

# MIDDLE RIO GRANDE ENDANGERED SPECIES COLLABORATIVE PROGRAM

2017 Topographic Data Collection of  
Three High Flow Channels  
Located in Albuquerque, New Mexico



US Army Corps of Engineers  
Albuquerque District

September 2020

**ABSTRACT**

This report summarizes the field collection of topographic data for three high flow channels (HFC) adjacent to the Rio Grande in the Albuquerque Reach. The data were collected 7-8 March 2017. The USACE - Albuquerque District conducted the survey of each channel. Global Positioning System (GPS) Real Time Kinematic (RTK) survey equipment was used to conduct the work. The data will provide insight into general aggradation and degradation trends within the channels and determine connectivity and conveyance capacity to the Rio Grande. This is the fifth year in which these geomorphic aspects were measured for these particular channels. Depending on funding, this type of survey will be carried out on a regular basis. The Hydrology and Hydraulics (H&H) contacts in the Albuquerque office are Jonathan AuBuchon, PE and Kirsty Bramlett, PE.

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## **ACRONYMS**

COA	City of Albuquerque
GPS	Global Positioning System
H&H	Hydrology and Hydraulics
HFC	high flow channel
HR	habitat restoration
MRG	Middle Rio Grande
Program	Middle Rio Grande Endangered Species Collaborative Program
R66 HFC ‘A’	Route 66 High Flow Channel ‘A’
R66 HFC ‘C’	Route 66 High Flow Channel ‘C’
RGNC HFC	Rio Grande Nature Center High Flow Channel
RTK	Real Time Kinematic

## I. Background

The Middle Rio Grande Endangered Species Collaborative Program (Program) is a partnership involving 16 current signatories organized to protect and improve the status of endangered species along the Middle Rio Grande (MRG) of New Mexico while simultaneously protecting existing and future regional water uses (USACE 2014). The two species of particular concern are the Rio Grande Silvery Minnow (*Hybognathus amarus*) and the Southwestern Willow Flycatcher (*Empidonax traillii extimus*). The Program's stated goals are:

- Alleviate jeopardy to listed species in the Program area,
- Conserve and contribute to the recovery of the listed species,
- Protect existing and future water uses,
- Report to the community at large about the work of the Program.

The Program funds activities that are anticipated to contribute to these goals including funding a broad category of habitat restoration (HR) projects. The Program recognizes the need to understand the effectiveness of each project's ability to achieve its stated project goals as well as the more general goals of the Program. One of the objectives of the Program is to create or restore habitats necessary for the silvery minnow and flycatcher.

The Rio Grande was once a braided river that meandered across a broad floodplain. This has been reduced to a single channel constrained between levees (Lagasse 1980, Massong et al. 2010, Scurlock 1998). Features like dams, diversions, channelization, and bank-stabilization have all contributed to dramatic changes in its original riverine function isolating the river from its floodplain. Many of the current restoration projects have been designed to reconnect a portion of the river with its adjacent floodplain (USACE 2011, USACE 2014). This connection provides silvery minnow and flycatcher habitat along with restoring ecosystem function at the project sites.

This report summarizes the field collection of topographic data for three high flow channels (HFC) that connect the Rio Grande to its floodplain. At each HFC a cross-section survey and a centerline survey was conducted. The survey data will provide insight into

general aggradation and degradation trends within the channels. This information provides insight into the development of general design guidelines that may promote desirable silvery minnow habitat. The topographic data were collected between March 7 and March 8 2017. This is the fifth year in which these specific geomorphic aspects were measured for these particular channels. All sites are accessible through current agreements with the Middle Rio Grande Conservancy District and through the City of Albuquerque (COA) Open Space Division Special Use Permits. Additional access agreements are not required, though updated permits are required on a yearly basis from the COA. The channels selected for survey are shown in Figure 1. The channels selected for the year 2017 survey are described as:

**1) Rio Grande Nature Center High Flow Channel (RGNC HFC)**

The channel was created as part of the Rio Grande Nature Center Habitat Restoration Project, with construction completed in March 2008. The Site Layout for the RGNC HFC plan view is shown as Figure 2. The channel is earth lined and is approximately 3,300 feet long and 20 feet wide. The channel was designed as trapezoidal in shape, with 3H to 1 V side slopes. The channel was designed to flow at a depth of 1 foot across the high point, when the Rio Grande is flowing at ~3,000 cfs. However, it has been observed to begin flowing when the Rio Grande flows at ~1,500 cfs. The channel was originally constructed with two slack-water embayments that are intended to promote fish spawning. A third slack-water embayment about 100 yards downstream of the inlet was added in 2013. There is also a USGS stream gage located in the upper half of the channel. An upstream and downstream embayment was included, as well as two culvert crossings for pedestrian access.

**2) Route 66 High Flow Channel ‘A’ (R66 HFC ‘A’)**

The channel was created as part of the Bosque Revitalization @ Route 66 project. This channel was completed in 2009. The Site Layout for the R66 HFC ‘A’ is shown as Figure 3. The channel is earth lined and is approximately 1,230 feet long and 10 feet wide. The channel was designed as trapezoidal in shape, with 3H to 1V side slopes. The channel is designed to flow at a depth of 0.5 feet across the high point, when the Rio Grande is flowing at ~3,000 cfs. The channel begins flowing when the Rio Grande

flows at 2,000 to 2,500 cfs. An upstream and downstream embayment was included as well as two bridge crossings for pedestrian access.



**Figure 1 – Site Map for surveys conducted on the high flow channels at the Rio Grande Nature Center and the Route 66 habitat restoration projects.**



Figure 2 – RGNC HFC Site Layout.



Figure 3 – Route 66 HFC ‘A’ Site Layout.

### 3) Route 66 High Flow Channel ‘C’ (R66 HFC ‘C’)

The channel was created as part of the Bosque Revitalization @ Route 66 project. This channel was completed in 2009. The Site Layout for the R66 HFC ‘C’ is shown as Figure 4. The channel is earth lined and is approximately 3,330 feet long and 10 feet wide. The channel was designed as trapezoidal in shape, with 3H to 1 V side slopes. The channel is designed to flow at depth of 0.5 feet across the high point, when the Rio Grande is flowing at ~3,000 cfs. The channel begins flowing when the Rio Grande flows at ~ 2,000 to 2,500 cfs. An upstream and downstream embayment was included as well as multiple bridge crossings for pedestrian access.

## II. Methods

The USACE - Albuquerque District conducted the survey of each channel. In particular, the data collected was ground elevation for the centerline of channel and cross sections. The cross sections were located at the upstream and downstream embayments of each channel. Plan views of the cross section cut lines can be seen for each respective channel in Figures 2 thru 4. Intermediate cross-sections along the channel were also surveyed. Photos were taken of several cross-sections and are included in Appendix A. The topographic surveys and site reconnaissance were conducted on the dates shown in Table 1.

**Table 1 – Survey and Site Reconnaissance Dates**

Date	Site	Description
Mar 7 2017	Route 66 HFC 'A'	Survey Channel Centerline & Cross-Sections
Mar 7 2017	Route 66 HFC 'C'	Survey Channel Centerline & Cross-Sections
Mar 8 2017	RGNC HFC	Survey Channel Centerline & Cross-Sections

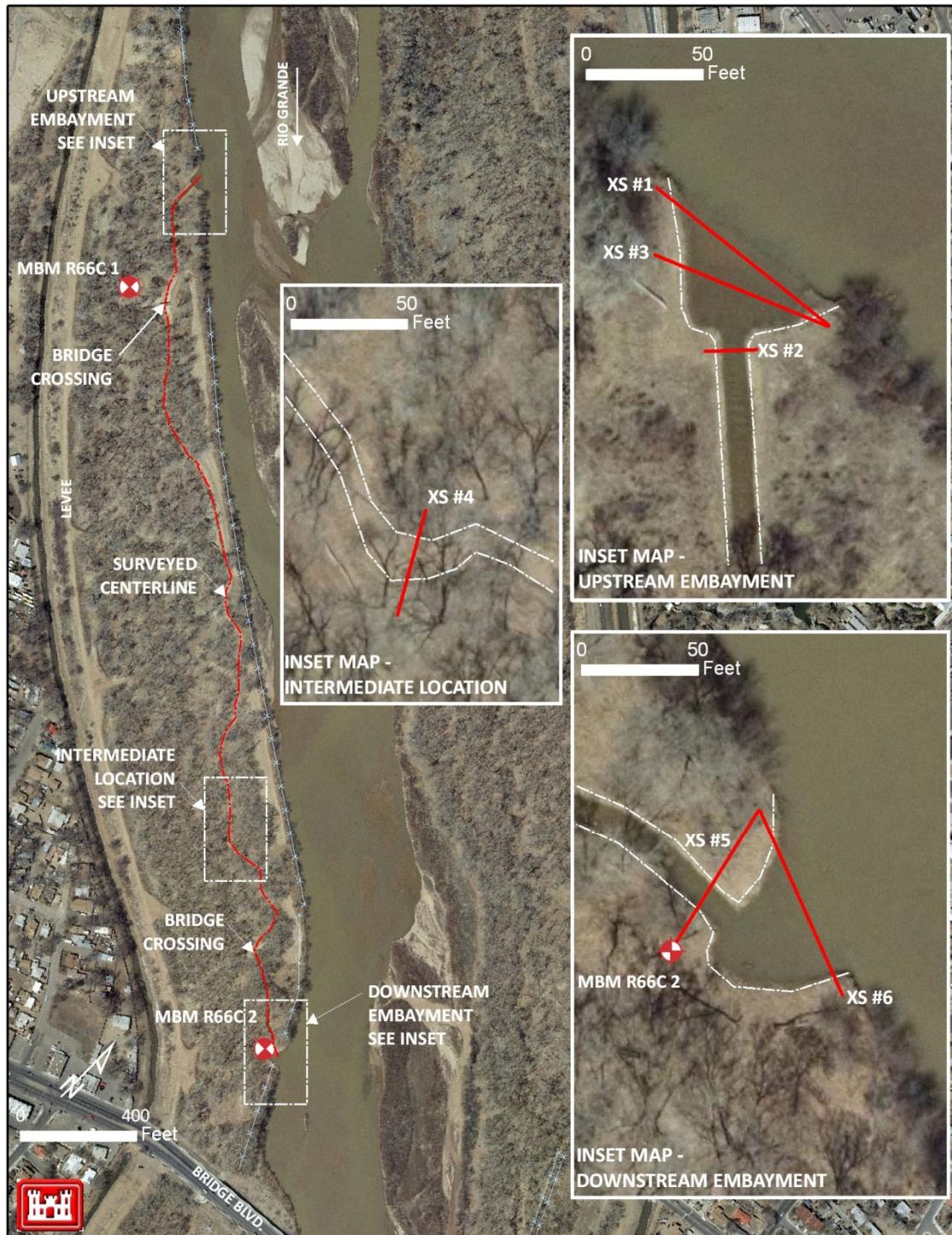


Figure 4 - Route 66 HFC 'C' Site Layout.

In order to correlate the surveyed ground elevations into the NAVD88 datum, several elevation benchmarks were installed. The benchmarks were installed per Contract W91299-09-D-0013, Delivery Order 0018. This contract was a services contract with Wilson & Co. Inc., Engineers and Architects of the Albuquerque, New Mexico office. The contract called for the installation of six USACE Type G brass capped survey monuments cast in concrete footings. The contract was successfully executed and the monuments were installed. The USACE U-SMART Datasheets have been included in Appendix B for each benchmark.

The benchmarks are shown for each respective channel in Figures 2 thru 4. The monuments were installed two per site, near the upstream and downstream ends of each channel, this allowed for ease in finding a known elevation virtually at all locations within each channel. Installing two per site also allowed for ease in confirming level loops and determining survey error. Each installed benchmark, along with their associated coordinates, is noted in Table 2. Northing and Easting are shown in the New Mexico State Plane Central Zone NAD83 horizontal datum while the elevations are shown in the NAVD88 vertical datum.

**Table 2 – Benchmark Characteristics**

Site	Name	Latitude	Longitude	Easting	Northing	Elevation
RGNC HFC	MBM RGNC 1	35° 08'00.62246 N	106° 41'04.03027 W	1,510,521.749	1,504,165.436	4,973.61
RGNC HFC	MBM RGNC 2	35° 07'43.95202 N	106° 41'21.30833 W	1,509,079.336	1,502,486.385	4,971.44
R66 HFC 'A'	MBM R66A 1	35° 05'23.60337 N	106° 41'06.72645 W	1,488,292.157	1,510,228.473	4,958.17
R66 HFC 'A'	MBM R66A 2	35° 05'19.29031 N	106° 40'59.61598 W	1,487,853.545	1,510,817.430	4,955.41
R66 HFC 'C'	MBM R66C 1	35° 04'30.29630 N	106° 40'12.14187 W	1,482,883.508	1,514,741.535	4,949.81
R66 HFC 'C'	MBM R66C 2	35° 04'15.24757 N	106° 39'45.69857 W	1,481,352.951	1,516,932.972	4,946.98

### III. Materials

The survey utilized a Leica GS14 Dual Frequency Receivers and a Leica CS20 Controller. One receiver was placed on a tripod over the benchmarks, while the other receiver was mounted to the top of the rod with the controller and was used to collect individual data points. Coordinate and elevation data were stored in the controller for later processing. During the initial survey, rebar that measured  $\frac{1}{2}$ " diameter by 18 inches in

length were set into the ground at the ends of each cross section cut line. Additional rebar was used in this survey to replace missing rebar from prior years' surveys. If needed, high visibility tape was wrapped around each rebar to aide in field locating. The use of GPS and the "stake point" feature has improved the method of locating previously installed rebar and has therefore increased accuracy and consistency of the survey.

#### **IV. Results**

Results comparing 2017 survey to previously collected surveys are not provided in this report due to stationing discrepancies. Survey results are provided for the 2017 survey in Appendix C. These results have a relative stationing, and are not directly comparable to previous years.

## v. References

- Lagasse, P. F. (1980). "An Assessment of the Response of the Rio Grande to Dam Construction - Cochiti to Isleta Reach."West Point, NY.
- Massong, T., Makar, P., and Bauer, T. "Planform Evolution Model for the Middle Rio Grande, NM." *Proc., 2nd Joint Federal Interagency Conference*.
- Scurlock, D. (1998). "From the Rio to the Sierra: An Environmental History of the Middle Rio Grande Basin."Ft. Collins, CO.
- USACE (2011). "2008, 2009, and 2010 Fish and Environmental Monitoring Report for the Rio Grande Nature Center Habitat Restoration Project bernalillo County, NM."Albuquerque, NM.
- USACE (2014). "Ecosystem Restoration@Route 66 Project 2014 Inventory."Albuquerque, NM.
- USACE (2014). "USACE Collaborative Program Report of Activities: Fiscal Years 2009-2013." *Middle Rio Grande Endangered Species Collaborative Program*Albuquerque, NM.

**Appendix A – Site Visit Photos of Surveyed Channels**



**Looking upstream at the Rio Grande River from the Rio Grande Nature Center HFC inlet (Photograph taken 22 March 2017).**



**Looking at the Rio Grande Nature Center HFC inlet (Photograph taken 22 March 2017).**



**Staff Gage at Rio Grande Nature Center HFC (Photograph taken 22 March 2017).**



**Looking upstream from bridge at Route 66 HFC A (Photograph taken 22 March 2017).**



**Looking upstream at the Route 66 HFC A (Photograph taken 22 March 2017).**



**Looking upstream on the Rio Grande at the Route 66 High Flow Channel 'C' from the downstream embayment (Photograph taken on 8 March 2017).**

## **Appendix B – USACE U-SMART Datasheets**

**USACE Survey Marker Archive & Retrieval Tool Datasheet**

Type: New

<b>Designation:</b> MBM RGNC 1 <b>Project:</b> RIO GRANDE RESTORATION SITE <b>Stamping:</b> MBM RGNC 1 <b>PID NGS:</b> _____ <b>COE:</b> _____ <b>State:</b> New Mexico <b>County:</b> BERNALILLO <b>District:</b> Albuquerque <b>Nearest Town:</b> ALBUQUERQUE <b>USGS Quad:</b> _____ <b>T.R.S.:</b> T11N, R2E, S36 <b>Nearest Hwy/Mi:</b> _____ <b>Date Recovered:</b> 04/12/2011 <b>By:</b> WILSON & COMPANY <b>Condition/Stability:</b> Good C <b>Setting/Monument Type:</b> BRASS CAP <b>Owner:</b> COE <b>GPS Suitable:</b> <input checked="" type="radio"/> Yes <input type="radio"/> No <b>Obstructions:</b> <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W <b>Magnetic:</b> <input checked="" type="radio"/> Yes <input type="radio"/> No <b>Access:</b> Coordinate with the City of Albuquerque Open Space Division and the Rio Grande Nature Center																	
<b>- Horizontal -</b> <b>Datum:</b> NAD83 (2002.0000) <b>Lat:</b> 35 08 00.62246 N <b>Lon:</b> 106 41 04.03027 W <b>Local Accuracy:</b> _____ <b>NSRS Accuracy:</b> _____ <b>Survey/Computation Method:</b> OPUS-DB <b>Date Observed:</b> 04/12/2011		<b>- Vertical -</b> <b>Datum:</b> NAVD88 ( ) <b>Elevation Ht:</b> 4,973.61 <b>Ellip Ht:</b> 4,903.28 <b>Local Accuracy:</b> _____ <b>NSRS Accuracy:</b> _____ <b>Survey/Computation Method:</b> OPUS-DB <b>Date Observed:</b> 04/12/2011															
<b>Description/Comments:</b> This station is located 4945.5 feet south from the intersection of Montano Blvd. and the Albuquerque Riverside Drain. 637.6 feet west of the asphalt bike path on the west side of the Albuquerque Riverside Drain, on the west bank of the Rio Grande Nature Center High Flow Channel.		<b>- Tidal/Hydraulic Gage Relationships -</b> <table border="1"> <thead> <tr> <th>Owner:</th> <th>Gage ID:</th> <th>- Elevation -</th> <th>- Datum -</th> <th>Epoch:</th> </tr> </thead> <tbody> <tr> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table>	Owner:	Gage ID:	- Elevation -	- Datum -	Epoch:	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
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_____	_____	_____	_____	_____													
_____	_____	_____	_____	_____													
<b>- State Plane Coordinates -</b> <b>Zone:</b> _____ <b>Northing:</b> _____ <b>USFT Easting:</b> _____ <b>USFT Convergence:</b> _____ <b>CSF:</b> _____																	
<b>- Horizon/Setup View -</b>  <b>- Close-Up View-</b> 																	
<b>Required Fields In Red</b> <b>Submit</b> <b>System Fields In Green</b> U-SMART ver 3.0 12/17/2010																	

**USACE Survey Marker Archive & Retrieval Tool Datasheet**

Type: New

**Designation:** MBM RGNC 2

**Project:** RIO GRANDE RESTORATION SITE

**Stamping:** MBM RGNC 2

**PID NGS:** \_\_\_\_\_ **COE:** \_\_\_\_\_

**State:** New Mexico

**County:** BERNALILLO

**District:** Albuquerque

**Nearest Town:** ALBUQUERQUE

**USGS Quad:** \_\_\_\_\_

**T.R.S.:** T10N, R2E, S1

**Nearest Hwy/Mi:** \_\_\_\_\_

**Date Recovered:** 04/12/2011

**By:** WILSON & COMPANY

**Condition/Stability:** Good C

**Setting/Monument Type:** BRASS CAP

**Owner:** COE

**GPS Suitable:**  Yes  No

**Obstructions:**  N  E  S  W

**Magnetic:**  Yes  No



**- Horizontal -**

**Datum:** NAD83 (2002.000) **Lat:** 35 07 43.95202 N **Lon:** 106 41 21.30833 W

**Local Accuracy:** \_\_\_\_\_

**NSRS Accuracy:** \_\_\_\_\_

**Survey/Computation Method:** RTK

**Date Observed:** 04/12/2011

**- Vertical -**

**Datum:** NAVD88 ( ) **Elevation Ht:** 4,971.44

**Ellip Ht:** \_\_\_\_\_

**Local Accuracy:** \_\_\_\_\_

**NSRS Accuracy:** \_\_\_\_\_

**Survey/Computation Method:** Geodetic Levels

**Date Observed:** 04/12/2011

**Access:** Coordinate with the City of Albuquerque Open Space Division and the Rio Grande Nature Center

**- Tidal/Hydraulic Gage Relationships -**

Owner:	Gage ID:	- Elevation -	- Datum -	Epoch:
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

**Description/Comments:** This station is located 7151.8 feet south from the intersection of Montano Blvd. and the Albuquerque Riverside Drain. 816.3 feet west of the asphalt bike path on the west side of the Albuquerque Riverside Drain and 125.6 feet east of the east bank of the Rio Grande. The station is 226.4 feet southwest of the center of a pedestrian bridge over the Rio Grande Nature Center High Flow Channel.

**- State Plane Coordinates -**

**Zone:** \_\_\_\_\_ **Northing:** \_\_\_\_\_ **USFT Easting:** \_\_\_\_\_ **USFT Convergence:** \_\_\_\_\_ **CSF:** \_\_\_\_\_

**- Horizon/Setup View -****- Close-Up View-**

Required Fields In Red

Submit

System Fields In Green

U-SMART ver 3.0  
12/17/2010

**USACE Survey Marker Archive & Retrieval Tool Datasheet**

Type: New

**Designation:** MBM R66A 1  
**Project:** RIO GRANDE RESTORATION SITE  
**Stamping:** MBM R66A 1  
**PID NGS:** COE:  
**State:** New Mexico  
**County:** BERNALILLO  
**District:** Albuquerque  
**Nearest Town:** ALBUQUERQUE  
**USGS Quad:**  
**T.R.S.:** T10N, R2E, S13  
**Nearest Hwy/Mi:**  
**Date Recovered:** 04/13/2011  
**By:** WILSON & COMPANY  
**Condition/Stability:** Good C  
**Setting/Monument Type:** BRASS CAP  
**Owner:** COE  
**GPS Suitable:**  Yes  No  
**Obstructions:**  N  E  S  W  
**Magnetic:**  Yes  No



<p><b>- Horizontal -</b></p> <p><b>Datum:</b> NAD83 ( 2002.0000 )  <b>Lat:</b> 35 05 23.60337 N  <b>Lon:</b> 106 41 06.72645 W</p> <p><b>Local Accuracy:</b> _____</p> <p><b>NSRS Accuracy:</b> _____</p> <p><b>Survey/Computation Method:</b> RTK</p> <p><b>Date Observed:</b> 04/25/2011</p>	<p><b>- Vertical -</b></p> <p><b>Datum:</b> NAVD88 ( )  <b>Elevation Ht:</b> 4,958.17  <b>Ellip Ht:</b> _____</p> <p><b>Local Accuracy:</b> _____</p> <p><b>NSRS Accuracy:</b> _____</p> <p><b>Survey/Computation Method:</b> Geodetic Levels</p> <p><b>Date Observed:</b> 04/25/2011</p>
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**Access:** Coordinate with the City of Albuquerque Open Space Division

<p><b>- Tidal/Hydraulic Gage Relationships -</b></p> <p><b>Owner:</b> _____ <b>Gage ID:</b> _____</p>	<p><b>- Elevation -</b></p> <p>_____</p>	<p><b>- Datum -</b></p> <p>_____</p>	<p><b>Epoch:</b> _____</p>
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**Description/Comments:** This station is located 1146.8 feet northwest from the intersection of Central Ave. and the Albuquerque West Unit of the Middle Rio Grande Levee, 159.3 feet northeast of the centerline of the Middle Rio Grande Levee and 113.8 feet southeast of the center of a pedestrian bridge over the Route 66 High Flow Channel 'A'.

**- State Plane Coordinates -**

Zone: \_\_\_\_\_ Northing: \_\_\_\_\_ USFT Easting: \_\_\_\_\_ USFT Convergence: \_\_\_\_\_ CSF: \_\_\_\_\_

**- Horizon/Setup View -****- Close-Up View -**

Required Fields In Red

Submit

System Fields In Green

U-SMART ver 3.0  
12/17/2010

**USACE Survey Marker Archive & Retrieval Tool Datasheet**Type:  New

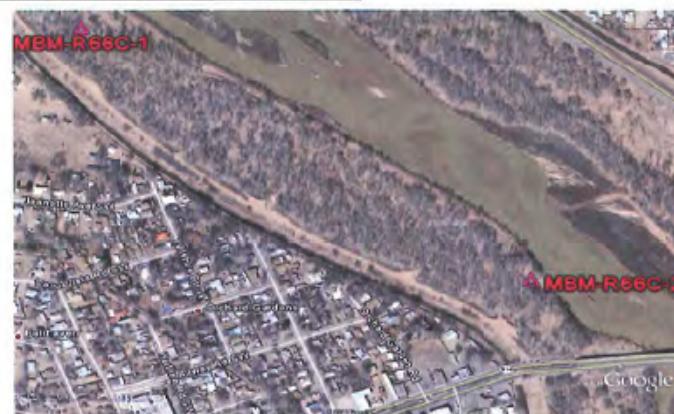
<p><b>Designation:</b> MBM R66A 2</p> <p><b>Project:</b> RIO GRANDE RESTORATION SITE</p> <p><b>Stamping:</b> MBM R66A 2</p> <p><b>PID NGS:</b> _____ <b>COE:</b> <input type="checkbox"/></p> <p><b>State:</b> New Mexico</p> <p><b>County:</b> BERNALILLO</p> <p><b>District:</b> Albuquerque</p> <p><b>Nearest Town:</b> ALBUQUERQUE</p> <p><b>USGS Quad:</b> _____</p> <p><b>T.R.S.:</b> T10N, R2E, S13</p> <p><b>Nearest Hwy/Mi:</b> _____</p> <p><b>Date Recovered:</b> 04/13/2011</p> <p><b>By:</b> WILSON &amp; COMPANY</p> <p><b>Condition/Stability:</b> Good <input type="checkbox"/></p> <p><b>Setting/Monument Type:</b> BRASS CAP</p> <p><b>Owner:</b> COE</p> <p><b>GPS Suitable:</b> <input checked="" type="radio"/> Yes <input type="radio"/> No</p> <p><b>Obstructions:</b> <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W</p> <p><b>Magnetic:</b> <input checked="" type="radio"/> Yes <input type="radio"/> No</p> <p><b>Access:</b> Coordinate with the City of Albuquerque Open Space Division</p>																		
		<p><b>- Horizontal -</b></p> <p><b>Datum:</b> NAD83 ( 2002.0000 )</p> <p><b>Lat:</b> 35° 05' 19.29031 N</p> <p><b>Lon:</b> 106° 40' 59.61598 W</p> <p><b>Local Accuracy:</b> _____</p> <p><b>NSRS Accuracy:</b> _____</p> <p><b>Survey/Computation Method:</b> OPUS-DB</p> <p><b>Date Observed:</b> 04/13/2011</p>	<p><b>- Vertical -</b></p> <p><b>Datum:</b> NAVD88 ( )</p> <p><b>Elevation Ht:</b> 4,955.41</p> <p><b>Ellip Ht:</b> 4,884.98</p> <p><b>Local Accuracy:</b> _____</p> <p><b>NSRS Accuracy:</b> _____</p> <p><b>Survey/Computation Method:</b> OPUS-DB</p> <p><b>Date Observed:</b> 04/13/2011</p>															
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_____	_____	_____	_____	_____														
<p><b>Description/Comments:</b> This station is located 467.72 feet northwest from the intersection of Central Ave. and the Albuquerque West Unit of the Middle Rio Grande Levee. 158.1 feet northeast of the centerline of the Middle Rio Grande Levee.</p>																		
<p><b>- State Plane Coordinates -</b></p> <p><b>Zone:</b> _____ <b>Northing:</b> _____ <b>USFT Easting:</b> _____ <b>USFT Convergence:</b> _____ <b>CSF:</b> _____</p>																		
<p><b>- Horizon/Setup View -</b></p> 		<p><b>- Close-Up View -</b></p> 																
<p>Required Fields In Red</p>		<p><b>Submit</b></p>	<p>System Fields In Green</p>															
<p>U-SMART ver 3.0 12/17/2010</p>																		

**USACE Survey Marker Archive & Retrieval Tool Datasheet**Type: **New**

<b>Designation:</b> MBM R66C 1 <b>Project:</b> RIO GRANDE RESTORATION SITE <b>Stamping:</b> MBM R66C 1 <b>PID NGS:</b> _____ <b>COE:</b> _____ <b>State:</b> New Mexico <b>County:</b> BERNALILLO <b>District:</b> Albuquerque <b>Nearest Town:</b> ALBUQUERQUE <b>USGS Quad:</b> _____ <b>T.R.S.:</b> T10N, R3E, S19 <b>Nearest Hwy/Mi:</b> _____ <b>Date Recovered:</b> 04/14/2011 <b>By:</b> WILSON & COMPANY <b>Condition/Stability:</b> Good C <b>Setting/Monument Type:</b> BRASS CAP <b>Owner:</b> COE <b>GPS Suitable:</b> <input checked="" type="radio"/> Yes <input type="radio"/> No <b>Obstructions:</b> <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W <b>Magnetic:</b> <input checked="" type="radio"/> Yes <input type="radio"/> No <b>Access:</b> Coordinate with the City of Albuquerque Open Space Division	 <p><b>- Horizontal -</b></p> <p>Datum: NAD83 ( 2002.0000 )            Lat: 35 04 30.29630 N            Lon: 106 40 12.14187 W</p> <p>Local Accuracy: _____            NSRS Accuracy: _____</p> <p><b>Survey/Computation Method:</b>            RTK  <b>Date Observed:</b> 04/14/2011</p> <p><b>- Vertical -</b></p> <p>Datum: NAVD83 ( )            Elevation Ht: 4,949.81            Ellip Ht: _____</p> <p>Local Accuracy: _____            NSRS Accuracy: _____</p> <p><b>Survey/Computation Method:</b>            Geodetic Levels  <b>Date Observed:</b> 04/14/2011</p> <p><b>- Tidal/Hydraulic Gage Relationships -</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Owner:</th> <th style="width: 25%;">Gage ID:</th> <th style="width: 25%;">- Elevation -</th> <th style="width: 25%;">- Datum -</th> </tr> </thead> <tbody> <tr> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table> <p><b>Description/Comments:</b> This station is located 3007.9 feet northwest from the intersection of Bridge Ave. and the Albuquerque West Unit of the Middle Rio Grande Levee. 196.5 feet northeast of the centerline of the Middle Rio Grande Levee and 131.6 feet west of the center of a pedestrian bridge over the Route 66 High Flow Channel 'C'.</p>	Owner:	Gage ID:	- Elevation -	- Datum -	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Owner:	Gage ID:	- Elevation -	- Datum -																		
_____	_____	_____	_____																		
_____	_____	_____	_____																		
_____	_____	_____	_____																		
_____	_____	_____	_____																		
<b>- State Plane Coordinates -</b> Zone: _____ Northing: _____ USFT Easting: _____ USFT Convergence: _____ CSP: _____																					
<b>- Horizon/Setup View -</b>  <b>- Close-Up View-</b> 																					
Required Fields In Red <span style="float: right;">System Fields In Green</span>																					
<input type="button" value="Submit"/> U-SMART ver 3.0 12/17/2010																					

**USACE Survey Marker Archive & Retrieval Tool Datasheet**Type: 

**Designation:** MBM R66C 2  
**Project:** RIO GRANDE RESTORATION SITE   
**Stamping:** MBM R66C 2  
**PID NGS:**  **COE:**   
**State:** New Mexico  
**County:** BERNALILLO  
**District:** Albuquerque  
**Nearest Town:** ALBUQUERQUE  
**USGS Quad:**   
**T.R.S.:** T10N, R3E, S30  
**Nearest Hwy/Mi:**   
**Date Recovered:** 04/14/2011  
**By:** WILSON & COMPANY  
**Condition/Stability:** Good    
**Setting/Monument Type:** BRASS CAP  
**Owner:** COE  
**GPS Suitable:**  Yes  No  
**Obstructions:**  N  E  S  W  
**Magnetic:**  Yes  No



<b>- Horizontal -</b>	<b>- Vertical -</b>
<b>Datum:</b> NAD83 ( 2002.0000 )	<b>Datum:</b> NAVD88 ( )
<b>Lat:</b> 35 04 15.24757 N	<b>Elevation Ht:</b> 4,946.98
<b>Lon:</b> 106 39 45.69857 W	<b>Ellip Ht:</b> 4,876.68
<b>Local Accuracy:</b> <input type="text"/>	<b>Local Accuracy:</b> <input type="text"/>
<b>NSRS Accuracy:</b> <input type="text"/>	<b>NSRS Accuracy:</b> <input type="text"/>
<b>Survey/Computation Method:</b> OPUS-DB	<b>Survey/Computation Method:</b> OPUS-DB
<b>Date Observed:</b> 04/14/2011	<b>Date Observed:</b> 04/14/2011

<b>Access:</b> Coordinate with the City of Albuquerque Open Space Division	<b>- Tidal/Hydraulic Gage Relationships -</b>			
	<b>Owner:</b> <input type="text"/>	<b>Gage ID:</b> <input type="text"/>	<b>- Elevation -</b> <input type="text"/>	<b>- Datum -</b> <input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**Description/Comments:** This station is located 413.2 feet northwest from the intersection of Bridge Ave. and the Albuquerque West Unit of the Middle Rio Grande Levee. 311.4 feet northeast of the centerline of the Middle Rio Grande Levee and 58.2 feet west of the west bank of the Rio Grande.

**- State Plane Coordinates -**

**Zone:**  **Northing:**  **USFT Easting:**  **USFT Convergence:**  **CSF:**

**- Horizon/Setup View -****- Close-Up View-**

Required Fields In Red

Submit

System Fields In Green

U-SMART ver 3.0  
12/17/2010

## **Appendix C – Tabular Data of Topographic Survey**

### Rio Grande Nature Center- Profile Survey Data

Number	Northing	Easting	Elevation	Description	Site	Type
12043	1504881.097	1510497.852	4971.088	THLWG	Site 1	Center
12045	1504828.944	1510530.058	4971.021	THLWG	Site 1	Center
12046	1504733.498	1510577.468	4970.811	THLWG	Site 1	Center
12047	1504588.731	1510656.059	4970.607	THLWG	Site 1	Center
12048	1504517.625	1510679.783	4970.488	THLWG	Site 1	Center
12049	1504421.212	1510667.84	4970.19	THLWG	Site 1	Center
12050	1504334.204	1510635.502	4970.224	THLWG	Site 1	Center
12051	1504101.47	1510524.574	4969.913	THLWG	Site 1	Center
12052	1504032.198	1510493.044	4969.894	THLWG	Site 1	Center
12054	1503902.993	1510423.693	4969.793	THLWG	Site 1	Center
12061	1503793.772	1510340.392	4969.684	THLWG	Site 1	Center
12062	1503735.547	1510298.341	4969.697	THLWG	Site 1	Center
24077	1503681.778	1510260.326	4969.59	THLWG	Site 1	Center
24076	1503670.072	1510248.1	4969.6	THLWG	Site 1	Center
24075	1503649.197	1510242.943	4969.189	THLWG	Site 1	Center
24074	1503641.405	1510229.337	4968.938	THLWG	Site 1	Center
24073	1503634.137	1510236.454	4969.535	THLWG	Site 1	Center
24072	1503609.644	1510213.522	4969.621	THLWG	Site 1	Center
24071	1503614.522	1510206.858	4969.424	THLWG	Site 1	Center
24070	1503587.676	1510188.182	4969.419	THLWG	Site 1	Center
24069	1503566.312	1510164.15	4969.44	THLWG	Site 1	Center
24064	1503536.178	1510144.017	4969.243	THLWG	Site 1	Center
24063	1503501.989	1510105.451	4969.448	THLWG	Site 1	Center
24062	1503466.28	1510064.472	4969.255	THLWG	Site 1	Center
24061	1503427.363	1510023.541	4969.151	THLWG	Site 1	Center
24060	1503379.668	1509982.733	4969.138	THLWG	Site 1	Center
24059	1503364.556	1509966.516	4969.05	THLWG	Site 1	Center
24058	1503317.745	1509905.095	4968.865	THLWG	Site 1	Center
24057	1503296.224	1509879.94	4968.904	THLWG	Site 1	Center
24056	1503273.054	1509845.294	4969.056	THLWG	Site 1	Center
24055	1503225.196	1509778.535	4968.872	THLWG	Site 1	Center
24054	1503193.042	1509740.818	4968.931	THLWG	Site 1	Center
24053	1503159.433	1509700.757	4968.8	THLWG	Site 1	Center
24052	1503107.281	1509647.46	4968.756	THLWG	Site 1	Center
24051	1503036.284	1509583.085	4968.83	THLWG	Site 1	Center
24050	1502988.215	1509528.884	4975.385	THLWG	Site 1	Center
24049	1502907.696	1509451.349	4968.701	THLWG	Site 1	Center
24048	1502885.88	1509425.074	4968.441	THLWG	Site 1	Center
24047	1502843.429	1509356.618	4968.419	THLWG	Site 1	Center
24046	1502814.765	1509308.656	4968.412	THLWG	Site 1	Center
24045	1502763.457	1509263.818	4968.396	THLWG	Site 1	Center
24044	1502714.667	1509217.039	4968.395	THLWG	Site 1	Center
24039	1502669.391	1509171.323	4967.885	THLWG	Site 1	Center
24038	1502642.497	1509150.849	4967.911	THLWG	Site 1	Center
24037	1502618.934	1509132.497	4968.146	THLWG	Site 1	Center
24029	1502577.681	1509080.316	4968.273	THLWG	Site 1	Center
24028	1502557.339	1509058.624	4968.35	THLWG	Site 1	Center
24027	1502521.865	1509031.73	4968.131	THLWG	Site 1	Center
24026	1502498.201	1509013.958	4968.081	THLWG	Site 1	Center
24025	1502483.017	1508993.051	4968.044	THLWG	Site 1	Center

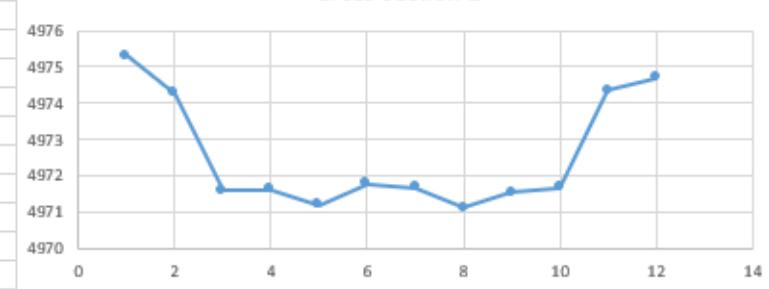
### Rio Grande Nature Center High Flow Channel-Cross Section Data

Rio Grande Nature Center-Cross Section Data

Cross Section 1

Number	Northing	Easting	Elevation	Description	Site	Type	Order_
12028	1504935	1510504	4975.29	REBAR L	Site 1	Cross Section 1	1
12027	1504936	1510503	4974.27	TOP	Site 1	Cross Section 1	2
12026	1504925	1510497	4971.58	TOE	Site 1	Cross Section 1	3
12025	1504910	1510497	4971.62	GROUND	Site 1	Cross Section 1	4
12024	1504909	1510496	4971.19	THLWG	Site 1	Cross Section 1	5
12023	1504908	1510493	4971.77	GROUND	Site 1	Cross Section 1	6
12022	1504905	1510487	4971.65	GROUND	Site 1	Cross Section 1	7
12021	1504905	1510484	4971.11	THLWG	Site 1	Cross Section 1	8
12020	1504904	1510482	4971.54	GROUND	Site 1	Cross Section 1	9
12019	1504904	1510476	4971.66	TOE	Site 1	Cross Section 1	10
12018	1504901	1510474	4974.34	TOP	Site 1	Cross Section 1	11
12017	1504900	1510473	4974.68	REBAR R	Site 1	Cross Section 1	12

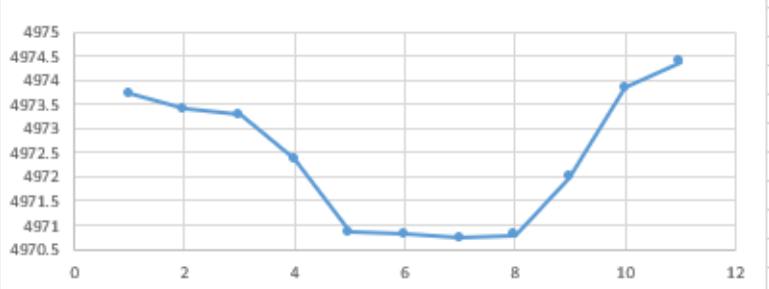
Cross Section 1



Cross Section 2

Number	Northing	Easting	Elevation	Description	Site	Type	Order_
12001	1505070	1510549	4973.73	REBAR L	Site 1	Cross Section 2	1
12002	1505062	1510542	4973.4	GROUND	Site 1	Cross Section 2	2
12005	1505046	1510523	4973.28	TOP	Site 1	Cross Section 2	3
12006	1505033	1510513	4972.37	TOE	Site 1	Cross Section 2	4
12007	1505030	1510508	4970.84	WATER	Site 1	Cross Section 2	5
12041	1504994	1510468	4970.82	SAND BAR	Site 1	Cross Section 2	6
12042	1504967	1510441	4970.72	SAND BAR	Site 1	Cross Section 2	7
12029	1504964	1510417	4970.79	SAND BAR	Site 1	Cross Section 2	8
12014	1504949	1510391	4971.99	TOE	Site 1	Cross Section 2	9
12015	1504942	1510380	4973.84	TOP	Site 1	Cross Section 2&2	127
12016	1504942	1510379	4974.37	REBAR R	Site 1	Cross Section 2&2	138

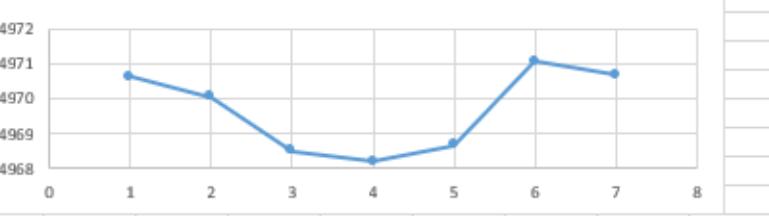
Cross Section 2



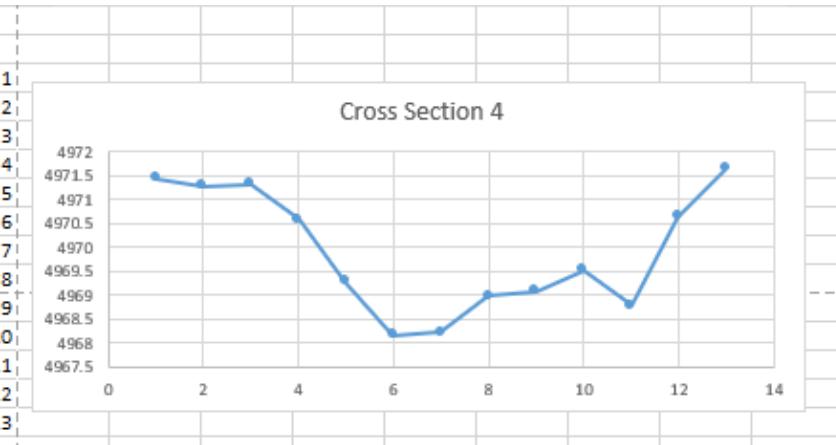
Cross Section 3

Number	Northing	Easting	Elevation	Description	Site	Type	Order_
24030	1502574	1509111	4970.62	REBAR L	Site 1	Cross Section 3	1
24031	1502575	1509111	4970.05	TOP	Site 1	Cross Section 3	2
24032	1502577	1509110	4968.5	TOE	Site 1	Cross Section 3	3
24033	1502587	1509102	4968.2	GROUND	Site 1	Cross Section 3	4
24034	1502602	1509097	4968.66	TOE	Site 1	Cross Section 3	5
24035	1502608	1509092	4971.07	REBAR R	Site 1	Cross Section 3	7
24036	1502607	1509092	4970.67	TOP	Site 1	Cross Section 3	6

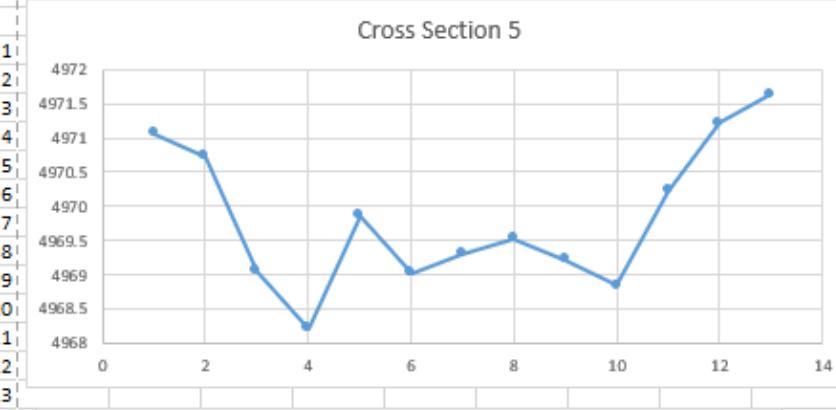
Cross Section 3



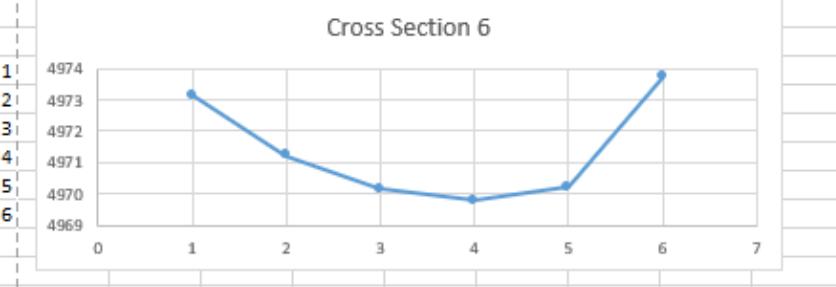
Cross Section 4							
Number	Northing	Easting	Elevation	Description	Site	Type	Order_
0	1502486	1509079	4971.44	MBM RFNC 2	Site 1	Cross Section 4	1
12000	1502504	1509072	4971.28	GROUND	Site 1	Cross Section 4	2
24000	1502504	1509070	4971.33	GROUND	Site 1	Cross Section 4	3
24001	1502518	1509063	4970.58	TOP	Site 1	Cross Section 4	4
24002	1502520	1509061	4969.27	TOE	Site 1	Cross Section 4	5
24003	1502527	1509055	4968.15	GROUND	Site 1	Cross Section 4	6
24004	1502538	1509050	4968.21	GROUND	Site 1	Cross Section 4	7
24005	1502558	1509044	4968.98	GROUND	Site 1	Cross Section 4	8
24006	1502576	1509037	4969.09	BRKLN	Site 1	Cross Section 4	9
24007	1502594	1509031	4969.52	GROUND	Site 1	Cross Section 4	10
24008	1502615	1509022	4968.77	TOE	Site 1	Cross Section 4	11
24013	1502620	1509020	4970.64	TOP	Site 1	Cross Section 4	12
24014	1502628	1509019	4971.65	REBAR R	Site 1	Cross Section 4&5	13



Cross Section 4							
Number	Northing	Easting	Elevation	Description	Site	Type	Order_
24024	1502443	1508946	4971.06	REBAR L	Site 1	Cross Section 5	1
24023	1502447	1508951	4970.73	TOP	Site 1	Cross Section 5	2
24022	1502448	1508952	4969.06	TOE	Site 1	Cross Section 5	3
24021	1502468	1508962	4968.22	GROUND	Site 1	Cross Section 5	4
24020	1502503	1508973	4969.87	GROUND	Site 1	Cross Section 5	5
24019	1502528	1508984	4969.02	GROUND	Site 1	Cross Section 5	6
24016	1502557	1508994	4969.3	GROUND	Site 1	Cross Section 5	7
24015	1502593	1509008	4969.53	GROUND	Site 1	Cross Section 5	8
24009	1502604	1509009	4969.22	GROUND	Site 1	Cross Section 5	9
24010	1502611	1509013	4968.84	TOE	Site 1	Cross Section 5	10
24011	1502614	1509013	4970.22	BRKLN	Site 1	Cross Section 5	11
24012	1502621	1509016	4971.22	TOP	Site 1	Cross Section 5	12
24014	1502628	1509019	4971.65	REBAR R	Site 1	Cross Section 4&5	13



Cross Section 6							
Number	Northing	Easting	Elevation	Description	Site	Type	Order_
12055	1503849	1510410	4973.14	TOP	Site 1	Cross Section 6	1
12056	1503853	1510403	4971.21	TOP	Site 1	Cross Section 6	2
12057	1503854	1510401	4970.17	TOE	Site 1	Cross Section 6	3
12058	1503860	1510392	4969.8	THLWG	Site 1	Cross Section 6	4
12059	1503867	1510386	4970.22	TOE	Site 1	Cross Section 6	5
12060	1503876	1510376	4973.73	TOP	Site 1	Cross Section 6	6



### Route 66 High Flow Channel A- Profile Survey Data

Number	Northing	Easting	Elevation	Description	Site	Type
11018	1488492.821	1510116.655	4955.812	THLWG	Site 2	Center Line
11019	1488487.912	1510107.573	4955.381	THLWG	Site 2	Center Line
11020	1488475.378	1510116.214	4955.307	THLWG	Site 2	Center Line
11021	1488468.225	1510123.274	4955.351	THLWG	Site 2	Center Line
11022	1488462.564	1510119.045	4955.421	THLWG	Site 2	Center Line
11023	1488442.338	1510177.553	4955.379	THLWG	Site 2	Center Line
11028	1488389.78	1510239.768	4954.847	THLWG	Site 2	Center Line
11029	1488373.354	1510263.334	4954.846	THLWG	Site 2	Center Line
11033	1488266.073	1510408.342	4954.454	THLWG	Site 2	Center Line
11034	1488255.922	1510423.116	4954.798	THLWG	Site 2	Center Line
11035	1488241.43	1510463.681	4954.576	THLWG	Site 2	Center Line
11036	1488211.772	1510487.851	4954.422	THLWG	Site 2	Center Line
11037	1488191.093	1510507.562	4953.572	THLWG	Site 2	Center Line
22033	1488145.416	1510560.039	4956.8	THLWG	Site 2	Center Line
22028	1488127.691	1510582.076	4954.315	THLWG	Site 2	Center Line
22027	1488107.182	1510614.712	4953.888	THLWG	Site 2	Center Line
22026	1488081.508	1510679.316	4953.864	THLWG	Site 2	Center Line
22025	1488034.844	1510769.412	4953.843	THLWG	Site 2	Center Line
22024	1487975.145	1510899.484	4956.828	THLWG	Site 2	Center Line
22023	1488009.434	1510958.665	4955.55	THLWG	Site 2	Center Line
22022	1488035.137	1511008.256	4953.737	THLWG	Site 2	Center Line

### Route 66 High Flow Channel A-Cross Section Data

Route 66 High Flow Channel A

Cross Section 1

Number	Northing	Easting	Elevation	Description	Site	Type
11000	1488517	1510134	4957.42	REBAR L	Site 2	Cross Section 1
11001	1488524	1510123	4957.05	TOP	Site 2	Cross Section 1
11002	1488527	1510115	4956.48	GRND	Site 2	Cross Section 1
11003	1488527	1510106	4956.25	BRKLN	Site 2	Cross Section 1
11004	1488528	1510103	4955.56	TOE	Site 2	Cross Section 1
11005	1488531	1510087	4956.06	GRND	Site 2	Cross Section 1
11006	1488544	1510061	4955.52	GRND	Site 2	Cross Section 1
11007	1488557	1510050	4955.7	TOE	Site 2	Cross Section 1
11008	1488566	1510039	4957.3	TOP	Site 2	Cross Section 1
11009	1488569	1510042	4957.64	REBAR R	Site 2	Cross Section 1

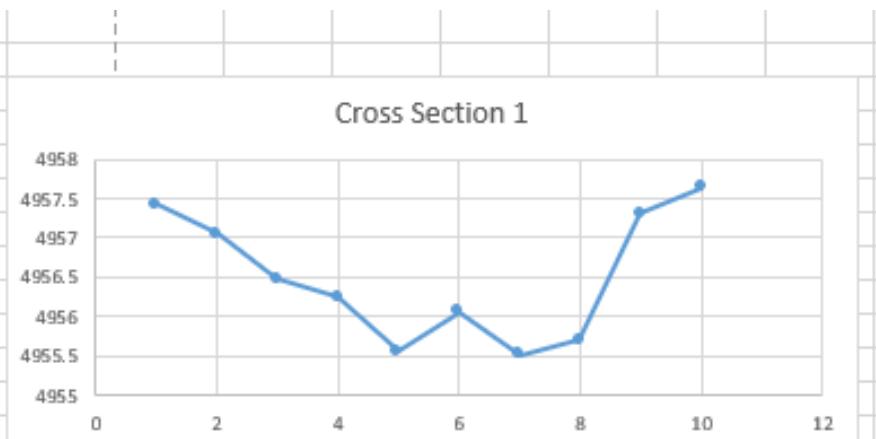
Cross Section 2

Number	Northing	Easting	Elevation	Description	Site	Type
11000	1488517	1510134	4957.42	REBAR L	Site 2	Cross Section 1&2
11012	1488520	1510117	4956.79	TOP	Site 2	Cross Section 2
11013	1488516	1510110	4956.17	TOE	Site 2	Cross Section 2
11014	1488510	1510102	4955.73	CENTER	Site 2	Cross Section 2
11015	1488505	1510096	4956.06	TOE	Site 2	Cross Section 2
11016	1488502	1510092	4956.8	TOP	Site 2	Cross Section 2
11017	1488504	1510079	4957.08	REBAR R	Site 2	Cross Section 2

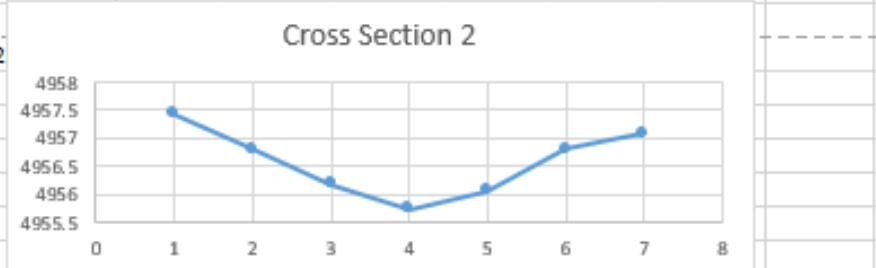
Cross Section 3

Number	Northing	Easting	Elevation	Description	Site	Type
22015	1488059	1511031	4956.07	REBAR L	Site 2	Cross Section 3
22016	1488056	1511032	4955.85	TOP	Site 2	Cross Section 3
22017	1488054	1511033	4954.1	TOE	Site 2	Cross Section 3
22018	1488048	1511038	4953.49	THLWG	Site 2	Cross Section 3
22019	1488043	1511039	4954.22	TOE	Site 2	Cross Section 3
22020	1488038	1511042	4955.99	TOP	Site 2	Cross Section 3
22021	1488033	1511046	4956.21	REBAR R	Site 2	Cross Section 3

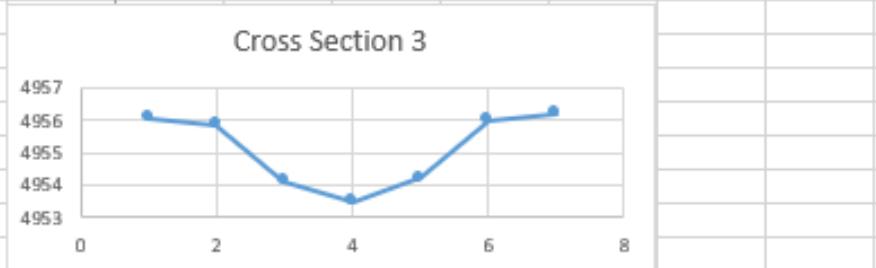
Cross Section 1



Cross Section 2



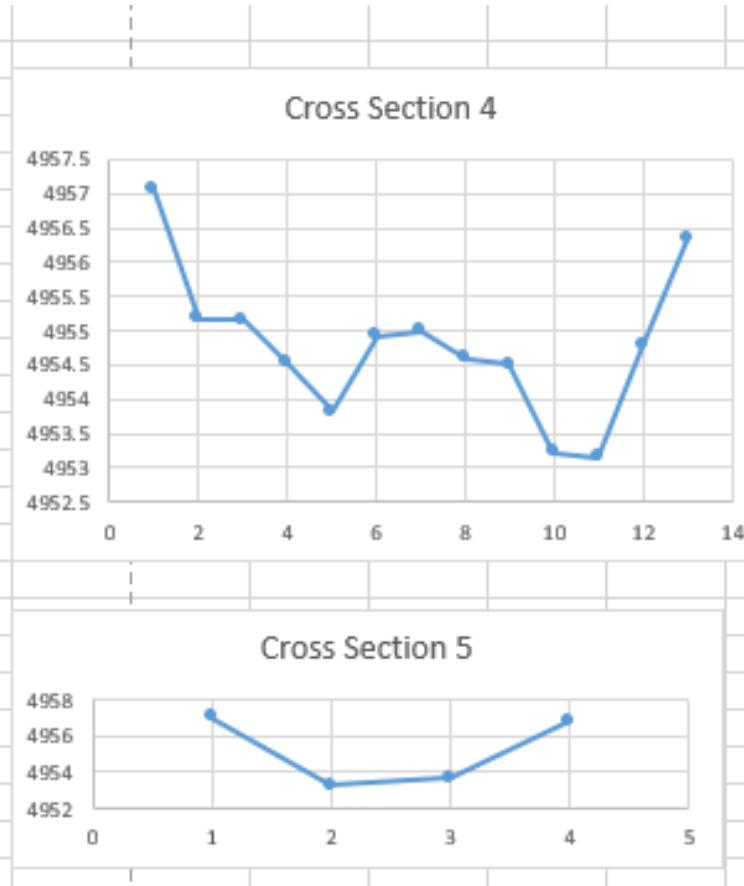
Cross Section 3



Cross Section 4						
Number	Northing	Easting	Elevation	Description	Site	Type
22014	1488100	1511031	4957.05	REBAR L	Site 2	Cross Section 4
22013	1488099	1511037	4955.18	TOE	Site 2	Cross Section 4
22012	1488087	1511070	4955.15	GROUND	Site 2	Cross Section 4
22011	1488083	1511077	4954.53	GROUND	Site 2	Cross Section 4
22010	1488082	1511079	4953.81	THLWG	Site 2	Cross Section 4
22009	1488081	1511081	4954.92	GROUND	Site 2	Cross Section 4
22008	1488079	1511084	4955	GROUND	Site 2	Cross Section 4
22007	1488071	1511097	4954.59	GROUND	Site 2	Cross Section 4
22006	1488056	1511118	4954.51	GROUND	Site 2	Cross Section 4
22005	1488055	1511120	4953.23	edge	Site 2	Cross Section 4
22004	1488049	1511130	4953.15	WATER	Site 2	Cross Section 4
22003	1488048	1511132	4954.77	TOP	Site 2	Cross Section 4
22000	1488046	1511137	4956.32	REBAR R	Site 2	Cross Section 4

Cross Section 5						
Number	Northing	Easting	Elevation	Description	Site	Type
22035	1488184	1510527	4957.01	TOP	Site 2	Cross Section 5
22036	1488181	1510523	4953.27	TOE	Site 2	Cross Section 5
11039	1488176	1510519	4953.67	TOE	Site 2	Cross Section 5
11038	1488171	1510515	4956.82	TOP	Site 2	Cross Section 5



### Route 66 High Flow Channel C-Profile Survey Data

Number	Northing	Easting	Elevation	Description	Site	Type
20060	1483252.501	1514640.068	4948.378	THLWG	Site 3	Center Line
20062	1483237.018	1514643.548	4948.252	THLWG	Site 3	Center Line
20063	1483160.993	1514660.971	4947.54	THLWG	Site 3	Center Line
20064	1483118.981	1514706.352	4959.573	THLWG	Site 3	Center Line
20065	1483088.289	1514747.785	4947.632	THLWG	Site 3	Center Line
20066	1483075.523	1514785.082	4947.74	THLWG	Site 3	Center Line
20067	1483037.874	1514812.349	4947.784	THLWG	Site 3	Center Line
10068	1483015.45	1514820.426	4947.661	THLWG	Site 3	Center Line
10067	1482972.029	1514840.935	4947.626	THLWG	Site 3	Center Line
10058	1482893.601	1514922.758	4947.12	THLWG	Site 3	Center Line
10057	1482857.971	1514965.699	4946.255	THLWG	Site 3	Center Line
10056	1482788.579	1515030.238	4946.493	THLWG	Site 3	Center Line
10055	1482745.002	1515054.833	4946.483	THLWG	Site 3	Center Line
10054	1482682.722	1515108.372	4946.694	THLWG	Site 3	Center Line
10053	1482643.351	1515186.957	4946.342	THLWG	Site 3	Center Line
10052	1482634.364	1515233.172	4945.114	THLWG	Site 3	Center Line
10051	1482622.158	1515254.796	4945.92	THLWG	Site 3	Center Line
10050	1482613.033	1515279.555	4945.436	THLWG	Site 3	Center Line
10049	1482614.406	1515360.927	4945.898	THLWG	Site 3	Center Line
10048	1482602.359	1515392.599	4946.015	THLWG	Site 3	Center Line
10047	1482570.013	1515465.907	4946.29	THLWG	Site 3	Center Line
10046	1482539.442	1515510.466	4946.188	THLWG	Site 3	Center Line
10045	1482502.597	1515577.463	4945.986	THLWG	Site 3	Center Line
10044	1482416.532	1515689.736	4945.741	THLWG	Site 3	Center Line
10043	1482376.566	1515720.897	4945.688	THLWG	Site 3	Center Line
10042	1482331.248	1515751.23	4945.748	THLWG	Site 3	Center Line
10041	1482306.778	1515791.053	4945.565	THLWG	Site 3	Center Line
10040	1482308.842	1515847.406	4945.889	THLWG	Site 3	Center Line
10039	1482293.268	1515870.719	4945.783	THLWG	Site 3	Center Line
10038	1482246.212	1515902.333	4945.652	THLWG	Site 3	Center Line
10037	1482188.198	1515982.429	4945.416	THLWG	Site 3	Center Line
10036	1482105.132	1516030.616	4945.595	THLWG	Site 3	Center Line
10035	1482075.424	1516048.718	4945.578	THLWG	Site 3	Center Line
10034	1482009.201	1516068.592	4945.314	THLWG	Site 3	Center Line
10033	1481996.393	1516076.564	4945.578	THLWG	Site 3	Center Line
10032	1481930.795	1516107.68	4945.511	THLWG	Site 3	Center Line
10031	1481917.21	1516148.167	4945.541	THLWG	Site 3	Center Line
10030	1481906.476	1516188.215	4945.524	THLWG	Site 3	Center Line
10029	1481824.493	1516284.868	4945.23	THLWG	Site 3	Center Line
10028	1481755.358	1516356.386	4945.195	THLWG	Site 3	Center Line
10026	1481776.207	1516488.634	4944.927	THLWG	Site 3	Center Line
10025	1481769.318	1516497.501	4945.071	THLWG	Site 3	Center Line
10027	1481766.828	1516503.628	4945.055	THLWG	Site 3	Center Line
10024	1481721.813	1516538.783	4944.986	THLWG	Site 3	Center Line
10023	1481710.22	1516625.572	4944.446	THLWG	Site 3	Center Line
10022	1481679.017	1516629.927	4960.617	THLWG	Site 3	Center Line
10021	1481648.956	1516641.019	4944.999	THLWG	Site 3	Center Line
10020	1481580.893	1516659.145	4945.027	THLWG	Site 3	Center Line
10019	1481558.387	1516677.887	4944.008	THLWG	Site 3	Center Line
10014	1481517.552	1516759.987	4944.833	THLWG	Site 3	Center Line
10013	1481405.881	1516901.947	4944.886	THLWG	Site 3	Center Line
10012	1481362.001	1516959.536	4945.22	GRND	Site 3	Center Line
10011	1481356.379	1516964.38	4945.213	GRND	Site 3	Center Line
10010	1481349.66	1516975.324	4945.161	GRND	Site 3	Center Line

### Route 66 High Flow Channel C-Cross Section Data

Route 66   HFC-C						
Cross Section 1						
Number	Northing	Easting	Elevation	Description	Site	Type
20044	1483281	1514680	4950.17	REBAR L	Site 3	Cross Section 1
20043	1483283	1514678	4949.64	TOP	Site 3	Cross Section 1
20042	1483289	1514675	4949.1	TOE	Site 3	Cross Section 1
20038	1483299	1514665	4949.04	GROUND	Site 3	Cross Section 1
20037	1483315	1514644	4948.96	GROUND	Site 3	Cross Section 1
20034	1483331	1514630	4948.91	GROUND	Site 3	Cross Section 1
20035	1483338	1514614	4949.12	TOE	Site 3	Cross Section 1
20036	1483338	1514610	4950	TOP	Site 3	Cross Section 1
20032	1483340	1514609	4950.07	TOP	Site 3	Cross Section 1
20031	1483341	1514605	4950.71	REBAR R	Site 3	Cross Section 1
Cross Section 2						
Number	Northing	Easting	Elevation	Description	Site	Type
20045	1483272	1514663	4950.08	REBAR L	Site 3	Cross Section 2&3
20049	1483272	1514653	4949.83	TOP	Site 3	Cross Section 2
20050	1483274	1514650	4948.9	TOE	Site 3	Cross Section 2
20051	1483276	1514643	4948.22	GROUND	Site 3	Cross Section 2
20055	1483278	1514635	4948.32	TOE	Site 3	Cross Section 2
20054	1483278	1514630	4949.23	TOP	Site 3	Cross Section 2
20053	1483278	1514624	4950.14	REBAR R	Site 3	Cross Section 2
Cross Section 3						
Number	Northing	Easting	Elevation	Description	Site	Type
20045	1483272	1514663	4950.08	REBAR L	Site 3	Cross Section 3
20046	1483278	1514660	4949.65	TOP	Site 3	Cross Section 3
20047	1483282	1514660	4949.22	TOE	Site 3	Cross Section 3
20048	1483285	1514656	4948.89	GROUND	Site 3	Cross Section 3
20052	1483295	1514641	4949.01	GROUND	Site 3	Cross Section 3
20059	1483305	1514624	4948.52	GROUND	Site 3	Cross Section 3
20058	1483306	1514615	4948.82	TOE	Site 3	Cross Section 3
20057	1483306	1514610	4949.95	TOP	Site 3	Cross Section 3
20056	1483308	1514604	4950.3	REBAR R	Site 3	Cross Section 3

**Cross Section 1**

Distance (X)	Elevation (Y)
1	4950.1
2	4949.8
3	4949.6
4	4949.5
5	4949.4
6	4949.5
7	4950.0
8	4950.4
9	4950.6
10	4951.0

**Cross Section 2**

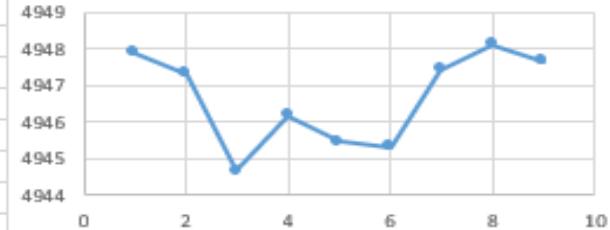
Distance (X)	Elevation (Y)
1	4950.1
2	4949.9
3	4949.7
4	4949.4
5	4949.3
6	4949.5
7	4950.0
8	4950.4

**Cross Section 3**

Distance (X)	Elevation (Y)
1	4950.1
2	4949.8
3	4949.5
4	4949.3
5	4949.5
6	4948.6
7	4949.0
8	4950.1
9	4950.4

Cross Section 4												
Number	Northing	Easting	Elevation	Description	Site	Type						
20028	1481938	1516140	4947.9	GROUND	Site 3	Cross Section 4						
20026	1481922	1516130	4947.32	TOP	Site 3	Cross Section 4						
20027	1481918	1516130	4944.67	REBAR L	Site 3	Cross Section 4						
20024	1481914	1516128	4946.18	TOE	Site 3	Cross Section 4						
20025	1481907	1516128	4945.45	CENTER	Site 3	Cross Section 4						
20023	1481902	1516127	4945.32	TOE	Site 3	Cross Section 4						
20022	1481900	1516127	4947.44	TOP	Site 3	Cross Section 4						
20029	1481885	1516120	4948.13	REBAR R	Site 3	Cross Section 4						
20021	1481879	1516121	4947.67	GROUND	Site 3	Cross Section 4						

Cross Section 4



## Cross Section 6

Number	Northing	Easting	Elevation	Description	Site	Type
10009	1481404	1516968	4947.68	REBAR L	Site 3	Cross Section 5&6
10008	1481396	1516976	4945.81	TOE	Site 3	Cross Section 6
10004	1481381	1516978	4945.35	GRND	Site 3	Cross Section 6
10005	1481375	1516984	4945.68	GRND	Site 3	Cross Section 6
20004	1481364	1516985	4945.61	GROUND	Site 3	Cross Section 6
10002	1481350	1516994	4945.54	GRND	Site 3	Cross Section 6
10001	1481340	1516995	4945.54	TOE	Site 3	Cross Section 6
10000	1481333	1516998	4947.05	REBARRIGHT	Site 3	Cross Section 6

Cross Section 6

