



# **DRAINAGE DESIGN MANAGEMENT SYSTEM FOR WINDOWS VERSION 5.6.0**

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## **TUTORIAL # 14 LATERAL EROSION ANALYSIS**

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**KVL Consultants, Inc.**

# LATERAL EROSION ANALYSIS

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# RIPRAP SIZING ANALYSIS FOR BANK PROTECTION

DATE UPDATED: MAY 1, 2018

## 1.0 PROBLEM STATEMENT

To estimate the lateral erosion corridor for a watercourse as a basis to protect the public from potential flood encroachments caused by unmitigated lateral bank migration.

The following data are provided for this tutorial:

❖ The Cross Section “*LATEROS1*”

➤ Parameters for Hydraulics and Geometry:

- **Design Flow Rate (cfs):** 3200
- **Channel Slope (ft/ft):** 0.015
- **Design Manning’s n for Main Channel:** 0.035
- **Design Manning’s n for LOB:** 0.045
- **Design Manning’s n for ROB:** 0.050

➤ The geometric data (station and elevation) of the cross section:

Station (X)	Elevation (Y)	Notes
0	165.0	
200	164.9	
215	164.5	<i>FEMA Floodway Left Station</i>
275	164.3	
318	164.1	<i>Left Bank Station</i>
320	163.9	
321	163.85	
325	163.8	
340	163.6	
345	160.0	
350	159.9	
355	159.6	<i>Thalweg Station</i>
365	159.7	
370	160.0	
375	161.0	
380	163.0	<i>Right Bank Station</i>

Station (X)	Elevation (Y)	Notes
390	163.2	
420	164.0	FEMA Floodway Right Station
515	164.3	
600	164.6	
900	165.0	

➤ Data for Alternative Analyses

**(a) Alternative Scenario #1: No Data Available**

- Channel Depth, D (ft): 4.5

**(b) Alternative Scenario #2: Scour Data Available**

- Channel Depth, D (ft): 4.5
- Scour Depth, Zt (ft): 12.0

**(c) Alternative Scenario #3: Scour and Historical Data are Available**

- Channel Depth, D (ft): 4.5
- Scour Depth, Zt (ft): 12.0
- Left Historical Lateral Erosion Distance, Lh (ft) 85.0
- Right Historical Lateral Erosion Distance, Rh (ft) 85.0

**(d) Alternative Scenario #4: Scour, Historical Data and Cross Section Data are Available**

- Cross Section ID: LATEROS1
- Scour Depth, Zt (ft): 12.0
- Left Historical Lateral Erosion Distance, Lh (ft) 85.0
- Right Historical Lateral Erosion Distance, Rh (ft) 85.0
- FEMA Floodway Left Station 215.0
- FEMA Floodway Right Station 420.0
- Thalweg Station 355.0

## 2.0 STEP-BY-STEP PROCEDURES

Step 1: Establish a New Project and Default Set-up

Step 2: Prepare the Cross Section Geometry

Step 3: Import Cross Section and Hydraulic Data

Step 4: Calculate Lateral Erosion Distance

- (a) Scenario #1 – No Data Available
- (b) Scenario #2 – Scour Data Available
- (c) Scenario #3 – Scour and Historical Data Available
- (d) Scenario #4 – Scour, Historical and Cross Section Data Available

Step 5: Report and Documentation of Results

## 2.1 STEP 1 - ESTABLISH A NEW PROJECT AND DEFAULTS SET-UP

- (a) Click the **DDMSW** icon on the Desktop or Program menu to launch the **DDMSW**. Click **OK** to accept the software disclaimer as is shown in the following figure.



After the **DDMSW** is launched, the **SELECT PROJECT** window is automatically opened as is shown in the following figure.

Reference	Date	ID	Title
RIPRAPSIZINGFCD	01/01/2012	00054	River Mechanics Example - Riprap Sizing
SEDIMENTYIELD1	03/03/2016	00060	River Mechanics Example - Sediment Yield
SEDIMENTYIELDFCD	01/01/2012	00055	River Mechanics Example - Sediment Yield
TASK1110_LATEROSION	02/29/2016	00088	Assignment No. 4 - Task 1.1.10_Lenth to Distance Labeling
TASK1111_LATEROSION	02/29/2016	00089	Assignment No. 4 - Task 1.1.11_Lateral Erosion Project
TASK1111_SCOUR	02/29/2016	00090	Assignment No. 4 - Task 1.1.11_Import Total Scour
TASK1112_LRIPRAP	02/29/2016	00091	Assignment No. 4 - Task 1.1.12_Launchable Riprap
TASK1112_RIPRAP	02/29/2016	00092	Assignment No. 4 - Task 1.1.12_Import Riprap and Scour Val
TASK1112_SCOUR	02/29/2016	00093	Assignment No. 4 - Task 1.1.12_Import Riprap and Scour
TASK1113_RIPRAP	02/29/2016	00099	River Mechanics Example - Riprap Sizing
TASK1113_SCOUR	02/29/2016	00097	Assignment No. 4 - Task 1.1.13_Import Riprap and Scour
TASK1114_SYIELD	02/29/2016	00100	Assignment No. 4 - Task 1.1.4_Add Comment Box to the Was
TASK1115_SYIELD	02/29/2016	00101	Assignment No. 4 - Task 1.1.4_Add Comment Box to the Was
TASK1116_NEWPROJ2	02/29/2016	00102	Task 1.1.16 - Import HEC-1 File
TASK1118_EXAMPLE1	02/29/2016	00103	Assignment No. 4 - Task 1.1.18_Q Format and NSTPS Correc
TASK1119_CALCULATOR	02/29/2016	00104	Assignment No. 4 - Task 1.1.19_Street Drainage Calculator

- (b) Click the **Add** button on the **SELECT PROJECT** window to start a new project (or you can start a new project by **File ➔ New Project**).
- (c) On the **NEW PROJECT OPTIONS** form, select **River Mechanics** checkbox and click the **OK** button to close the form.
- (d) Type "**LATEROSION1**" into the **Reference** textbox. This is the name of this newly created project. The users can choose the name as long as it does not exist in the **DDMSW** database.
- (e) Type into the **Title** textbox a brief descriptive title of this project. (*Optional*)
- (f) Type into the **Location** textbox the location of this project. (*Optional*)
- (g) Type into the **Agency** textbox the agency or company name. (*Optional*)
- (h) Check **River Mechanics Only** checkbox for this project.
- (i) Type a detailed description of this project into the **Comment Box** under the **Project Reference** frame. (*Optional*)
- (j) Click the **Save** button to save the entered data.
- (k) Click the **OK** button on the **SELECT PROJECT** window, and then click **OK** on the pop-up message box. The following figure shows what the window looks like.

**Select Project**

**Project Reference**

Project ID: 00175    Reference: LATEROSION1

Title: Lateral Erosion Analysis Tutorial

Location: Maricopa County

Agency: Flood Control District of Maricopa County

☒ River Mechanics Only

**Project Defaults**

Soils: FCDMC

Land Use: FCDMC

This tutorial is set up to give a step-by-step instruction on how to use DDMSW to perform lateral erosion analysis.

Modification Date: 02/18/2016

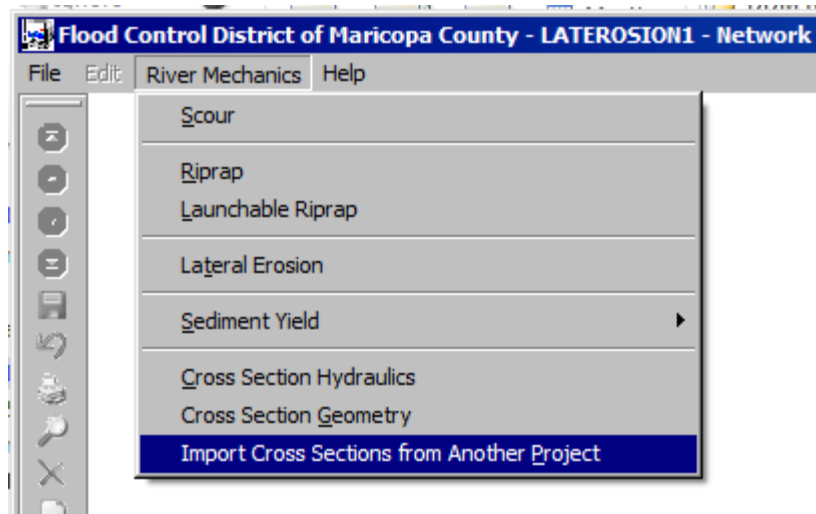
Info    Print...    Delete    Add    OK

**Note:** the **Project ID 00175** in the above figure is the database records unique read-only identifier of the project, which is automatically generated by the program when a new project is created. When the users create a new project, the **Project ID** of this new project will not be the same as the **Project ID** shown in the above figure.

## 2.2 STEP 2 – PREPARE THE CROSS SECTION AND HYDRAULICS DATA

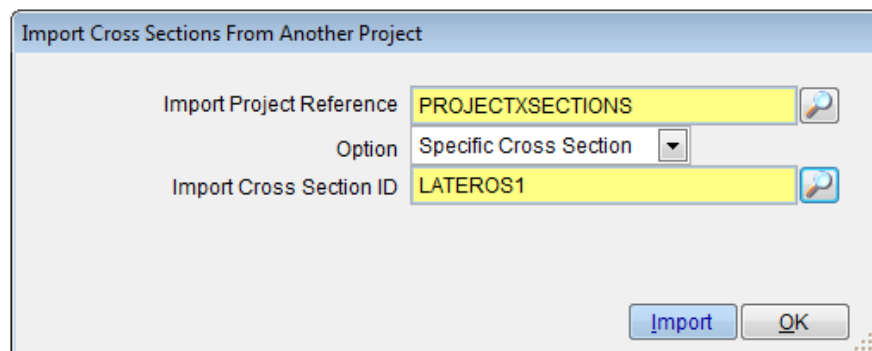
To develop the cross section and hydraulic data to be used for this project, the “*LATEROS1*” dataset will be used which will be imported from another project.

- (a) From the menu bar of main application window, click **River Mechanics** → **Import Cross Sections from Another Project** to open the **IMPORT CROSS SECTIONS FROM ANOTHER PROJECT** form.



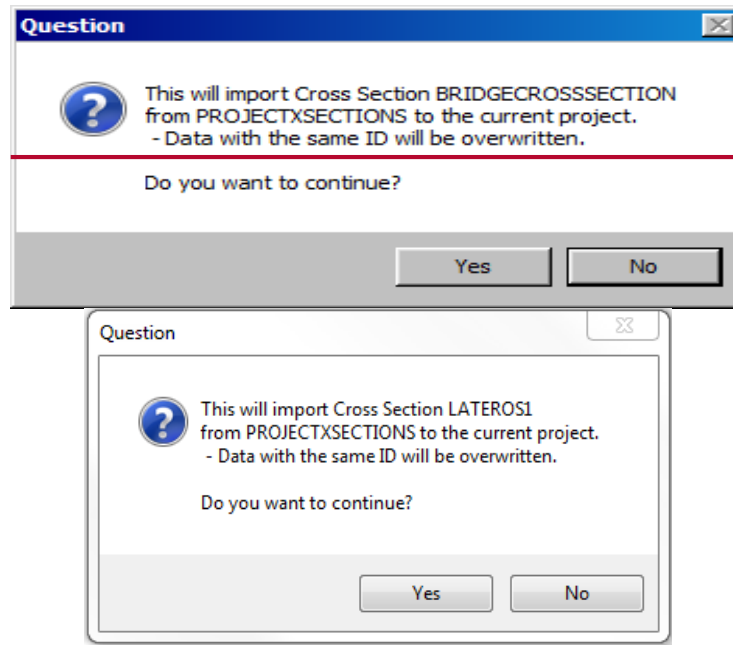
(b) On the **IMPORT CROSS SECTIONS FROM ANOTHER PROJECT** form, select the following settings:

- **Import Project Reference:** *PROJECTXSECTIONS*
- **Option:** *Specific Cross Section*
- **Import Cross Section ID:** *LATEROS1*

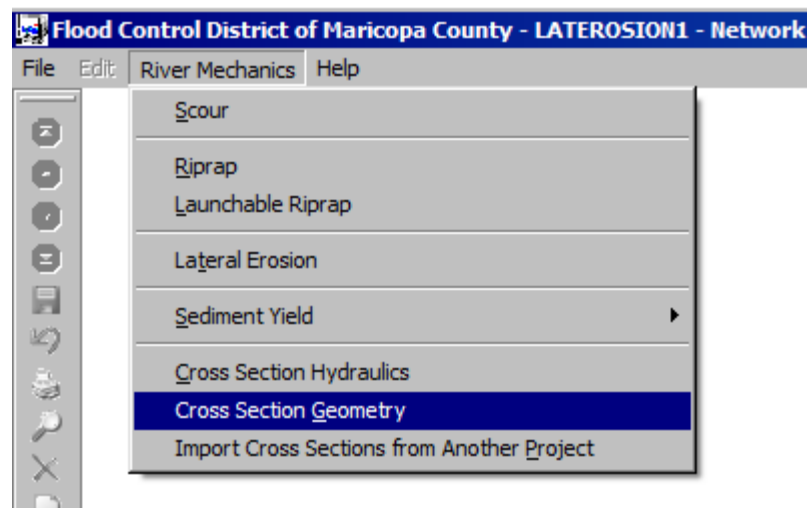


(c) Once the specified data have been selected, click the **Import** button. Select **Yes** to proceed, and hit **OK** to close the **IMPORT CROSS SECTION FROM ANOTHER PROJECT** form.





- (d) To check if the lateral erosion cross section data has been successfully imported, open the **NATURAL CROSS SECTIONS** form (**River Mechanics** → **Cross Section Geometry**).



- (e) On the form, select “*LATEROS1*” for the **Cross Section ID** by clicking the Selector button at the right side of the ID textbox.

**Natural Cross Sections**

X	Y
0.00	165.00
200.00	164.90
215.00	164.50
275.00	164.30
318.00	164.10
320.00	163.90
321.00	163.85
325.00	163.80
340.00	163.60
345.00	160.00
350.00	159.90
355.00	159.60
365.00	159.70
370.00	160.00
375.00	161.00
380.00	163.00
390.00	163.20
420.00	164.00
515.00	164.30
600.00	164.60
900.00	165.00

**Overbank**  
 Left: 318.00  
 Right: 380.00

☒ Graph current record

**Adjustments**  
 Elevation Adjustment (ft): 0.00  
 Adjust

**Cross Section**  
 ID: LATEROS1  
 X (ft): 900.00  
 Y (ft): 165.00  
 Delete and Confirm  
 Save & Add Record

Info Print... Delete Add OK

**Natural Cross Sections**

X	Y
0.00	165.00
200.00	164.90
215.00	164.50
275.00	164.30
318.00	164.10
320.00	163.90
321.00	163.85
325.00	163.80
340.00	163.60
345.00	160.00
350.00	159.90
355.00	159.60
365.00	159.70
370.00	160.00
375.00	161.00
380.00	163.00
390.00	163.20
420.00	164.00
515.00	164.30
600.00	164.60
900.00	165.00

**Overbank**  
 Left: 318.00  
 Right: 380.00

**FEMA Floodway**  
 Left: 215.00  
 Right: 420.00

**Thalweg**  
 355.00

☒ Graph current record  
☒ Lateral Erosion

**Adjustments**  
 Elevation Adjustment (ft): 0.00  
 Adjust

**Cross Section**  
 ID: LATEROS1  
 X (ft): 900.00  
 Y (ft): 165.00  
 Delete and Confirm  
 Save & Add Record

Info Print... Delete Add OK

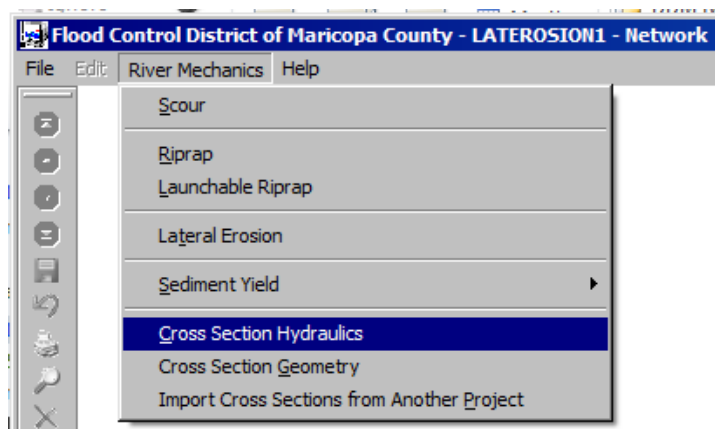
Floodway Overbank Thalweg

Compare the geometric data on the **NATURAL CROSS SECTIONS** form against the tabulated data listed below. Make necessary data edits or adjustments on the form, if necessary. Click **OK** to close the form.

Station (X)	Elevation (Y)	Notes
0	165.0	
200	164.9	
215	164.5	FEMA Floodway Left Station

Station (X)	Elevation (Y)	Notes
275	164.3	
318	164.1	<i>Left Bank Station</i>
320	163.9	
321	163.85	
325	163.8	
340	163.6	
345	160.0	
350	159.9	
355	159.6	<i>Thalweg Station</i>
365	159.7	
370	160.0	
375	161.0	
380	163.0	<i>Right Bank Station</i>
390	163.2	
420	164.0	<i>FEMA Floodway Right Station</i>
515	164.3	
600	164.6	
900	165.0	

- (f) Edit the cross section geometry, if necessary, and click **Save** to save all changes and revisions. Click **OK** to close and exit the **NATURAL CROSS SECTION** form.
- (g) To view the cross-section hydraulic data for this cross-section, open the **CROSS SECTION HYDRAULICS** form (**River Mechanics** ➔ **Cross Section Hydraulics**) and on the form select “**LATEROS1**” from the **Cross Section ID** listing.

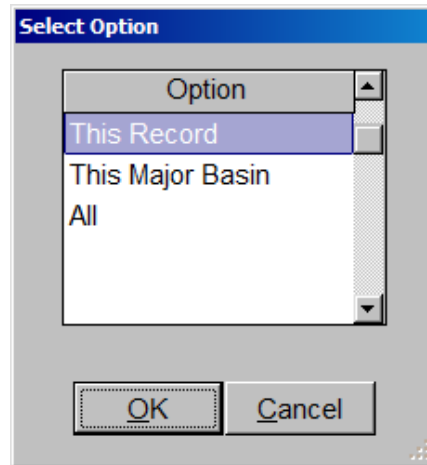


- (h) On the **CROSS SECTION HYDRAULICS** form, ensure that the **Source** is set to “*Calculate Data*”. Check to ensure that the imported data values for **Flow Rate (cfs)**, **Slope (ft/ft)**, and **Manning’s n (Channel, LOB, and ROB)** are the project values specified for this project, otherwise, edit and modify them.

The project data are provided below:

- **Design Flow Rate (cfs):** 3200
- **Channel Slope (ft/ft):** 0.015
- **Design Manning’s n for Main Channel:** 0.035
- **Design Manning’s n for LOB:** 0.045
- **Design Manning’s n for ROB:** 0.050

- (i) Click **Save** to save the edits, if you have made any.
- (j) To recalculate or update the hydraulic analysis on this form, click **Update**.
- (k) Select “*This Record*” from the **SELECT OPTION** form. Click **OK** to close the form.



(l) Click **Yes** on the **UPDATE CROSS SECTION HYDRAULICS** form to continue.

(m) Click **OK** to close the form.

## 2.3 STEP 3 - CALCULATE LATERAL EROSION DISTANCE

Four (4) analysis scenarios will be presented in this tutorial. These different scenarios are dependent on availability of data for analysis. These scenarios include: (a) no data; (b) with scour data; (c) with scour and historical data; and (d) with scour, historical, and cross section data.

### 2.3.1 Scenario #1 - No Data

- (a) On the **RIVER MECHANICS – LATERAL EROSION** form (**River Mechanics → Lateral Erosion → Details** tab), make sure that all the check boxes in the **Available Data** frame are unchecked.
- (b) Click **Add** to enter a new data and type in "**LOCID**" on the **Location ID** textbox.
- (c) Type in "**4.5**" into the **Channel Depth, D (ft)** textbox. This information is assumed to be the field estimate made on the channel depth.

(d) Click **Save** to save the data entered.

(e) To calculate the **Lateral Erosion Distance, L (ft)**, click the **Update** button and select “*This Record*” from the **SELECT OPTION** form. Click **OK** to close the form.

(f) Click **Yes** when the **CALCULATE LATERAL EROSION** form opens.

The following screen capture below shows the results of the analysis. The only data used was a field estimate of the **Channel Depth, D (ft)** at the location of interest.

### 2.3.2 Scenario #2 – Scour Data Available

- (a) On the **RIVER MECHANICS – LATERAL EROSION** form (**River Mechanics → Lateral Erosion**), check the **Scour** checkbox and leave the other two checkboxes unchecked.
- (b) Type in “12.00” into the **Scour Depth, Zt (ft)** textbox, while keeping the value of the **Channel Depth, D (ft)** at “4.50”. Click **Save**.

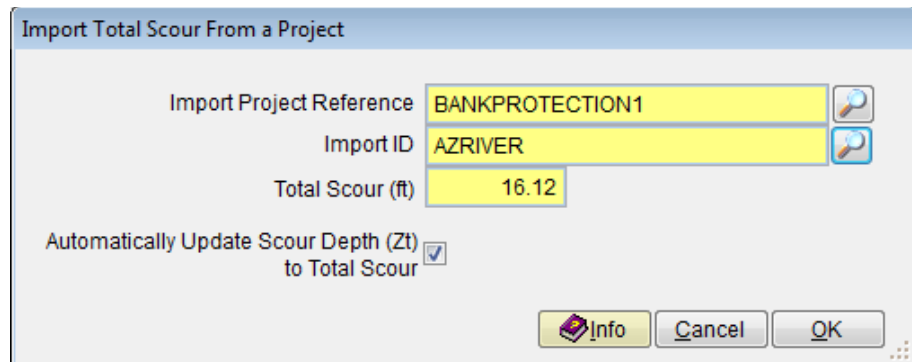
- (c) To calculate the **Lateral Erosion Distance, L (ft)** for the manually entered data, click the **Update** button and select “This Record” from the **SELECT OPTION**

form. Click **Yes** to continue. Note that the estimated **Lateral Erosion Distance, L (ft)** is **99 ft**.

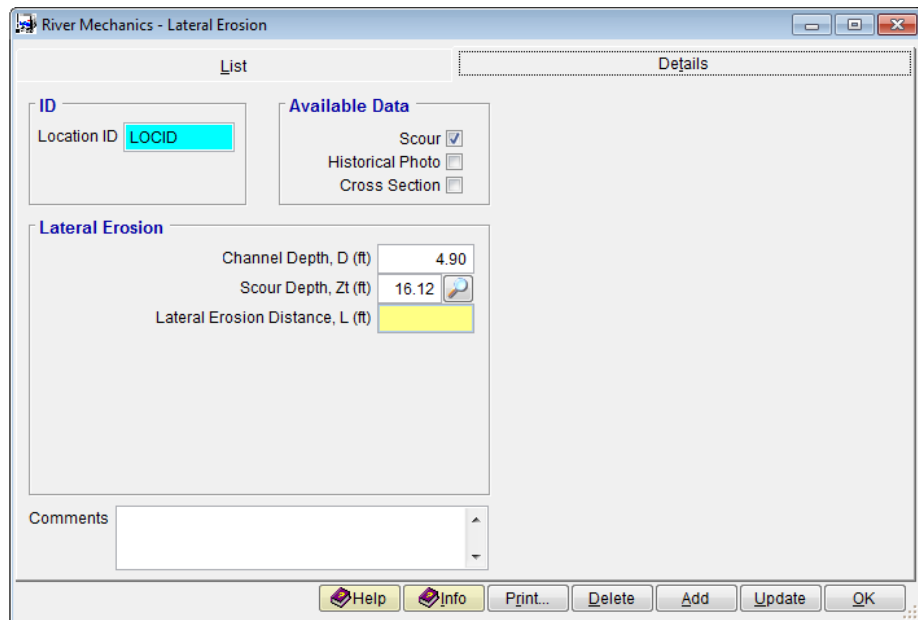
(d) As an alternative to the manual entries made, **DDMSW** has the capability to import the value from a scour analysis project. To use this import feature, click the magnifying glass across the **Scour Depth, Zt (ft)** textbox.

(e) On the **IMPORT TOTAL SCOUR FROM A PROJECT** form, use the following data:

- **Import Project Reference:** *BANKPROTECTION1*
- **Import ID:** *AZRIVER*
- **Automatically Update Scour Depth (Zt) to Total scour Checkbox** *Check*

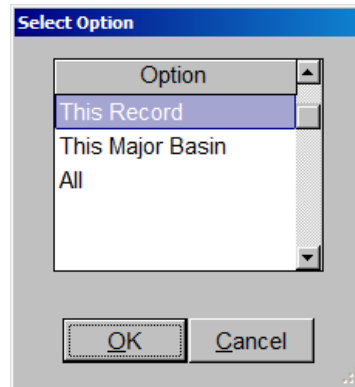


Click **OK** to close the form. [Note that the **Scour Depth, Zt (ft)** value has changed from “12.00” to “16.12”].

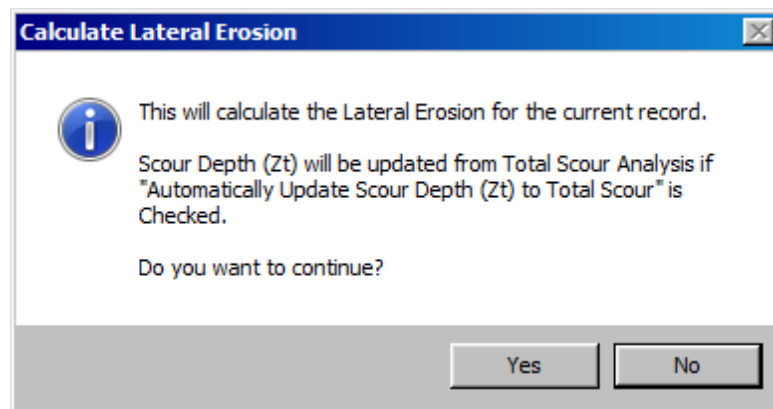




- (f) To calculate the **Lateral Erosion Distance, L (ft)**, click the **Update** button and select *"This Record"* from the **SELECT OPTION** form. Click **OK** to close the form.



- (g) Click **Yes** when the **CALCULATE LATERAL EROSION** form opens.



The screen capture below shows the results of the lateral erosion analysis where scour data is available, in addition to the field estimate of **Channel Depth, D (ft)** at "4.50" ft.

**River Mechanics - Lateral Erosion**

**List** **Details**

**ID**  
Location ID:

**Available Data**  
 Scour ☒  
 Historical Photo ☐  
 Cross Section ☐

**Lateral Erosion**  
 Channel Depth, D (ft)   
 Scour Depth, Zt (ft)   
 Lateral Erosion Distance, L (ft)

Comments

Help Info Print... Delete Add Update OK

### 2.3.3 Scenario #3 – Scour and Historical Data Available

- (a) On the **RIVER MECHANICS – LATERAL EROSION** form (**River Mechanics** → **Lateral Erosion**), make sure that the **Scour** and **Historical Photo** checkboxes are checked. Leave the **Cross Section** checkbox unchecked.

**River Mechanics - Lateral Erosion**

**List** **Details**

**ID**  
Location ID:

**Available Data**  
 Scour ☒  
 Historical Photo ☒  
 Cross Section ☐

**Lateral Erosion**  
 Channel Depth, D (ft)   
 Scour Depth, Zt (ft)   
 Left Historical Lateral Erosion Distance, Lh (ft)   
 Right Historical Lateral Erosion Distance, Lh (ft)   
 Left Lateral Erosion Distance, Ll (ft)   
 Right Lateral Erosion Distance, Lr (ft)

Comments

Help Info Print... Delete Add Update OK

- (b) Type in “85.0” into the **Left Historical Lateral Erosion Distance, Lh (ft)** and the **Right Historical Lateral Erosion distance, Lh (ft)** textboxes. Leave the **Channel Depth, D (ft)** value at “4.50” and the **Scour Depth, Zt (ft)** at “16.1299” unchanged. Click **Save** to save the data.

- (c) To calculate the **Lateral Erosion Distance, L (ft)**, click the **Update** button and select *"This Record"* from the **SELECT OPTION** form. Click **OK** to close the form.

**River Mechanics - Lateral Erosion**

**List** | **Details**

**ID**  
Location ID: **LOCID**

**Available Data**  
Scour ☒  
Historical Photo ☒  
Cross Section ☐

**Lateral Erosion**

Channel Depth, D (ft)	4.90
Scour Depth, Zt (ft)	16.12
Left Historical Lateral Erosion Distance, Lh (ft)	85.0
Right Historical Lateral Erosion Distance, Lh (ft)	85.0
Left Lateral Erosion Distance, Li (ft)	
Right Lateral Erosion Distance, Lr (ft)	

Comments

Help Info Print... Delete Add Update OK

**Select Option**

Option

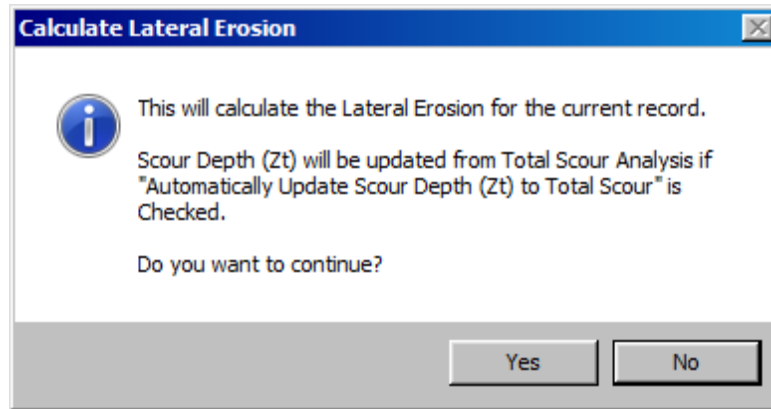
This Record

This Major Basin

All

OK Cancel

- (d) Click **Yes** when the **CALCULATE LATERAL EROSION** form opens.



The screen capture below shows the results of the lateral erosion analysis where scour and historical data are available, in addition to the field estimate of **Channel Depth, D (ft)** at “4.50” ft.

Lateral Erosion	
Channel Depth, D (ft)	4.90
Scour Depth, Zt (ft)	16.12
Left Historical Lateral Erosion Distance, Lh (ft)	85.0
Right Historical Lateral Erosion Distance, Lh (ft)	85.0
Left Lateral Erosion Distance, Li (ft)	148.1
Right Lateral Erosion Distance, Lr (ft)	148.1

#### 2.3.4 Scenario #4 – Scour, Historical and Cross Section Data Available

- (a) On the **RIVER MECHANICS – LATERAL EROSION** form (**River Mechanics → Lateral Erosion**), make sure that all the checkboxes (i.e., **Scour**, **Historical Photo**, and **Cross Section**) are checked.

**River Mechanics - Lateral Erosion**


**List**

ID  
Location ID:

**Available Data**

Scour ☒  
 Historical Photo ☒  
 Cross Section ☒

**Details**

**Cross Section**  
 Section ID:  

**Lateral Erosion**

Channel Depth, D (ft)   
 Scour Depth, Zt (ft)   
 Left Historical Lateral Erosion Distance, Lh (ft)   
 Right Historical Lateral Erosion Distance, Lh (ft)   
 Left Lateral Erosion Distance, Li (ft)   
 Right Lateral Erosion Distance, Lr (ft)   
 Left Lateral Erosion Station (ft)   
 Right Lateral Erosion Station (ft)   
 Comments

**Cross Section Data**

	Station (ft)	Elevation (ft)
<b>Overbank</b>		
Left	318.0	164.10
Right	380.0	163.00
<b>FEMA Floodway</b>		
Left	215.0	164.50
Right	420.0	164.00
<b>Thalweg</b>	355.0	159.60
<b>Opposite Side</b>	571.7	164.50

- (b) To access the Cross Section Data for this project, click the **Selector** button (Magnifying glass) to the right of the **Section ID** textbox. On the **SELECT CROSS SECTION ID** form, select the "LATEROS1" from the list.

**Lateral Erosion Cross Section IDs**

Look for

ID	Description
LATEROS1	Lateral erosion first cross section

**Cross Section ID**

Section ID:   
 Description:

- (c) Click **OK** to close the **SELECT CROSS SECTION ID** form.

The screenshot shows the 'River Mechanics - Lateral Erosion' software window. It is divided into several sections:

- ID:** Location ID is 'LOCID'.
- Available Data:** Scour, Historical Photo, and Cross Section are all checked.
- Cross Section:** Section ID is 'LATEROSXSECTION'. Buttons for 'X Section Data', 'X Section IDs', and 'Graph' are present.
- Lateral Erosion:**
  - Channel Depth, D (ft): 4.90 (circled in red)
  - Scour Depth, Zt (ft): 16.09
  - Left Historical Lateral Erosion Distance, Lh (ft): 85.0
  - Right Historical Lateral Erosion Distance, Lh (ft): 85.0
  - Left Lateral Erosion Distance, Li (ft): (empty)
  - Right Lateral Erosion Distance, Lr (ft): (empty)
  - Left Lateral Erosion Station (ft): (empty)
  - Right Lateral Erosion Station (ft): (empty)
- Cross Section Data:**
  - Overbank:**

	Station (ft)	Elevation (ft)
Left	318.0	164.10
Right	380.0	163.00
  - FEMA Floodway:**

	Station (ft)	Elevation (ft)
Left	218.0	164.50 (circled in red)
Right	420.0	164.00
  - Thalweg:**

	Station (ft)	Elevation (ft)
	358.0	159.60 (circled in red)
  - Opposite Side:**

	Station (ft)	Elevation (ft)
	571.7	164.50

At the bottom, there are buttons for Help, Info, Print..., Delete, Add, Update, and OK.

Note that by using the Cross Section Data, the “**Channel Depth, D (ft)**” textbox becomes “inactive” and a new value of the Channel Depth had replaced the manual data entered. This new value of the Channel Depth is the difference between the **FEMA Floodway Elevation** and the **Thalweg Elevation** (i.e.,  $164.50 - 159.60 = 4.90$  ft).

- (d) On the **RIVER MECHANICS – LATERAL EROSION** form, click on the **X Section Data** button to view the **LATERAL EROSION CROSS SECTION** form that shows the cross section data and plot identifying the location of the banks and the FEMA Floodway limits.

**Lateral Erosion Cross Section**

X	Y
0.00	165.00
200.00	164.90
215.00	164.50
275.00	164.30
318.00	164.10
320.00	163.90
321.00	163.85
325.00	163.80
340.00	163.60
345.00	160.00
350.00	159.90
355.00	159.60
365.00	159.70
370.00	160.00
375.00	161.00
380.00	163.00
390.00	163.20
420.00	164.00
515.00	164.30
600.00	164.60
900.00	165.00

**Overbank**  
 Left: 318.00  
 Right: 380.00

**FEMA Floodway**  
 Left: 215.00  
 Right: 420.00

**Thalweg**  
 355.00

☒ Graph current record

**Adjustments**  
 Elevation Adjustment (ft): 0.00 [Adjust]

**Cross Section**  
 ID: LATEROS1  
 X (ft): 420.00 [Delete and Confirm]  
 Y (ft): 164.00 [Save & Add Record]

[Floodway] [Overbank] [Thalweg] [Info] [Print...] [Delete] [Add] [OK]

(e) Click **OK** to close the **LATERAL EROSION CROSS SECTION** form.

(f) To calculate the **Left Lateral Erosion Distance LI (ft)**, and the **Right Lateral Erosion Distance, Lr (ft)**, click the **Update** button.

**River Mechanics - Lateral Erosion**

**List**

ID: Location ID: LOCID

**Available Data**  
 Scour ☒  
 Historical Photo ☒  
 Cross Section ☒

**Cross Section**  
 Section ID: LATEROS1  
 [X Section Data] [X Section IDs] [Graph]

**Lateral Erosion**

Channel Depth, D (ft)	4.90
Scour Depth, Zt (ft)	16.12
Left Historical Lateral Erosion Distance, Lh (ft)	85.0
Right Historical Lateral Erosion Distance, Lh (ft)	85.0
Left Lateral Erosion Distance, LI (ft)	148.1
Right Lateral Erosion Distance, Lr (ft)	148.1
Left Lateral Erosion Station (ft)	66.9
Right Lateral Erosion Station (ft)	719.8

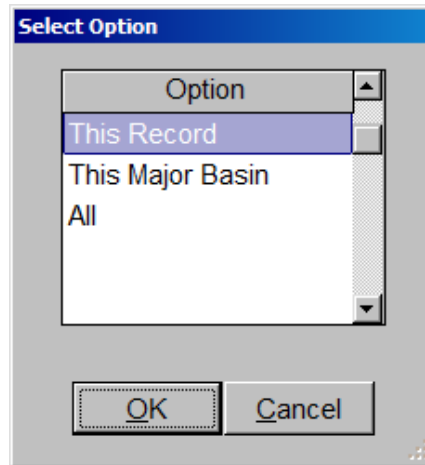
Comments: [Text Area]

**Cross Section Data**

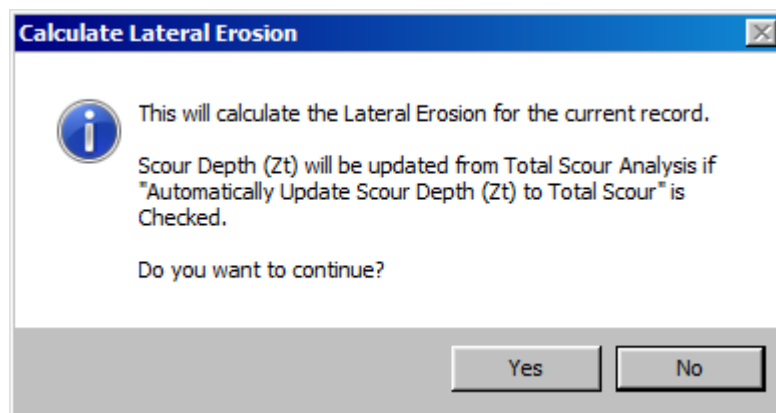
	Station (ft)	Elevation (ft)
<b>Overbank</b>		
Left	318.0	164.10
Right	380.0	163.00
<b>FEMA Floodway</b>		
Left	215.0	164.50
Right	420.0	164.00
<b>Thalweg</b>		
	355.0	159.60
<b>Opposite Side</b>		
	571.7	164.50

[Help] [Info] [Print...] [Delete] [Add] [Update] [OK]

(g) When the **SELECT OPTION** form appears, highlight **"This Record"** and click **OK** to close the form.



(h) Click **Yes** when the **CALCULATE LATERAL EROSION** form opens.



The screen capture provided below shows the results of the lateral erosion analysis where scour depth, historical data, and cross-section data are available. The summary of the results are:

- **Left Lateral Erosion Distance, LI (ft):** **148.0**
- **Right Lateral Erosion Distance, Lr (ft):** **148.0**
- **Left lateral Erosion Station (ft):** **67.0**
- **Right Lateral Erosion Station (ft):** **719.7**



**River Mechanics - Lateral Erosion**

**List** | **Details**

**ID**  
Location ID: **LOCID**

**Available Data**  
☒ Scour  
☒ Historical Photo  
☒ Cross Section

**Cross Section**  
 Section ID: **LATEROSXSECTION**

**Lateral Erosion**

Channel Depth, D (ft): **4.90**  
 Scour Depth, Zt (ft): **16.09**  
 Left Historical Lateral Erosion Distance, Lh (ft): **85.0**  
 Right Historical Lateral Erosion Distance, Lh (ft): **85.0**  
**Left Lateral Erosion Distance, Li (ft): **148.0****  
**Right Lateral Erosion Distance, Lr (ft): **148.0****  
**Left Lateral Erosion Station (ft): **67.0****  
**Right Lateral Erosion Station (ft): **719.7****

**Cross Section Data**

Overbank	Station (ft)	Elevation (ft)
Left	318.0	164.10
Right	380.0	163.00

**FEMA Floodway**

Left	215.0	164.50
Right	420.0	164.00

**Thalweg**

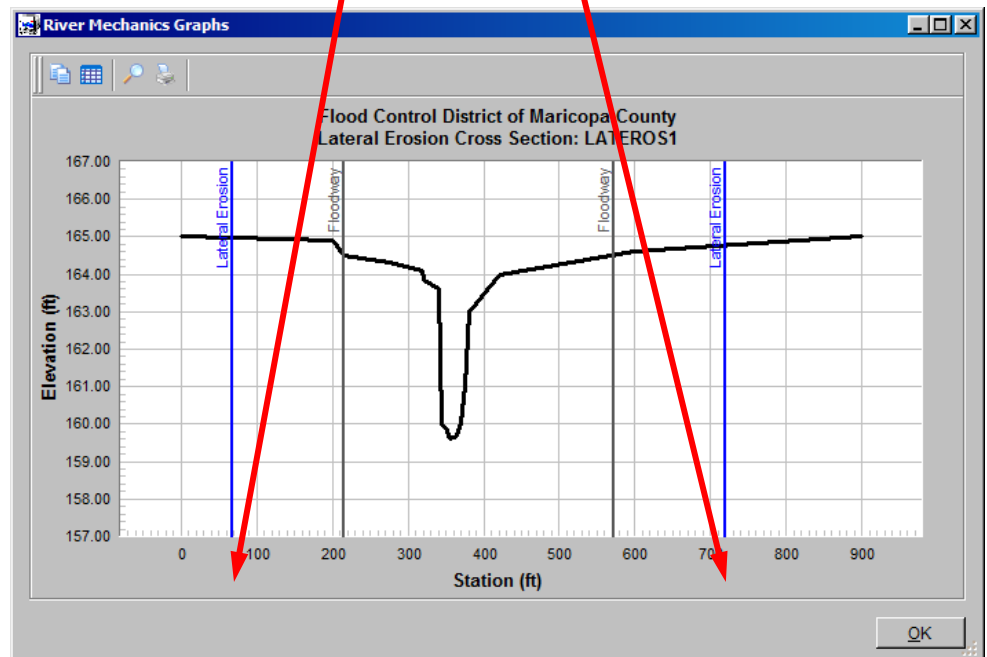
	355.0	159.60
--	-------	--------

**Opposite Side**

	571.7	164.50
--	-------	--------

Comments:

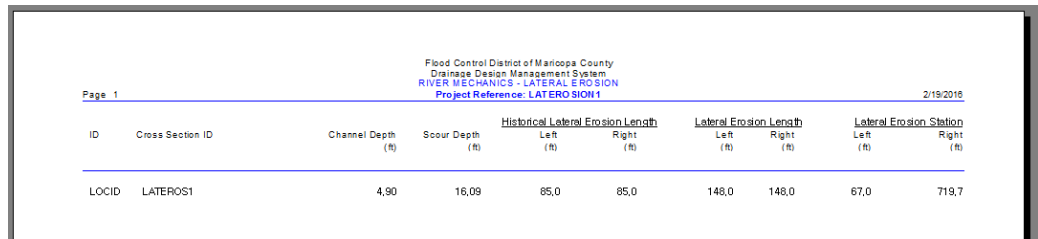
- (i) To view the plot of the Lateral Erosion analysis results, click the **Graph** button. As shown on the results plot, the extent of lateral erosion on the left bank is at Station 67.0 ft and the lateral erosion on the right bank is at Station 719.7 ft. To exit the **RIVER MECHANICS GRAPHS** form, click the OK button.





## 2.4 STEP 4 - REPORT AND DOCUMENTATION OF RESULTS

In this step, the instruction will be given on how to view, print, and export the calculation results of the lateral erosion analysis.

- (a) To view the Lateral Erosion report, click the **Print ...** button on the **RIVER MECHANICS – LATERAL EROSION** form.



Flood Control District of Maricopa County Drainage Design Management System RIVER MECHANICS - LATERAL EROSION Project Reference: LATERO SION 1									
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ID	Cross Section ID	Channel Depth (ft)	Scour Depth (ft)	Historical Lateral Erosion Length		Lateral Erosion Length		Lateral Erosion Station	
				Left (ft)	Right (ft)	Left (ft)	Right (ft)	Left (ft)	Right (ft)
LOCID	LATEROS1	4.90	16.09	85.0	85.0	148.0	148.0	67.0	719.7

- (b) To print the report, click the printer symbol (  ) at the top of the form.
- (c) To export the report to a PDF file or other file formats, click the export symbol (  ) at the top of the form.

This concludes the tutorial for the Lateral erosion Analysis.