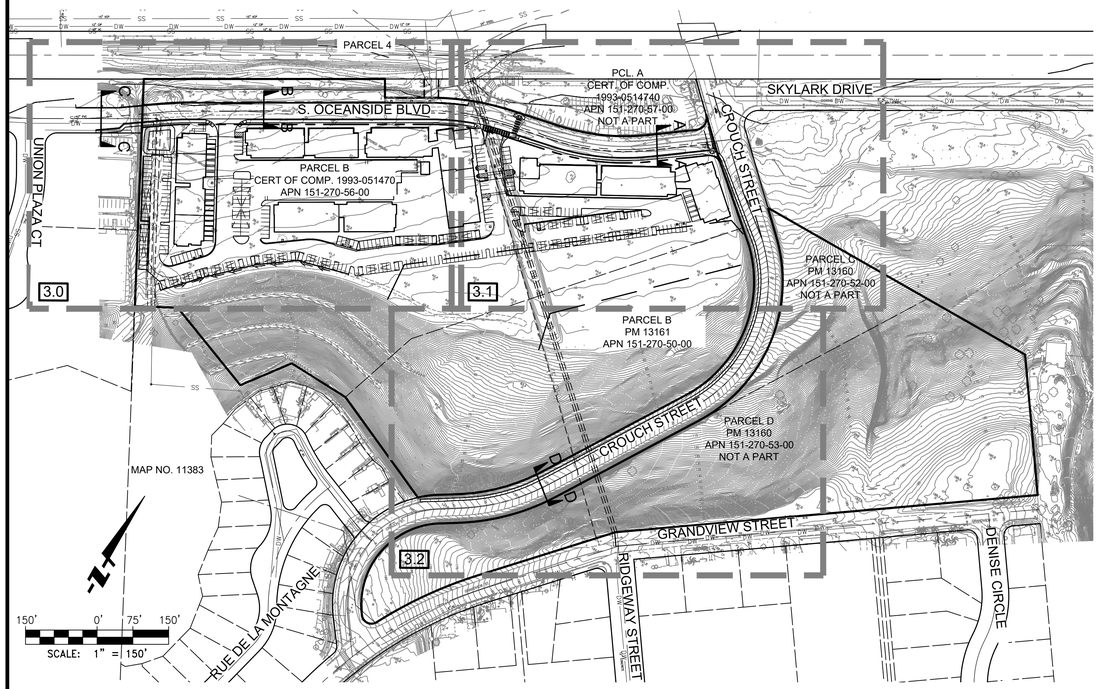
APPENDIX 2

CONCEPTUAL GRADING & UTILITY PLANS

CONCEPTUAL GRADING AND UTILITY PLANS

FOR

OCEAN CREEK



OWNER

THOMAS D. WEESE
TRUSTEE OF THE ROBERT. A WEESE FAMILY TRUST,
U/T/A DATED 12/23/78 TO AN UNDIVIDED ONE-HALF
INTEREST, AND TOMAS D, WEESE, AS TRUSTEE UNDER
THE BESSIE JANE WEESE TESTIMONY TRUST

APPLICANT

OCEAN CREEK, LLC
12250 EL CAMINO REAL
SUITE 380
SAN DIEGO, CA 92130
(858) 369-5670

SURVEY SOURCE

THE TOPOGRAPHIC MAPPING USED FOR THIS SURVEY IS BASED ON A FIELD SURVEY PERFORMED BY HUNSAKER & ASSOC. TOGETHER WITH AERIAL TOPOGRAPHY PRODUCED BY RJ LUNG PER FLIGHT OF DECEMBER 27, 2017. VERTICAL DATUM BASED ON NAVD 88 PER CITY OF OCEANSIDE BENCHMARK NO. 1013 PER RECORD OF SURVEY NO. 21787 EL=99.46.

LEGEND

RIGHT OF WAY
PARCEL LINE
STREET CENTERLINE
EASEMENT
PROPOSED SEWER (SS)
LANDSLIDE LIMITS
SEWER MANHOLE (S)
SEWER CLEANOUT
PROPOSED FIRE WATER (FW)
DOMESTIC WATER (W)
PROPOSED STORM DRAIN (SD)
PROPOSED FIRE HYDRANT
PROPOSED CONCRETE
PROPOSED AC
BIOFILTRATION BASIN
UNDERGROUND CISTERN
STORM DRAIN CLEANOUT
STORM DRAIN INLET/CATCH BASIN
SIDEWALK
CURB AND GUTTER
STREET TREE BMP PER COUNTY OF SAN DIEGO GREEN STREETS STANDARDS (SEE SWQMP FOR MORE INFORMATION) (S.T.) — STRUCTURAL SOIL OUTLINE
PROPOSED STREET LIGHT
MODULAR WETLAND SYSTEM (MWS) POLLUTANT CONTROL BMP

ABBREVIATIONS

ADA	– AMERICANS WITH DISABILITIES ACT
BS	– BOTTOM OF STAIRS
CB	– CATCH BASIN
CY	– CUBIC YARDS
EX	– EXISTING
FF	– FINISH FLOOR ELEVATION
FG	– FINISHED GRADE
FH	– FIRE HYDRANT
FL	– FLOW LINE
FS	– FINISHED SURFACE
GB	– GRADE BREAK
IE	– INVERT ELEVATION
MWS	– MODULAR WETLAND UNIT (SEE SWQMP)
PVC	– POLYVINYL CHLORIDE
RCP	– REINFORCED CONCRETE PIPE
RIM	– RIM OF STRUCTURE ELEVATION
R/W	– RIGHT-OF-WAY
SD	– STORM DRAIN
SDCO	– STORM DRAIN CLEAN OUT
SDRSD	– SAN DIEGO REGIONAL STD DWG
SF	– SQUARE FEET
SS	– SANITARY SEWER
SSCO	– SANITARY SEWER CLEAN OUT
S.T.	– STREET TREE BMP
TC	– TOP OF CURB
TD	– TOP OF DITCH
TF	– TOP OF FOOTING
TG	– TOP OF GRATE
TOB	– TOP OF BASIN
TS	– TOP/TOE OF SLOPE
TW	– TOP OF WALL
U.O.N.	– UNLESS OTHERWISE NOTED
WAS	– WATER AGENCIES STANDARD
WS	– WATER SERVICE

ZONING

EXISTING ZONE: CC (COMMUNITY COMMERCIAL)

PARCEL AREA

EXISTING: 2 PARCELS

APN	EX. NET AREA	R/W DEDICATION(–)/ VACATION(+)	PROP. NET AREA
151-270-56-00	12.87AC	– 1.65AC	11.22AC
151-270-50-00	5.98AC	0	5.98AC

FLOOD ZONE

A PORTION OF THIS SITE IS LOCATED IN ZONE AE (BASE FLOOD ELEVATIONS DETERMINED) AS SHOWN ON THE FLOOD INSURANCE RATE MAP (F.I.R.M.), COMMUNITY-PANEL NO. 06073C0753J, EFFECTIVE DATE: DECEMBER 20, 2019. A CLOMR WILL BE PROCESSED FOR IMPROVEMENTS WITHIN THE FLOODPLAIN AND FLOODWAY.

UTILITIES

ELECTRIC – SDG&E
GAS – SDG&E
TELEPHONE – COX OR AT&T
STORM DRAIN – OCEANSIDE WATER UTILITIES DEPARTMENT
WATER – OCEANSIDE WATER UTILITIES DEPARTMENT
SEWER – OCEANSIDE WATER UTILITIES DEPARTMENT

EXISTING LEGAL DESCRIPTION

REAL PROPERTY IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

APN: 151-270-56-00:

PARCEL "B" AS SHOWN ON CERTIFICATE OF COMPLIANCE NO. PLA-04-93 RECORDED AUGUST 9, 1993 AS INSTRUMENT NO. 93-0514740 OF OFFICIAL RECORDS, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

PARCEL A OF PARCEL MAP 13161, RECORDED: FEBRUARY 22, 1984, AS F/P 84-064016 OF OFFICIAL RECORDS OF SAN DIEGO COUNTY, BEING WITHIN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, EXCLUDING THAT PORTION BEING DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEASTERLY MOST CORNER OF SAID PARCEL "A"; THENCE SOUTHWESTERLY ALONG THE NORTHERLY LINE OF SAID PARCEL "A", SOUTH 59° 57' 17" WEST, 651.70 FEET (RECORD: SOUTH 59° 46' 47" WEST, P.M. 13161); THENCE LEAVING SAID NORTHERLY LINE, SOUTH 30° 02' 43" EAST, 39.22 FEET; THENCE PARALLEL WITH SAID NORTHERLY LINE OF PARCEL "A", NORTH 59° 57' 17" EAST, 96.00 FEET, TO THE BEGINNING OF A TANGENT 544.00 FOOT RADIUS CURVE, CONCAVE SOUTHEASTERLY, THENCE NORTHEASTERLY, ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 17° 51' 54", A DISTANCE OF 169.62 FEET; THENCE TANGENT TO SAID CURVE, NORTH 77° 49' 11" EAST, 106.22 FEET, TO THE BEGINNING OF A TANGENT 456.00 FOOT RADIUS CURVE, CONCAVE NORTHWESTERLY, THENCE NORTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 24° 00' 00", A DISTANCE OF 191.01 FEET; THENCE TANGENT TO SAID CURVE NORTH 53° 49' 11" EAST, 100 FEET, TO THE BEGINNING OF A TANGENT 25.00 FOOT RADIUS CURVE, CONCAVE NORTHWESTERLY, THENCE NORTHEASTERLY AND NORTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 100° 00' 00", A DISTANCE OF 43.63 FEET, TO AN INTERSECTION WITH THE EASTERLY LINE OF THE ABOVE DESCRIBED PARCEL "A"; THENCE NORTHWESTERLY ALONG SAID EASTERLY LINE, AND TANGENT TO SAID CURVE, NORTH 46° 10' 49" WEST, 78 FEET, (RECORD: NORTH 46° 19' 24" WEST, PM 13161) TO THE POINT OF BEGINNING.

APN 151-270-50-00:

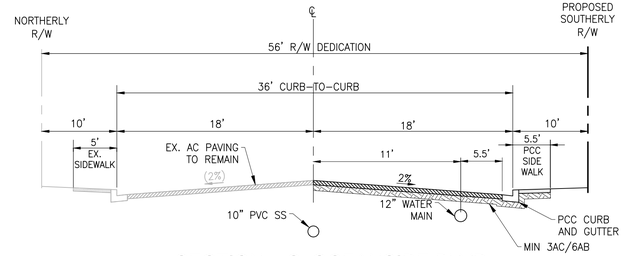
PARCEL B OF PARCEL MAP NO. 13161, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, FEBRUARY 22, 1984 AS INSTRUMENT NO. 84-064016 OF OFFICIAL RECORDS.

KEY MAP LEGEND

SHEET LAYOUT
SHEET NUMBER (#)

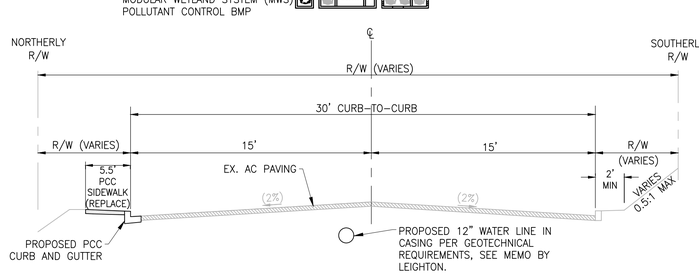
SHEET INDEX

TITLE SHEET	SHEET C-1.0
EXISTING CONDITIONS	SHEET C-2.0
CONCEPTUAL GRADING AND UTILITIES	SHEET C-3.0
CONCEPTUAL GRADING AND UTILITIES	SHEET C-3.1
CONCEPTUAL GRADING AND UTILITIES	SHEET C-3.2



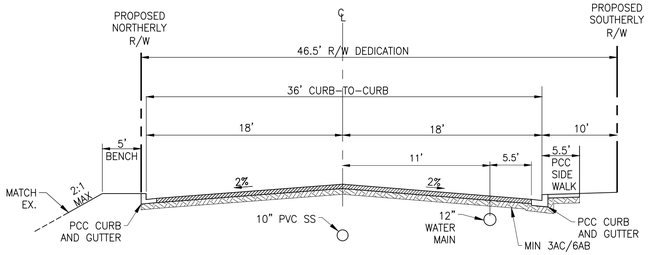
SECTION - S. OCEANSIDE BLVD.
ADJACENT TO NCTD PROPERTY
STA 11+24.66 - 17+41.17

A-A / C-1.0 SCALE: N.T.S.



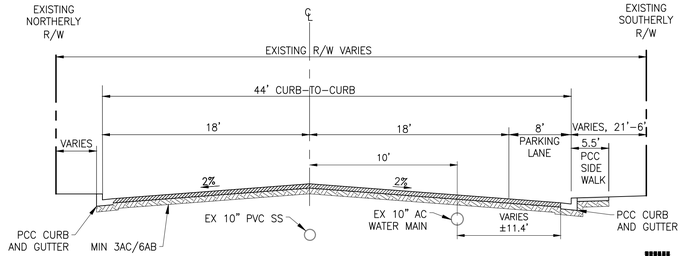
SECTION - CROUCH STREET
SOUTH OF PROJECT PROPERTY

D-D / C-1.0 SCALE: N.T.S.



SECTION - S. OCEANSIDE BLVD.
FROM WESTERN PL TO NCTD PROPERTY
STA 17+41.17 - 22+49.80

B-B / C-1.0 SCALE: N.T.S.



SECTION - S. OCEANSIDE BLVD.
WEST OF PROJECT PROPERTY
STA 22+49.80 - 23+89.84

C-C / C-1.0 SCALE: N.T.S.

GRADING QUANTITIES

TOTAL DISTURBED AREA:	9.91 AC
PROJECT MAX DEPTH OF CUT:	6 FT
PROJECT MAX DEPTH OF FILL:	4 FT
MAX CUT SLOPE RATIO:	2:1
MAX FILL SLOPE RATIO:	2:1

ON-SITE GRADING:

DISTURBED AREA:	9.91 AC
AMOUNT OF CUT:	13,600 CY
AMOUNT OF FILL:	3,500 CY
AMOUNT OF EXPORT:	10,100 CY

GRADING QUANTITIES ARE APPROXIMATE AND SUBJECT TO CHANGE BASED ON FINAL DESIGN. QUANTITIES SHALL NOT BE USED FOR BIDDING PURPOSES.

FUSCOE ENGINEERING
6390 Greenwich Dr., Suite 170, San Diego, California 92122
tel 858.554.1500 ◦ fax 858.597.0335 ◦ www.fuscoe.com

REGISTERED PROFESSIONAL ENGINEER
BRYAN D. SMITH
C 75822
EXP. 06-30-22
CIVIL
STATE OF CALIFORNIA

architecture design collaborative
23231 South Pointe Dr
Laguna Hills, CA 92653
www.adcollaborative.com
949.267.1660

ADC Project No: 190147

Project Contact: Chris Weimholt
Email: cweimholt@adcollaborative.com
Principal: Chris Weimholt
Project Manager:

Client

Company: Ocean Creek, LLC
Address: 12250 El Camino Real, Suite 380
San Diego, CA 92130
Phone No. (858) 699-7510

OCEAN CREEK, LLC
OCEANSIDE, CA

Issue Date

1ST SUBMITTAL 03/09/2020

2ND SUBMITTAL 06/07/2021

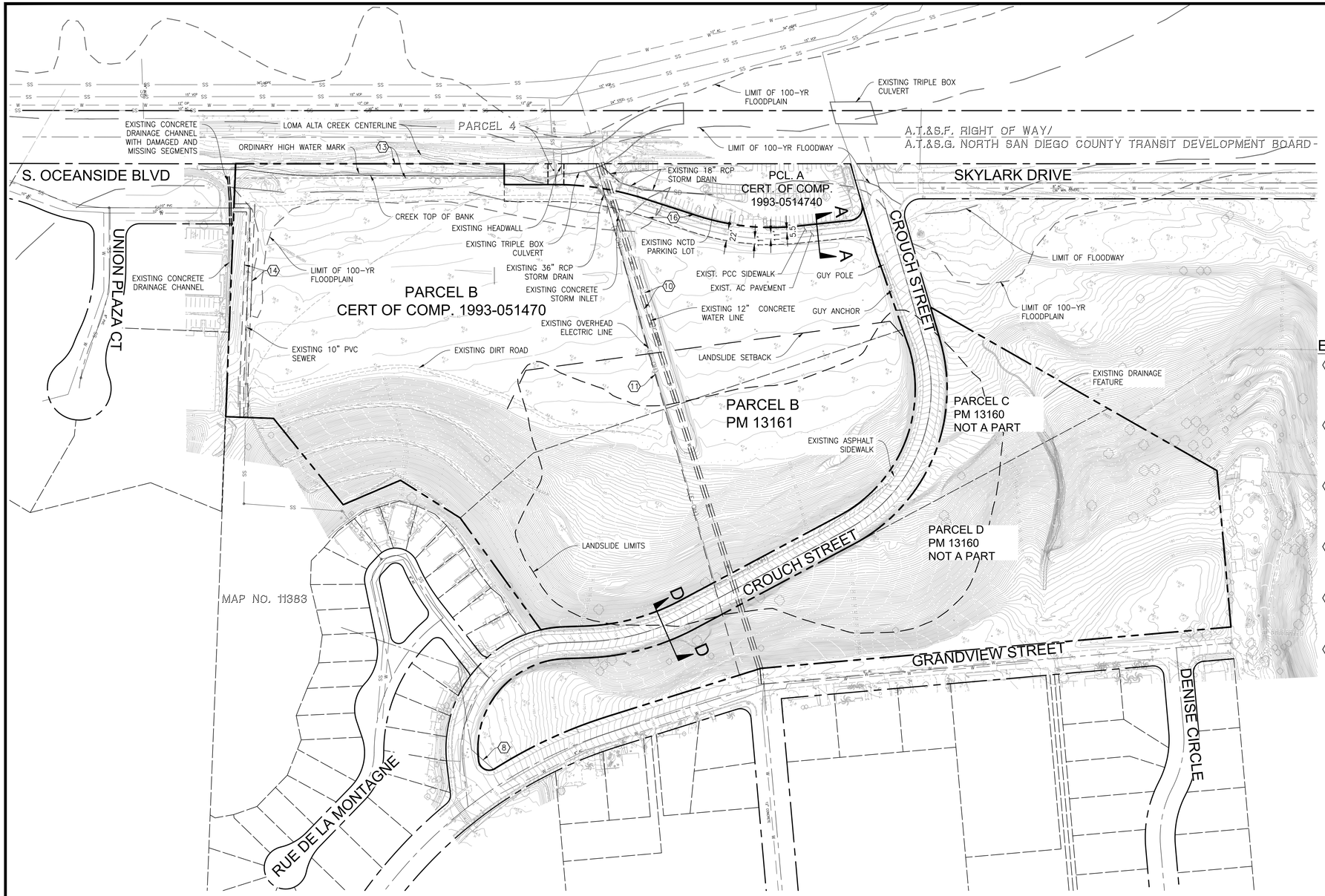
3RD SUBMITTAL 09/01/2021

4TH SUBMITTAL 02/23/2022

TITLE SHEET

C-1.0

F:\PROJECTS\557\010\PLANS\CONCEPTUAL GRADING PLAN\557-010-CPSCOTTS.DWG By: Bryan Smith



LEGEND

- RIGHT OF WAY
- PROPERTY LINE
- PARCEL LOT LINE
- STREET CENTERLINE
- EASEMENT
- 100-YR FLOODWAY
- 100-YR FLOOD PLAIN
- LANDSLIDE LIMITS
- EXISTING STORM DRAIN (SD)
- EXISTING SEWER (SS)
- EXISTING WATER (W)
- EXISTING OVERHEAD UTILITY (E-OH)

EASEMENT NOTES

(8) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES RECORDED JANUARY 30, 1934 AS BOOK 262, PAGE 435 OF OFFICIAL RECORDS.
IN FAVOR OF: SAN DIEGO CONSOLIDATED GAS AND ELECTRIC COMPANY
AFFECTS: PARCEL D OF PARCEL 1

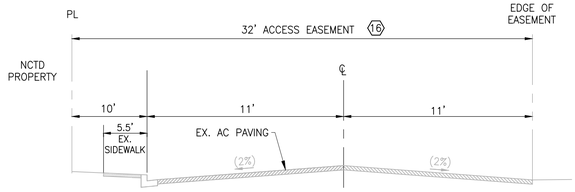
(10) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED JUNE 7, 1954 AS BOOK 5261, PAGE 195 OF OFFICIAL RECORDS.
IN FAVOR OF: CITY OF OCEANSIDE
AFFECTS: PARCEL D OF PARCEL 1, PARCEL 2 AND PARCEL 3 TO BE QUITCLAIMED

(11) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED FEBRUARY 16, 1955 AS BOOK 5534, PAGE 585 OF OFFICIAL RECORDS
IN FAVOR OF: SAN DIEGO GAS AND ELECTRIC COMPANY
AFFECTS: PARCEL D OF PARCEL 1, PARCEL 2 AND PARCEL 3 TO BE QUITCLAIMED

(13) AN EASEMENT SHOWN OR DEDICATED ON THE MAP AS REFERRED TO IN THE LEGAL DESCRIPTION FOR: DRAINAGE CHANNEL RESERVATION PER LOT SPLIT MAP NO. 458 AND INCIDENTAL PURPOSES.
AFFECTS: PARCEL 2

(14) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED DECEMBER 13, 1985 AS INSTRUMENT NO. 85-470870 OF OFFICIAL RECORDS.
IN FAVOR OF: CITY OF OCEANSIDE
AFFECTS: PARCEL 2

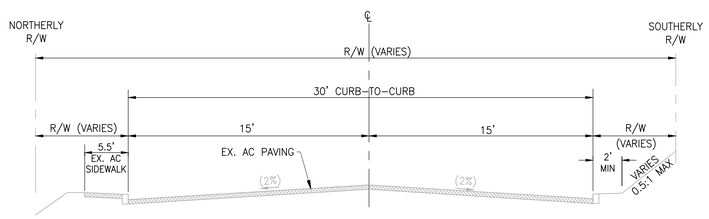
(16) THE TERMS, PROVISIONS AND EASEMENT(S) CONTAINED IN THE DOCUMENT ENTITLED "AGREEMENT REGARDING ACCESS EASEMENT" RECORDED AUGUST 22, 2006 AS INSTRUMENT NO. 2006-0600028 OF OFFICIAL RECORDS. TO BE SUPERCEDED BY PUBLIC RIGHT-OF-WAY DEDICATION



A-A
C-2.0

SECTION - S. OCEANSIDE BLVD.
ADJACENT TO NCTD PROPERTY
STA 11+24.66 - 17+41.17

SCALE: N.T.S.



D-D
C-2.0

SECTION - CROUCH STREET
SOUTH OF PROJECT PROPERTY

SCALE: N.T.S.

FUSCOE ENGINEERING
6390 Greenwich Dr., Suite 170, San Diego, California 92122
tel 858.554.1500 ◦ fax 858.597.0335 ◦ www.fuscoe.com

REGISTERED PROFESSIONAL ENGINEER
BRYAN D. SMITH
C 75822
EXP. 06-30-22
CIVIL
STATE OF CALIFORNIA

NOTE: EXISTING CONDITIONS SHOWN ON THIS MAP ARE BASED ON SURVEY PROVIDED BY OTHERS (AS NOTED ON TITLE SHEET, "SURVEY SOURCE"). A SURVEY WAS NOT PREPARED UNDER RESPONSIBLE CHARGE OF ENGINEER OF RECORD OF THESE CONCEPTS PLANS

100' 0' 50' 100'
SCALE: 1" = 100'

adc
architecture design collaborative
23231 South Pointe Dr
Laguna Hills, CA 92653
www.adcollaborative.com
949.267.1660

ADC Project No: 190147

Project Contact: Chris Weimholt
Email: cweimholt@adcollaborative.com
Principal: Chris Weimholt
Project Manager:

Client

Company: Ocean Creek, LLC
Address: 12250 El Camino Real, Suite 380
San Diego, CA 92130
Phone No. (858) 699-7510

OCEAN CREEK, LLC

OCEANSIDE, CA

Issue Date

1ST SUBMITTAL 03/09/2020

2ND SUBMITTAL 06/07/2021

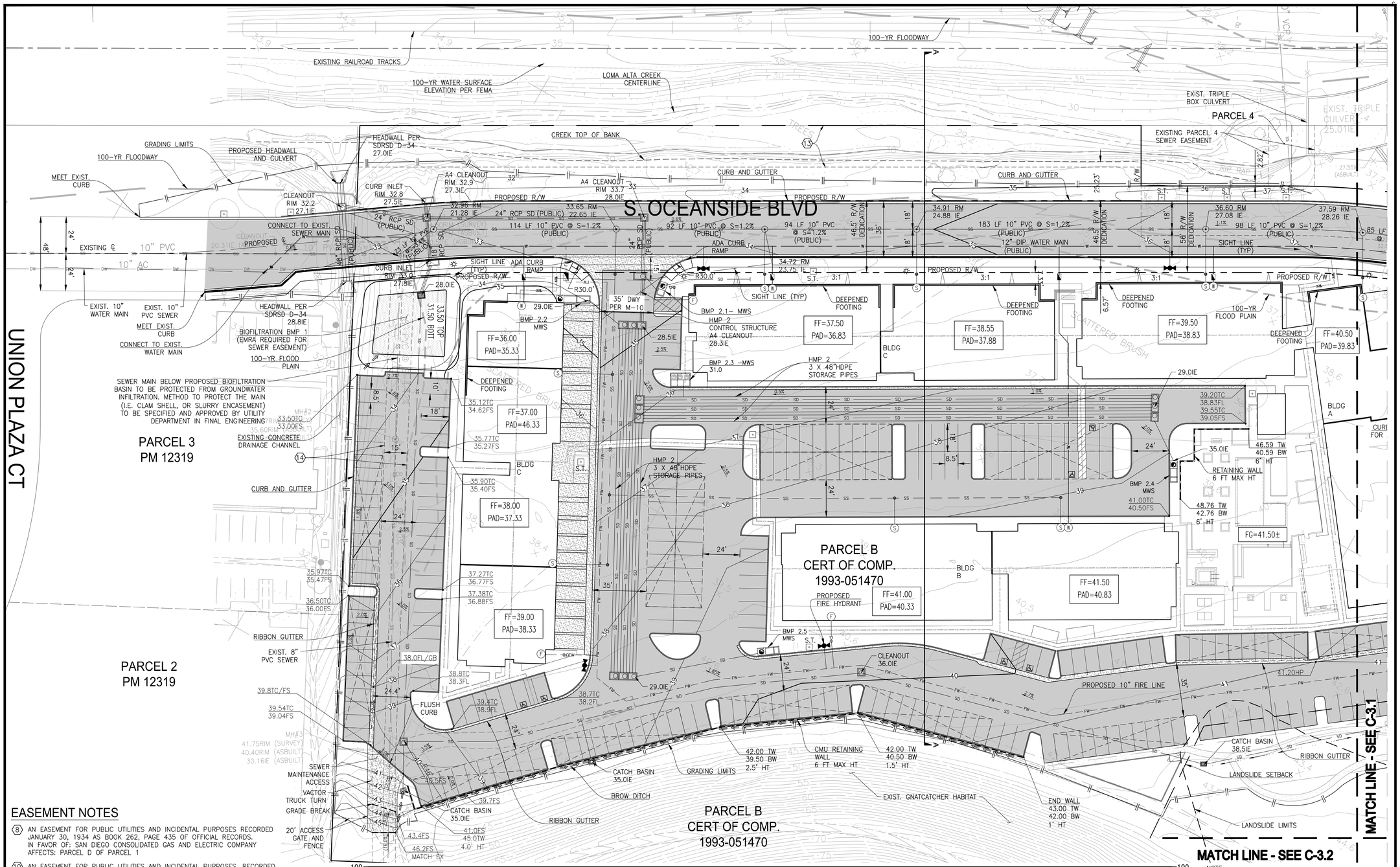
3RD SUBMITTAL 09/01/2021

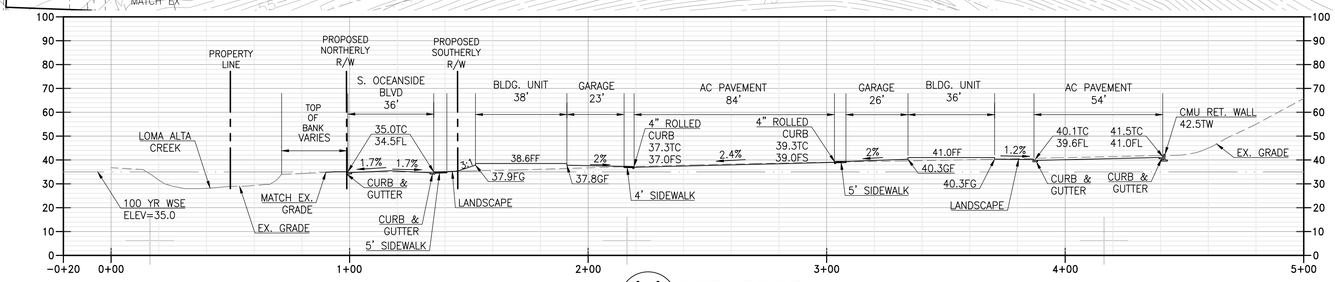
4TH SUBMITTAL 02/23/2022

EXISTING CONDITIONS

C-2.0

F:\PROJECTS\5570\010\PLANS\CONCEPTUAL GRADING PLAN\5570-010-CPGD02EX.DWG By: Bryan Smith





A-A / C-3.0 SITE SECTION

EASEMENT NOTES

(8) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES RECORDED JANUARY 30, 1934 AS BOOK 262, PAGE 435 OF OFFICIAL RECORDS.
IN FAVOR OF: SAN DIEGO CONSOLIDATED GAS AND ELECTRIC COMPANY
AFFECTS: PARCEL D OF PARCEL 1

(10) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED JUNE 7, 1954 AS BOOK 5261, PAGE 195 OF OFFICIAL RECORDS.
IN FAVOR OF: CITY OF OCEANSIDE
AFFECTS: PARCEL D OF PARCEL 1, PARCEL 2 AND PARCEL 3
TO BE QUITCLAIMED

(11) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED JUNE 7, 1954 AS BOOK 5261, PAGE 195 OF OFFICIAL RECORDS.
IN FAVOR OF: CITY OF OCEANSIDE
AFFECTS: PARCEL D OF PARCEL 1, PARCEL 2 AND PARCEL 3
TO BE QUITCLAIMED

(13) AN EASEMENT SHOWN OR DEDICATED ON THE MAP AS REFERRED TO IN THE LEGAL DESCRIPTION FOR: DRAINAGE CHANNEL RESERVATION PER LOT SPLIT MAP NO. 458 AND INCIDENTAL PURPOSES.
AFFECTS: PARCEL 2

(14) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED DECEMBER 13, 1985 AS INSTRUMENT NO. 85-470870 OF OFFICIAL RECORDS.
IN FAVOR OF: CITY OF OCEANSIDE
AFFECTS: PARCEL 2

(16) THE TERMS, PROVISIONS AND EASEMENT(S) CONTAINED IN THE DOCUMENT ENTITLED "AGREEMENT REGARDING ACCESS EASEMENT" RECORDED AUGUST 22, 2006 AS INSTRUMENT NO. 2006-0600028 OF OFFICIAL RECORDS.
TO BE SUPERCEDED BY PUBLIC RIGHT-OF-WAY DEDICATION.

NOTE:
- EXISTING ON SITE OVERHEAD UTILITIES & OVERHEAD UTILITIES ALONG THE PROPERTY LINE ON CROUCH STREET MUST BE PLACED UNDERGROUND

REGISTERED PROFESSIONAL ENGINEER BRYAN D. SMITH C 75822 EXP. 06-30-22 CIVIL STATE OF CALIFORNIA

30' 0' 15' 30'
SCALE: 1" = 30'

adc
architecture design collaborative
23231 South Pointe Dr
Laguna Hills, CA 92653
www.adcollaborative.com
949.267.1660

ADC Project No: 190147

Project Contact: Chris Weimholt
Email: cweimholt@adcollaborative.com
Principal: Chris Weimholt
Project Manager:

Client

Company: Ocean Creek, LLC
Address: 12250 El Camino Real, Suite 380
San Diego, CA 92130
Phone No. (858) 699-7510

OCEAN CREEK, LLC

OCEANSIDE, CA

Issue Date

1ST SUBMITTAL 03/09/2020

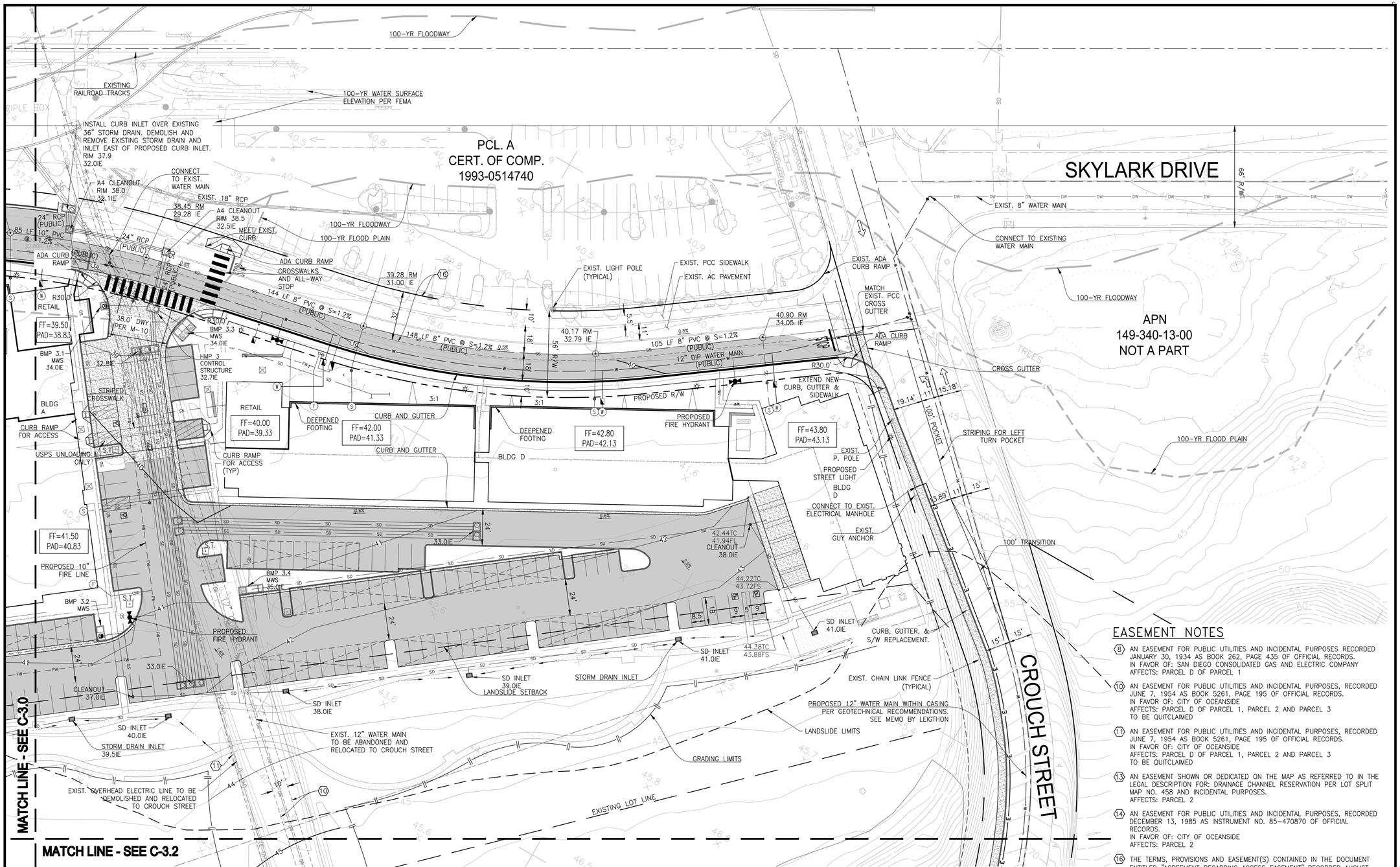
2ND SUBMITTAL 06/07/2021

3RD SUBMITTAL 09/01/2021

4TH SUBMITTAL 02/23/2022

CONCEPTUAL GRADING AND UTILITIES

C-3.0



EASEMENT NOTES

(8) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES RECORDED JANUARY 30, 1934 AS BOOK 262, PAGE 435 OF OFFICIAL RECORDS.
IN FAVOR OF: SAN DIEGO CONSOLIDATED GAS AND ELECTRIC COMPANY
AFFECTS: PARCEL D OF PARCEL 1

(10) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED JUNE 7, 1954 AS BOOK 5261, PAGE 195 OF OFFICIAL RECORDS.
IN FAVOR OF: CITY OF OCEANSIDE
AFFECTS: PARCEL D OF PARCEL 1, PARCEL 2 AND PARCEL 3
TO BE QUITCLAIMED

(11) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED JUNE 7, 1954 AS BOOK 5261, PAGE 195 OF OFFICIAL RECORDS.
IN FAVOR OF: CITY OF OCEANSIDE
AFFECTS: PARCEL D OF PARCEL 1, PARCEL 2 AND PARCEL 3
TO BE QUITCLAIMED

(13) AN EASEMENT SHOWN OR DEDICATED ON THE MAP AS REFERRED TO IN THE LEGAL DESCRIPTION FOR: DRAINAGE CHANNEL RESERVATION PER LOT SPLIT MAP NO. 458 AND INCIDENTAL PURPOSES.
AFFECTS: PARCEL 2

(14) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED DECEMBER 13, 1985 AS INSTRUMENT NO. 85-470870 OF OFFICIAL RECORDS.
IN FAVOR OF: CITY OF OCEANSIDE
AFFECTS: PARCEL 2

(16) THE TERMS, PROVISIONS AND EASEMENT(S) CONTAINED IN THE DOCUMENT ENTITLED "AGREEMENT REGARDING ACCESS EASEMENT" RECORDED AUGUST 22, 2006 AS INSTRUMENT NO. 2006-0600028 OF OFFICIAL RECORDS.
TO BE SUPERCEDED BY PUBLIC RIGHT-OF-WAY DEDICATION.

REGISTERED PROFESSIONAL ENGINEER
BRYAN D. SMITH
C 75822
EXP. 06-30-22
CIVIL
STATE OF CALIFORNIA

NOTE:
- EXISTING ON SITE OVERHEAD UTILITIES & OVERHEAD UTILITIES ALONG THE PROPERTY LINE ON CROUCH STREET MUST BE PLACED UNDERGROUND

30' 0' 15' 30'
SCALE: 1" = 30'

FUSCOE ENGINEERING
6390 Greenwich Dr., Suite 170, San Diego, California 92122
tel 858.554.1500 ◦ fax 858.597.0335 ◦ www.fuscoe.com

adc
architecture design collaborative
23231 South Pointe Dr
Laguna Hills, CA 92653
www.adcollaborative.com
949.267.1660

ADC Project No: 190147

Project Contact: Chris Weimholt
Email: cweimholt@adcollaborative.com
Principal: Chris Weimholt
Project Manager:

Client

Company: Ocean Creek, LLC
Address: 12250 El Camino Real, Suite 380
San Diego, CA 92130
Phone No. (858) 699-7510

OCEAN CREEK, LLC

OCEANSIDE, CA

Issue Date

1ST SUBMITTAL 03/09/2020

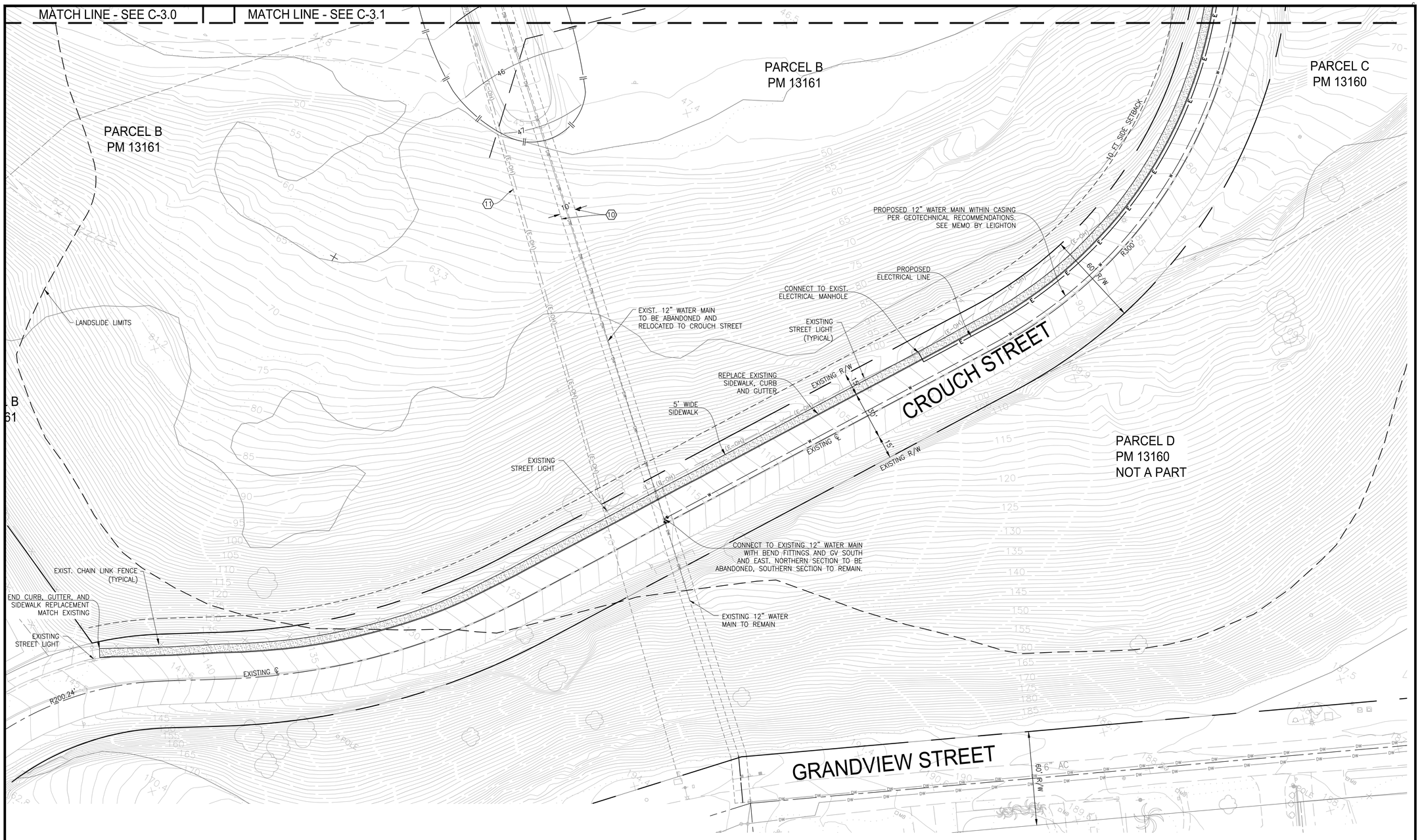
2ND SUBMITTAL 06/07/2021

3RD SUBMITTAL 09/01/2021

4TH SUBMITTAL 02/23/2022

CONCEPTUAL GRADING AND UTILITIES

C-3.1



NOTE:
- EXISTING ON SITE OVERHEAD UTILITIES & OVERHEAD UTILITIES ALONG THE PROPERTY LINE ON CROUCH STREET MUST BE PLACED UNDERGROUND

REGISTERED PROFESSIONAL ENGINEER
BRYAN D. SMITH
C 75822
EXP. 06-30-22
CIVIL
STATE OF CALIFORNIA

adc
architecture design collaborative
23231 South Pointe Dr
Laguna Hills, CA 92653
www.adcollaborative.com
949.267.1660

ADC Project No: 190147

Project Contact: Chris Weimholt
Email: cweimholt@adcollaborative.com
Principal: Chris Weimholt
Project Manager:

Client

Company: Ocean Creek, LLC
Address: 12250 El Camino Real, Suite 380
San Diego, CA 92130
Phone No. (858) 699-7510

OFF-SITE PUBLIC IMPROVEMENTS
OCEAN CREEK, LLC

OCEANSIDE, CA

Issue Date

1ST SUBMITTAL 03/09/2020

2ND SUBMITTAL 06/07/2021

3RD SUBMITTAL 09/01/2021

4TH SUBMITTAL 02/23/2022

CONCEPTUAL GRADING AND UTILITIES

C-3.2

APPENDIX 3

EXISTING HYDROLOGY CALCULATIONS

FUSCOE
ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 ▪ fax 858.554.0830
www.fuscoe.com

Job Name: Jefferson Oceanside
Job #: 557-010
Run Name: Existing Series 3
Date: 3/3/2020
Notes:

Node 1	Node 2	Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (acres)	Comments	BANK 1	BANK 2	BANK 3
305	304	2	120	84	100	0.35	0.111				
304	303	5	84	33.8	650	0.35	6.070				
303	300	4	33.8	30.37	54.5	-	0.000				
300	300	1	-	-	-	-	-				
302	301	2	42	40	100	0.87	0.074				
301	300	6	40	30.37	435	0.85	0.337				
						total	6.591				

FUSCOE
ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 ▪ fax 858.554.0830
www.fuscoe.com

Job Name: Jefferson Oceanside
Job #: 557-010
Run Name: Existing Series 4
Date: 3/3/2020
Notes:

Node 1	Node 2	Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (acres)	Comments	BANK 1	BANK 2	BANK 3
411	410	2	194	193.5	100	0.52	0.123				
410	409	6	193.5	145	946.19	0.79	1.850				
410	409	8	-	-	-	0.58	13.305				
409	408	3	136.05	94	454.5	-	-				
408	404	5	99	29	1061	0.39	21.391				
404	404	1	-	-	-		-				
407	406	2	127	107	100	0.35	0.141				
406	405	5	107	39	143.21	0.35	0.415				
405	404	6	39	29	596.69	0.87	0.688				
404	404	1	-	-	-		--				
404	400	9	29	25	92	0.35	0.112				
400	400	1	-	-	-		-				
403	402	2	146	107	100	0.35	0.156				
402	401	5	107	31	1355	0.35	11.774				
401	400	9	31	28.6	32		0.112				
400	400	1	-	-	-		-				
						total	50.067				

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1355

                            Analysis prepared by:

                               Fuscoe Engineering
                             6390 Greenwich Dr Ste 170
                                  San Diego, CA
                                      92122

 ************************** DESCRIPTION OF STUDY **************************
* JEFFERSON OCEANSIDE PRE-DEVELOPMENT STUDY                               *
* SERIES 3                                                                *
* OCEANSIDE, CALIFORNIA                                                   *
 *************************************************************************

  FILE NAME: EX100S3.DAT
  TIME/DATE OF STUDY: 14:13 03/04/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.700
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  ========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   21.0      1.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  1.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    304.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    120.00
```

```
  DOWNSTREAM ELEVATION(FEET) =     84.00
  ELEVATION DIFFERENCE(FEET) =     36.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
     100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.150
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    303.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     84.00  DOWNSTREAM(FEET) =     33.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   650.00   CHANNEL SLOPE =  0.0772
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.633
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.27
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.14
  AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   3.45
  Tc(MIN.) =    9.72
  SUBAREA AREA(ACRES) =     6.07       SUBAREA RUNOFF(CFS) =    9.84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        6.2         PEAK FLOW RATE(CFS) =      10.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   3.97
  LONGEST FLOWPATH FROM NODE    305.00 TO NODE    303.00 =     750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    300.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    33.80  DOWNSTREAM(FEET) =    30.37
  FLOW LENGTH(FEET) =    54.50   MANNING'S N =  0.011
  DEPTH OF FLOW IN  36.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.37
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.02
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.78
  LONGEST FLOWPATH FROM NODE    305.00 TO NODE    300.00 =     804.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    300.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.78
  RAINFALL INTENSITY(INCH/HR) =   4.61
  TOTAL STREAM AREA(ACRES) =     6.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.02
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     42.00
  DOWNSTREAM ELEVATION(FEET) =     40.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.030
      100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    300.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   40.00  DOWNSTREAM ELEVATION(FEET) =   30.37
  STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 21.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.31
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   2.68   Tc(MIN.) =    5.71
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.529
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.854
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    1.87
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       2.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.04
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    300.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    300.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.71
  RAINFALL INTENSITY(INCH/HR) =   6.53
  TOTAL STREAM AREA(ACRES) =     0.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.29

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.02     9.78        4.614          6.18
      2        2.29     5.71        6.529          0.41

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.14     5.71       6.529
      2       11.64     9.78       4.614

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.64   Tc(MIN.) =    9.78
  TOTAL AREA(ACRES) =        6.6
  LONGEST FLOWPATH FROM NODE    305.00 TO NODE    300.00 =     804.50 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.6  TC(MIN.) =      9.78
  PEAK FLOW RATE(CFS)   =      11.64
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
_____
*****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1355

                             Analysis prepared by:

                               Fuscoe Engineering
                             6390 Greenich Dr Ste 170
                                  San Diego, CA
                                      92122

 ************************** DESCRIPTION OF STUDY **************************
* JEFFERSON OCEANSIDE PRE-DEVELOPMENT STUDY                               *
* SERIES 4                                                                *
* OCEANSIDE, CALIFORNIA                                                   *
 *************************************************************************

  FILE NAME: EX100S4.DAT
  TIME/DATE OF STUDY: 14:20 03/04/2020
-----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
-----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.700
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  ========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   18.0      1.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150
  3   23.0      1.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  1.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

*****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    410.00 IS CODE =  21
-----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
```

```
  UPSTREAM ELEVATION(FEET) =    194.00
  DOWNSTREAM ELEVATION(FEET) =    193.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.301
      100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.767
  SUBAREA RUNOFF(CFS) =      0.30
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    409.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  193.50  DOWNSTREAM ELEVATION(FEET) =  145.00
  STREET LENGTH(FEET) =   946.19   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   4.11   Tc(MIN.) =   13.41
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.765
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.773
  SUBAREA AREA(ACRES) =    1.85      SUBAREA RUNOFF(CFS) =    5.50
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       5.74

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.34
  FLOW VELOCITY(FEET/SEC.) =  4.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    411.00 TO NODE    409.00 =    1046.19 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.765
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6050
  SUBAREA AREA(ACRES) =   13.30   SUBAREA RUNOFF(CFS) =   29.04
  TOTAL AREA(ACRES) =       15.3   TOTAL RUNOFF(CFS) =      34.78
  TC(MIN.) =   13.41
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    408.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   136.05  DOWNSTREAM(FEET) =    94.00
  FLOW LENGTH(FEET) =   454.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.37
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.78
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   13.77
  LONGEST FLOWPATH FROM NODE    411.00 TO NODE    408.00 =    1500.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    404.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     99.00  DOWNSTREAM(FEET) =     29.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1061.00   CHANNEL SLOPE =  0.0660
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.023   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.475
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3900
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      49.33
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.46
  AVERAGE FLOW DEPTH(FEET) =   0.82   TRAVEL TIME(MIN.) =   1.42
  Tc(MIN.) =   15.18
  SUBAREA AREA(ACRES) =    21.39       SUBAREA RUNOFF(CFS) =   28.99
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.480
  TOTAL AREA(ACRES) =       36.7         PEAK FLOW RATE(CFS) =      61.09

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.93   FLOW VELOCITY(FEET/SEC.) =  13.26
  LONGEST FLOWPATH FROM NODE    411.00 TO NODE    404.00 =    2561.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.18
  RAINFALL INTENSITY(INCH/HR) =   3.47
  TOTAL STREAM AREA(ACRES) =    36.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     61.09

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    406.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    127.00
  DOWNSTREAM ELEVATION(FEET) =    107.00
  ELEVATION DIFFERENCE(FEET) =     20.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
     100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.150
  SUBAREA RUNOFF(CFS) =      0.30
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    405.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    107.00  DOWNSTREAM(FEET) =     39.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   143.21   CHANNEL SLOPE =  0.4748
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.869
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.06
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.47
  Tc(MIN.) =    6.74
  SUBAREA AREA(ACRES) =     0.41       SUBAREA RUNOFF(CFS) =    0.85
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   6.06
  LONGEST FLOWPATH FROM NODE    407.00 TO NODE    405.00 =     243.21 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    404.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   39.00  DOWNSTREAM ELEVATION(FEET) =   29.00
  STREET LENGTH(FEET) =   596.69   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 23.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.83
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.73
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   3.64   Tc(MIN.) =   10.38
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.441
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.638
  SUBAREA AREA(ACRES) =    0.69      SUBAREA RUNOFF(CFS) =    2.66
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       3.52

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.35
  FLOW VELOCITY(FEET/SEC.) =  2.96   DEPTH*VELOCITY(FT*FT/SEC.) =   0.99
  LONGEST FLOWPATH FROM NODE    407.00 TO NODE    404.00 =     839.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.38
  RAINFALL INTENSITY(INCH/HR) =   4.44
  TOTAL STREAM AREA(ACRES) =     1.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.52

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       61.09    15.18        3.475         36.66
      2        3.52    10.38        4.441          1.24

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       45.29    10.38       4.441
      2       63.85    15.18       3.475

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.85   Tc(MIN.) =   15.18
  TOTAL AREA(ACRES) =       37.9
  LONGEST FLOWPATH FROM NODE    411.00 TO NODE    404.00 =    2561.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    400.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     29.00  DOWNSTREAM(FEET) =     25.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    92.00   CHANNEL SLOPE =  0.0435
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.448
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      63.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.48
  AVERAGE FLOW DEPTH(FEET) =   1.29   TRAVEL TIME(MIN.) =   0.18
  Tc(MIN.) =   15.37
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.14
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.484
  TOTAL AREA(ACRES) =       38.0         PEAK FLOW RATE(CFS) =      63.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.29   FLOW VELOCITY(FEET/SEC.) =   8.47
  LONGEST FLOWPATH FROM NODE    411.00 TO NODE    400.00 =    2653.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    400.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.37
  RAINFALL INTENSITY(INCH/HR) =   3.45
  TOTAL STREAM AREA(ACRES) =    38.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     63.85

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    402.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    146.00
  DOWNSTREAM ELEVATION(FEET) =    107.00
  ELEVATION DIFFERENCE(FEET) =     39.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.150
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    401.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    107.00  DOWNSTREAM(FEET) =     31.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =     0.35   CHANNEL SLOPE = *******
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.150
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  64.46
```

```
 AVERAGE FLOW DEPTH(FEET) =   0.02   TRAVEL TIME(MIN.) =   0.00
 Tc(MIN.) =    6.27
 SUBAREA AREA(ACRES) =    11.78       SUBAREA RUNOFF(CFS) =   25.35
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =       11.9         PEAK FLOW RATE(CFS) =      25.69

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =  75.95
 LONGEST FLOWPATH FROM NODE    403.00 TO NODE    401.00 =     100.35 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    401.00 TO NODE    400.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =     31.00  DOWNSTREAM(FEET) =     28.60
 CHANNEL LENGTH THRU SUBAREA(FEET) =    32.00   CHANNEL SLOPE =  0.0750
 CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.124
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.81
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.17
 AVERAGE FLOW DEPTH(FEET) =   0.41   TRAVEL TIME(MIN.) =   0.04
 Tc(MIN.) =    6.31
 SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.24
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =       12.0         PEAK FLOW RATE(CFS) =      25.82

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =  13.17
 LONGEST FLOWPATH FROM NODE    403.00 TO NODE    400.00 =     132.35 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    400.00 TO NODE    400.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.31
 RAINFALL INTENSITY(INCH/HR) =   6.12
 TOTAL STREAM AREA(ACRES) =    12.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.82

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       63.85    15.37        3.448         38.02
     2       25.82     6.31        6.124         12.05

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
```

```
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       61.78      6.31        6.124
      2       78.39     15.37        3.448

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      78.39   Tc(MIN.) =   15.37
  TOTAL AREA(ACRES) =       50.1
  LONGEST FLOWPATH FROM NODE    411.00 TO NODE    400.00 =    2653.69 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       50.1  TC(MIN.) =     15.37
  PEAK FLOW RATE(CFS)   =      78.39
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX 4

PROPOSED HYDROLOGY CALCULATIONS

FUSCOE
ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 ▪ fax 858.554.0099
www.fuscoe.com

Job Name: Jefferson Oceanside
Job #: 557-010
Run Name: Proposed Series 3
Date: 3/3/2020
Notes:

Node 1	Node 2	Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (acres)	Comments	BANK 1	BANK 2	BANK 3
307	306	2	72.1	45.7	100	0.35	0.080	0% IMP			
306	305	5	45.7	43.5	95.2	0.35	0.310				
305	304	3	40.5	38.4	81.3	-	-	D=8"			
304	304	8	-	-	-	0.87	0.210	100% IMP			
304	303	3	38.4	36.9	325.6	-	-	D=8"			
303	303	8	-	-	-	0.87	0.400	100% IMP			
303	302	3	36.9	32.7	221.35	0.79	-	80% IMP, ASSUMED			
302	302	8	-	-	-	0.35	0.130	0% IMP			
302	302	8	-	-	-	0.79	0.190	80% IMP, ASSUMED			
302	302	8	-	-	-	0.79	1.280	80% IMP, ASSUMED			
302	301	3	32.7	32.1	102	-	-	D= 24"			
301	301	1	-	-	-	-	-	1 OF 2			
312	311	2	122.8	84	100	0.35	0.130				
311	310	5	84	42.9	363.7	0.35	3.460	n=0.30, W=10', Z=4			
310	301	3	39.9	32.1	401	-	-				
301	301	1	-	-	-	-	-	2 OF 2			
301	300	3	32.1	32	10.3	-	-	d=36"			
300	300	1	-	-	-	-	-	1 OF 2			
309	308	2	42	38	100	0.87	0.100				
308	300	6	38	32	435	0.87	0.240				
300	300	1	-	-	-	-	-	2 OF 2			
						TOTAL	6.530				

FUSCOE
ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 ▪ fax 858.554.0099
www.fuscoe.com

Job Name: Jefferson Oceanside
Job #: 557-010
Run Name: Proposed Series 4
Date: 3/3/2020
Notes:

Node 1	Node 2	Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	C Factor	Area (acres)	Comments	BANK		
									1	2	3
426	425	2	194	193.5	100	0.52	0.123				
425	424	6	193.5	145	946.19	0.79	1.85	18' half width, 1 side			
424	424	8	-	-	-	0.58	13.305				
424	423	4	136.05	99	454.5	-	-	n=0.013			
423	422	5	99	29	1061	0.39	21.14	n=0.023, W=4', Z=1			
422	421	3	29	27.2	56.13	-	-	n=0.013			
421	421	10	-	-	-	-	-		X		
421	421	13	-	-	-	-	-				
420	419	2	146	107	100	0.35	0.156				
419	418	5	107	43	475	0.35	6.06				
418	417	3	35	33	735	-	-	n=0.011			
417	416	3	33	27.8	287	-	-	n=0.013			
416	416	8	-	-	-	0.85	0.75				
416	412	3	27.8	27.6	20	-	-	n=0.013			
412	412	1	-	-	-	-	-	1 of 2			
415	414	2	127	107	100	0.35	0.14				
414	413	5	107	39	143.21	0.35	0.41	n=0.03			
413	412	6	39	32.54	646	0.87	0.51	18' half width, 1 side			
412	412	8	-	-	-	0.79	0.73	S. side of OC Blvd E. of Inlet			
412	412	1	-	-	-	-	-	2 of 2			
412	401	3	27.6	27.3	30	-	-	n=0.013			
401	401	1	-	-	-	-	-	1 of 3			
404	403	2	36.8	35.4	100	0.87	0.06	S. side of OC Blvd W. of Inlet			
403	402	6	35.4	32.54	533	0.79	0.44	18' half width, 1 side			
402	402	8	-	-	-	0.87	0.11	N. side of OC Blvd W. of Inlet			
402	401	3	27.6	27.3	16	-	-	n=0.013			
401	401	1	-	-	-	-	-	2 of 3			
411	410	2	42	40.7	100	0.87	0.12				
410	409	9	40.7	39.25	288	0.79	0.66	width =3', depth 0.13'			
409	408	3	30.69	29.09	80	-	-	n=0.011			
408	407	3	29.09	28.65	175	-	-	n=0.011			
407	407	8	-	-	-	0.85	0.52	DMA W. of U.G. Det. Sys.			
407	407	8	-	-	-	0.87	1.12	DMA S. of U.G. Det. Sys.			
407	406	3	28.65	28.5	55	-	-	n=0.011			
406	406	8	-	-	-	0.87	1	DMA E. of U.G. Det. Sys.			
406	405	3	28.5	28.3	20	-	-	n=0.011			
405	405	8	-	-	-	0.87	0.37	S. Half of Bldg.			
405	405	8	-	-	-	0.35	0.07	Area between Bldg & ROW			
405	401	3	28.3	27.3	185	-	-	n=0.013			
401	401	1	-	-	-	-	-	3 of 3			
401	421	3	27.3	27.2	57	-	-	n=0.013			
421	421	11	-	-	-	-	-		X		
421	400	3	27.2	27	8.3	-	-	n=0.013			
						TOTAL	49.644				

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1355

                            Analysis prepared by:

                               Fuscoe Engineering
                             6390 Greenwich Dr Ste 170
                                  San Diego, CA
                                      92122

 ************************** DESCRIPTION OF STUDY **************************
* JEFFERSON OCEANSIDE POST-DEVELOPMENT STUDY                              *
* SERIES 3                                                                *
* OCEANSIDE, CALIFORNIA                                                   *
 *************************************************************************

  FILE NAME: PR100S3.DAT
  TIME/DATE OF STUDY: 13:36 03/05/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.700
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   18.0      1.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  1.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    306.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     72.10
```

```
  DOWNSTREAM ELEVATION(FEET) =     45.70
  ELEVATION DIFFERENCE(FEET) =     26.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.150
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    305.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     45.70  DOWNSTREAM(FEET) =     43.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =    95.20   CHANNEL SLOPE =  0.0231
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.265
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.93
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.71
  Tc(MIN.) =    7.97
  SUBAREA AREA(ACRES) =     0.31       SUBAREA RUNOFF(CFS) =    0.57
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       0.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.10
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    305.00 =     195.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    304.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    40.50  DOWNSTREAM(FEET) =    38.40
  FLOW LENGTH(FEET) =    81.30   MANNING'S N =  0.011
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.71
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.72
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    8.21
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    304.00 =     276.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.167
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5320
  SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    0.94
```

```
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.65
  TC(MIN.) =    8.21

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    38.40  DOWNSTREAM(FEET) =    36.90
  FLOW LENGTH(FEET) =   325.60   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.70
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.65
  PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =    9.68
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    303.00 =     602.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.646
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6672
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.62
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       3.10
  TC(MIN.) =    9.68

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    302.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    36.90  DOWNSTREAM(FEET) =    32.70
  FLOW LENGTH(FEET) =   221.35   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.36
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.10
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   10.18
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    302.00 =     823.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.498
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6307
  SUBAREA AREA(ACRES) =    0.13   SUBAREA RUNOFF(CFS) =    0.20
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       3.21
  TC(MIN.) =   10.18
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.498
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6536
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.68
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       3.88
  TC(MIN.) =   10.18

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.498
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7208
  SUBAREA AREA(ACRES) =    1.28   SUBAREA RUNOFF(CFS) =    4.55
  TOTAL AREA(ACRES) =        2.6   TOTAL RUNOFF(CFS) =       8.43
  TC(MIN.) =   10.18

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    301.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    32.70  DOWNSTREAM(FEET) =    32.10
  FLOW LENGTH(FEET) =   102.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.95
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.43
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    301.00 =     925.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   4.42
  TOTAL STREAM AREA(ACRES) =     2.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.43

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    311.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    122.80
  DOWNSTREAM ELEVATION(FEET) =     84.00
  ELEVATION DIFFERENCE(FEET) =     38.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.150
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.28

**************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    310.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     84.00  DOWNSTREAM(FEET) =     42.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   363.70   CHANNEL SLOPE =  0.1130
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.251
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.48
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.74
  Tc(MIN.) =    8.01
  SUBAREA AREA(ACRES) =     3.46       SUBAREA RUNOFF(CFS) =    6.36
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        3.6         PEAK FLOW RATE(CFS) =       6.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   4.39
  LONGEST FLOWPATH FROM NODE    312.00 TO NODE    310.00 =     463.70 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    301.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    39.90  DOWNSTREAM(FEET) =    32.10
  FLOW LENGTH(FEET) =   401.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.96
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.60
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =    8.75
  LONGEST FLOWPATH FROM NODE    312.00 TO NODE    301.00 =     864.70 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

```
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.75
  RAINFALL INTENSITY(INCH/HR) =   4.96
  TOTAL STREAM AREA(ACRES) =     3.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.60

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.43    10.46        4.418          2.60
      2        6.60     8.75        4.958          3.59

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       13.65     8.75       4.958
      2       14.31    10.46       4.418

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.31   Tc(MIN.) =   10.46
  TOTAL AREA(ACRES) =        6.2
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    301.00 =     925.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    300.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    32.10  DOWNSTREAM(FEET) =    32.00
  FLOW LENGTH(FEET) =    10.30   MANNING'S N =  0.011
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.30
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.31
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.48
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    300.00 =     935.75 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    300.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.48
  RAINFALL INTENSITY(INCH/HR) =   4.41
  TOTAL STREAM AREA(ACRES) =     6.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.31

****************************************************************************
  FLOW PROCESS FROM NODE    309.00 TO NODE    308.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     42.00
  DOWNSTREAM ELEVATION(FEET) =     38.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.608
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.62
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.62

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    300.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   38.00  DOWNSTREAM ELEVATION(FEET) =   32.00
  STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   3.31   Tc(MIN.) =    5.92
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.379
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.24      SUBAREA RUNOFF(CFS) =    1.33
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.19
  FLOW VELOCITY(FEET/SEC.) =  2.39   DEPTH*VELOCITY(FT*FT/SEC.) =   0.69
  LONGEST FLOWPATH FROM NODE    309.00 TO NODE    300.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    300.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
_____
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                              Analysis prepared by:

                                Fuscoe Engineering
                                 16795 Von Karman
                                    Suite 210
                                 Irvine CA 92606

 ************************** DESCRIPTION OF STUDY **************************
* JEFFERSON OCEANSIDE POST-DEVELOPMENT STUDY                             *
* SERIES 4                                                               *
* OCEANSIDE CALIFORNIA                                                   *
 **************************************************************************

  FILE NAME: SMIT4.DAT
  TIME/DATE OF STUDY: 16:12 04/09/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.700
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   18.0      1.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  1.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    426.00 TO NODE    425.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    194.00
```

```
  DOWNSTREAM ELEVATION(FEET) =    193.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.301
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.767
  SUBAREA RUNOFF(CFS) =      0.30
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    424.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  193.50  DOWNSTREAM ELEVATION(FEET) =  145.00
  STREET LENGTH(FEET) =   946.16   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   4.11   Tc(MIN.) =   13.41
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.765
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.773
  SUBAREA AREA(ACRES) =    1.85      SUBAREA RUNOFF(CFS) =    5.50
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       5.74

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.34
  FLOW VELOCITY(FEET/SEC.) =  4.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    426.00 TO NODE    424.00 =    1046.16 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.765
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6049
```

```
  SUBAREA AREA(ACRES) =   13.31   SUBAREA RUNOFF(CFS) =   29.05
  TOTAL AREA(ACRES) =       15.3   TOTAL RUNOFF(CFS) =      34.79
  TC(MIN.) =   13.41

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    423.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   136.05  DOWNSTREAM(FEET) =    99.00
  FLOW LENGTH(FEET) =   454.50   MANNING'S N =  0.011
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.04
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.79
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   13.74
  LONGEST FLOWPATH FROM NODE    426.00 TO NODE    423.00 =    1500.66 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    423.00 TO NODE    422.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     99.00  DOWNSTREAM(FEET) =     29.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1061.00   CHANNEL SLOPE =  0.0660
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.023   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.474
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3900
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      49.16
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.19
  AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   1.45
  Tc(MIN.) =   15.19
  SUBAREA AREA(ACRES) =    21.14       SUBAREA RUNOFF(CFS) =   28.64
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.480
  TOTAL AREA(ACRES) =       36.4         PEAK FLOW RATE(CFS) =      60.75

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.94   FLOW VELOCITY(FEET/SEC.) =  13.06
  LONGEST FLOWPATH FROM NODE    426.00 TO NODE    422.00 =    2561.66 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    422.00 TO NODE    421.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    29.00  DOWNSTREAM(FEET) =    27.20
  FLOW LENGTH(FEET) =    56.13   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.37
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.75
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   15.25
  LONGEST FLOWPATH FROM NODE    426.00 TO NODE    421.00 =    2617.79 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    421.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    421.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    419.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    146.00
  DOWNSTREAM ELEVATION(FEET) =    107.00
  ELEVATION DIFFERENCE(FEET) =     39.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.150
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    419.00 TO NODE    418.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    107.00  DOWNSTREAM(FEET) =     43.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   475.00   CHANNEL SLOPE =  0.1347
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.233
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.44
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   1.78
  Tc(MIN.) =    8.05
  SUBAREA AREA(ACRES) =     6.06       SUBAREA RUNOFF(CFS) =   11.10
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        6.2         PEAK FLOW RATE(CFS) =      11.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   5.70
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    418.00 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    417.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    35.00  DOWNSTREAM(FEET) =    33.00
  FLOW LENGTH(FEET) =   735.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.85
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.38
  PIPE TRAVEL TIME(MIN.) =   2.53    Tc(MIN.) =   10.58
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    417.00 =    1310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    416.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    33.00  DOWNSTREAM(FEET) =    27.80
  FLOW LENGTH(FEET) =   287.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.38
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   11.06
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    416.00 =    1597.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.264
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4038
  SUBAREA AREA(ACRES) =    0.75   SUBAREA RUNOFF(CFS) =    2.72
  TOTAL AREA(ACRES) =       7.0   TOTAL RUNOFF(CFS) =     11.99
  TC(MIN.) =   11.06

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    412.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.80  DOWNSTREAM(FEET) =    27.60
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.80
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.99
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    412.00 =    1617.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.10
  RAINFALL INTENSITY(INCH/HR) =   4.25
  TOTAL STREAM AREA(ACRES) =     6.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.99

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    414.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    127.00
  DOWNSTREAM ELEVATION(FEET) =    107.00
  ELEVATION DIFFERENCE(FEET) =     20.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.150
  SUBAREA RUNOFF(CFS) =      0.30
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    413.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    107.00  DOWNSTREAM(FEET) =     39.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   143.21   CHANNEL SLOPE =  0.4748
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.652
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.72
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   0.88
  Tc(MIN.) =    7.14
  SUBAREA AREA(ACRES) =     0.41       SUBAREA RUNOFF(CFS) =    0.81
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.09

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   3.22
  LONGEST FLOWPATH FROM NODE    415.00 TO NODE    413.00 =     243.21 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    412.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   39.00  DOWNSTREAM ELEVATION(FEET) =   32.54
  STREET LENGTH(FEET) =   646.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   5.07   Tc(MIN.) =   12.21
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.999
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    0.51      SUBAREA RUNOFF(CFS) =    1.77
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       2.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.07
  FLOW VELOCITY(FEET/SEC.) =  2.25   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE    415.00 TO NODE    412.00 =     889.21 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.999
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6776
  SUBAREA AREA(ACRES) =    0.73   SUBAREA RUNOFF(CFS) =    2.31
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       4.85
  TC(MIN.) =   12.21

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.21
  RAINFALL INTENSITY(INCH/HR) =   4.00
  TOTAL STREAM AREA(ACRES) =     1.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.85

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
```

```
      1       11.99    11.10        4.253          6.97
      2        4.85    12.21        3.999          1.79

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       16.40    11.10       4.253
      2       16.13    12.21       3.999

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.40   Tc(MIN.) =   11.10
  TOTAL AREA(ACRES) =        8.8
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    412.00 =    1617.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    401.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.60  DOWNSTREAM(FEET) =    27.30
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.59
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.40
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.16
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    401.00 =    1647.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.16
  RAINFALL INTENSITY(INCH/HR) =   4.24
  TOTAL STREAM AREA(ACRES) =     8.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.40

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    403.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     36.80
  DOWNSTREAM ELEVATION(FEET) =     35.40
  ELEVATION DIFFERENCE(FEET) =      1.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.226
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    76.00
           (Reference: Table 3-1B of Hydrology Manual)
```

```
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    402.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   35.40  DOWNSTREAM ELEVATION(FEET) =   32.54
  STREET LENGTH(FEET) =   533.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0300

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.37
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.51
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
  STREET FLOW TRAVEL TIME(MIN.) =   5.89   Tc(MIN.) =    9.12
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.829
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.800
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.68
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.19
  FLOW VELOCITY(FEET/SEC.) =  1.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.55
  LONGEST FLOWPATH FROM NODE    404.00 TO NODE    402.00 =     633.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.829
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8123
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.46
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       2.39
  TC(MIN.) =    9.12

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

```
 FLOW PROCESS FROM NODE    402.00 TO NODE    401.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    27.60  DOWNSTREAM(FEET) =    27.30
 FLOW LENGTH(FEET) =    16.00   MANNING'S N =  0.011
 DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.69
 ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.39
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.16
 LONGEST FLOWPATH FROM NODE    404.00 TO NODE    401.00 =     649.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.16
 RAINFALL INTENSITY(INCH/HR) =   4.81
 TOTAL STREAM AREA(ACRES) =     0.61
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.39

****************************************************************************
 FLOW PROCESS FROM NODE    411.00 TO NODE    410.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8700
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =     42.00
 DOWNSTREAM ELEVATION(FEET) =     40.70
 ELEVATION DIFFERENCE(FEET) =      1.30
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.274
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    74.50
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.74
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.74

****************************************************************************
 FLOW PROCESS FROM NODE    410.00 TO NODE    409.00 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =     40.70
 DOWNSTREAM NODE ELEVATION(FEET) =     39.25
 CHANNEL LENGTH THRU SUBAREA(FEET) =   288.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.050
 PAVEMENT LIP(FEET) =  0.100   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.08600
 MAXIMUM DEPTH(FEET) =   2.00
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.898
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .7900
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.55
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.44
AVERAGE FLOW DEPTH(FEET) =   0.29   FLOOD WIDTH(FEET) =    6.34
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =    5.25
SUBAREA AREA(ACRES) =    0.66       SUBAREA RUNOFF(CFS) =    3.60
AREA-AVERAGE RUNOFF COEFFICIENT =  0.802
TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       4.32

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  0.37   FLOOD WIDTH(FEET) =    8.10
FLOW VELOCITY(FEET/SEC.) =   2.71   DEPTH*VELOCITY(FT*FT/SEC) =   1.00
LONGEST FLOWPATH FROM NODE    411.00 TO NODE    409.00 =     388.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    409.00 TO NODE    408.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    30.69  DOWNSTREAM(FEET) =    29.09
FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.011
DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.10
ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       4.32
PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    5.41
LONGEST FLOWPATH FROM NODE    411.00 TO NODE    408.00 =     468.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    408.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    29.09  DOWNSTREAM(FEET) =    28.65
FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.011
DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   3.73
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       4.32
PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =    6.19
LONGEST FLOWPATH FROM NODE    411.00 TO NODE    407.00 =     643.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.197
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8500
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8214
SUBAREA AREA(ACRES) =    0.52   SUBAREA RUNOFF(CFS) =    2.74
TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       6.62
TC(MIN.) =    6.19
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.197
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8439
  SUBAREA AREA(ACRES) =    1.12   SUBAREA RUNOFF(CFS) =    6.04
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =      12.66
  TC(MIN.) =    6.19

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    406.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.65  DOWNSTREAM(FEET) =    28.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.92
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.66
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    6.38
  LONGEST FLOWPATH FROM NODE    411.00 TO NODE    406.00 =     698.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.080
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8515
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    5.29
  TOTAL AREA(ACRES) =        3.4   TOTAL RUNOFF(CFS) =      17.71
  TC(MIN.) =    6.38

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  18.00   RAIN INTENSITY(INCH/HOUR) =  3.11
  TOTAL AREA(ACRES) =     3.40   TOTAL RUNOFF(CFS) =      1.86

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    405.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.50  DOWNSTREAM(FEET) =    28.30
```

```
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.92
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.86
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   18.07
  LONGEST FLOWPATH FROM NODE    411.00 TO NODE    405.00 =     718.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.106
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2438
  SUBAREA AREA(ACRES) =    0.37   SUBAREA RUNOFF(CFS) =    1.00
  TOTAL AREA(ACRES) =        3.8   TOTAL RUNOFF(CFS) =       2.86
  TC(MIN.) =   18.07

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.106
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2458
  SUBAREA AREA(ACRES) =    0.07   SUBAREA RUNOFF(CFS) =    0.08
  TOTAL AREA(ACRES) =        3.8   TOTAL RUNOFF(CFS) =       2.93
  TC(MIN.) =   18.07

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    401.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.30  DOWNSTREAM(FEET) =    27.30
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.38
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.93
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =   18.77
  LONGEST FLOWPATH FROM NODE    411.00 TO NODE    401.00 =     903.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.77
```

```
 RAINFALL INTENSITY(INCH/HR) =   3.03
 TOTAL STREAM AREA(ACRES) =     3.84
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.93

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       16.40    11.16        4.239          8.76
     2        2.39     9.16        4.815          0.61
     3        2.93    18.77        3.031          3.84

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       18.26     9.16       4.815
     2       20.25    11.16       4.239
     3       16.16    18.77       3.031

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      20.25   Tc(MIN.) =   11.16
 TOTAL AREA(ACRES) =       13.2
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    401.00 =    1647.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    401.00 TO NODE    421.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    27.30  DOWNSTREAM(FEET) =    27.20
 FLOW LENGTH(FEET) =    57.00   MANNING'S N =  0.011
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.77
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      20.25
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   11.36
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    421.00 =    1704.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    421.00 TO NODE    421.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       20.25    11.36       4.191       13.21
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    421.00 =    1704.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       60.75    15.25       3.466       36.42
 LONGEST FLOWPATH FROM NODE    426.00 TO NODE    421.00 =    2617.79 FEET.

 ** PEAK FLOW RATE TABLE **
```

```
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      65.50      11.36        4.191
      2      77.50      15.25        3.466

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      77.50   Tc(MIN.) =   15.25
  TOTAL AREA(ACRES) =       49.6

****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    400.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.20  DOWNSTREAM(FEET) =    27.00
  FLOW LENGTH(FEET) =     8.30   MANNING'S N =  0.011
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.76
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      77.50
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   15.26
  LONGEST FLOWPATH FROM NODE    426.00 TO NODE    400.00 =    2626.09 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       49.6  TC(MIN.) =     15.26
  PEAK FLOW RATE(CFS)   =      77.50
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      65.50      11.36        4.191
      2      77.50      15.25        3.466

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      77.50   Tc(MIN.) =   15.25
  TOTAL AREA(ACRES) =       49.6

****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    400.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.20  DOWNSTREAM(FEET) =    27.00
  FLOW LENGTH(FEET) =     8.30   MANNING'S N =  0.011
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.76
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      77.50
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   15.26
  LONGEST FLOWPATH FROM NODE    426.00 TO NODE    400.00 =    2626.09 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       49.6  TC(MIN.) =     15.26
  PEAK FLOW RATE(CFS)   =      77.50
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Culvert

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.03125	ft/ft
Normal Depth	1.50	ft
Height	1.50	ft
Bottom Width	5.00	ft

Results

Discharge	105.02	ft^3/s
Flow Area	7.50	ft^2
Wetted Perimeter	13.00	ft
Hydraulic Radius	0.58	ft
Top Width	5.00	ft
Critical Depth	2.39	ft
Percent Full	100.0	%
Critical Slope	0.00451	ft/ft
Velocity	14.00	ft/s
Velocity Head	3.05	ft
Specific Energy	4.55	ft
Froude Number	2.02	
Discharge Full	105.02	ft^3/s
Slope Full	0.03125	ft/ft
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Culvert

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	2.39	ft
Channel Slope	0.03125	ft/ft
Critical Slope	0.00451	ft/ft

APPENDIX 5

FEMA FLOOD MAP

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the USDA National Agriculture Imagery Program (NAIP). this information was photogrammetrically compiled at a scale of 1:24,000 from aerial photography dated 2009.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-877-FEMA MAP (1-877-336-2627) for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

The **"profile base lines"** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line", in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4275000mE — 1000-meter Universal Transverse Mercator grid ticks, zone 11
- 6000000 FT — 5000-foot grid values: California State Plane coordinate system, Zone VI (FIPSZONE = 406), Lambert projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
June 19, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
May 16, 2012 - to update corporate limits, to add roads and road names, to incorporate previously issued Letters of Map Revision, and to update map elevations to North American Vertical Datum of 1988

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 500 1,000 1,500 2,000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1885G

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 1885 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

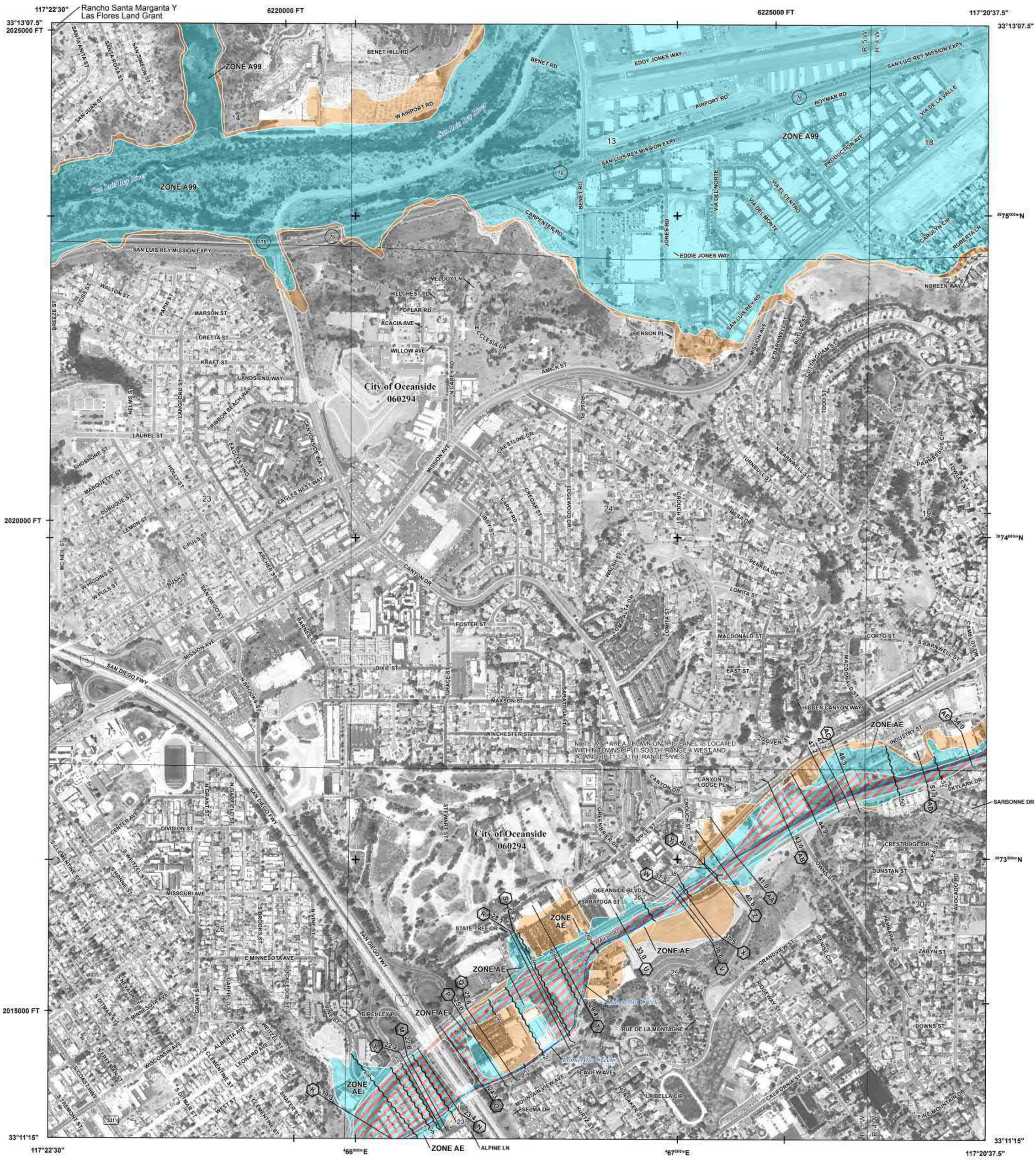
COMMUNITY	NUMBER	PANEL	SUFFIX
CORONADO, CITY OF	060287	1885	G
SAN DIEGO, CITY OF	060295	1885	G

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
06073C1885G

MAP REVISED
MAY 16, 2012

Federal Emergency Management Agency



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A,V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- E 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was derived from digital orthophotography collected by the U.S. Department of Agriculture Farm Service Agency. Department of Agriculture imagery was flown in 2016 and was produced with a 1-meter ground sample distance.

Coastal Base Flood Elevations shown on the map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Coastal flood elevations are also provided in the Coastal Transect Parameters table in the FIS Report for this jurisdiction. Elevations shown in the Coastal Transect Parameters table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on the FIRM.

SCALE

N

Map Projection:
Universal Transverse Mercator Zone 11N; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

*PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA and Incorporated Areas

PANEL 753 OF 2375

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
OCEANSIDE, CITY OF	060294	0753	J

VERSION NUMBER 2.3.3.3

MAP NUMBER 06073C0753J

MAP REVISED DECEMBER 20, 2019

APPENDIX 6

FEMA LETTERS OF MAP REVISION

Marla

Federal Emergency Management Agency

RECEIVED

APR 28 2004

APR 23 2004

REC'D APR 26 2004

CERTIFIED MAIL CITY MANAGER OFFICE
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 02-09-1057P

The Honorable Terry Johnson
Mayor, City of Oceanside
300 North Coast Highway
Oceanside, CA 92054

Community: City of Oceanside, CA
Community No.: 060294
Map Panel Affected: 06073C0759 F

116

Dear Mayor Johnson:

In a Letter of Map Revision (LOMR) dated November 21, 2003, you were notified of proposed modified flood elevation determinations affecting the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for the City of Oceanside, San Diego County, California. These determinations were for Loma Alta Creek from approximately 500 feet northwest of the intersection of Seasons Road and North Avenue to approximately 600 feet southwest of the intersection of Temple Heights and the Atchison, Topeka & Santa Fe Railway. The 90-day appeal period that was initiated on January 15, 2004, when the Department of Homeland Security's Federal Emergency Management Agency (FEMA) published a notice of proposed Base (1-percent-annual-chance) Flood Elevations (BFEs) in the *North County Times*, has elapsed.

FEMA received no valid requests for changes to the modified BFEs. Therefore, the modified BFEs that became effective on November 21, 2003, remain valid and revise the FIRM and FIS report that were in effect prior to that date.

The modifications are pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. The community number and suffix code are unaffected by this revision. The community number and appropriate suffix code as shown above will be used by the National Flood Insurance Program (NFIP) for all flood insurance policies and renewals issued for your community.

FEMA has developed criteria for floodplain management as required under the above-mentioned Acts of 1968 and 1973. To continue participation in the NFIP, your community must use the modified BFEs to carry out the floodplain management regulations for the NFIP. The modified BFEs will also be used to calculate the appropriate flood insurance premium rates for all new buildings and their contents and for the second layer of insurance on existing buildings and their contents.

If you have any questions regarding the necessary floodplain management measures for your community or the NFIP in general, please call the Director, Federal Insurance and Mitigation Division of FEMA in Oakland, California at (510) 627-7103. If you have any questions regarding the LOMR, the proposed modified BFEs, or mapping issues in general, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate

cc: Mr. Donald See
Associate Civil Engineer
County of San Diego

Ms. Marla Doyle, P.E.
City Engineer
Engineering Division
Public Works Department
City of Oceanside

Mr. Ernest Espinoza

Mr. Adolph Lugo, P.E.
Project Design Consultants

Mr. Richard Muelheim

Federal Emergency Management Agency

Washington, D.C. 20472

NOV 2 1 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Terry Johnson
Mayor, City of Oceanside
300 North Coast Highway
Oceanside, CA 92054

IN REPLY REFER TO:
Case No.: 02-09-1057P
Community Name: City of Oceanside, CA
Community No.: 060294
Effective Date of This Revision: **NOV 2 1 2003**

Dear Mayor Johnson:

The Flood Insurance Study report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Chief, National Flood Insurance Program Branch, Federal Insurance and Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7184, or the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Sincerely,

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

For: Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

List of Enclosures:
Letter of Map Revision Determination Document
Annotated Flood Insurance Rate Map
Annotated Flood Insurance Study Report

cc: Mr. Donald See
Associate Civil Engineer
County of San Diego

Ms. Marla Doyle, P.E.
City Engineer
Engineering Division
Public Works Department
City of Oceanside

Mr. Earnest Espinoza

Mr. Adolph Lugo, P.E.
Project Design Consultants

Mr. Richard Muelheim

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City of Oceanside San Diego County California	CHANNELIZATION	HYDRAULIC ANALYSIS NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 060294		
IDENTIFIER	4586 and 4590 Maple Drive	APPROXIMATE LATITUDE & LONGITUDE: 33.225, -117.310 SOURCE: USGS QUADRANGLE DATUM: NAD 27	
FLOODING SOURCE(S) & REVISED REACH(ES)	Loma Alta Creek – from approximately 500 feet northwest of the intersection of Seasons Road and North Avenue to approximately 600 feet southwest of the intersection of Temple Heights and the Atchison, Topeka & Santa Fe Railway (AT&SF)		

SUMMARY OF REVISIONS

Effective Flooding:	Zone AE	BFEs*	Floodway	Zone AE	Zone X (shaded)
Revised Flooding:	Zone AE	BFEs*	Floodway	Zone X (unshaded)	Zone X (shaded)
Increases:	NONE	YES	NONE	NONE	YES
Decreases:	YES	YES	YES	YES	YES

* BFEs – Base Flood Elevations

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO: 06073C0759 F Date: June 19, 1997	DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: July 2, 2002 FLOODWAY DATA TABLE 8 PROFILE: 169P

* FIRM – Flood Insurance Rate Map; ** FBFM – Flood Boundary and Floodway Map; *** FHBM – Flood Hazard Boundary Map

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate

10080301DA02091057E102IAC

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

We provide the floodway designation to your community as a tool to regulate floodplain development. Therefore, the floodway revision we have described in this letter, while acceptable to us, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

NFIP regulations Subparagraph 60.3(b)(7) requires communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management ordinances; therefore, responsibility for maintenance of the modified channel rests with your community. We may request that your community submit a description and schedule of channel activities.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance flood discharges computed in the FIS for your community without considering subsequent changes in watershed characteristics that could increase flood discharges. Future development of projects upstream could cause increased flood discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on flood discharges subsequent to the publication of the FIS report for your community and could, therefore, establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Jack Eldridge
Chief, National Flood Insurance Program Branch
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7184

STATUS OF THE COMMUNITY NFIP MAPS

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

Our review of the submitted information revealed that the BFEs along Loma Alta Creek increased as a result of the channel constructed between North Avenue and the Atchison, Topeka & Santa Fe Railway embankment. Because the BFEs increased as a result of construction in the regulatory floodway, the City of Oceanside is potentially in violation of Paragraph 60.3(d)(3) of the NFIP regulations, which prohibits encroachments, including new construction, in the regulatory floodway that would cause an increase in flood levels.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. This revision is effective as of the date of this letter. However, until the 90-day period has elapsed, the revised BFEs presented in this LOMR may be changed.

This information will be published in the *Federal Register* and your local newspaper as detailed below.

LOCAL NEWSPAPER Name: *North County Times*
Dates: 01/08/2004 01/15/2004

PUBLIC NOTIFICATION

FLOODING SOURCE	LOCATION OF REFERENCED ELEVATION	BFE (FEET NGVD)		MAP PANEL NUMBER(S)
		EFFECTIVE	REVISED	
Loma Alta Creek	Approximately 150 feet northwest of intersection of Seasons Road and North Avenue	263	262	06073C0759 F
	Approximately 600 feet southwest of intersection of Temple Heights and AT&SF	306	311	06073C0759 F

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate

10080301DA02091057E102IAC

CHANGES ARE MADE IN DETERMINATIONS OF BASE FLOOD ELEVATIONS FOR THE CITY OF OCEANSIDE, SAN DIEGO COUNTY, CALIFORNIA, UNDER THE NATIONAL FLOOD INSURANCE PROGRAM

On June 19, 1997, the Department of Homeland Security's Federal Emergency Management Agency identified Special Flood Hazard Areas (SFHAs) in the City of Oceanside, San Diego County, California, through issuance of a Flood Insurance Rate Map (FIRM). The Mitigation Division has determined that modification of the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for certain locations in this community is appropriate. The modified Base Flood Elevations (BFEs) revise the FIRM for the community.

The changes are being made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65.

A hydraulic analysis was performed to incorporate the effects of updated topographic information and the channelization of Loma Alta Creek from approximately 500 feet northwest of the intersection of Seasons Road and North Avenue to approximately 600 feet southwest of the intersection of Temple Heights and the Atchison, Topeka & Santa Fe Railway. This has resulted in a revised delineation of the regulatory floodway, a decrease in SFHA width, and increased and decreased BFEs for Loma Alta Creek. The table below indicates existing and modified BFEs for selected locations along the affected lengths of the flooding source(s) cited above.

Location	Existing BFE (feet)*	Modified BFE (feet)*
Approximately 150 feet northwest of intersection of Seasons Road and North Avenue	263	262
Approximately 600 feet southwest of intersection of Temple Heights and Atchison, Topeka & Santa Fe Railway	306	311

*National Geodetic Vertical Datum, rounded to nearest whole foot

Under the above-mentioned Acts of 1968 and 1973, the Mitigation Division must develop criteria for floodplain management. To participate in the National Flood Insurance Program (NFIP), the community must use the modified BFEs to administer the floodplain management measures of the NFIP. These modified BFEs will also be used to calculate the appropriate flood insurance premium rates for new buildings and their contents and for the second layer of insurance on existing buildings and contents.

Upon the second publication of notice of these changes in this newspaper, any person has 90 days in which he or she can request, through the Chief Executive Officer of the community, that the Mitigation Division reconsider the determination. Any request for reconsideration must be based on knowledge of changed conditions or new scientific or technical data. All interested parties are on notice that until the 90-day period elapses, the Mitigation Division's determination to modify the BFEs may itself be changed.

Any person having knowledge or wishing to comment on these changes should immediately notify:

The Honorable Terry Johnson
Mayor, City of Oceanside
300 North Coast Highway
Oceanside, CA 92054

Federal Emergency Management Agency

Washington, D.C. 20472

FEE SCHEDULE FOR PROCESSING REQUESTS FOR MAP CHANGES

This notice contains the revised fee schedule for processing certain types of requests for changes to National Flood Insurance Program (NFIP) maps. The change in the fee schedule will allow FEMA to further reduce the expenses to the NFIP by more fully recovering the costs associated with processing conditional and final map change requests. The revised fee schedule for map changes is effective for all requests dated September 1, 2002, or later and supersedes the current fee schedule, which was established on June 1, 2000.

To develop the revised fee schedule for conditional and final map change requests, FEMA evaluated the actual costs of reviewing and processing requests for Conditional Letters of Map Amendment (CLOMAs), Conditional Letters of Map Revision – based on Fill (CLOMR-Fs), Conditional Letters of Map Revision (CLOMRs), Letters of Map Revision – based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs), and Physical Map Revisions (PMRs).

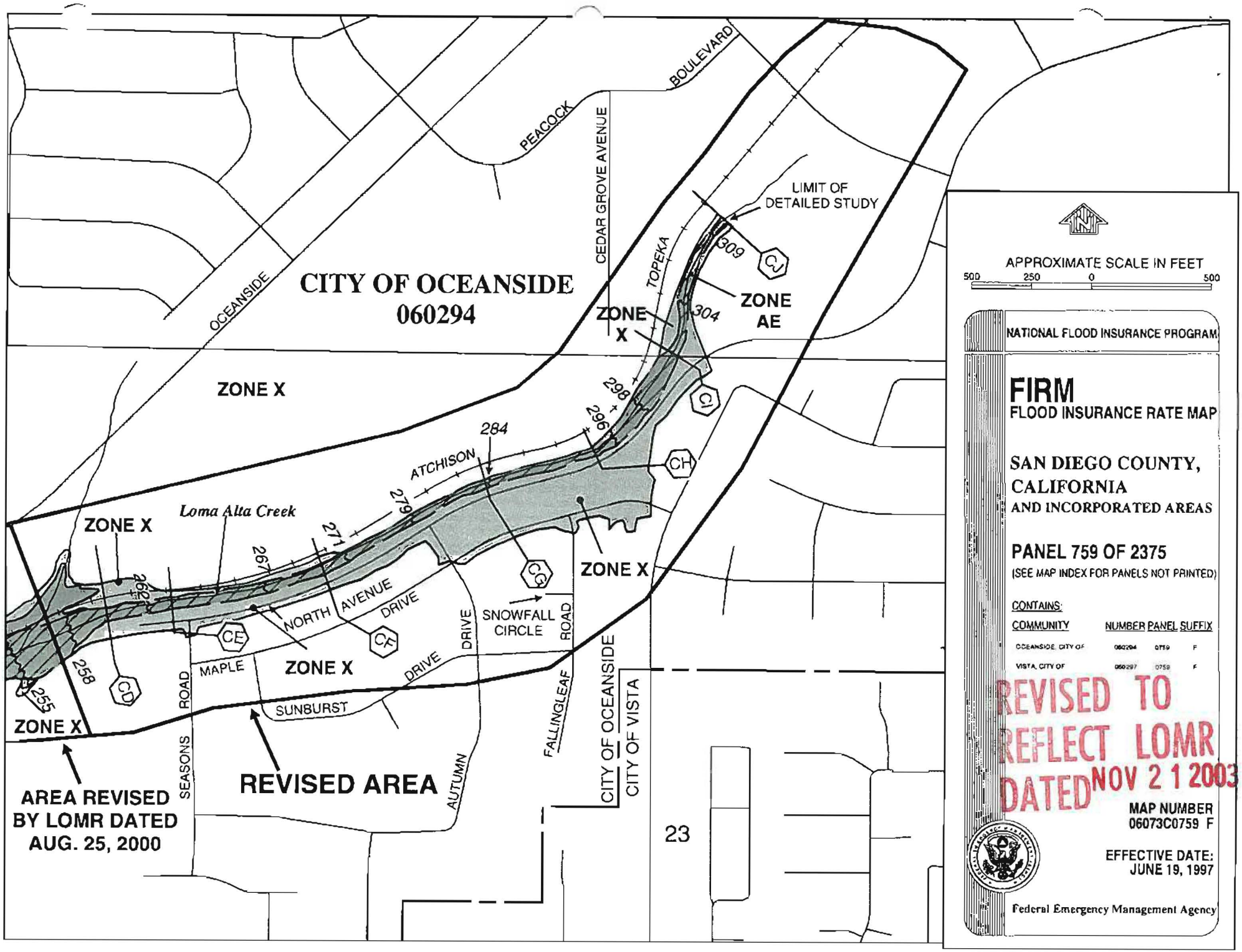
Based on our review of actual cost data for Fiscal Years 2000 and 2001, FEMA has established the following review and processing fees, which are to be submitted with all requests submitted on or after September 1, 2002, that are not otherwise exempted under 44 CFR 72.5. Those fees below shown in bold format reflect a change in the fee established in June 1, 2000.

Fee Schedule for Requests for CLOMAs, CLOMR-Fs, and LOMR-Fs

Request for single-lot/single-structure CLOMA and CLOMR-F	**$500**
Request for single-lot/single-structure LOMR-F	**$425**
Request for single-lot/single-structure LOMR-F based on as-built information (CLOMR-F previously issued by us)	**$325**
Request for multiple-lot/multiple-structure CLOMA	**$700**
Request for multiple-lot/multiple-structure CLOMR-F and LOMR-F	**$800**
Request for multiple-lot/multiple-structure LOMR-F based on as-built information (CLOMR-F previously issued)	$700

Fee Schedule for Requests for CLOMRs

Request based on new hydrology, bridge, culvert, channel, or combination of any of these	**$4,000**
Request based on levee, berm, or other structural measure	**$4,500**


CITY OF OCEANSIDE
060294
ZONE X
ZONE AE
ZONE X
ZONE X
ZONE X
ZONE X
ZONE X
Loma Alta Creek
OCEANSIDE
PEACOCK
BOULEVARD
CEDAR GROVE AVENUE
TOPEKA
LIMIT OF DETAILED STUDY
ATCHISON
NORTH AVENUE
DRIVE
SNOWFALL CIRCLE
ROAD
MAPLE
DRIVE
SUNBURST
DRIVE
SEASONS
ROAD
AUTUMN
FALLINGLEAF
CITY OF OCEANSIDE
CITY OF VISTA
309
304
298
292
284
279
271
267
262
258
255
CJ
CI
CH
CG
CE
CF
CD
AREA REVISED BY LOMR DATED AUG. 25, 2000
REVISED AREA
23
APPROXIMATE SCALE IN FEET
500 250 0 500
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SAN DIEGO COUNTY, CALIFORNIA
AND INCORPORATED AREAS
PANEL 759 OF 2375
(SEE MAP INDEX FOR PANELS NOT PRINTED)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
OCEANSIDE, CITY OF 060294 0759 F
VISTA, CITY OF 060297 0759 F
REVISED TO REFLECT LOMR DATED NOV 21 2003
MAP NUMBER
06073C0759 F
EFFECTIVE DATE:
JUNE 19, 1997
Federal Emergency Management Agency

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Loma Alta Creek (Cont'd)						THESE DATA WERE REVISED BY LOMR DATED AUGUST 25, 2000		
CA	30,490	280	283	6.0	234.3	234.3	234.4	0.1
CB	31,094	84	182	7.2	243.3	243.3	243.5	0.2
CC	31,888	168	178	7.3	252.0	252.0	252.3	0.3
CD	32,433	56	131	5.4	259.2	259.2	259.2	0.0
CE	32,715	36	92	7.7	263.7	263.7	263.7	0.0
CF	33,359	25	72	9.8	269.1	269.1	269.1	0.0
CG	34,123	33	99	7.2	283.5	283.5	283.5	0.0
CH	34,585	27	77	9.3	288.8	288.8	288.8	0.0
CI	35,117	36	97	7.3	299.7	299.7	299.7	0.0
CJ	35,747	40	98	7.3	310.9	310.9	310.9	0.0
CK	36,382	121	300	5.7	313.4	313.4	313.6	0.2
CL	37,022	81	192	8.9	326.9	326.9	326.9	0.0
				REVISED DATA				

1Feet Above Pacific Street

TABLE 8

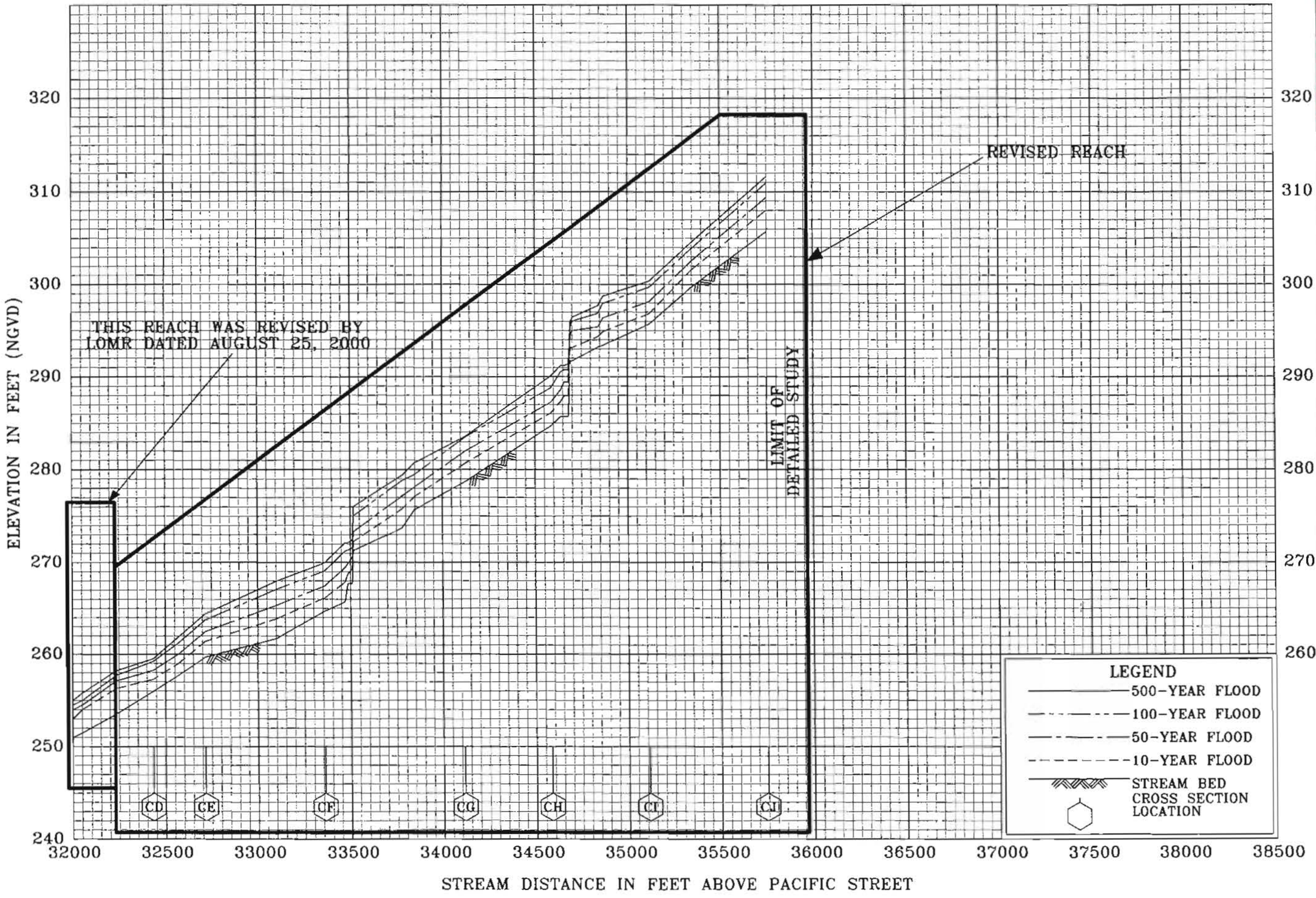
FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA AND INCORPORATED AREAS

FLOODWAY DATA

LOMA ALTA CREEK

REVISED TO REFLECT LOMR DATED NOV 2 1 200



FLOOD PROFILES

REVISED TO REFLECT LOMR DATED NOV 21 2002

LOMA ALTA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA
AND INCORPORATED AREAS

169P

SCOTT

REC'D AUG 19 REC'D

Federal Emergency Management Agency

Washington, D.C. 20472

August 13, 2013

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Jim Wood
Mayor, City of Oceanside
300 North Coast Highway
Oceanside, CA 92054

IN REPLY REFER TO:
Case No.: 13-09-2315P
Community Name: City of Oceanside, CA
Community No.: 060294
Effective Date of
This Revision: **August 13, 2013**

Dear Mayor Wood:

The Flood Insurance Study report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7175, or the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Sincerely,

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

For: Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

List of Enclosures:

Letter of Map Revision Determination Document
Annotated Flood Insurance Rate Map
Annotated Flood Insurance Study Report

cc: Ms. Maryam Wagner
Senior Engineering Assistant
City of Oceanside Engineering Division

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City of Oceanside San Diego County California	NO PROJECT	REISSUANCE
	COMMUNITY NO.: 060294		
IDENTIFIER	Loma Alta Creek (Reissuance of LOMR 96-09-207P)	APPROXIMATE LATITUDE & LONGITUDE: 33.194, -117.354 SOURCE: USGS QUADRANGLE DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 06073C0753F DATE: May16, 2012	DATE OF EFFECTIVE FLOOD INSURANCE STUDYREPORT: May 16, 2012 PROFILE(S): 210P FLOODWAY DATA TABLE: 13

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map; ** FBFM - Flood Boundary and Floodway Map; *** FHBM - Flood Hazard Boundary Map

FLOODING SOURCE(S) & REVISED REACH(ES)

LOMA ALTA CREEK - from approximately 2,430 feet downstream to approximately 880 feet upstream of Crouch Street

SUMMARY OF REVISIONS

This Letter of Map Revision (LOMR) is a reissuance of a LOMR dated March 4, 1997 (Case No. 96-09-207P), which revised the Special Flood Hazard Area (SFHA), the area subject to inundation by the base (1-percent-annual-chance) flood, the regulatory floodway, the 0.2-percent-annual-chance floodplain and the Base Flood Elevations (BFEs) along Loma Alta Creek. A portion of the 0.2-percent-annual-chance floodplain presented in the March 4 LOMR was inadvertently omitted when it was incorporated into the updated FIRM for San Diego County, California and Incorporated Areas, dated May 16, 2012. Additionally, a portion of the updates made to the FIS report in the March 4 LOMR was also inadvertently omitted when it was incorporated into the updated FIS report for San Diego County. Therefore, this LOMR reissues the March 4 LOMR on the current effective FIRM and FIS report. This LOMR does not revise the BFEs or SFHA along Loma Alta Creek presented in the March 4 LOMR.

* BFEs - Base Flood Elevations

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a LOMR for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the FIS report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA MAP Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

COMMUNITY REMINDERS

We based this determination on the base flood discharges computed in the FIS for your community without considering subsequent changes in watershed characteristics that could increase flood discharges. Future development of projects upstream could cause increased flood discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on flood discharges subsequent to the publication of the FIS report for your community and could, therefore, establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA MAP Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Sally M. Ziolkowski
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

STATUS OF THE COMMUNITY NFIP MAPS

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA MAP Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Loma Alta Creek								
A	0	300	1,297	2.9	14.3	14.3	15.3	1.0
B	440	400	2,605	1.5	14.8	14.8	15.7	0.9
C	520	350	2,174	1.7	14.8	14.8	15.7	0.9
D	1,260	300	1,794	2.1	14.9	14.9	15.9	1.0
E	1,370	300	1,917	2.0	15.1	15.1	16.0	0.9
F	1,930	130	634	6.0	15.1	15.1	16.0	0.9
G	2,300	222	639	5.9	15.6	15.6	16.2	0.6
H	3,155	334	922	4.1	18.0	18.0	18.4	0.4
I	3,200	341	1,073	3.5	18.3	18.3	18.6	0.3
J	3,865	337	946	4.0	18.9	18.9	19.1	0.2
K	4,150	565	1,380	2.8	19.3	19.3	19.5	0.2
L	4,595	696	1,009	3.8	22.2	22.2	22.2	0.0
M	4,610	696	1,353	2.8	22.8	22.8	22.8	0.0
N	4,845	675	908	4.2	23.4	23.4	23.4	0.0
O	5,160	708	3,109	1.2	24.3	24.3	24.3	0.0
P	5,420	755[2]	648	5.9	25.0	25.0	25.0	0.0
Q	5,537	770[2]	566	6.7	25.6	25.6	25.6	0.0
R	6,275	800	1,562	2.4	28.1	28.1	28.5	0.4
S	6,325	800	1,040	3.7	28.2	28.2	28.6	0.4
T	6,730	475	1,429	2.7	29.4	29.4	29.7	0.3
U	7,518	150	497	7.7	33.0	33.0	33.5	0.5
V	8,107	130	526	7.2	36.6	36.6	36.8	0.2
W	8,151	125	821	4.6	37.5	37.5	37.6	0.1
X	8,200	111	378	10.0	37.5	37.5	37.6	0.1
Y	8,522	141	834	4.6	40.6	40.6	41.0	0.4
Z	8,630	200	1,066	3.6	40.8	40.8	41.1	0.3

REVISED DATA

[1] Feet Above Pacific Street

[2] Width includes Islands

REVISED TO REFLECT LOMR EFFECTIVE: August 13, 2013

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA

AND INCORPORATED AREAS

FLOODWAY DATA

LOMA ALTA CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Loma Alta Creek (cont'd)								
AA	8,829	170	629	6.0	41.0	41.0	41.4	0.4
AB	9,443	414	1,187	3.2	43.0	43.0	43.7	0.7
AC	10,160	314	626	6.1	46.8	46.8	46.8	0.0
AD	10,960	140	618	6.1	51.5	51.5	51.8	0.3
AE	11,465	112	457	8.3	54.0	54.0	54.4	0.4
AF	11,970	288	747	5.1	57.8	57.8	58.2	0.4
AG	12,500	319	832	4.3	59.9	59.9	60.2	0.3
AH	12,810	285	546	7.0	61.7	61.7	62.5	0.8
AI	13,300	277	939	4.0	64.8	64.8	65.6	0.8
AJ	13,830	224	827	2.7	66.2	66.2	66.7	0.5
AK	14,460	60	213	10.3	68.8	68.8	69.1	0.3
AL	15,120	246	578	3.8	74.8	74.8	75.3	0.5
AM	15,510	110	255	8.6	78.0	78.0	78.5	0.5
AN	15,690	279	528	4.2	81.9	81.9	82.4	0.5
AO	16,050	84	265	8.3	84.6	84.6	84.6	0.0
AP	16,742	68	230	9.6	92.2	92.2	92.8	0.6
AQ	17,175	54	221	10.0	97.6	97.6	98.6	1.0
AR	17,740	268[2]	378	5.8	104.9	104.9	105.2	0.3
AS	17,780	327[2]	338	6.5	107.0	107.0	107.1	0.1
AT	17,835	267	957	2.3	107.8	107.8	107.8	0.0
AU	17,995	140[2]	700	3.2	110.5	110.5	110.5	0.0
AV	18,075	138[2]	699	3.1	113.0	113.0	113.0	0.0
AW	18,540	84	231	9.5	113.3	113.3	113.3	0.0
AX	18,610	49	194	11.4	114.6	114.6	114.7	0.1
AY	18,780	161[2]	473	4.7	117.0	117.0	118.0	1.0
AZ	18,960	172[2]	291	7.6	118.7	118.7	118.8	0.1

REVISED DATA

[1] Feet Above Pacific Street
[2] Width includes Islands

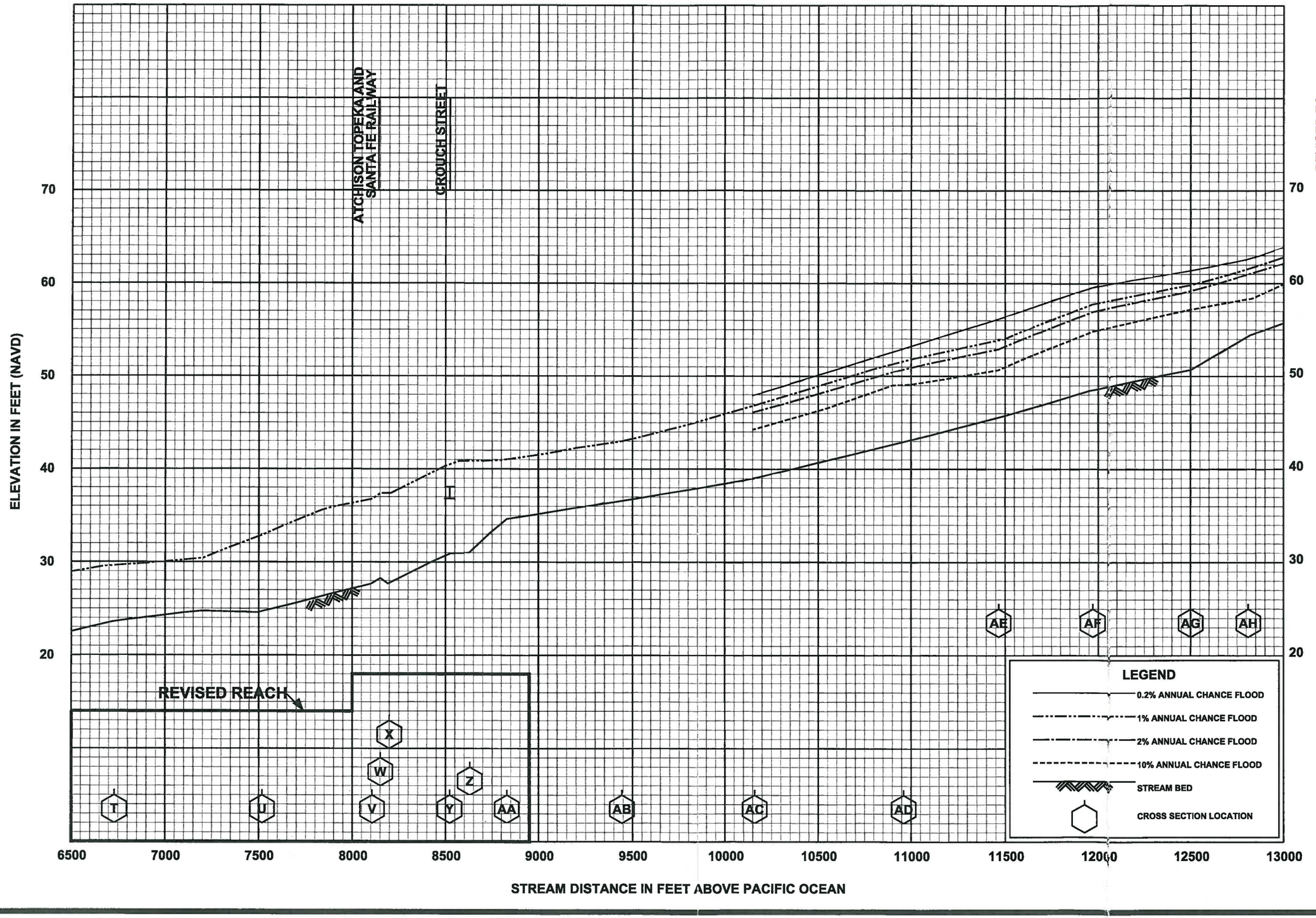
REVISED TO REFLECT LOMR EFFECTIVE: August 13, 2013

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY
SAN DIEGO COUNTY, CA
AND INCORPORATED AREAS

FLOODWAY DATA

LOMA ALTA CREEK



REVISED TO REFLECT LOMR EFFECTIVE: August 13, 2013

FLOOD PROFILES

LOMA ALTA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA

(AND INCORPORATED AREAS)

210P

Legend

- 1% annual chance (100-Year) Floodplain
- 1% annual chance (100-Year) Floodway
- 0.2% annual chance (500-Year) Floodplain

MAP SCALE 1" = 500'

250 0 500 FEET

150 0 150 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0753H

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY,

CALIFORNIA

AND INCORPORATED AREAS

PANEL 753 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
OCEANSIDE, CITY OF	060294	0753	H

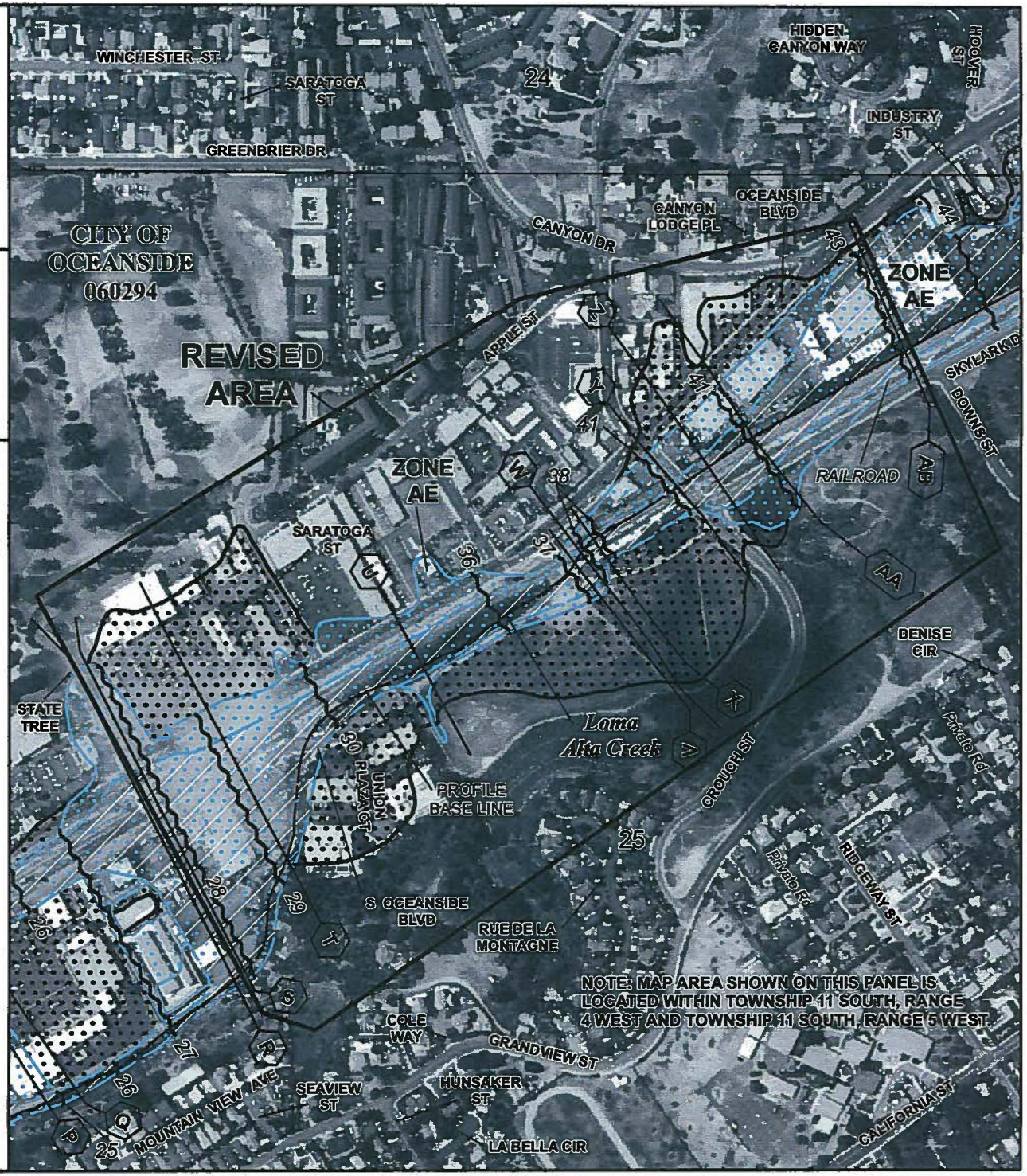
REVISED TO REFLECT LOMR EFFECTIVE: August 13, 2013

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 06073C0753H

MAP REVISED MAY 16, 2012

Federal Emergency Management Agency



Federal Emergency Management Agency

Washington, D.C. 20472

July 5, 2018

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 17-09-0571P

The Honorable Peter Weiss
Mayor, City of Oceanside
300 North Coast Highway
Oceanside, CA 92054

Follows Conditional
Case No.: 14-09-3743R
Community Name: City of Oceanside, CA
Community No.: 060294
FIRM Panel Affected: 06073C0753H

116

Dear Mayor Weiss:

In a Letter of Map Revision (LOMR) dated February 16, 2018, you were notified of proposed flood hazard determinations affecting the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for the City of Oceanside, San Diego County, CA. These determinations were for Loma Alta Creek - from approximately 925 feet upstream of Crouch Street to approximately 2,425 feet upstream of Crouch Street. The 90-day appeal period that was initiated on March 5, 2018, when the Department of Homeland Security's Federal Emergency Management Agency (FEMA) published a notice of proposed Flood Hazard Determinations in *The San Diego Union-Tribune* has elapsed.

FEMA received no valid requests for changes to the modified flood hazard information. Therefore, the modified flood hazard information for your community that became effective on July 3, 2018, remains valid and revises the FIRM and FIS report that were in effect prior to that date.

The modifications are pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. The community number(s) and suffix code(s) are unaffected by this revision. The community number and appropriate suffix code as shown above will be used by the National Flood Insurance Program (NFIP) for all flood insurance policies and renewals issued for your community.

FEMA has developed criteria for floodplain management as required under the above-mentioned Acts of 1968 and 1973. To continue participation in the NFIP, your community must use the modified flood hazard information to carry out the floodplain management regulations for the NFIP. The modified flood hazard information will also be used to calculate the appropriate flood insurance premium rates for all new buildings and their contents and for the second layer of insurance on existing buildings and their contents.

If you have any questions regarding the necessary floodplain management measures for your community or the NFIP in general, please contact the Mitigation Division Director, FEMA Region IX, in Oakland, California, either by telephone at (510) 627-7175, or in writing at 1111 Broadway, Suite 1200, Oakland, California, 94607-4052.

If you have any questions regarding the LOMR, the proposed flood hazard determinations, or mapping issues in general, please call the FEMA Map Information eXchange, toll free, at (877) 336-2627 (877-FEMA MAP).

Sincerely,

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

cc: Mr. Marty Eslambolchi
City Development Engineer
City of Oceanside

Mr. Kenneth Ryan
District Manager
Waste Management, Inc.

Mr. David Cline, P.E., WA, CFM
Vice President
Shannon & Wilson, Inc.

Issue Date: February 16, 2018	Effective Date: July 3, 2018	Case No.: 17-09-0571P	LOMR-APP

Follows Conditional Case No.: 14-09-3743R

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City of Oceanside San Diego County California	FILL	HYDRAULIC ANALYSIS FLOODWAY UPDATED TOPOGRAPHIC DATA
	COMMUNITY NO.: 060294		
IDENTIFIER	WM CNG (As Built Follow Up To 14-09-3743R)	APPROXIMATE LATITUDE & LONGITUDE: 33.196, -117.350 SOURCE: USGS QUADRANGLE DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 06073C0753H DATE: May 16, 2012	DATE OF EFFECTIVE FLOOD INSURANCE STUDY: April 05, 2016 PROFILE(S): 210P FLOODWAY DATA TABLE: 13

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map

FLOODING SOURCE(S) & REVISED REACH(ES)

Loma Alta Creek - From approximately 925 feet upstream of Crouch Street to approximately 2,425 feet upstream of Crouch Street.

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Loma Alta Creek	Zone AE	Zone AE	YES	NONE
	Zone X (shaded)	Zone X (shaded)	YES	NONE
	Floodway	Floodway	NONE	NONE
	BFEs*	BFEs	YES	YES

* BFEs - Base Flood Elevations

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

We provide the floodway designation to your community as a tool to regulate floodplain development. Therefore, the floodway revision we have described in this letter, while acceptable to us, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance flood discharges computed in the FIS for your community without considering subsequent changes in watershed characteristics that could increase flood discharges. Future development of projects upstream could cause increased flood discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on flood discharges subsequent to the publication of the FIS report for your community and could, therefore, establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This revision has met our criteria for removing an area from the 1-percent-annual-chance floodplain to reflect the placement of fill. However, we encourage you to require that the lowest adjacent grade and lowest floor (including basement) of any structure placed within the subject area be elevated to or above the Base (1-percent-annual-chance) Flood Elevation.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Jeffrey Lusk
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

STATUS OF THE COMMUNITY NFIP MAPS

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel(s) and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below, and through FEMA's Flood Hazard Mapping website at https://www.floodmaps.fema.gov/fhm/bfe_status/bfe_main.asp

LOCAL NEWSPAPER

Name: *The San Diego Union-Tribune*
Dates: February 26, 2018 and March 5, 2018

Within 90 days of the second publication in the local newspaper, any interested party may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Loma Alta Creek (cont'd)	DATA REVISED BY LOMR EFFECTIVE AUGUST 13, 2013							
AA	8,829	170	629	6.0	41.0	41.0	41.4	0.4
AB	9,443	414	1195	3.2	43.0	43.0	43.7	0.7
AC	10,160	314	1194	3.2	48.5	48.5	48.5	0.0
AD	10,960	140	540	7.0	51.1	51.1	51.2	0.1
AE	11,465	112	457	8.3	54.0	54.0	54.4	0.4
AF	11,970	288	747	5.1	57.8	57.8	58.2	0.4
AG	12,500	319	832	4.3	59.9	59.9	60.2	0.3
AH	12,810	285	546	7.0	61.7	61.7	62.5	0.8
AI	13,300	277	939	4.0	64.8	64.8	65.6	0.8
AJ	13,830	224	827	2.7	66.2	66.2	66.7	0.5
AK	14,460	60	213	10.3	68.8	68.8	69.1	0.3
AL	15,120	246	578	3.8	74.8	74.8	75.3	0.5
AM	15,510	110	255	8.6	78.0	78.0	78.5	0.5
AN	15,690	279	528	4.2	81.9	81.9	82.4	0.5
AO	16,050	84	265	8.3	84.6	84.6	84.6	0.0
AP	16,742	68	230	9.6	92.2	92.2	92.8	0.6
AQ	17,175	54	221	10.0	97.6	97.6	98.6	1.0
AR	17,740	268[2]	378	5.8	104.9	104.9	105.2	0.3
AS	17,780	327[2]	338	6.5	107.0	107.0	107.1	0.1
AT	17,835	267	957	2.3	107.8	107.8	107.8	0.0
AU	17,995	140[2]	700	3.2	110.5	110.5	110.5	0.0
AV	18,075	138[2]	699	3.1	113.0	113.0	113.0	0.0
AW	18,540	84	231	9.5	113.3	113.3	113.3	0.0
AX	18,610	49	194	11.4	114.6	114.6	114.7	0.1
AY	18,780	161[2]	473	4.7	117.0	117.0	118.0	1.0
AZ	18,960	172[2]	291	7.6	118.7	118.7	118.8	0.1

[1] Feet Above Pacific Street
[2] Width includes Islands

REVISED DATA

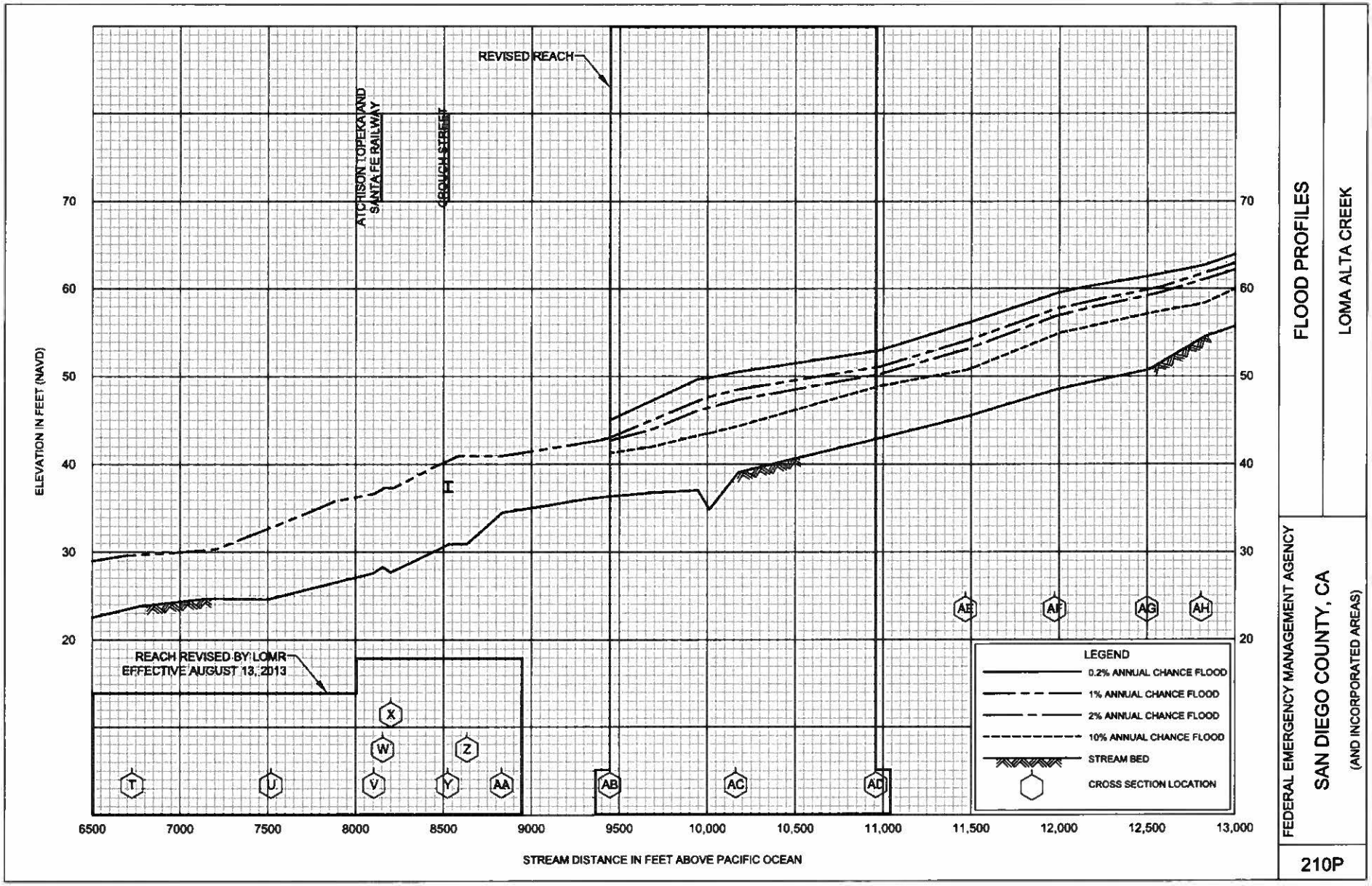
TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA AND INCORPORATED AREAS

FLOODWAY DATA

LOMA ALTA CREEK



FLOOD PROFILES

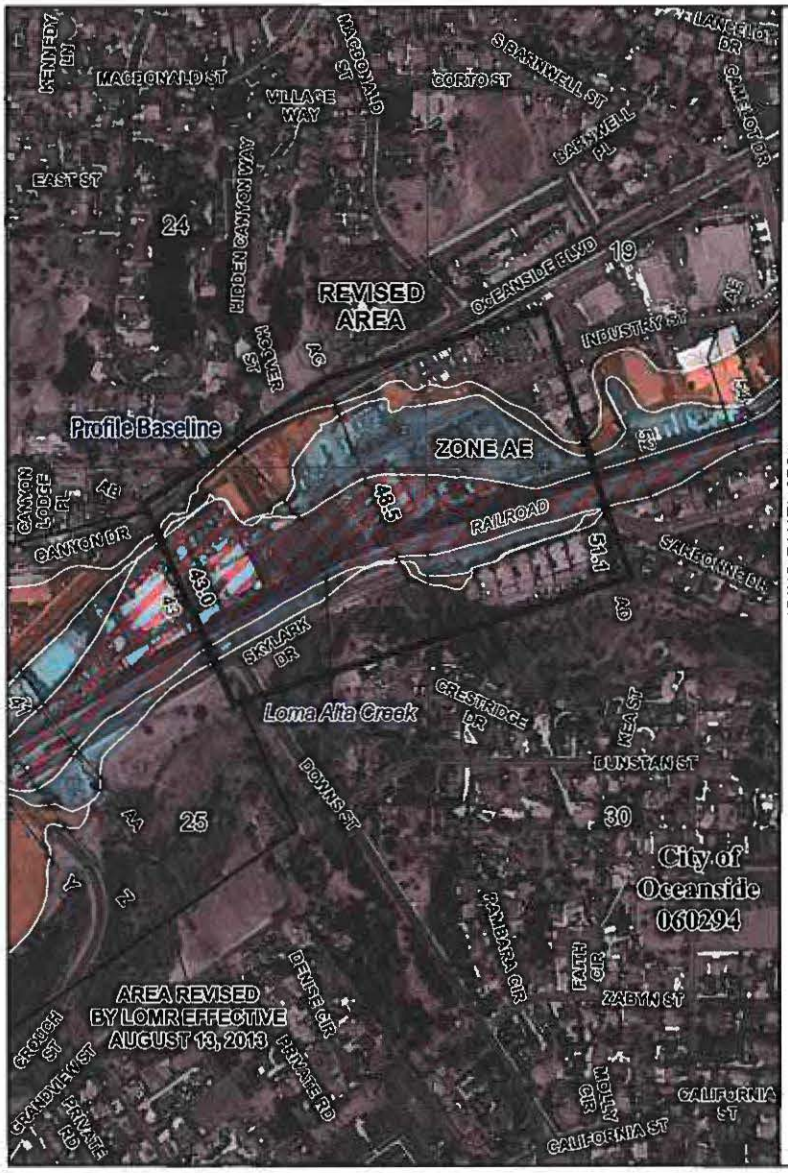
LOMA ALTA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA

(AND INCORPORATED AREAS)

210P



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 11 SOUTH, RANGE 4 WEST AND TOWNSHIP 11 SOUTH, RANGE 5 WEST

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
	Future Conditions 1% Annual Chance Flood Hazard
	Area with Reduced Flood Risk due to Levee See Notes. Zone X
OTHER AREAS	Area of Undetermined Flood Hazard

SCALE

Map Projection: NAD 1983 UTM Zone 11N; Horizontal Datum: NAD83; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 1,000 Feet

0 75 150 300 Meters

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA and Incorporated Areas

PANEL 753 OF 2375

FEMA

COMMUNITY	NUMBER	PANEL	SUFFIX
OCEANSIDE, CITY OF	060294	0753	H

VERSION NUMBER 1.1.1.0

MAP NUMBER 06073C0753H

EFFECTIVE DATE MAY 16, 2012

APPENDIX 7

HYDROGRAPHS, STORAGE CURVES & INFLOW HYDROGRAPH INPUTS

Hydrograph Report

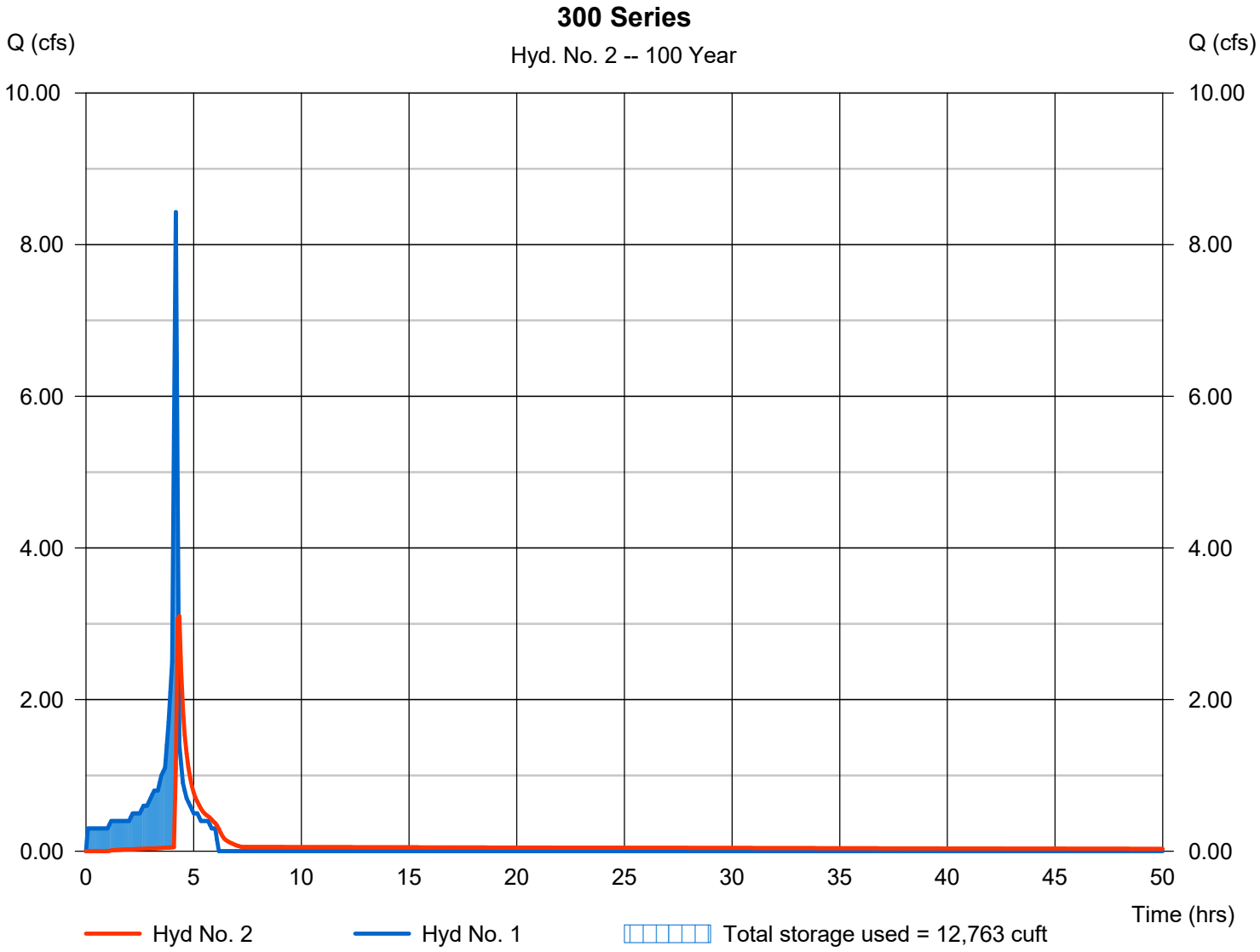
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Thursday, 04 / 8 / 2021

Hyd. No. 2

300 Series

Hydrograph type	=	Reservoir	Peak discharge	=	3.101 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.33 hrs
Time interval	=	5 min	Hyd. volume	=	17,217 cuft
Inflow hyd. No.	=	1 - 300-series	Max. Elevation	=	35.49 ft
Reservoir name	=	UG detention	Max. Storage	=	12,763 cuft

Storage Indication method used.



Pond Report

SERIES 300

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 — Thursday, 04 / 8 / 2021

Pond No. 1 - UG detention

Pond Data

UG Chambers -Invert elev. = 32.70 ft, Rise x Span = 4.00 x 4.00 ft, Barrel Len = 340.33 ft, No. Barrels = 3, Slope = 0.00%, Headers = No
Encasement -Invert elev. = 32.20 ft, Width = 6.32 ft, Height = 6.00 ft, Voids = 30.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	32.20	n/a	0	0
0.60	32.80	n/a	1,218	1,218
1.20	33.40	n/a	2,159	3,376
1.80	34.00	n/a	2,638	6,014
2.40	34.60	n/a	2,838	8,853
3.00	35.20	n/a	2,864	11,717
3.60	35.80	n/a	2,725	14,442
4.20	36.40	n/a	2,370	16,812
4.80	37.00	n/a	1,467	18,279
5.40	37.60	n/a	1,162	19,441
6.00	38.20	n/a	1,162	20,603

Culvert / Orifice Structures

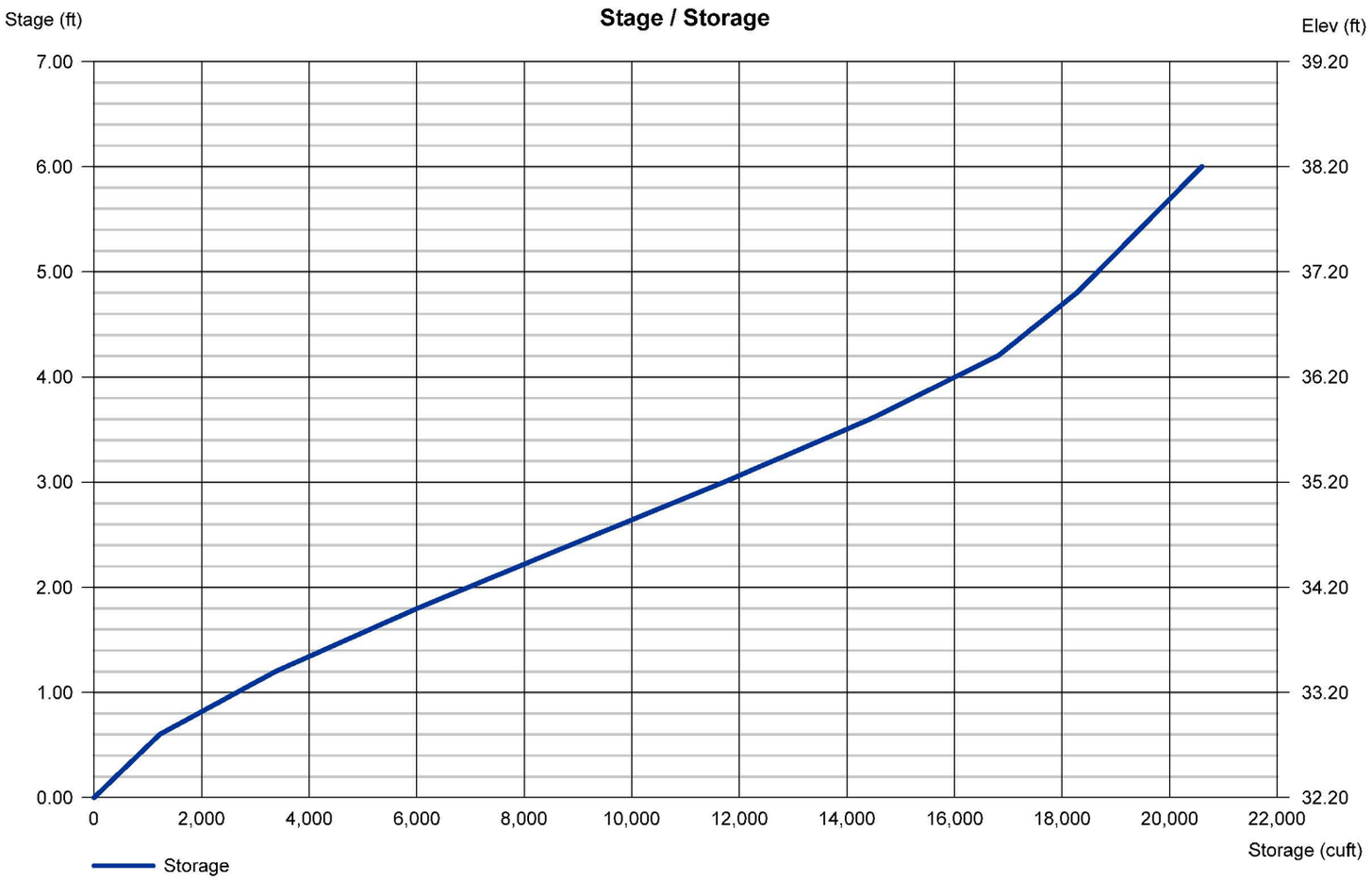
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 1.50	0.00	0.00	0.00
Span (in)	= 1.50	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 32.70	0.00	0.00	0.00
Length (ft)	= 10.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.00	Inactive	0.00	0.00
Crest El. (ft)	= 34.84	35.40	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No

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

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



RATIONAL METHOD HYDROGRAPH PROGRAM

SERIES 300

RUN DATE 4/8/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 2.7 INCHES
BASIN AREA 2.6 ACRES
RUNOFF COEFFICIENT 0.72
PEAK DISCHARGE 8.43 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 0.3
TIME (MIN) = 20	DISCHARGE (CFS) = 0.3
TIME (MIN) = 30	DISCHARGE (CFS) = 0.3
TIME (MIN) = 40	DISCHARGE (CFS) = 0.3
TIME (MIN) = 50	DISCHARGE (CFS) = 0.3
TIME (MIN) = 60	DISCHARGE (CFS) = 0.3
TIME (MIN) = 70	DISCHARGE (CFS) = 0.4
TIME (MIN) = 80	DISCHARGE (CFS) = 0.4
TIME (MIN) = 90	DISCHARGE (CFS) = 0.4
TIME (MIN) = 100	DISCHARGE (CFS) = 0.4
TIME (MIN) = 110	DISCHARGE (CFS) = 0.4
TIME (MIN) = 120	DISCHARGE (CFS) = 0.4
TIME (MIN) = 130	DISCHARGE (CFS) = 0.5
TIME (MIN) = 140	DISCHARGE (CFS) = 0.5
TIME (MIN) = 150	DISCHARGE (CFS) = 0.5
TIME (MIN) = 160	DISCHARGE (CFS) = 0.6
TIME (MIN) = 170	DISCHARGE (CFS) = 0.6
TIME (MIN) = 180	DISCHARGE (CFS) = 0.7
TIME (MIN) = 190	DISCHARGE (CFS) = 0.8
TIME (MIN) = 200	DISCHARGE (CFS) = 0.8
TIME (MIN) = 210	DISCHARGE (CFS) = 1
TIME (MIN) = 220	DISCHARGE (CFS) = 1.1
TIME (MIN) = 230	DISCHARGE (CFS) = 1.7
TIME (MIN) = 240	DISCHARGE (CFS) = 2.5
TIME (MIN) = 250	DISCHARGE (CFS) = 8.43
TIME (MIN) = 260	DISCHARGE (CFS) = 1.4
TIME (MIN) = 270	DISCHARGE (CFS) = 0.9
TIME (MIN) = 280	DISCHARGE (CFS) = 0.7
TIME (MIN) = 290	DISCHARGE (CFS) = 0.6
TIME (MIN) = 300	DISCHARGE (CFS) = 0.5
TIME (MIN) = 310	DISCHARGE (CFS) = 0.5
TIME (MIN) = 320	DISCHARGE (CFS) = 0.4
TIME (MIN) = 330	DISCHARGE (CFS) = 0.4
TIME (MIN) = 340	DISCHARGE (CFS) = 0.4
TIME (MIN) = 350	DISCHARGE (CFS) = 0.3
TIME (MIN) = 360	DISCHARGE (CFS) = 0.3
TIME (MIN) = 370	DISCHARGE (CFS) = 0

Hydrograph Report

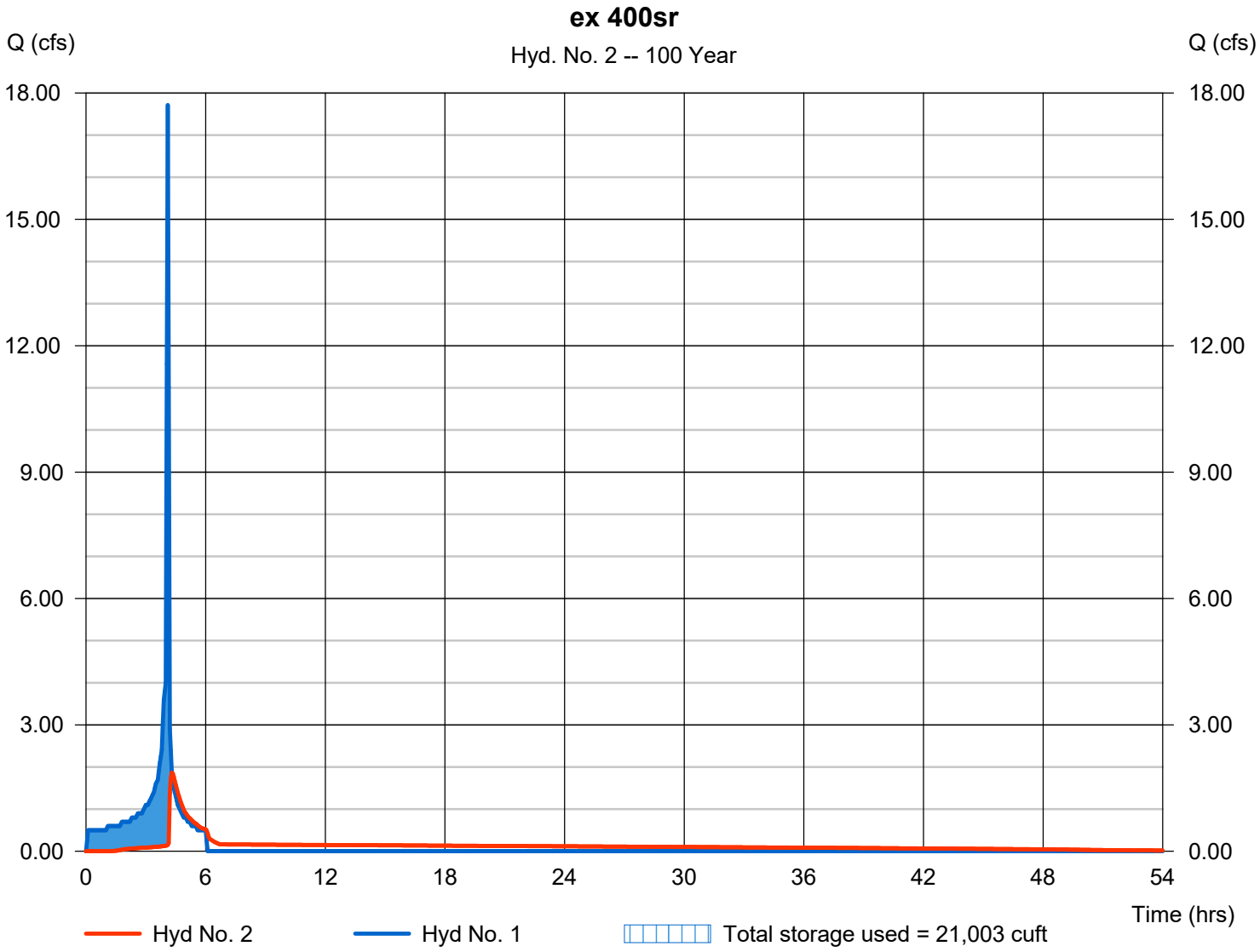
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Friday, 04 / 9 / 2021

Hyd. No. 2

ex 400sr

Hydrograph type	=	Reservoir	Peak discharge	=	1.864 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.30 hrs
Time interval	=	3 min	Hyd. volume	=	25,524 cuft
Inflow hyd. No.	=	1 - existing 400-series	Max. Elevation	=	31.26 ft
Reservoir name	=	underground chambers	Max. Storage	=	21,003 cuft

Storage Indication method used.



Pond Report

Series 400

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 — Friday, 04 / 9 / 2021

Pond No. 1 - underground chambers

Pond Data

UG Chambers -Invert elev. = 28.50 ft, Rise x Span = 4.00 x 4.00 ft, Barrel Len = 555.00 ft, No. Barrels = 3, Slope = 0.00%, Headers = No
Encasement -Invert elev. = 28.00 ft, Width = 6.30 ft, Height = 6.00 ft, Voids = 30.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	28.00	n/a	0	0
0.60	28.60	n/a	1,976	1,976
1.20	29.20	n/a	3,513	5,489
1.80	29.80	n/a	4,299	9,789
2.40	30.40	n/a	4,623	14,412
3.00	31.00	n/a	4,666	19,077
3.60	31.60	n/a	4,442	23,519
4.20	32.20	n/a	3,857	27,376
4.80	32.80	n/a	2,386	29,762
5.40	33.40	n/a	1,890	31,652
6.01	34.01	n/a	1,890	33,543

Culvert / Orifice Structures

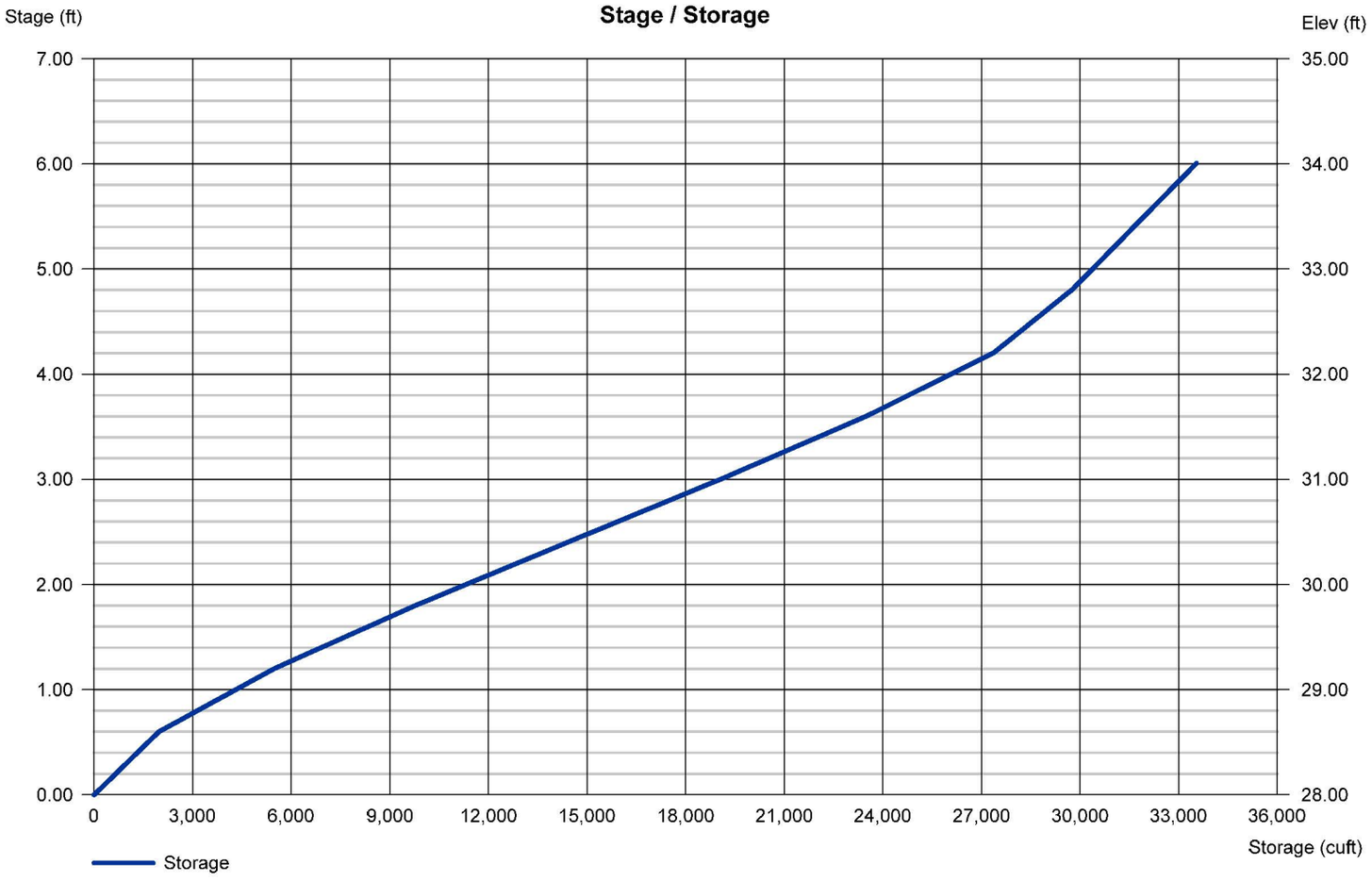
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.00	0.00	0.00	0.00
Span (in)	= 2.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 28.60	0.00	0.00	0.00
Length (ft)	= 1.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.00	0.00	0.00	0.00
Crest El. (ft)	= 31.09	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

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

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



RATIONAL METHOD HYDROGRAPH PROGRAM

SERIES 400

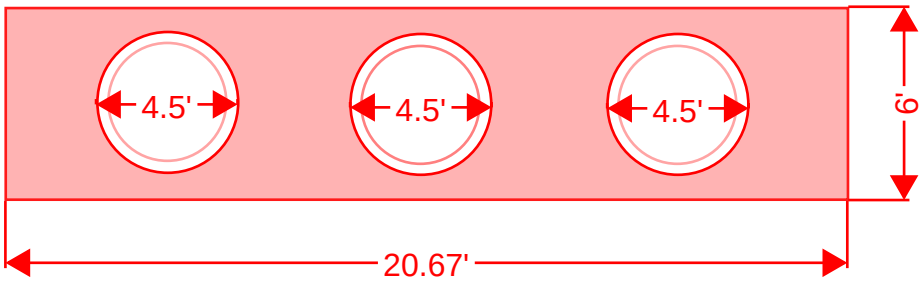
RUN DATE 4/7/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 6 MIN.
6 HOUR RAINFALL 2.7 INCHES
BASIN AREA 3.4 ACRES
RUNOFF COEFFICIENT 0.84
PEAK DISCHARGE 19.14 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 6	DISCHARGE (CFS) = 0.5
TIME (MIN) = 12	DISCHARGE (CFS) = 0.5
TIME (MIN) = 18	DISCHARGE (CFS) = 0.5
TIME (MIN) = 24	DISCHARGE (CFS) = 0.5
TIME (MIN) = 30	DISCHARGE (CFS) = 0.5
TIME (MIN) = 36	DISCHARGE (CFS) = 0.5
TIME (MIN) = 42	DISCHARGE (CFS) = 0.5
TIME (MIN) = 48	DISCHARGE (CFS) = 0.5
TIME (MIN) = 54	DISCHARGE (CFS) = 0.5
TIME (MIN) = 60	DISCHARGE (CFS) = 0.5
TIME (MIN) = 66	DISCHARGE (CFS) = 0.6
TIME (MIN) = 72	DISCHARGE (CFS) = 0.6
TIME (MIN) = 78	DISCHARGE (CFS) = 0.6
TIME (MIN) = 84	DISCHARGE (CFS) = 0.6
TIME (MIN) = 90	DISCHARGE (CFS) = 0.6
TIME (MIN) = 96	DISCHARGE (CFS) = 0.6
TIME (MIN) = 102	DISCHARGE (CFS) = 0.6
TIME (MIN) = 108	DISCHARGE (CFS) = 0.7
TIME (MIN) = 114	DISCHARGE (CFS) = 0.7
TIME (MIN) = 120	DISCHARGE (CFS) = 0.7
TIME (MIN) = 126	DISCHARGE (CFS) = 0.7
TIME (MIN) = 132	DISCHARGE (CFS) = 0.7
TIME (MIN) = 138	DISCHARGE (CFS) = 0.8
TIME (MIN) = 144	DISCHARGE (CFS) = 0.8
TIME (MIN) = 150	DISCHARGE (CFS) = 0.8
TIME (MIN) = 156	DISCHARGE (CFS) = 0.9
TIME (MIN) = 162	DISCHARGE (CFS) = 0.9
TIME (MIN) = 168	DISCHARGE (CFS) = 0.9
TIME (MIN) = 174	DISCHARGE (CFS) = 1
TIME (MIN) = 180	DISCHARGE (CFS) = 1.1
TIME (MIN) = 186	DISCHARGE (CFS) = 1.1
TIME (MIN) = 192	DISCHARGE (CFS) = 1.2
TIME (MIN) = 198	DISCHARGE (CFS) = 1.3
TIME (MIN) = 204	DISCHARGE (CFS) = 1.4
TIME (MIN) = 210	DISCHARGE (CFS) = 1.6
TIME (MIN) = 216	DISCHARGE (CFS) = 1.7
TIME (MIN) = 222	DISCHARGE (CFS) = 2.1
TIME (MIN) = 228	DISCHARGE (CFS) = 2.4
TIME (MIN) = 234	DISCHARGE (CFS) = 3.6
TIME (MIN) = 240	DISCHARGE (CFS) = 4
TIME (MIN) = 246	DISCHARGE (CFS) = 17.71
TIME (MIN) = 252	DISCHARGE (CFS) = 2.9
TIME (MIN) = 258	DISCHARGE (CFS) = 1.9
TIME (MIN) = 264	DISCHARGE (CFS) = 1.5
TIME (MIN) = 270	DISCHARGE (CFS) = 1.3
TIME (MIN) = 276	DISCHARGE (CFS) = 1.1
TIME (MIN) = 282	DISCHARGE (CFS) = 1
TIME (MIN) = 288	DISCHARGE (CFS) = 0.9
TIME (MIN) = 294	DISCHARGE (CFS) = 0.8
TIME (MIN) = 300	DISCHARGE (CFS) = 0.8
TIME (MIN) = 306	DISCHARGE (CFS) = 0.7
TIME (MIN) = 312	DISCHARGE (CFS) = 0.7
TIME (MIN) = 318	DISCHARGE (CFS) = 0.6
TIME (MIN) = 324	DISCHARGE (CFS) = 0.6
TIME (MIN) = 330	DISCHARGE (CFS) = 0.6
TIME (MIN) = 336	DISCHARGE (CFS) = 0.5
TIME (MIN) = 342	DISCHARGE (CFS) = 0.5
TIME (MIN) = 348	DISCHARGE (CFS) = 0.5
TIME (MIN) = 354	DISCHARGE (CFS) = 0.5
TIME (MIN) = 360	DISCHARGE (CFS) = 0.5
TIME (MIN) = 366	DISCHARGE (CFS) = 0

APPENDIX 8

DETENTION STORAGE HAND-CALCULATIONS

Hydraflow Storage Hand Calculation - Series 300



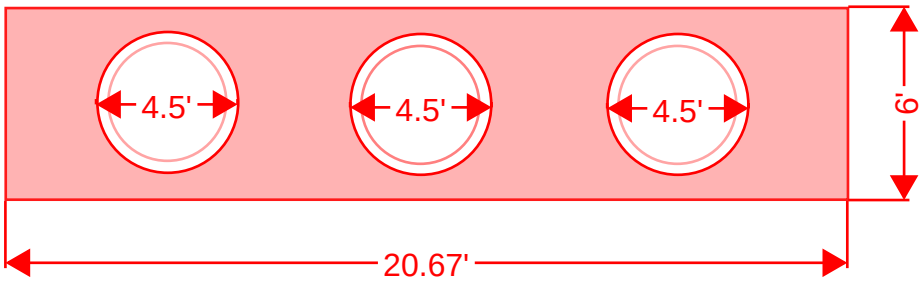
Detention Chamber Simplified Cross-Section

Area of encasement= (20.67ft*6ft)-((3)*π*(2.25ft^2))
Area of encasement = 76.3sf
Void ratio of gravel= 0.3
76.3sf*0.3 = 22.89sf
22.89sf * 340.33lf (one pipe)
Contribution of encasement to overall storage = 7787cf

This gets added to the value that Hydraflow calculates when you run the analysis with the stone encasement set to "no" (12,883cf)

Total storage = 20,670cf

Hydraflow Storage Hand Calculation - Series 400



Detention Chamber Simplified Cross-Section

Area of encasement= (20.67ft*6ft)-((3)*π*(2.25ft^2))
Area of encasement = 76.3sf
Void ratio of gravel= 0.3
76.3sf*0.3 = 22.89sf
22.89sf * 555lf (one pipe)
Contribution of encasement to overall storage = 12,704cf

This gets added to the value that Hydraflow calculates when you run the analysis with the stone encasement set to "no" (20,297cf)

Total storage = 33,625.4cf

APPENDIX 9

CCSYA BYPASS CALCULATION

CCSYA Bypass Velocity Calculation

This calculation is provided to show compliance with the CCSYA bypass criteria for the CCSYA located upstream of the project site.

Criteria from San Diego County Stormwater Manual Appendix H-3.1.

H.3.1 Bypass CCSYAs from Hillslopes Both onsite and upstream hillslopes mapped as CCSYAs must be effectively bypassed through and/or around the proposed project site. • Proposed hardened drainage systems (e.g. storm drains, drainage ditches) that convey the bed sediment from the hillslopes to the downstream waters of the state should maintain a peak velocity from the discrete 2-year, 24-hour runoff event greater than three feet per second.

- *When an 18" concrete storm drain is proposed for bypass, this velocity may typically be achieved by maintaining a storm drain slope of ≥0.5%. In instances where 2 year, 24-hour peak flow rates associated with the storm drain are less than 1.1 cfs, applicants may refer to the table below for minimum slopes needed to maintain three feet per second. Applicants may interpolate the values from the table below, or may elect to perform more detailed cleansing velocity calculations presented in Appendix H.7.1. 2-Year, 24-Hour Peak Flow (cfs) Minimum Slope for 18" Concrete Storm Drain*

2-Year, 24-Hour Peak Flow (cfs)	Minimum Slope for 18" Concrete Storm Drain
<0.25	n/a, this PCCSYA is considered de-minimis
0.25	2.0%
0.50	1.0%
1.10	0.5%

<u>Node 310 Velocity Check</u> (See Proposed Hydrology Map in Appendix 1)**:**

Q100 = 6.60 cfs, Q2 = 2.64 cfs*

Required min slope per table above = 0.5%. Minimum provided slope = 1.0%.

Minimum Velocity Criteria will be met.

<u>Node 418 Velocity Check</u> (See Proposed Hydrology Map in Appendix 1)**:**

Q100 = 6.60 cfs, Q2 = 4.55 cfs*

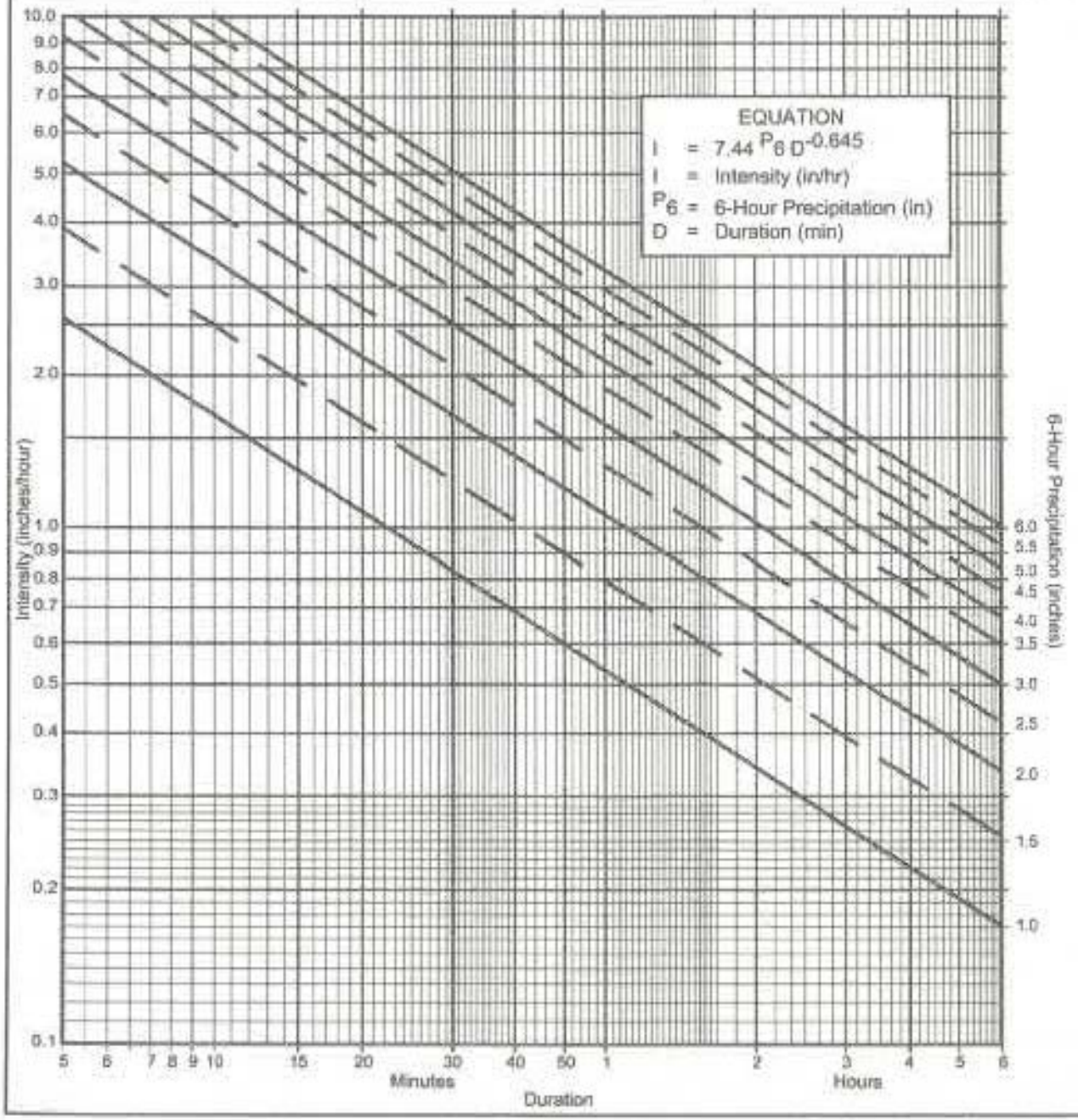
Required min slope per table above = 0.5%. Minimum provided slope = 0.6%.

Minimum Velocity Criteria will be met.

*based on calculated 100 year discharge calculated in Appendix 4, adjust to 2 year storm via ratio of 24-hour rainfall depths for 100-year storm (5") to 2-year storm (2") as shown in Appendix 10

APPENDIX 10

SAN DIEGO COUNTY ISOPLUVIAL MAPS



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 2.7 in., P_{24} = 5.0 , $\frac{P_6}{P_{24}}$ = 54 %(2)

(c) Adjusted P_6(2) = N/A in.

(d) t_x = _____ min.

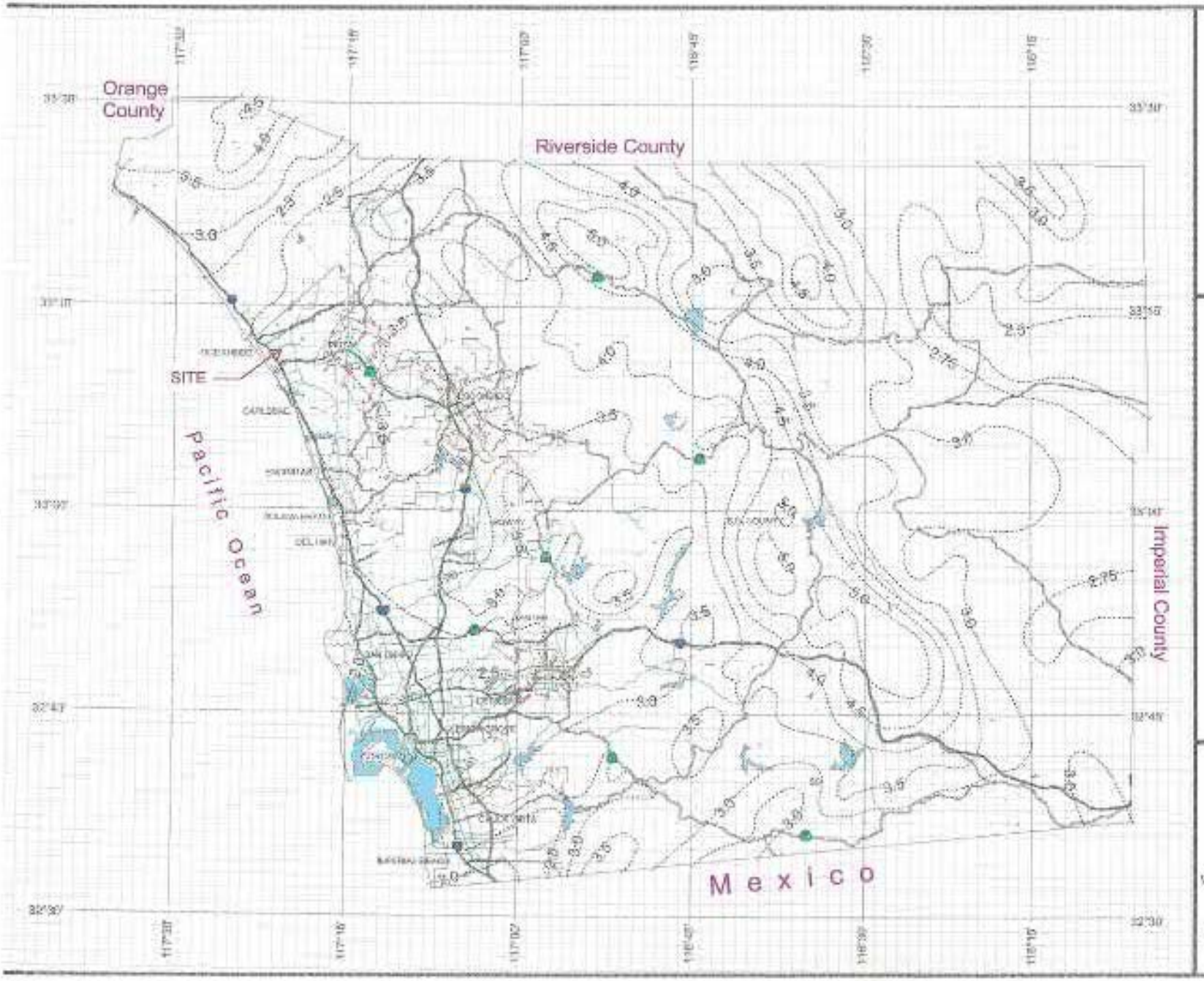
(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.75	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE
3-1



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

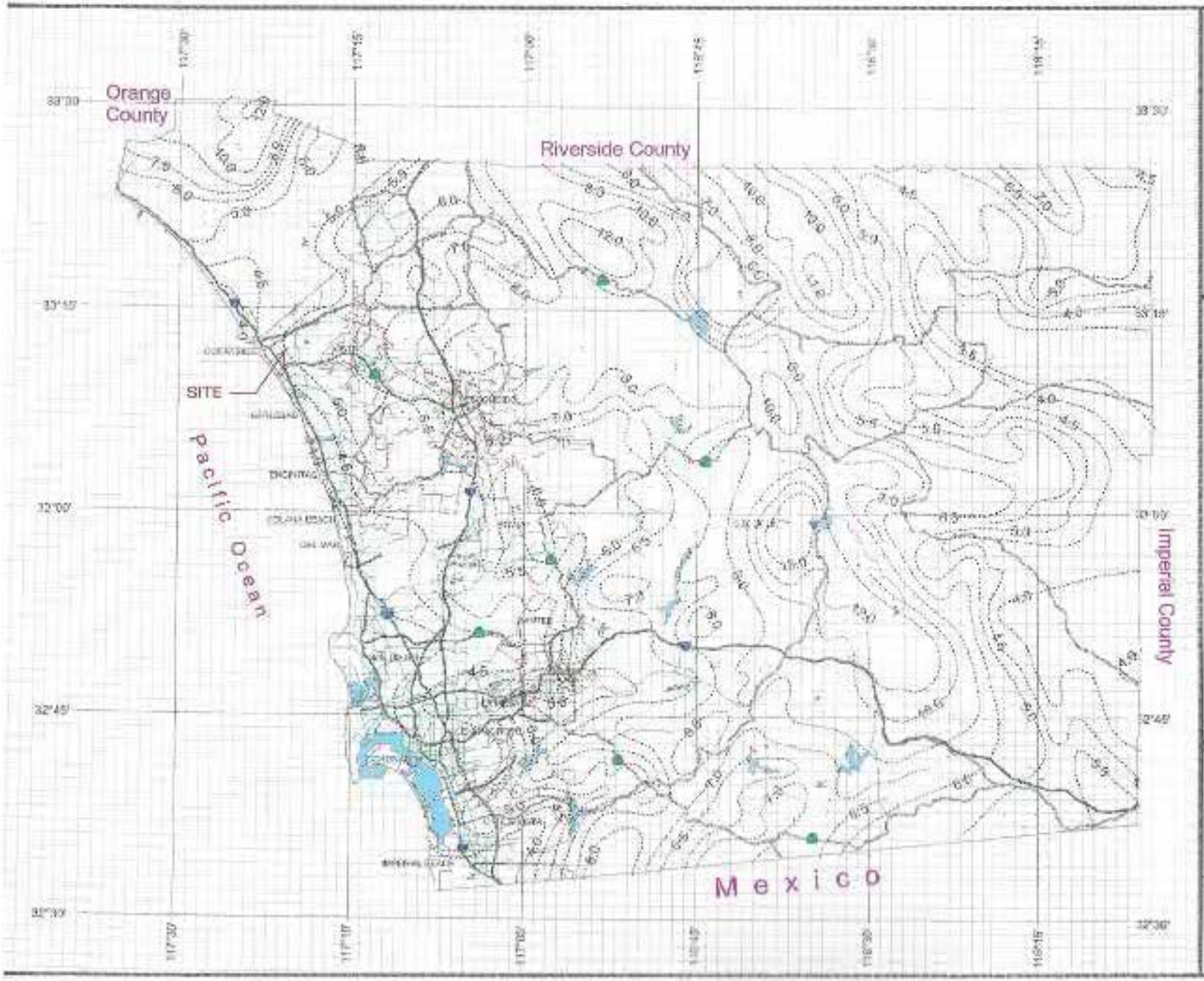
P6=2.7"

DPW GIS

SanGIS

N
W
E
S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

P24=5.0"

DPW GIS

SanGIS

N W E S

3 0 3 Miles

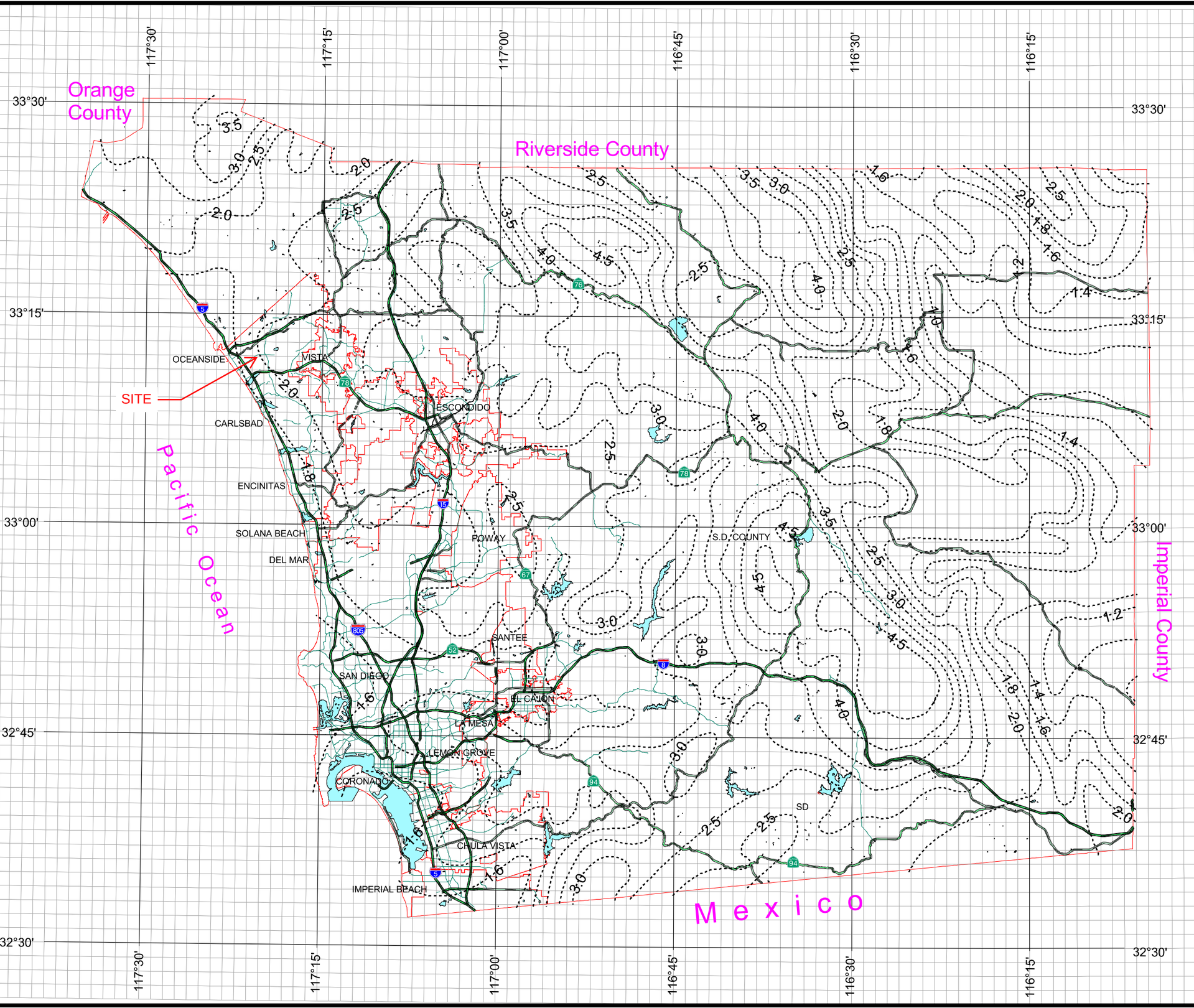
County of San Diego Hydrology Manual

Rainfall Isopluvials

2 Year Rainfall Event - 24 Hours

Isopluvial (inches)

P24= 2.0"



DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles

APPENDIX 11

HYDRAULIC ANALYSES FOR JEFFERSON OCEANSIDE

HYDRAULIC ANALYSES

FOR

JEFFERSON OCEANSIDE

February 15, 2022

Wayne W. Chang, MS, PE 46548

ChangConsultants

Civil Engineering ◦ Hydrology ◦ Hydraulics ◦ Sedimentation

P.O. Box 9496
Rancho Santa Fe, CA 92067
(858) 692-0760

TABLE OF CONTENTS

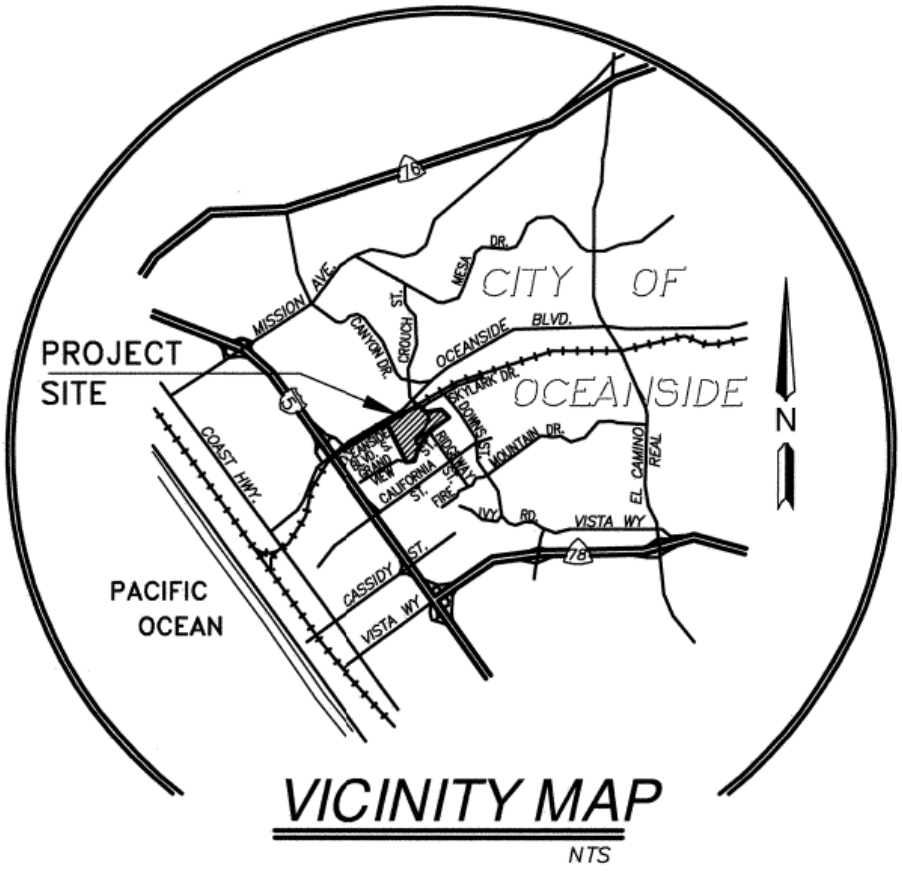
Introduction....1
Hydraulic Analyses....2
Conclusion....3
FIRMette....5
Title 44 CFR 65.12....6

APPENDIX

A. HEC-RAS Results and Work Map

INTRODUCTION

The Jefferson Oceanside project is pursuing entitlements for a mixed-use, transit-oriented development located southwest of the existing North County Transit District Crouch Street Sprinter Station. The site is bordered by Oceanside Boulevard to the north, Crouch Street to the east and south, and South Oceanside Boulevard to the west (see the Vicinity Map). The development proposes 295 dwelling units, approximately 3,000 square feet of commercial/office and commercial/retail space, and associated amenity spaces. The existing access road from Crouch Street will be extended and connect to South Oceanside Boulevard west of the property boundary. South Oceanside Boulevard will become a dedicated public street with right-of-way widths ranging from 56 feet wide at the eastern side of the project to 72 feet wide west of the property boundary. South Oceanside Boulevard will include added public storm drain, water, and sewer improvements. Fuscoe Engineering has prepared the conceptual grading plans.



Loma Alta Creek flows west along the northerly portion of the site. FEMA has mapped the associated Loma Alta Creek 100-year floodplain and regulatory floodway on Flood Insurance Rate Map No. 06073C0753J dated December 20, 2019. A FIRMette is included after this report text. The private development site is outside the regulatory floodway, but a portion is within the 100-year floodplain. In addition, the required public street improvements encroach into a portion of the floodplain and regulatory floodway. This report contains preliminary 100-year existing and proposed condition hydraulic analyses to determine the project impacts on Loma Alta Creek.

HYDRAULIC ANALYSES

The hydraulic analyses were performed using the US Army Corps of Engineers' HEC-RAS model. This model is approved by FEMA and used frequently for their floodplain and floodway mapping. Existing and proposed condition HEC-RAS hydraulic analyses were performed to determine the proposed grading and public street improvement impacts on the Loma Alta Creek 100-year water surface elevations. The following describes the HEC-RAS input parameters and results.

The HEC-RAS cross-sections are shown on the HEC-RAS Work Map in Appendix A. The cross-sections are at the same locations as the FIRM, where appropriate. HEC-RAS cross-sections 3, 9, and 10 correspond to FIRM cross-sections U, Z, and AA. Additional cross-sections were added to accurately model the project reach. The existing condition cross-sections were created from the project's 1-foot contour interval topographic mapping flown on December 27, 2017, where available. This was supplemented with SANGIS' 2014/2015 2-foot contour interval topographic mapping. Both mapping sources are on NAVD 88. For proposed conditions, Fuscoe Engineering's grading was modeled from cross-sections 2 to 8.

The study reach includes existing Loma Alta Creek channel improvements. Triple 12-foot-wide by 8-foot-high box culverts are located along the NCTD Crouch Street Station between cross-sections 5 and 6. Quadruple (a single 8.5-foot-wide by 5-foot-high and triple 10-foot-wide by 5-foot-high) box culverts are located under Crouch Street between cross-sections 8 and 9. A rectangular concrete channel extends between the two sets of box culverts and upstream of Crouch Street. The culverts and channel were modeled based on the topographic mapping and as-built drawings.

Additional modeling parameters are as follows. A site inspection and review of aerial photographs were used to estimate the roughness coefficients. The roughness coefficients range from n=0.020 for paved areas to n=0.075 for areas with dense vegetation. The effective 100-year flow rate of 3,800 cubic feet per second was used. The downstream starting water surface elevation at cross-section 1 was set at 30 feet NAVD 88 to match the effective water surface contour from the FIRM. HEC-RAS adjusted the downstream elevation to 31.21 feet. Blocked obstructions were used to model existing buildings. The existing and proposed condition HEC-RAS results are included in Appendix A and summarized in Table 1.

Table 1 shows that the existing condition 100-year water surface elevations are generally maintained by the proposed project. The project causes a slight decrease in water surface elevations at cross-section 4 and 5 as well as a minimal increase in water surface elevations at cross-section 6. The existing and proposed condition upstream water surface elevation at cross-section 10 are both 41.40 feet. These match the effective elevation of 41.0 feet, which satisfies FEMA's tie-in requirement of 0.5 feet.

Cross-Section	100-Year Water Surface Elevations, feet		Prop. – Exist., feet
	Existing Conditions	Proposed Conditions	
10	41.40	41.40	0.00
9	41.53	41.53	0.00
8	38.36	38.36	0.00
7	37.25	37.25	0.00
6	36.15	36.17	0.02
5	34.53	34.47	-0.06
4	35.22	35.21	-0.01
3	33.16	33.16	0.00
2	31.68	31.68	0.00
1	31.21	31.21	0.00

Table 1. HEC-RAS Hydraulic Results

CONCLUSION

Entitlement-level hydraulic analyses of Loma Alta Creek have been performed for existing and proposed conditions associated with the Jefferson Oceanside mixed-use project. The results show that the project causes minor changes in the 100-year water surface elevations at three locations. The water surface elevations are reduced slightly at a couple cross-sections. The only project increase in the 100-year water surface elevation occurs at cross-section 6 and is 0.02 feet. This minimal increase does not impact insurable structures.

Section 65.12 from Title 44 of the *Code of Federal Regulations* states that FEMA can allow a project to encroach into the regulatory floodway and increase the 100-year water surface elevations as long as seven conditions are met. The conditions are included after this report text and will be met by the project as follows:

1. A Conditional Letter of Map Revision (CLOMR) will be prepared and processed.

2. The current project is the preferred alternative.

3. Individual legal notices will be sent to impacted property owners as part of the CLOMR process.

4. The city of Oceanside will be required to sign the CLOMR prior to submittal to FEMA for their review and approval.

5. As mentioned above, no structures will be impacted by the minor increase in the 100-year water surface elevation.

6. The base flood elevations will be revised as documented in the CLOMR and LOMR.

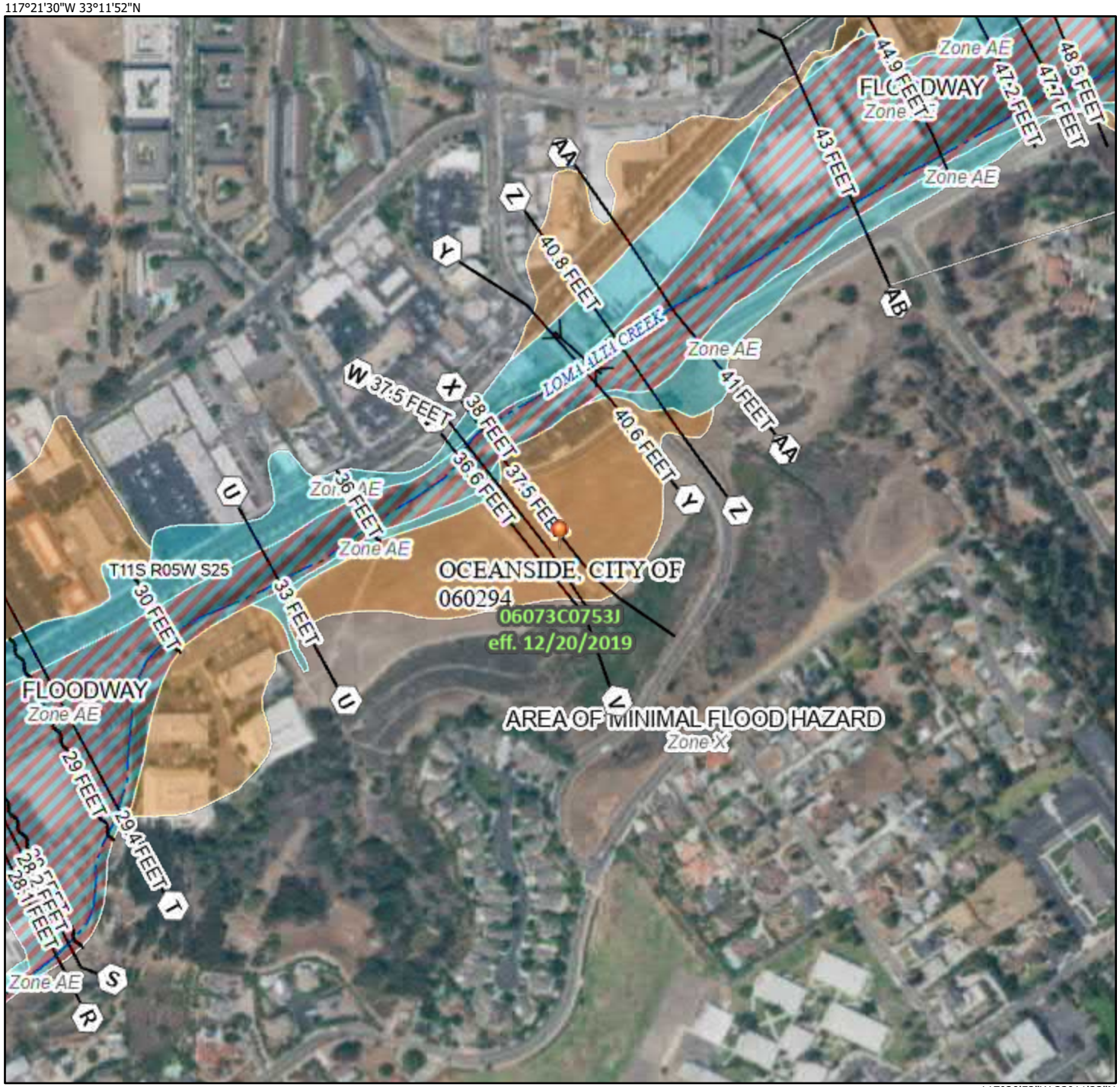
7. The floodway will be revised as documented in the CLOMR and LOMR.

The results indicate that the project will not cause significant impacts, and it is feasible to obtain a FEMA Conditional Letter of Map Revision and Letter of Map Revision. The CLOMR and LOMR will include existing and proposed condition models similar to those included in this report. In addition, they will include the effective FEMA hydraulic model as well as a corrective effective model if corrections to the effective model are needed.

National Flood Hazard Layer FIRMette

FEMA

117°21'30"W 33°11'52"N



117°20'52"W 33°11'22"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/11/2021 at 1:15 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

sought or when the plan for a previously recognized system is revised in any manner. All maintenance activities must be under the jurisdiction of a Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP that must assume ultimate responsibility for maintenance. This plan must document the formal procedure that ensures that the stability, height, and overall integrity of the levee and its associated structures and systems are maintained. At a minimum, maintenance plans shall specify the maintenance activities to be performed, the frequency of their performance, and the person by name or title responsible for their performance.

(e) *Certification requirements.* Data submitted to support that a given levee system complies with the structural requirements set forth in paragraphs (b)(1) through (7) of this section must be certified by a registered professional engineer. Also, certified as-built plans of the levee must be submitted. Certifications are subject to the definition given at §65.2 of this subchapter. In lieu of these structural requirements, a Federal agency with responsibility for levee design may certify that the levee has been adequately designed and constructed to provide protection against the base flood.

[51 FR 30316, Aug. 25, 1986]

§65.11 Evaluation of sand dunes in mapping coastal flood hazard areas.

(a) *General conditions.* For purposes of the NFIP, FEMA will consider storm-induced dune erosion potential in its determination of coastal flood hazards and risk mapping efforts. The criterion to be used in the evaluation of dune erosion will apply to primary frontal dunes as defined in §59.1, but does not apply to artificially designed and constructed dunes that are not well-established with long-standing vegetative cover, such as the placement of sand materials in a dune-like formation.

(b) *Evaluation criterion.* Primary frontal dunes will not be considered as effective barriers to base flood storm surges and associated wave action where the cross-sectional area of the primary frontal dune, as measured perpendicular to the shoreline and above the 100-year stillwater flood elevation and seaward of the dune crest, is equal to, or less than, 540 square feet.

(c) *Exceptions.* Exceptions to the evaluation criterion may be granted where it can be demonstrated through authoritative historical documentation that the primary frontal dunes at a specific site withstood previous base flood storm surges and associated wave action.

[53 FR 16279, May 6, 1988]

§65.12 Revision of flood insurance rate maps to reflect base flood elevations caused by proposed encroachments.

(a) When a community proposes to permit encroachments upon the flood plain when a regulatory floodway has not been adopted or to permit encroachments upon an adopted regulatory floodway which will cause base flood elevation increases in excess of those permitted under paragraphs (c)(10) or (d)(3) of §60.3 of this subchapter, the community shall apply to the Federal Insurance Administrator for conditional approval of such action prior to permitting the encroachments to occur and shall submit the following as part of its application:

(1) A request for conditional approval of map change and the appropriate initial fee as specified by §72.3 of this subchapter or a request for exemption from fees as specified by §72.5 of this subchapter, whichever is appropriate;

(2) An evaluation of alternatives which would not result in a base flood elevation increase above that permitted under paragraphs (c)(10) or (d)(3) of §60.3 of this subchapter demonstrating why these alternatives are not feasible;

(3) Documentation of individual legal notice to all impacted property owners within and outside of the community, explaining the impact of the proposed action on their property.

(4) Concurrence of the Chief Executive Officer of any other communities impacted by the proposed actions;

(5) Certification that no structures are located in areas which would be impacted by the increased base flood elevation;

(6) A request for revision of base flood elevation determination according to the provisions of § 65.6 of this part;

(7) A request for floodway revision in accordance with the provisions of § 65.7 of this part;

(b) Upon receipt of the Federal Insurance Administrator's conditional approval of map change and prior to approving the proposed encroachments, a community shall provide evidence to the Federal Insurance Administrator of the adoption of flood plain management ordinances incorporating the increased base flood elevations and/or revised floodway reflecting the post-project condition.

(c) Upon completion of the proposed encroachments, a community shall provide as-built certifications in accordance with the provisions of § 65.3 of this part. The Federal Insurance Administrator will initiate a final map revision upon receipt of such certifications in accordance with part 67 of this subchapter.

[53 FR 16279, May 6, 1988]

§ 65.13 Mapping and map revisions for areas subject to alluvial fan flooding.

This section describes the procedures to be followed and the types of information FEMA needs to recognize on a NFIP map that a structural flood control measure provides protection from the base flood in an area subject to alluvial fan flooding. This information must be supplied to FEMA by the community or other party seeking recognition of such a flood control measure at the time a flood risk study or restudy is conducted, when a map revision under the provisions of part 65 of this subchapter is sought, and upon request by the Federal Insurance Administrator during the review of previously recognized flood control measures. The FEMA review will be for the sole purpose of establishing appropriate risk zone determinations for NFIP maps and shall not constitute a determination by FEMA as to how the flood control measure will perform in a flood event.

(a) The applicable provisions of §§ 65.2, 65.3, 65.4, 65.6, 65.8 and 65.10 shall also apply to FIRM revisions involving alluvial fan flooding.

(b) The provisions of § 65.5 regarding map revisions based on fill and the provisions of part 70 of this chapter shall not apply to FIRM revisions involving alluvial fan flooding. In general, elevations of a parcel of land or a structure by fill or other means, will not serve as a basis for removing areas subject to alluvial fan flooding from an area of special food hazards.

(c) FEMA will credit on NFIP maps only major structural flood control measures whose design and construction are supported by sound engineering analyses which demonstrate that the measures will effectively eliminate alluvial fan flood hazards from the area protected by such measures. The provided analyses must include, but are not necessarily limited to, the following:

(1) Engineering analyses that quantify the discharges and volumes of water, debris, and sediment movement associated with the flood that has a one-percent probability of being exceeded in any year at the apex under current watershed conditions and under potential adverse conditions (e.g., deforestation of the watershed by fire). The potential for debris flow and sediment movement must be assessed using an engineering method acceptable to FEMA. The assessment should consider the characteristics and availability of sediment in the drainage basin above the apex and on the alluvial fan.

(2) Engineering analyses showing that the measures will accommodate the estimated peak discharges and volumes of water, debris, and sediment, as determined in accordance with paragraph (c)(1) of this section, and will withstand the associated hydrodynamic and hydrostatic forces.

(3) Engineering analyses showing that the measures have been designed to withstand the potential erosion and scour associated with estimated discharges.

(4) Engineering analyses or evidence showing that the measures will provide protection from hazards associated with the possible relocation of flow paths from other parts of the fan.

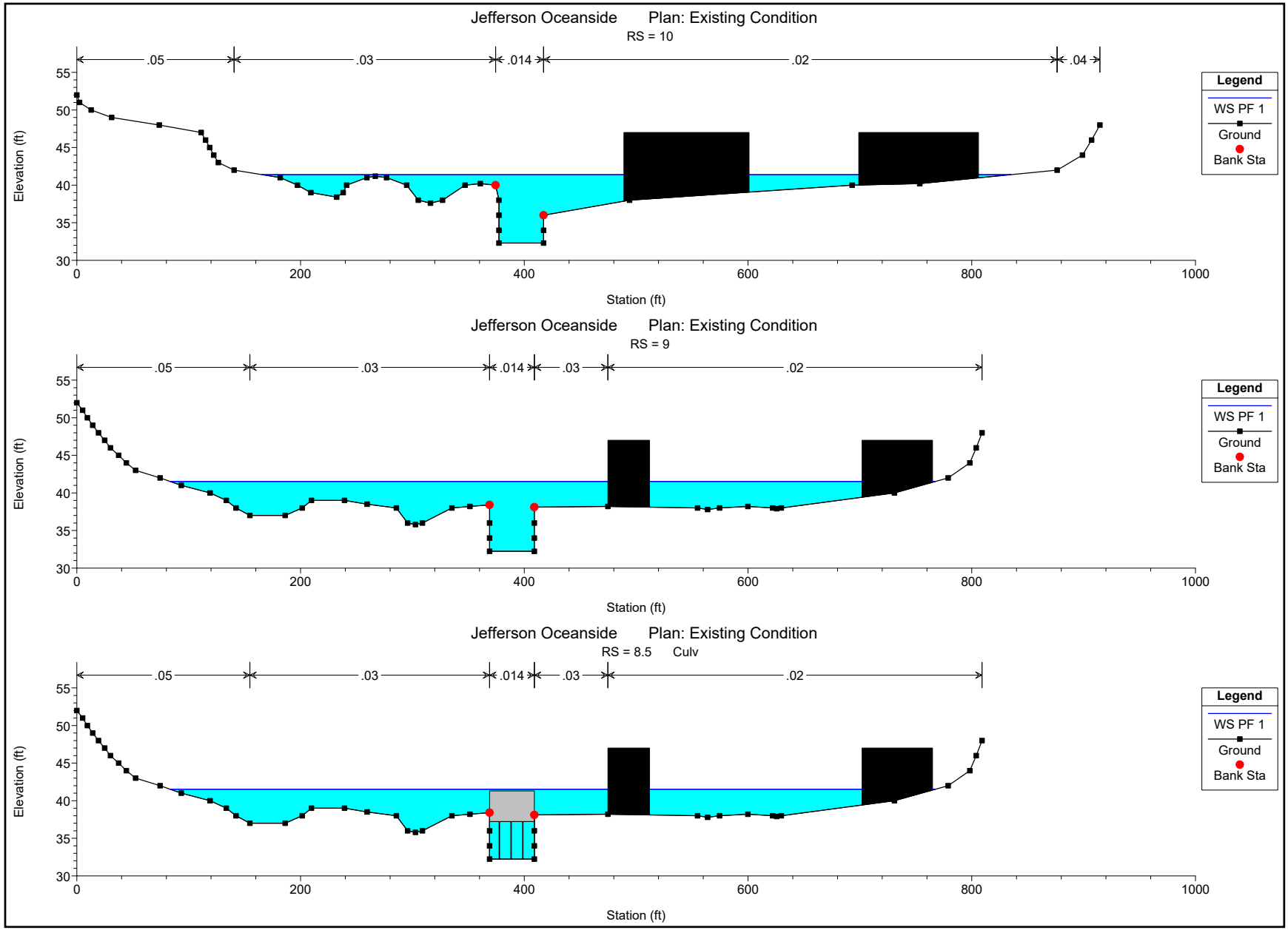
APPENDIX A

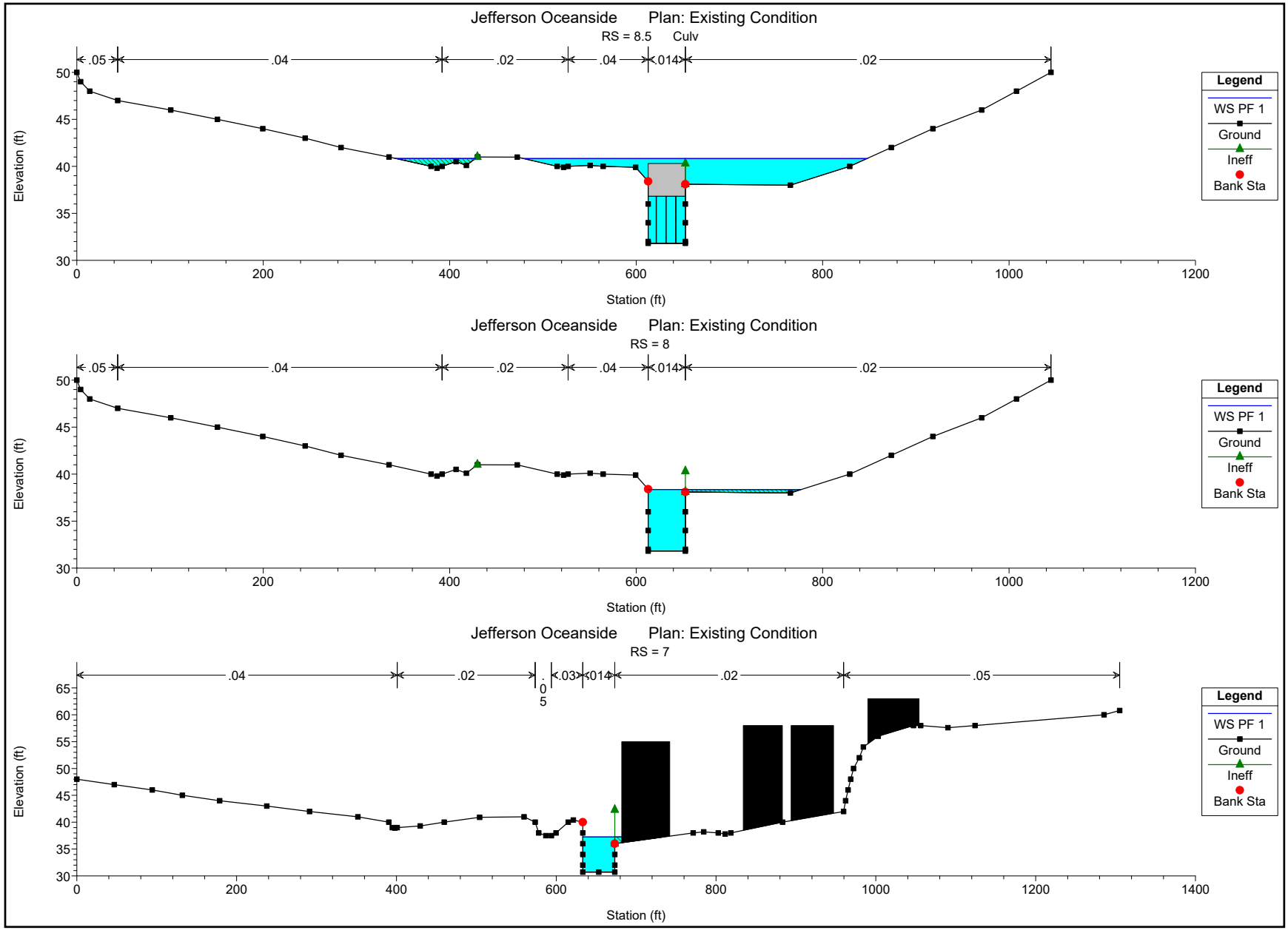
HEC-RAS RESULTS
AND WORK MAP

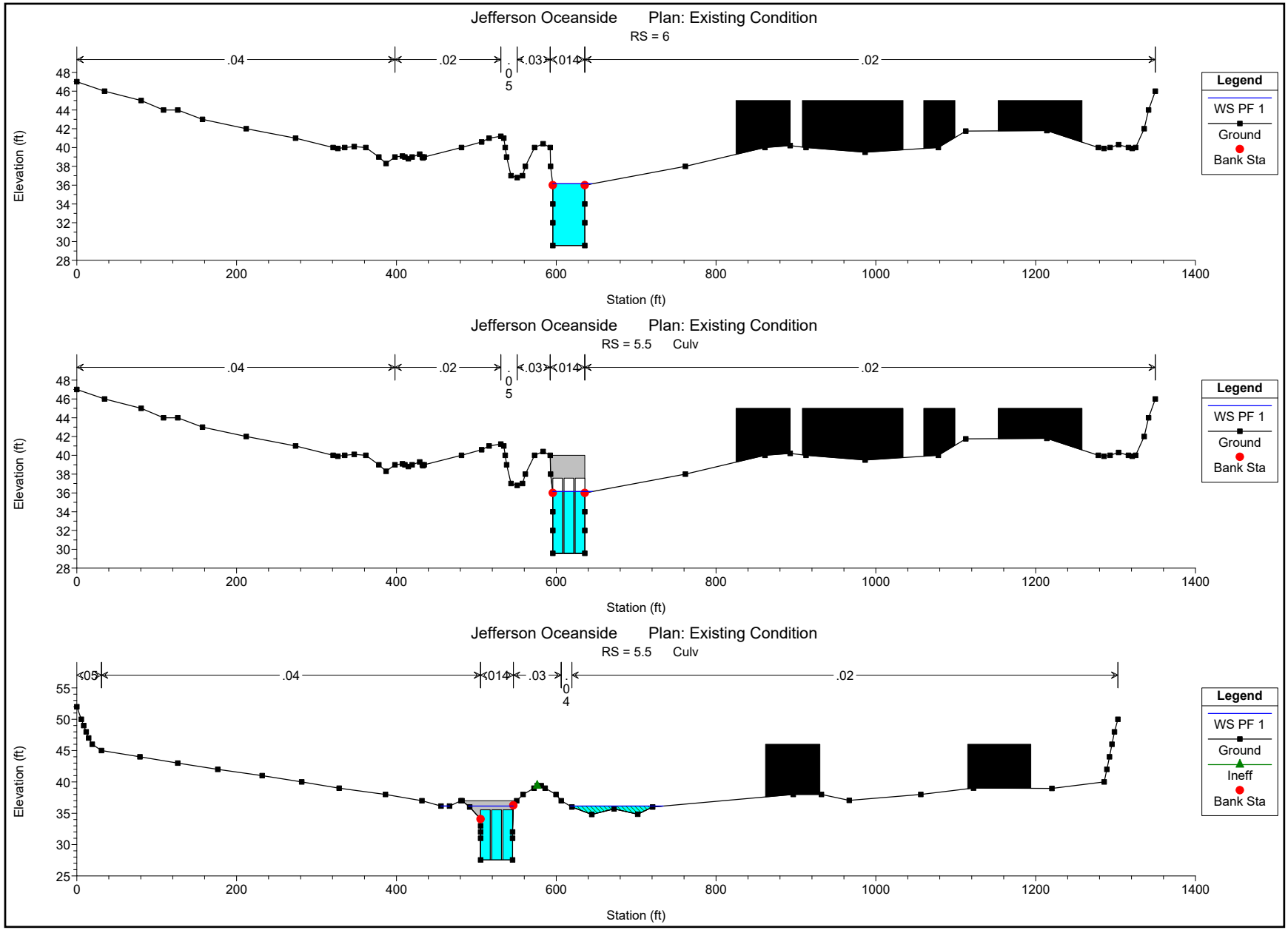
Existing Conditions

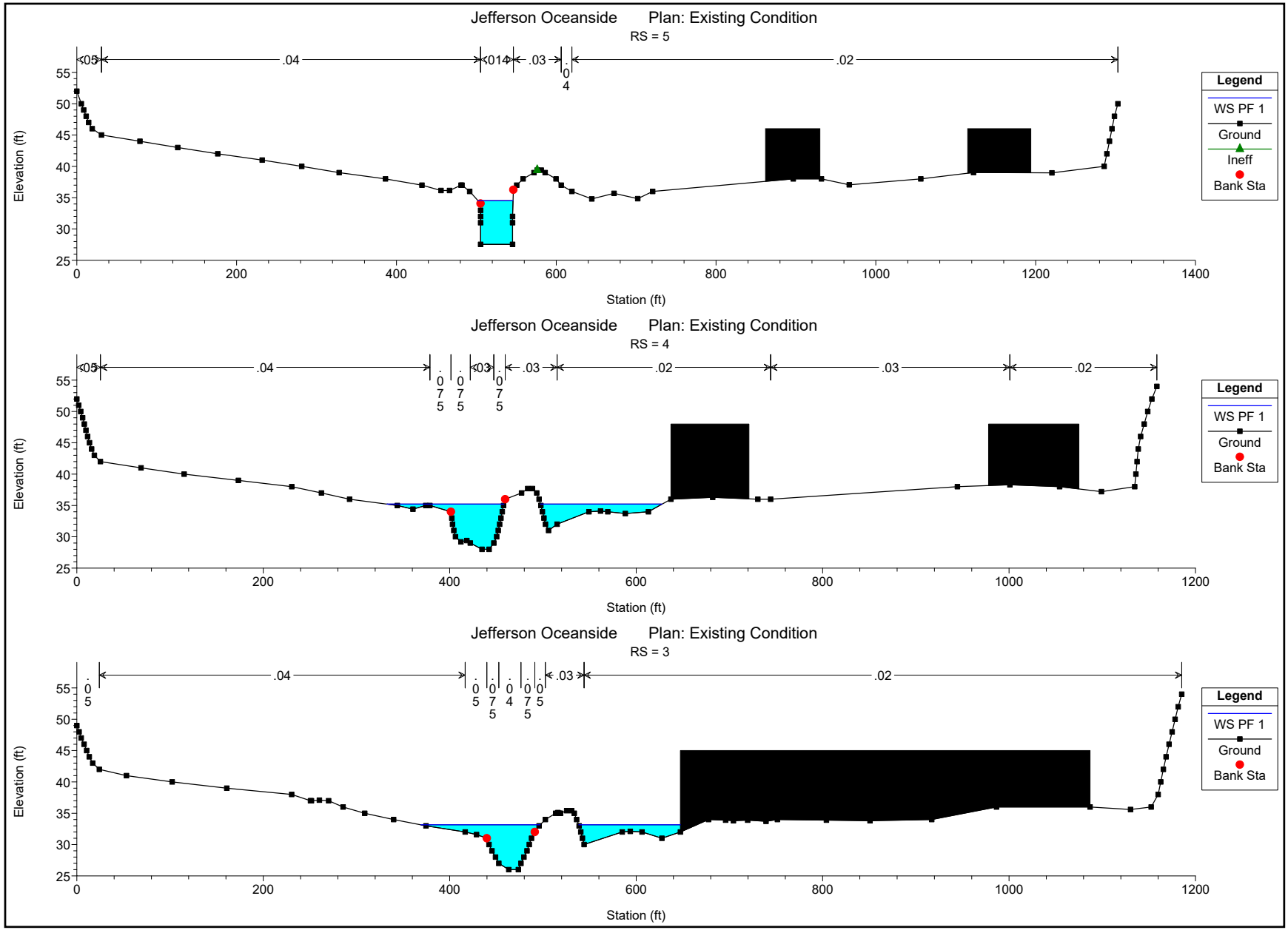
HEC-RAS Plan: Exist Cond River: RIVER-1 Reach: Reach-1 Profile: PF 1

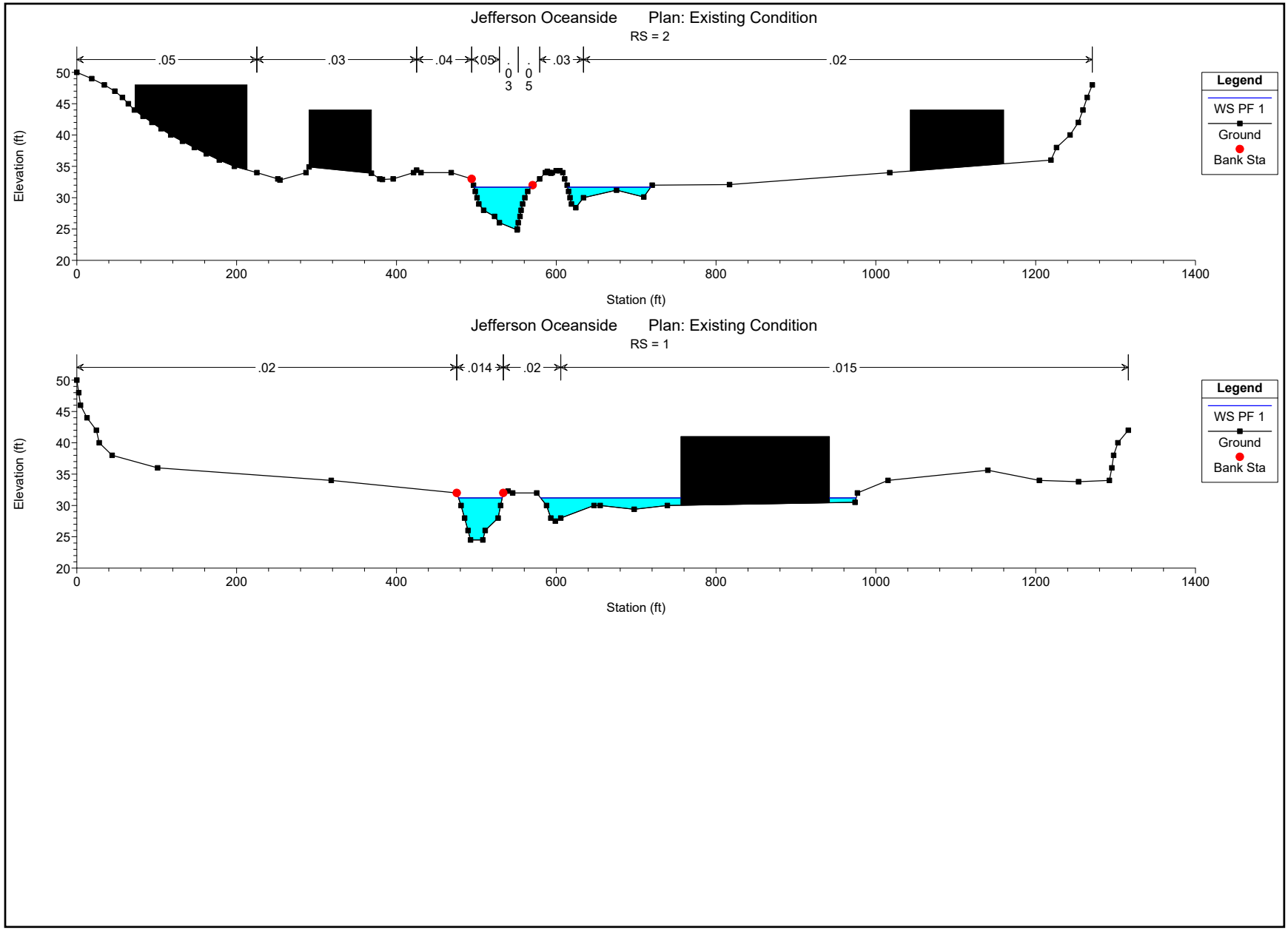
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	10	PF 1	3800.0	32.30	41.40		41.74	0.000231	5.90	1223.74	450.62	0.35
Reach-1	9	PF 1	3800.0	32.23	41.53	39.41	41.64	0.000106	4.06	2138.62	583.83	0.23
Reach-1	8.5		Culvert									
Reach-1	8	PF 1	3800.0	31.81	38.36	38.36	41.63	0.002210	14.51	261.95	164.00	1.00
Reach-1	7	PF 1	3800.0	30.70	37.25	37.25	40.52	0.002153	14.50	262.02	48.71	1.00
Reach-1	6	PF 1	3800.0	29.57	36.15	36.15	39.39	0.002179	14.44	263.77	49.46	0.99
Reach-1	5.5		Culvert									
Reach-1	5	PF 1	3800.0	27.55	34.53	34.11	37.39	0.001804	13.58	280.63	43.84	0.91
Reach-1	4	PF 1	3800.0	28.00	35.22		35.98	0.006438	6.23	578.27	255.96	0.46
Reach-1	3	PF 1	3800.0	26.00	33.16	32.79	34.13	0.008138	6.60	531.33	236.96	0.50
Reach-1	2	PF 1	3800.0	24.86	31.68	31.68	32.89	0.011124	9.03	431.12	175.42	0.78
Reach-1	1	PF 1	3800.0	24.50	31.21	31.21	32.17	0.001147	9.45	577.15	263.67	0.79


Jefferson Oceanside Plan: Existing Condition
RS = 10
.05
.03
.014
.02
.04
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Jefferson Oceanside Plan: Existing Condition
RS = 9
.05
.03
.014
.03
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Jefferson Oceanside Plan: Existing Condition
RS = 8.5 Culv
.05
.03
.014
.03
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta


Jefferson Oceanside Plan: Existing Condition
RS = 8.5 Culv
.05
.04
.02
.04
.014
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Ineff
Bank Sta
Jefferson Oceanside Plan: Existing Condition
RS = 8
Jefferson Oceanside Plan: Existing Condition
RS = 7
.03
.05


Jefferson Oceanside Plan: Existing Condition
RS = 6
.04
.02
.05
.03
.014
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Jefferson Oceanside Plan: Existing Condition
RS = 5.5 Culv
.04
.02
.05
.03
.014
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Jefferson Oceanside Plan: Existing Condition
RS = 5.5 Culv
.05
.04
.014
.03
.04
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Ineff
Bank Sta

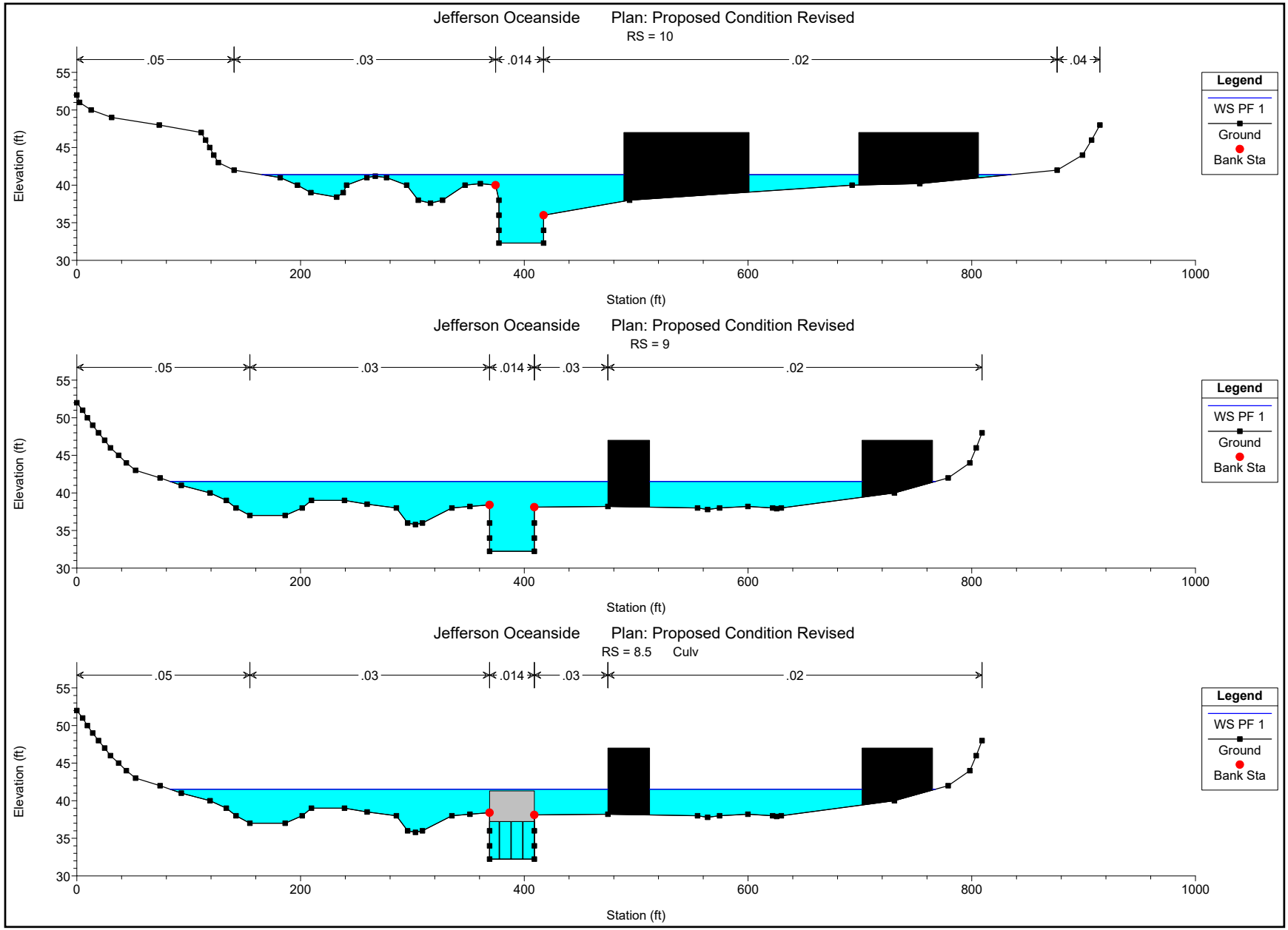

Jefferson Oceanside Plan: Existing Condition
RS = 5
.05
.04
.014
.03
.04
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Ineff
Bank Sta
Jefferson Oceanside Plan: Existing Condition
RS = 4
.05
.04
.075
.075
.03
.075
.03
.02
.03
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Jefferson Oceanside Plan: Existing Condition
RS = 3
.05
.04
.05
.075
.04
.075
.05
.03
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta

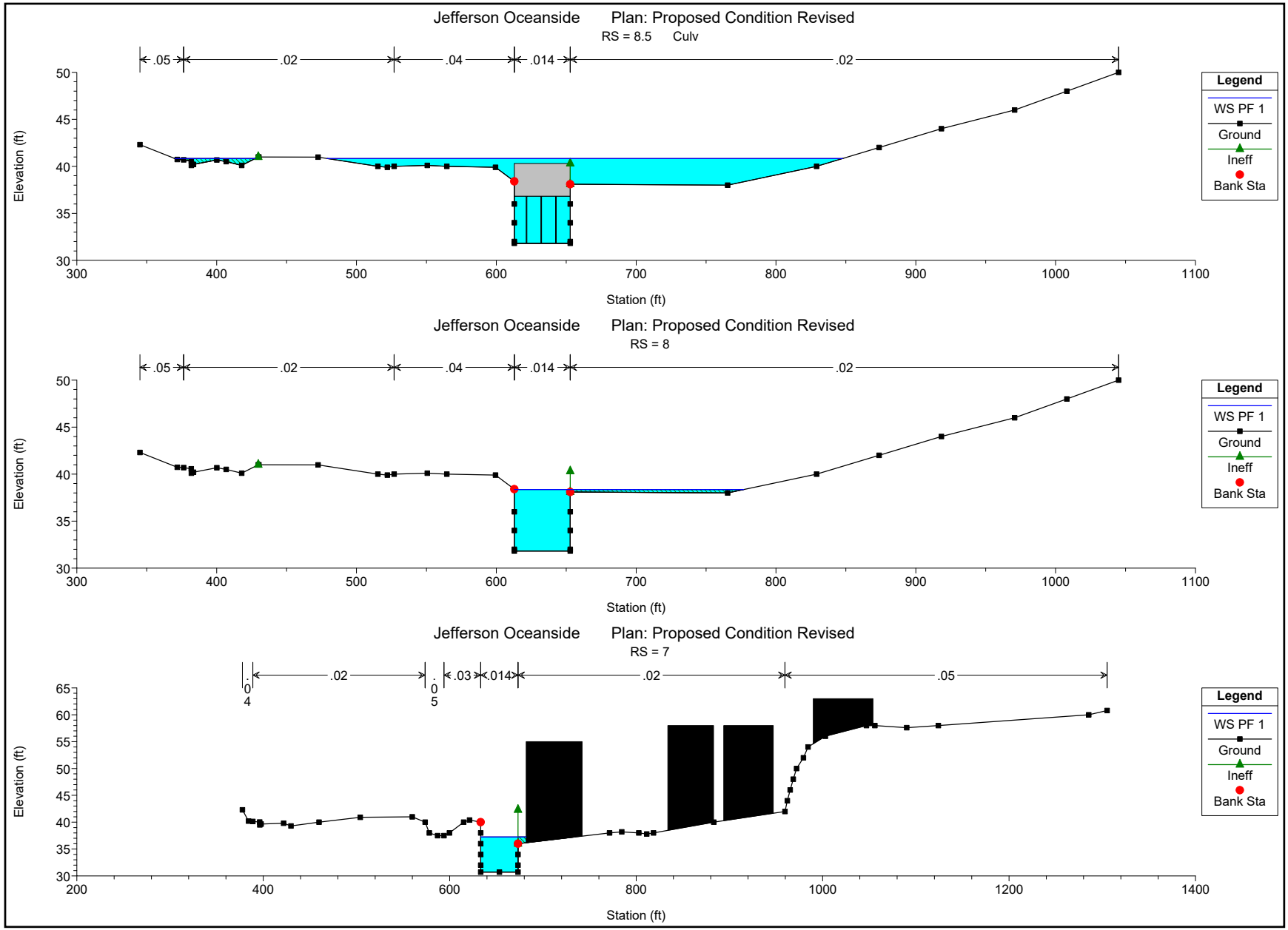

Jefferson Oceanside Plan: Existing Condition
RS = 2
.05
.03
.04
.05
.03
.05
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Jefferson Oceanside Plan: Existing Condition
RS = 1
.02
.014
.02
.015
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta

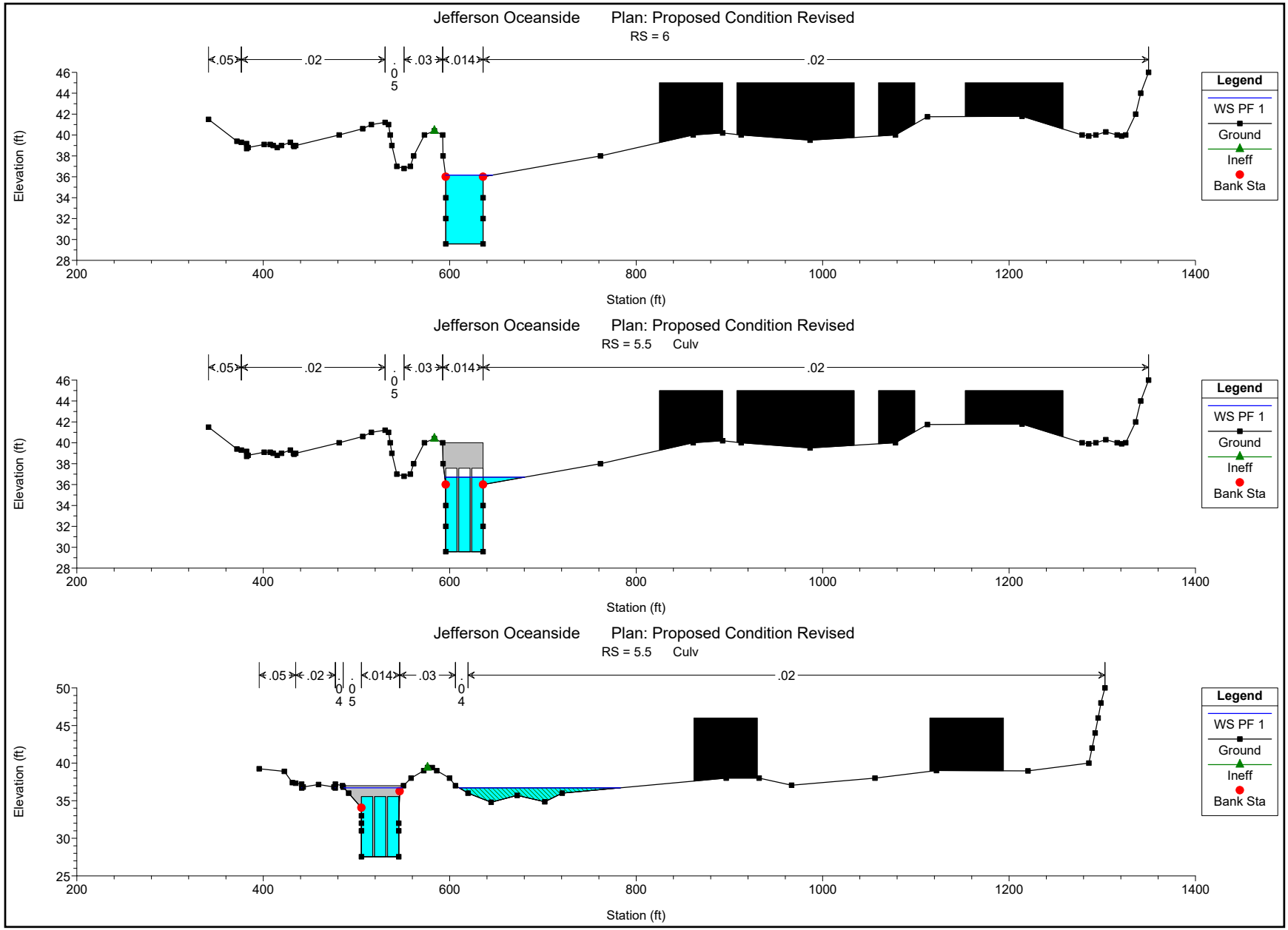
Proposed Conditions

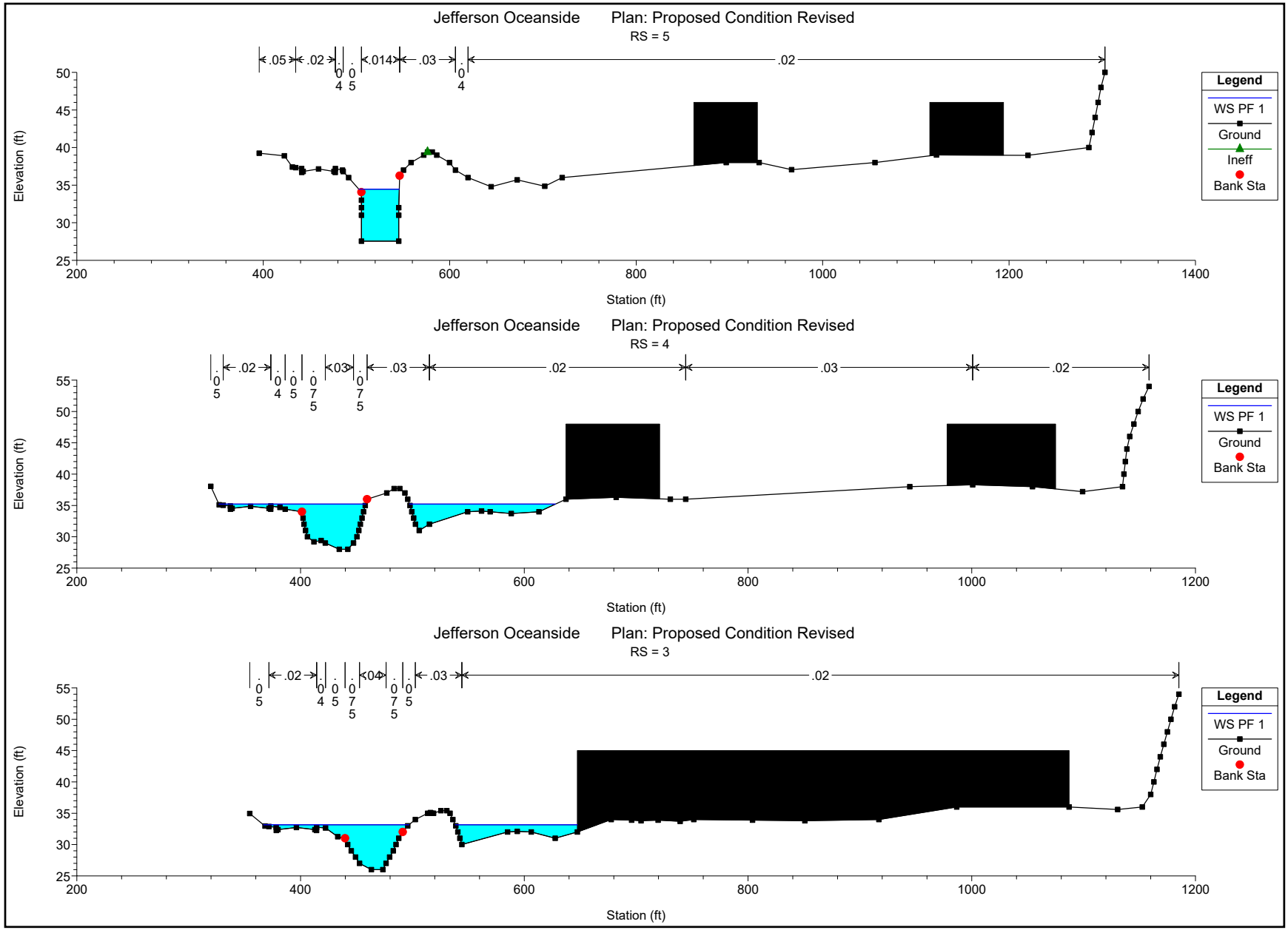
HEC-RAS Plan: Prop Cond Rev River: RIVER-1 Reach: Reach-1 Profile: PF 1

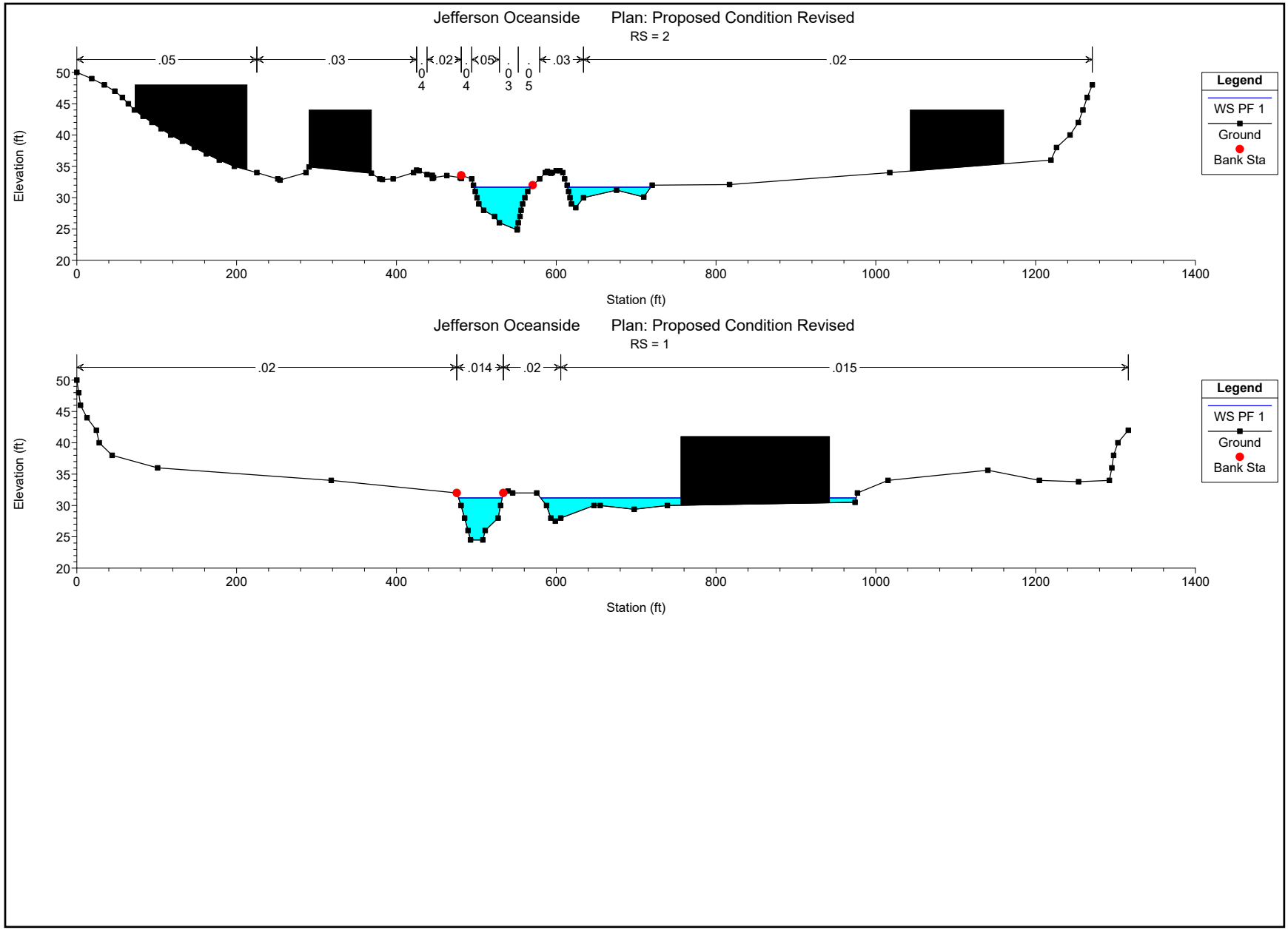
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	10	PF 1	3800.0	32.30	41.40		41.74	0.000231	5.90	1223.74	450.62	0.35
Reach-1	9	PF 1	3800.0	32.23	41.53	39.41	41.64	0.000106	4.06	2138.62	583.83	0.23
Reach-1	8.5		Culvert									
Reach-1	8	PF 1	3800.0	31.81	38.36	38.36	41.63	0.002210	14.51	261.95	164.00	1.00
Reach-1	7	PF 1	3800.0	30.70	37.25	37.25	40.52	0.002153	14.50	262.02	48.71	1.00
Reach-1	6	PF 1	3800.0	29.57	36.17	36.17	39.39	0.002158	14.40	264.72	50.68	0.99
Reach-1	5.5		Culvert									
Reach-1	5	PF 1	3800.0	27.55	34.47	34.11	37.38	0.001857	13.70	277.90	43.38	0.92
Reach-1	4	PF 1	3800.0	28.00	35.21		35.93	0.006223	6.12	586.12	261.54	0.45
Reach-1	3	PF 1	3800.0	26.00	33.16	32.92	34.12	0.008064	6.57	522.34	239.10	0.50
Reach-1	2	PF 1	3800.0	24.86	31.68	31.68	32.89	0.011124	9.03	431.12	175.42	0.78
Reach-1	1	PF 1	3800.0	24.50	31.21	31.21	32.17	0.001147	9.45	577.15	263.67	0.79


Jefferson Oceanside Plan: Proposed Condition Revised
RS = 10
.05
.03
.014
.02
.04
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Jefferson Oceanside Plan: Proposed Condition Revised
RS = 9
.05
.03
.014
.03
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Jefferson Oceanside Plan: Proposed Condition Revised
RS = 8.5 Culv
.05
.03
.014
.03
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta


Jefferson Oceanside Plan: Proposed Condition Revised
RS = 8.5 Culv
.05
.02
.04
.014
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Ineff
Bank Sta
Jefferson Oceanside Plan: Proposed Condition Revised
RS = 8
Jefferson Oceanside Plan: Proposed Condition Revised
RS = 7
.03
.05


Jefferson Oceanside Plan: Proposed Condition Revised
RS = 6
.05
.02
.05
.03
.014
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Ineff
Bank Sta
Jefferson Oceanside Plan: Proposed Condition Revised
RS = 5.5 Culv
.05
.02
.05
.03
.014
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Ineff
Bank Sta
Jefferson Oceanside Plan: Proposed Condition Revised
RS = 5.5 Culv
.05
.02
.04
.05
.014
.03
.04
.02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Ineff
Bank Sta


Jefferson Oceanside Plan: Proposed Condition Revised
RS = 5
.05 .02 .014 .03 .02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Ineff
Bank Sta
Jefferson Oceanside Plan: Proposed Condition Revised
RS = 4
.02 .03 .02 .03 .02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
Jefferson Oceanside Plan: Proposed Condition Revised
RS = 3
.02 .04 .03 .02
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta


Jefferson Oceanside Plan: Proposed Condition Revised
RS = 2
.05
.03
.02
.04
.02
.04
.05
.03
.03
.05
.02
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Jefferson Oceanside Plan: Proposed Condition Revised
RS = 1
.02
.014
.02
.015
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

GRAPHIC SCALE

100 0 50 100 200

1 INCH = 100 FEET

LEGEND:

- HEC–RAS CROSS–SECTION
- PROPOSED PROJECT
- EFFECTIVE 100–YEAR FLOODPLAIN
- EFFECTIVE 100–YEAR FLOODWAY

HEC–RAS WORK MAP