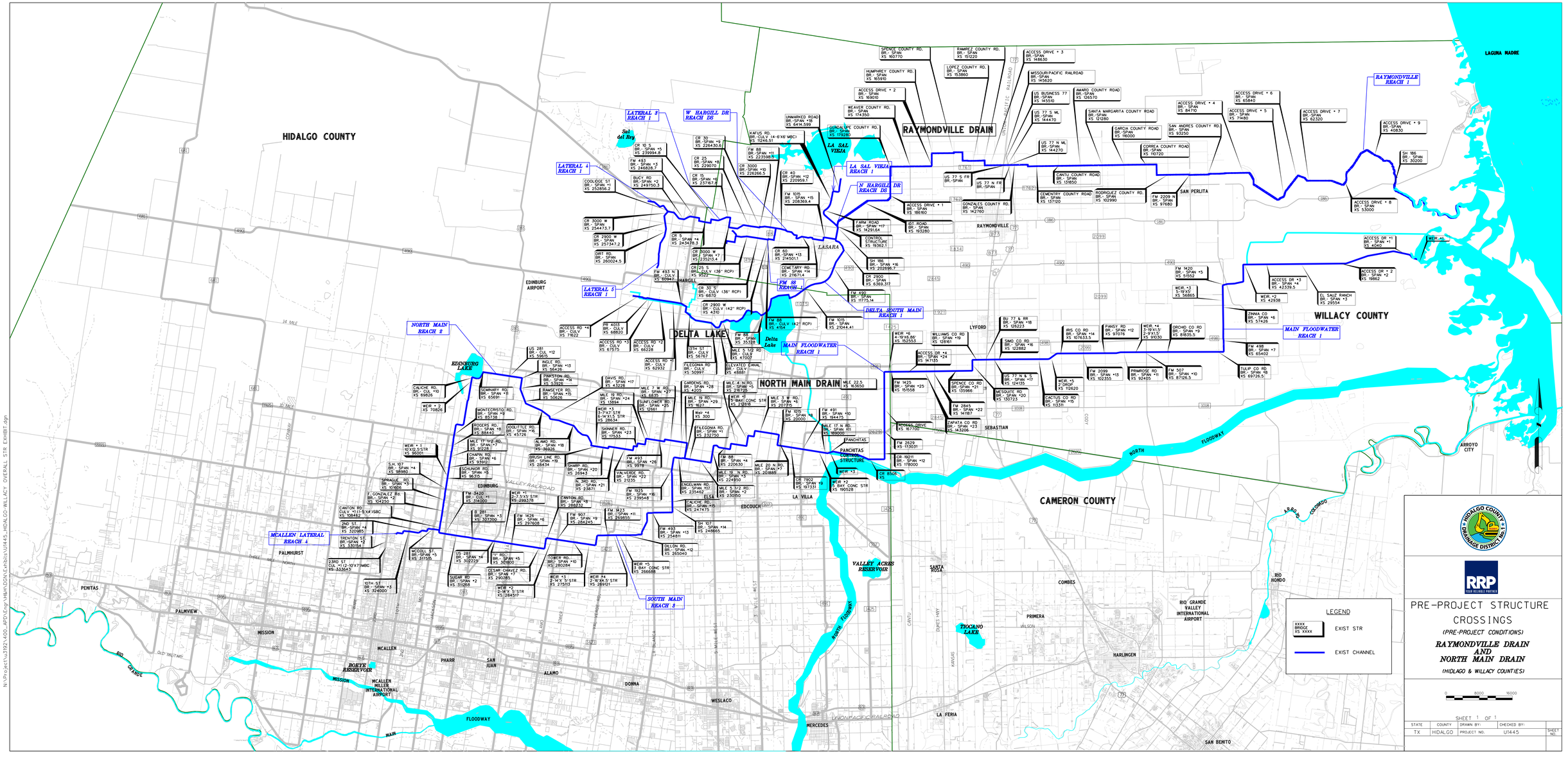
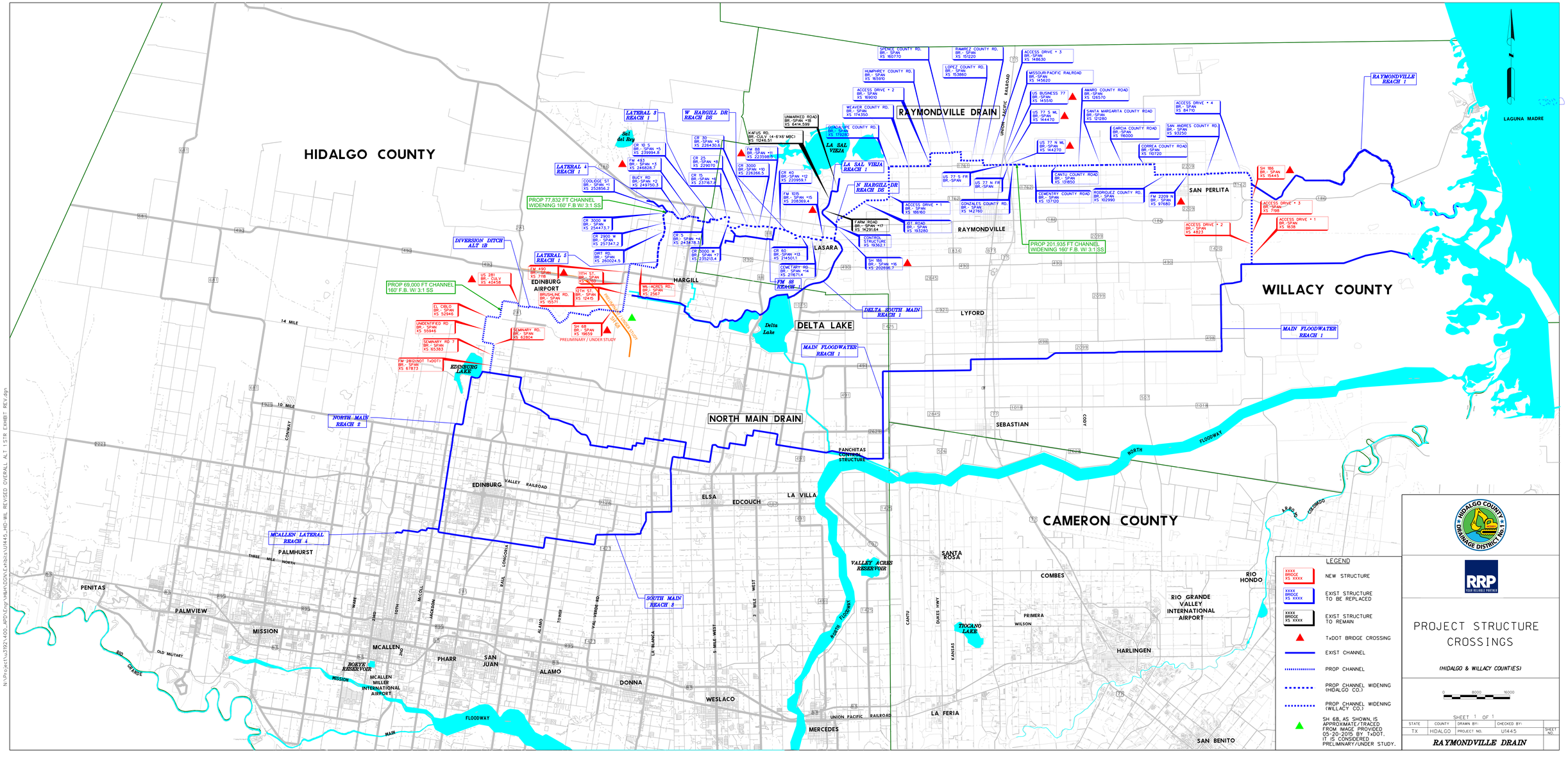
RAYMONDVILLE DRAIN PROJECT
ENGINEERING APPENDIX A1

ATTACHMENT B

HYDRAULICS


HIDALGO COUNTY
WILLACY COUNTY
CAMERON COUNTY
RAYMONDVILLE DRAIN
NORTH MAIN DRAIN
DELTA LAKE
EDINBURG LAKE
EDINBURG AIRPORT
RAYMONDVILLE
LYFORD
SEBASTIAN
LA VILLA
EDCOUCH
ELSA
WESLACO
DONNA
MERCEDES
PHARR
SAN JUAN
ALAMO
MCALLEN
MISSION
PALMVIEW
PENITAS
HARLINGEN
COMBES
PRIMERA
SANTA ROSA
LA FERIA
SAN BENITO
SAN PERLITA
ARROYO CITY
LAGUNA MADRE
BIO HONDO
LASARA
HARGILL
PANCHITAS
VALLEY ACRES RESERVOIR
TIOCANO LAKE
BORTZ RESERVOIR
LATERAL 3 REACH 1
LATERAL 4 REACH 1
LATERAL 5 REACH 1
W HARGILL DR REACH DS
N HARGILL DR REACH DS
LA SAL VISIA REACH 1
FM 88 REACH
MAIN FLOODWATER REACH 1
DELTA SOUTH MAIN REACH 1
NORTH MAIN REACH 2
SOUTH MAIN REACH 3
MCALLEN LATERAL REACH 4
RAYMONDVILLE REACH 1
MAIN FLOODWATER REACH 1
NORTH FLOODWAY
MAIN FLOODWAY
SOUTH FLOODWAY
ARROYO COLORADO
VALLEY RAILROAD
UNION PACIFIC RAILROAD
M-K-T RAILROAD
SPENCE COUNTY RD.
RAMIREZ COUNTY RD.
HUMPHREY COUNTY RD.
LOPEZ COUNTY RD.
ACCESS DRIVE * 2
ACCESS DRIVE * 3
MISSOURI PACIFIC RAILROAD
WEAVER COUNTY RD.
US BUSINESS 77
AMARO COUNTY ROAD
US 77 S ML
SANTA MARGARITA COUNTY ROAD
ACCESS DRIVE * 4
ACCESS DRIVE * 5
ACCESS DRIVE * 6
ACCESS DRIVE * 7
GUADALUPE COUNTY RD.
US 77 N ML
GARCIA COUNTY ROAD
SAN ANDRES COUNTY RD.
ACCESS DRIVE * 9
SH 186
CORREA COUNTY ROAD
CANTU COUNTY ROAD
US 77 S FR
US 77 N FR
CEMETERY COUNTY ROAD
RODRIGUEZ COUNTY RD.
FM 2209 N
ACCESS DRIVE * 8
GONZALES COUNTY RD.
FARM ROAD
GT ROAD
CONTROL STRUCTURE
FM 1015
FM 490
FM 88
FM 493
FM 491
FM 1425
FM 1420
FM 498
FM 2099
FM 507
FM 2629
FM 2845
FM 1925
FM 1426
FM 907
FM 1423
SH 107
SH 281
SH 336
US 281
US 77 N & S
BU 77 & RR
SMO CO. RD.
IRIS CO RD
PANSY RD.
ORCHID CO RD
ZINNIA CO.
TULIP CO. RD
PRIMROSE RD.
MESQUITE RD
CACTUS CO RD
SPENCE CO RD
WILLIAMS CO RD
MORGAN DRIVE
ZAPATA CO RD
EL SAUZ RANCH
CR 3000 W
CR 2900 W
CR 2800 W
CR 25 S
CR 30
CR 25
CR 15
CR 10 S
CR 40
CR 60
CR 3000
CR 2900
CR 2800
CR 1015
CR 1000
CR 990
CR 980
CR 970
CR 960
CR 950
CR 940
CR 930
CR 920
CR 910
CR 900
CR 890
CR 880
CR 870
CR 860
CR 850
CR 840
CR 830
CR 820
CR 810
CR 800
CR 790
CR 780
CR 770
CR 760
CR 750
CR 740
CR 730
CR 720
CR 710
CR 700
CR 690
CR 680
CR 670
CR 660
CR 650
CR 640
CR 630
CR 620
CR 610
CR 600
CR 590
CR 580
CR 570
CR 560
CR 550
CR 540
CR 530
CR 520
CR 510
CR 500
CR 490
CR 480
CR 470
CR 460
CR 450
CR 440
CR 430
CR 420
CR 410
CR 400
CR 390
CR 380
CR 370
CR 360
CR 350
CR 340
CR 330
CR 320
CR 310
CR 300
CR 290
CR 280
CR 270
CR 260
CR 250
CR 240
CR 230
CR 220
CR 210
CR 200
CR 190
CR 180
CR 170
CR 160
CR 150
CR 140
CR 130
CR 120
CR 110
CR 100
CR 90
CR 80
CR 70
CR 60
CR 50
CR 40
CR 30
CR 20
CR 10
CR 9211
CR 8505
CR 7901
CR 7801
CR 7701
CR 7601
CR 7501
CR 7401
CR 7301
CR 7201
CR 7101
CR 7001
CR 6901
CR 6801
CR 6701
CR 6601
CR 6501
CR 6401
CR 6301
CR 6201
CR 6101
CR 6001
CR 5901
CR 5801
CR 5701
CR 5601
CR 5501
CR 5401
CR 5301
CR 5201
CR 5101
CR 5001
CR 4901
CR 4801
CR 4701
CR 4601
CR 4501
CR 4401
CR 4301
CR 4201
CR 4101
CR 4001
CR 3901
CR 3801
CR 3701
CR 3601
CR 3501
CR 3401
CR 3301
CR 3201
CR 3101
CR 3001
CR 2901
CR 2801
CR 2701
CR 2601
CR 2501
CR 2401
CR 2301
CR 2201
CR 2101
CR 2001
CR 1901
CR 1801
CR 1701
CR 1601
CR 1501
CR 1401
CR 1301
CR 1201
CR 1101
CR 1001
CR 901
CR 801
CR 701
CR 601
CR 501
CR 401
CR 301
CR 201
CR 101
CR 1
14 MILE
12 MILE
10 MILE
3 MILE NORTH
LEGEND
XXXX BRIDGE XS XXXX
EXIST STR
EXIST CHANNEL
PRE-PROJECT STRUCTURE CROSSINGS
(PRE-PROJECT CONDITIONS)
RAYMONDVILLE DRAIN AND NORTH MAIN DRAIN
(HIDALGO & WILLACY COUNTIES)
SHEET 1 OF 1
STATE TX
COUNTY HIDALGO
DRAWN BY:
CHECKED BY:
PROJECT NO. U1445
SHEET NO.
N:\Project\u1392\400_APD\Engr\H&H\DGN\Exhibits\U1445_HIDALGO-WILLACY OVERALL STR EXHIBIT.dgn


HIDALGO COUNTY
WILLACY COUNTY
CAMERON COUNTY
RAYMONDVILLE DRAIN
NORTH MAIN DRAIN
DELTA LAKE
LATERAL 3 REACH 1
W HARGILL DR REACH DS
LATERAL 4 REACH 1
LATERAL 5 REACH 1
N HARGILL DR REACH DS
FM 88 REACH
DIVERSION DITCH ALT 1B
PROP 77,832 FT CHANNEL WIDENING 160' F.B.W/ 3:1 SS
PROP 69,000 FT CHANNEL 160' F.B. W/ 3:1 SS
PROP 201,935 FT CHANNEL WIDENING 160' F.B. W/ 3:1 SS
DELTA SOUTH MAIN REACH 1
MAIN FLOODWATER REACH 1
NORTH MAIN REACH 2
MCALLEN LATERAL REACH 4
SOUTH MAIN REACH 3
RAYMONDVILLE REACH 1
MAIN FLOODWATER REACH 1
PREUMINARY / UNDER STUDY
EDINBURG AIRPORT
HARGILL
LASARA
RAYMONDVILLE
LYFORD
SAN PERLITA
SEBASTIAN
PANCHITAS CONTROL STRUCTURE
EDINBURG
ELSA
EDCOUCH
LA VILLA
PALMHURST
PENITAS
PALMVIEW
MISSION
MCALLEN
PHARR
SAN JUAN
ALAMO
DONNA
WESLACO
MERCEDES
LA FERIA
SANTA ROSA
COMBES
RIO HONDO
PRIMERA
HARLINGEN
SAN BENITO
RIO GRANDE VALLEY INTERNATIONAL AIRPORT
MCALLEN MILLER INTERNATIONAL AIRPORT
VALLEY ACRES RESERVOIR
TIOCANO LAKE
BORTA RESERVOIR
EDINBURG LAKE
LAGUNA MADRE
Sal del Rey
LA SAL VIEJA
Delta Lake
EDINBURG VALLEY RAILROAD
UNION PACIFIC RAILROAD
SOUTH MAIN FLOODWAY
NORTH FLOODWAY
MAIN FLOODWAY
ARROYO COLORADO
RIO GRANDE
OLD MILITARY
14 MILE
10 MILE
THREE MILE NORTH
CONWAY
WARE
2ND
10TH
McCOLL
JACKSON
RAIL
LONGORIA
ALAMO
TOWER
VAL VERDE RD.
LA BLANCA
5 MILE WEST
3 MILE WEST
CANTU
DUKES HWY
KANSAS
WILSON
COOK
SPENCE COUNTY RD.
RAMIREZ COUNTY RD.
HUMPHREY COUNTY RD.
LOPEZ COUNTY RD.
WEAVER COUNTY RD.
GONZALES COUNTY RD.
CANTU COUNTY ROAD
CEMENTERY COUNTY ROAD
RODRIGUEZ COUNTY RD.
GARCIA COUNTY ROAD
CORREA COUNTY ROAD
SAN ANDRES COUNTY RD.
AMARO COUNTY ROAD
SANTA MARGARITA COUNTY ROAD
MISSOURI PACIFIC RAILROAD
UNION PACIFIC RAILROAD
US BUSINESS 77
US 77 S ML
US 77 N ML
US 77 S FR
US 77 N FR
FM 2209 W
FM 2209 N
SH 186
SH 68
SH 88
FARM ROAD
GT ROAD
CONTROL STRUCTURE
11TH ST
12TH ST
BRUSHLINE RD.
SEMINARY RD.
EL CIBILO
UNIDENTIFIED RD
SEMINARY RD 7
FM 2812(NOT TxDOT)
UNNAMED ROAD
KAFUS RD.
ACCESS DRIVE
CR 10 S
CR 30
CR 25
CR 15
CR 3000
CR 40
FM 1015
CR 60
CEMETARY RD.
CR 5
CR 2900 W
CR 3000 W
DIRT RD.
BUCY RD
COOLIDGE ST
CR 150
LEGEND
NEW STRUCTURE
EXIST STRUCTURE TO BE REPLACED
EXIST STRUCTURE TO REMAIN
TxDOT BRIDGE CROSSING
EXIST CHANNEL
PROP CHANNEL
PROP CHANNEL WIDENING (HIDALGO CO.)
PROP CHANNEL WIDENING (WILLACY CO.)
SH 68, AS SHOWN, IS APPROXIMATE/TRACED FROM IMAGE PROVIDED 05-20-2015 BY TxDOT. IT IS CONSIDERED PRELIMINARY/UNDER STUDY.
PROJECT STRUCTURE CROSSINGS
(HIDALGO & WILLACY COUNTIES)
SHEET 1 OF 1
STATE TX
COUNTY HIDALGO
DRAWN BY:
CHECKED BY:
PROJECT NO. U1445
SHEET NO.
RAYMONDVILLE DRAIN
HIDALGO COUNTY DRAINAGE DISTRICT NO. 1
RRP
N:\Project\u3192\400_APD\Engr\R&H\DGN\Exhibits\U1445_HID-WIL REVISED OVERALL ALT 1 STR EXHIBIT REV.dgn

HIDALGO COUNTY DRAINAGE DISTRICT NO. 1

RRP

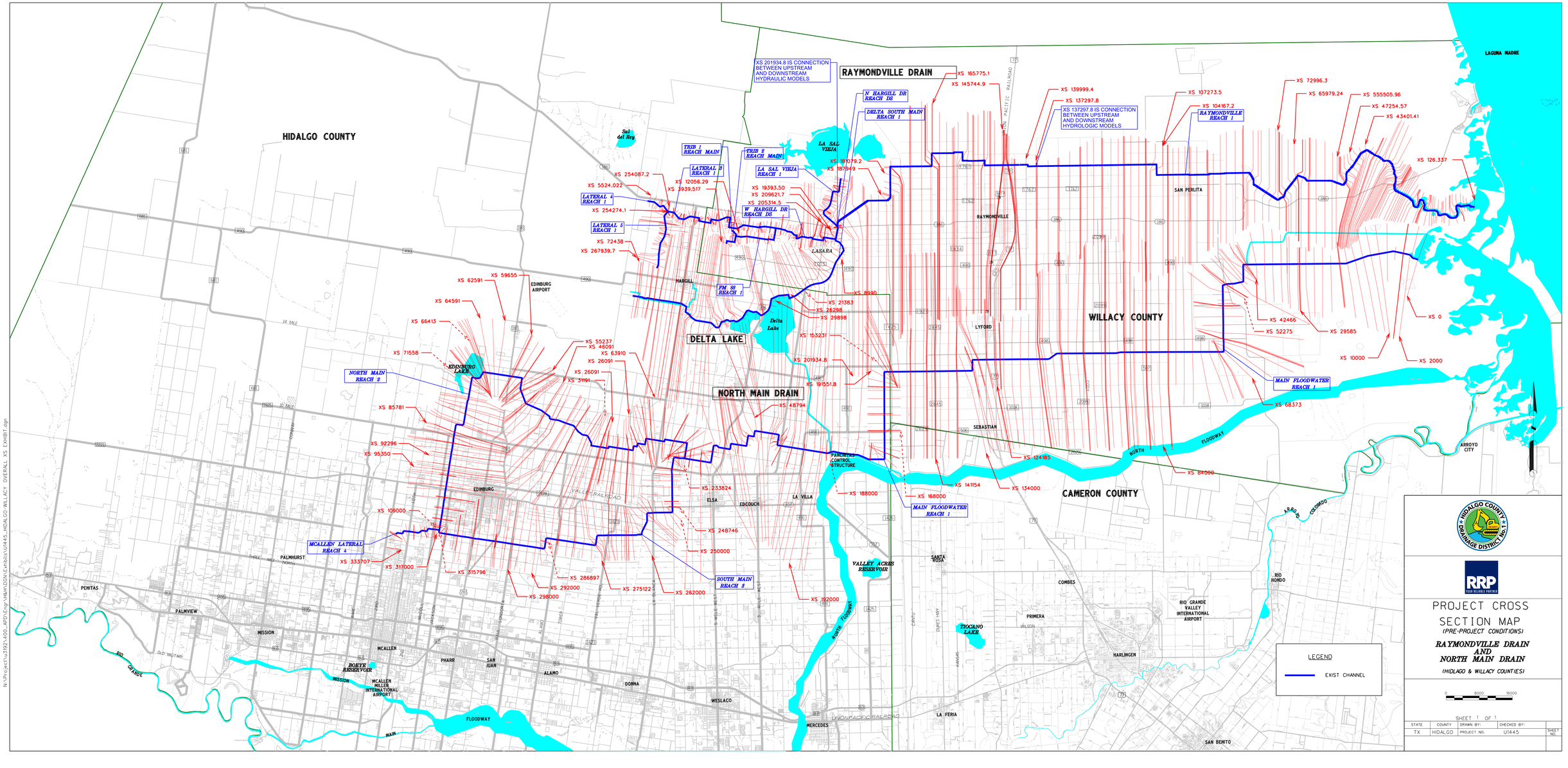
PROJECT STRUCTURE CROSSINGS

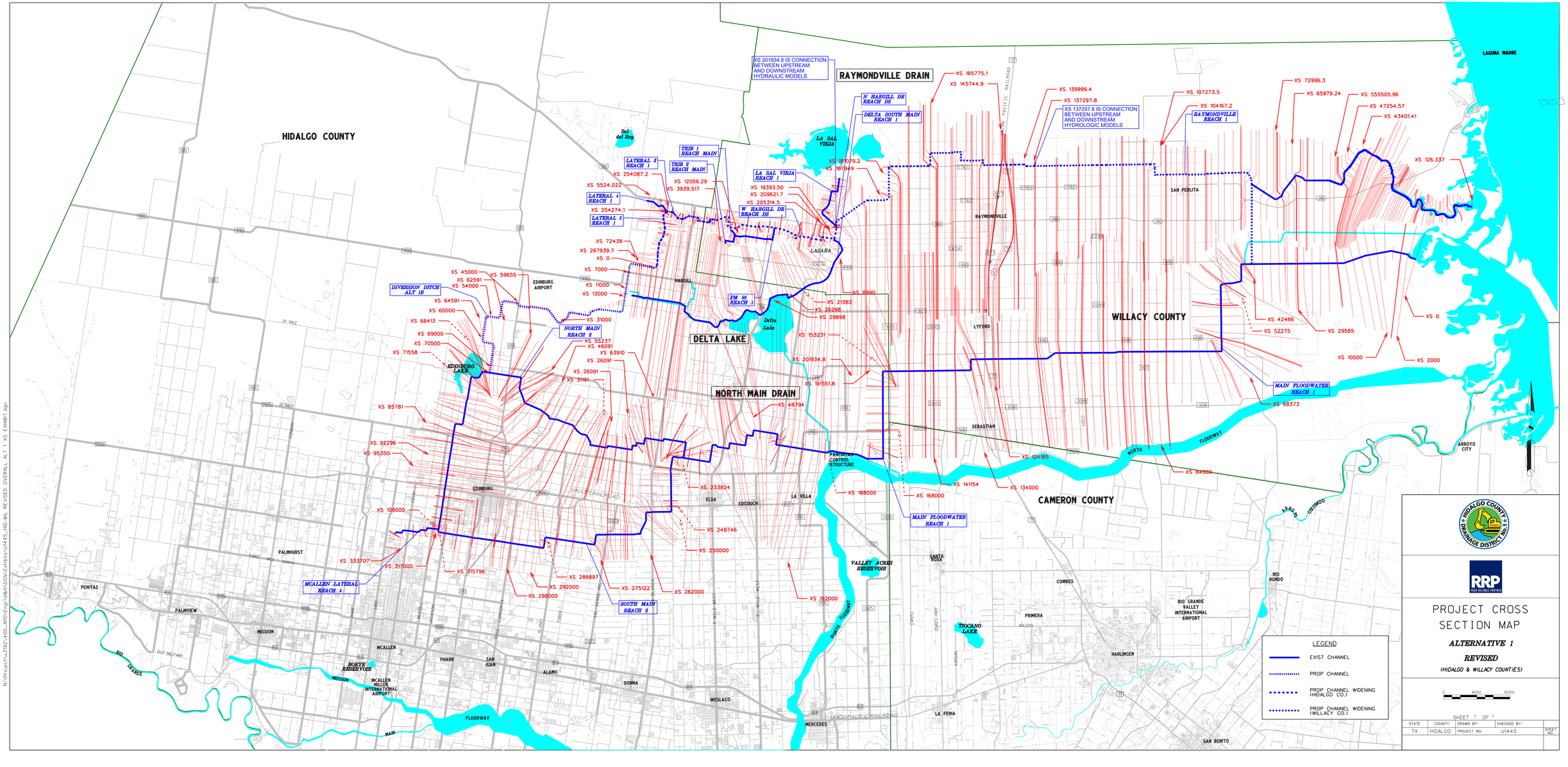
ALTERNATIVE 2

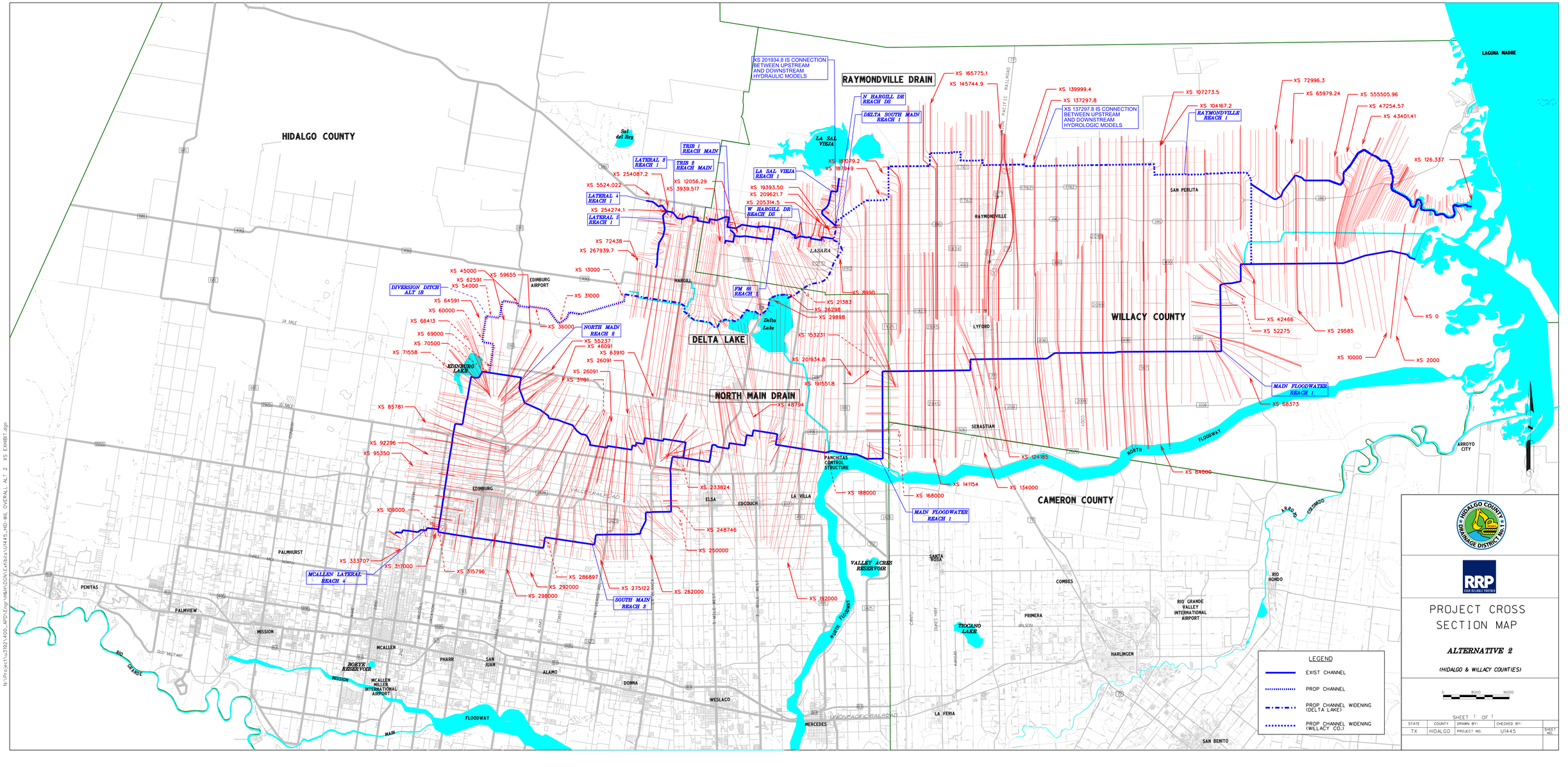
(HIDALGO & WILLACY COUNTIES)

SHEET 1 OF 1

STATE	COUNTY	DRAWN BY:	CHECKED BY:	SHEET NO.
TX	HIDALGO	PROJECT NO.	U1445	


HIDALGO COUNTY
WILLACY COUNTY
CAMERON COUNTY
LAGUNA MADRE
RAYMONDVILLE DRAIN
NORTH MAIN DRAIN
DELTA LAKE
XS 201934.8 IS CONNECTION BETWEEN UPSTREAM AND DOWNSTREAM HYDRAULIC MODELS
XS 137297.8 IS CONNECTION BETWEEN UPSTREAM AND DOWNSTREAM HYDROLOGIC MODELS
N HARGILL DR REACH DS
DELTA SOUTH MAIN REACH 1
RAYMONDVILLE REACH 1
TRIB 1 REACH MAIN
TRIB 2 REACH MAIN
LATERAL 5 REACH 1
LA SAL VIEJA REACH 1
LATERAL 4 REACH 1
W HARGILL DR REACH DS
LATERAL 6 REACH 1
FM 88 REACH 1
NORTH MAIN REACH 8
MCALLEN LATERAL REACH 4
SOUTH MAIN REACH 3
MAIN FLOODWATER REACH 1
PANCHITAS CONTROL STRUCTURE
VALLEY ACRES RESERVOIR
BORTZ RESERVOIR
TIOCANO LAKE
LA SAL VIEJA
Sal del Rey
Delta Lake
EDINBURG LAKE
EDINBURG AIRPORT
MCALLEN MILLER INTERNATIONAL AIRPORT
RIO GRANDE VALLEY INTERNATIONAL AIRPORT
SAN PERLITA
RAYMONDVILLE
LASARA
HARGILL
LYFORD
SEBASTIAN
EDINBURG
ELSA
EDCOUCH
LA VILLA
SANTA ROSA
COMBES
PRIMERA
HARLINGEN
ARROYO CITY
RIO HONDO
PENITAS
PALMVIEW
MISSION
MCALLEN
PHARR
SAN JUAN
ALAMO
DONNA
WESLACO
MERCEDES
LA FERIA
SAN BENITO
XS 254087.2
XS 5524.022
XS 254274.1
XS 72438
XS 267939.7
XS 12056.29
XS 3939.517
XS 19393.50
XS 209621.7
XS 205314.5
XS 197079.2
XS 187049
XS 165775.1
XS 145744.9
XS 139999.4
XS 137297.8
XS 107273.5
XS 104167.2
XS 72996.3
XS 65979.24
XS 555505.96
XS 47254.57
XS 43401.41
XS 126.337
XS 0
XS 2000
XS 10000
XS 29585
XS 52275
XS 42466
XS 68373
XS 84000
XS 124185
XS 134000
XS 141154
XS 168000
XS 188000
XS 192000
XS 233824
XS 248746
XS 250000
XS 262000
XS 275122
XS 286897
XS 292000
XS 298000
XS 315796
XS 317000
XS 333707
XS 109000
XS 92296
XS 95350
XS 85781
XS 71558
XS 66413
XS 64591
XS 62591
XS 59655
XS 55237
XS 46091
XS 63910
XS 26091
XS 26091
XS 31191
XS 48794
XS 153231
XS 201934.8
XS 191551.8
XS 8990
XS 21383
XS 26298
XS 29898
LEGEND
EXIST CHANNEL
HIDALGO COUNTY DRAINAGE DISTRICT NO. 1
RRP
PROJECT CROSS SECTION MAP
(PRE-PROJECT CONDITIONS)
RAYMONDVILLE DRAIN AND NORTH MAIN DRAIN
(HIDALGO & WILLACY COUNTIES)
SHEET 1 OF 1
STATE TX
COUNTY HIDALGO
DRAWN BY:
CHECKED BY:
PROJECT NO. U1445
SHEET NO.
N:\Project\u1392\400_APD\Engr\R&H\DGN\Exhibits\U1445_HIDALGO-WILLACY OVERALL XS EXHIBIT.dgn


HIDALGO COUNTY
WILLACY COUNTY
CAMERON COUNTY
LAGUNA MADRE
RAYMONDVILLE DRAIN
NORTH MAIN DRAIN
DELTA LAKE
XS 201934.8 IS CONNECTION BETWEEN UPSTREAM AND DOWNSTREAM HYDRAULIC MODELS
XS 137297.8 IS CONNECTION BETWEEN UPSTREAM AND DOWNSTREAM HYDROLOGIC MODELS
N HARGILL DR REACH 1S
DELTA SOUTH MAIN REACH 1
RAYMONDVILLE REACH 1
LA SAL VIEJA REACH 1
W HARGILL DR REACH 1S
TRIB 1 REACH MAIN
TRIB 2 REACH MAIN
LATERAL 5 REACH 1
LATERAL 4 REACH 1
LATERAL 6 REACH 1
FM 88 REACH 1
NORTH MAIN REACH 2
DIVERSION DITCH ALT 1B
MCALLEN LATERAL REACH 1
SOUTH MAIN REACH 3
MAIN FLOODWATER REACH 1
EDINBURG LAKE
LA SAL VIEJA
Sal del Rey
Delta Lake
VALLEY ACRES RESERVOIR
TIOCANO LAKE
BORTZ RESERVOIR
PANCHITAS CONTROL STRUCTURE
EDINBURG AIRPORT
MCALLEN MILLER INTERNATIONAL AIRPORT
RIO GRANDE VALLEY INTERNATIONAL AIRPORT
HARGILL
LASARA
RAYMONDVILLE
SAN PERLITA
LYFORD
SEBASTIAN
EDINBURG
ELSA
EDCOUCH
LA VILLA
PALMHURST
PENITAS
PALMVIEW
MISSION
MCALLEN
PHARR
SAN JUAN
ALAMO
DONNA
WESLACO
MERCEDES
LA FERIA
SANTA ROSA
COMBES
PRIMERA
HARLINGEN
SAN BENITO
BIO HONDO
ARROYO CITY
ARROYO COLORADO
NORTH FLOODWAY
FLOODWAY
MAIN
RIO GRANDE
VALLEY RAILROAD
UP PACIFIC RAILROAD
XS 165775.1
XS 145744.9
XS 139999.4
XS 137297.8
XS 107273.5
XS 104167.2
XS 72996.3
XS 65979.24
XS 555505.96
XS 47254.57
XS 43401.41
XS 126.337
XS 0
XS 2000
XS 10000
XS 42466
XS 52275
XS 29585
XS 68373
XS 84000
XS 124185
XS 134000
XS 141154
XS 168000
XS 188000
XS 191551.8
XS 201934.8
XS 153231
XS 29898
XS 26298
XS 21383
XS 8990
XS 48794
XS 63910
XS 46091
XS 55237
XS 31000
XS 31191
XS 26091
XS 26091
XS 85781
XS 92296
XS 95350
XS 109000
XS 333707
XS 317000
XS 315796
XS 298000
XS 292000
XS 286897
XS 275122
XS 262000
XS 250000
XS 248746
XS 233824
XS 192000
XS 72438
XS 267939.7
XS 0
XS 7000
XS 11000
XS 13000
XS 45000
XS 62591
XS 54000
XS 64591
XS 60000
XS 66413
XS 69000
XS 70500
XS 71558
XS 59655
XS 5524.022
XS 254087.2
XS 12056.29
XS 3939.517
XS 254274.1
XS 187079.2
XS 187049
XS 19393.50
XS 209621.7
XS 205314.5
LEGEND
EXIST CHANNEL
PROP CHANNEL
PROP CHANNEL WIDENING (HIDALGO CO.)
PROP CHANNEL WIDENING (WILLACY CO.)
PROJECT CROSS SECTION MAP
ALTERNATIVE 1
REVISED
(HIDALGO & WILLACY COUNTIES)
HIDALGO COUNTY DRAINAGE DISTRICT NO. 1
RRP
SHEET 1 OF 1
STATE TX
COUNTY HIDALGO
DRAWN BY:
CHECKED BY:
PROJECT NO. U1445
SHEET NO.
N:\Project\u1392\400_APD\Engr\H&H\DGN\Exhibits\U1445_HID-WIL REVISED OVERALL ALT 1 XS EXHIBIT.dgn


HIDALGO COUNTY
WILLACY COUNTY
CAMERON COUNTY
LAGUNA MADRE
RAYMONDVILLE DRAIN
NORTH MAIN DRAIN
DELTA LAKE
XS 201934.8 IS CONNECTION BETWEEN UPSTREAM AND DOWNSTREAM HYDRAULIC MODELS
XS 137297.8 IS CONNECTION BETWEEN UPSTREAM AND DOWNSTREAM HYDROLOGIC MODELS
N HARGILL DR REACH 1S
DELTA SOUTH MAIN REACH 1
RAYMONDVILLE REACH 1
LA SAL VIEJA REACH 1
TRIB 1 REACH MAIN
TRIB 2 REACH MAIN
LATERAL 5 REACH 1
LATERAL 4 REACH 1
LATERAL 6 REACH 1
W HARGILL DR REACH 1S
FM 88 REACH
DIVERSION DITCH ALT 1B
NORTH MAIN REACH 2
SOUTH MAIN REACH 3
MCALLEN LATERAL REACH 4
MAIN FLOODWATER REACH 1
XS 165775.1
XS 145744.9
XS 139999.4
XS 137297.8
XS 107273.5
XS 104167.2
XS 72996.3
XS 65979.24
XS 555505.96
XS 47254.57
XS 43401.41
XS 126.337
XS 0
XS 2000
XS 10000
XS 29585
XS 52275
XS 42466
XS 68373
XS 84000
XS 124185
XS 134000
XS 141154
XS 168000
XS 188000
XS 192000
XS 201934.8
XS 191551.8
XS 153231
XS 48794
XS 29898
XS 26298
XS 21383
XS 8990
XS 179079.2
XS 167949
XS 19393.50
XS 209621.7
XS 205314.5
XS 254087.2
XS 12056.29
XS 3939.517
XS 5524.022
XS 254274.1
XS 72438
XS 267939.7
XS 13000
XS 45000
XS 59655
XS 62591
XS 54000
XS 64591
XS 60000
XS 66413
XS 69000
XS 70500
XS 71558
XS 31000
XS 36000
XS 55237
XS 46091
XS 63910
XS 26091
XS 26091
XS 31191
XS 85781
XS 92296
XS 95350
XS 109000
XS 333707
XS 317000
XS 315796
XS 298000
XS 292000
XS 286897
XS 275122
XS 262000
XS 248746
XS 250000
XS 233824
SAL DEL REY
LA SAL VIEJA
RAYMONDVILLE
SAN PERLITA
LASARA
HARGILL
EDINBURG AIRPORT
EDINBURG LAKE
Delta Lake
LYFORD
SEBASTIAN
PANCHITAS CONTROL STRUCTURE
ARROYO CITY
NORTH FLOODWAY
EDINBURG
ELSA
EDCOUCH
LA VILLA
VALLEY ACRES RESERVOIR
SANTA ROSA
COMBES
PRIMERA
WILSON
TIOCANO LAKE
HARLINGEN
RIO HONDO
RIO GRANDE VALLEY INTERNATIONAL AIRPORT
ARROYO COLORADO
PENITAS
PALMHURST
PALMVIEW
MISSION
MCALLEN
PHARR
SAN JUAN
ALAMO
DONNA
WESLACO
MERCEDES
LA FERIA
SAN BENITO
BOOTH RESERVOIR
MCALLEN MILLER INTERNATIONAL AIRPORT
RIO GRANDE
FLOODWAY
MAIN
OLD MILITARY
14 MILE
10 MILE
9 MILE
8 MILE
7 MILE
6 MILE
5 MILE WEST
6 MILE WEST
7 MILE WEST
8 MILE WEST
9 MILE WEST
10 MILE WEST
UNION PACIFIC RAILROAD
VALLEY RAILROAD
LEGEND
EXIST CHANNEL
PROP CHANNEL
PROP CHANNEL WIDENING (DELTA LAKE)
PROP CHANNEL WIDENING (WILLACY CO.)
HIDALGO COUNTY DRAINAGE DISTRICT NO. 1
RRP
PROJECT CROSS SECTION MAP
ALTERNATIVE 2
(HIDALGO & WILLACY COUNTIES)
0 8000 16000
SHEET 1 OF 1
STATE TX
COUNTY HIDALGO
DRAWN BY:
CHECKED BY:
PROJECT NO. U1445
SHEET NO.
N:\Project\v3192\400_APD\Engr\R&H\DGN\Exhibits\U1445_HID-WIL OVERALL ALT 2 XS EXHIBIT.dgn

Raymondville Drain
Design Task Protocol – 2
Hydraulics

The Raymondville Drain is located in the Rio Grande Valley of South Texas including four towns; Raymondville, San Perlita, La Sara, and Hargill. The watershed flows in a west to east direction and the total area is approximately 355 square miles. The HEC-RAS model performed by RRP covers the main stems of the Raymondville drain beginning at a junction just south of the diversion to La Sal Vieja and proceeding upstream. Note that this junction is not at the same location as HEC-HMS. In response to RRP's submittal on January 2005, the USACE wrote a draft white paper titled "Raymondville Drain Pre-Project Conditions Report," April 2006. (USACE RDPR) RRP's model is referred to as the 'Upstream RAS Model' since USACE developed the Downstream RAS Model. RRP reevaluated the HEC-RAS model during September 2006 and determined required changes described below.

Required Changes to Upstream HMS Model

RRP performed the hydraulic model in HEC-RAS Version 4.1. The following revisions are needed to correct the model.

1. Raymondville HEC-RAS model levee points need to be set on channel banks to eliminate flow in overbank areas. When water surface overtops levee, flow will occur at that point in the overbanks. Currently cross sections are defining the levees as ineffective flow locations. This methodology is incorrect as it allows flow to enter the overbank areas and reduces flow in channel.
2. Flow revisions are required to both the Raymondville Drain and the North Main Drain to represent revised hydrology. In addition, new flow additions are needed. The RRP 2005 models have river reaches of over 3 miles with no flow increase or decrease.
3. The bridge modeling approach assumes the energy equation and does not account for momentum or Yarnell (Piers) in low flow calculations. Also, pressure and weir flow is not accounted for in high flow situations.
4. The downstream and upstream embankments are not included and left as zero in the culvert and bridge models. The bridges have no abutments modeled. Minimum weir flow elevations are not included.
5. Culverts at same location are modeled as No. 1, No. 2, etcetera rather than a multiple box or as a multiple opening.
6. Expansion and contraction coefficients should be 0.3 and 0.5 at upstream and downstream cross sections from bridges and culverts, not 0.1 and 0.3. This is prevalent at all crossings.
7. Manning's n values used universally on all stream was LOB = 0.035, channel = 0.05, and ROB = 0.035. This should be changed to LOB = 0.1, Channel = 0.06 to 0.1, and ROB=0.1.

References

Feldman, Arlen D., "Hydrologic Modeling System HEC-HMS Technical Reference Manual," U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC, 609 Second St., Davis, CA 95616-4687, March 2000.

U.S. Army Corps of Engineers Galveston District, "Draft Raymondville Drain Pre-Project Conditions Report," April 2006.