BUREAU OF RECLAMATION

Project Description: Los Lunas RM 163 Conveyance Capacity Project

Middle Rio Grande Project, New Mexico
Upper Colorado Basin Region
Albuquerque Area Office
Technical Services Division

U.S. Department of the Interior

July 2021

Mission Statements

The Department of the Interior (DOI) conserves and manages the Nation's natural resources and cultural heritage for the benefit and enjoyment of the American people, provides scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honors the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

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Cover Photo: Photo taken from project site RM 163.4 – 163.6 looking downstream in May 2021. (USBR/Ari Posner)

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1 Project Background and Purpose

1.1 Background

The project site River Mile (RM) 163 is within the Los Lunas subreach, a section of the Middle Rio Grande (MRG) river extending from Isleta Diversion Dam (RM 169) to the community of Los Chaves (RM 153).

This subreach has a unique topography involving a semi-perched channel where the banks are higher in elevation than the adjacent floodplain and spoil levee toes. Therefore, once flows overbank the main channel banks, the water tends to move laterally down to the levee toe and then continues flowing downstream parallel to the levees. There are limited locations where the overbanked water can return to the main channel. During high flows these conditions result in saturated levee toes (sometimes leading to levee failure) and water stranding in the floodplain. In 2019, repairs of levee in this area cost the Middle Rio Grande Conservancy District (MRGCD) over 1.2 million dollars.

Anecdotal accounts state that in recent years the historic banks in the subreach are overbanking at progressively lower flowrates. Field measurements of water surface elevations (WSE) at different flow rates over years have also confirmed this. This can be attributed mostly to channel narrowing via vegetation encroachment and bank and bar sediment accretion, but minor channel bed aggradation between Isleta and the NM-6 bridge may also play a role. Factors contributing to the channel narrowing and aggradation include major changes to the hydrologic and sediment regimes of the MRG, with reduction in hydrologic peaks and a reduction in the volume and concentration of sediment. The hydrologic peak reduction as well as supplemental water releases in the growing season are likely contributors to vegetation encroachment and thus channel narrowing.

1.2 Location and Land Ownership

The project site is located approximately 2 miles above the NM6 bridge in Los Lunas, New Mexico. Within the project area, the land between the spoil bank levees is defined as the Rio Grande Floodway. Reclamation has river channel rectification and maintenance authority under the Flood Control Acts of 1948 and 1950 that established the Middle Rio Grande (MRG) Project. The spoil bank levees and adjacent riverside drains are part of MRGCD's MRG Project Works and are currently held in title by the United States, but only until title transfer from Reclamation to the MRGCD is completed in 2021.

The specific location of the site is between RM 161.3 – 164 as shown in Figure **1**. Also included in Figure **1** is the Maximum Construction Area which is approximated as 595 acres. This project site has been selected following a 2020 study for the Los Lunas subreach from Isleta Diversion Dam to RM 153 (Kuria and Klein, 2020). In this study, RM 163 – 164 East was identified as the location where overbanking happens first at about 2300 cubic feet per second (cfs) while RM 163 West identified as overbanking at around 3500cfs. No Isleta Pueblo Land will be disturbed in the context of this project. Due to the inverted cross section at this location, once overbanked, water flows to

the levee toe and flows downstream adjacent to the levees before draining back to the main channel at the NM6 bridge.

One feature in the project area is a man-made berm connected to the eastern spoil levee. The owner/installer of the berm is unknown but will be sought out prior to its potential removal.

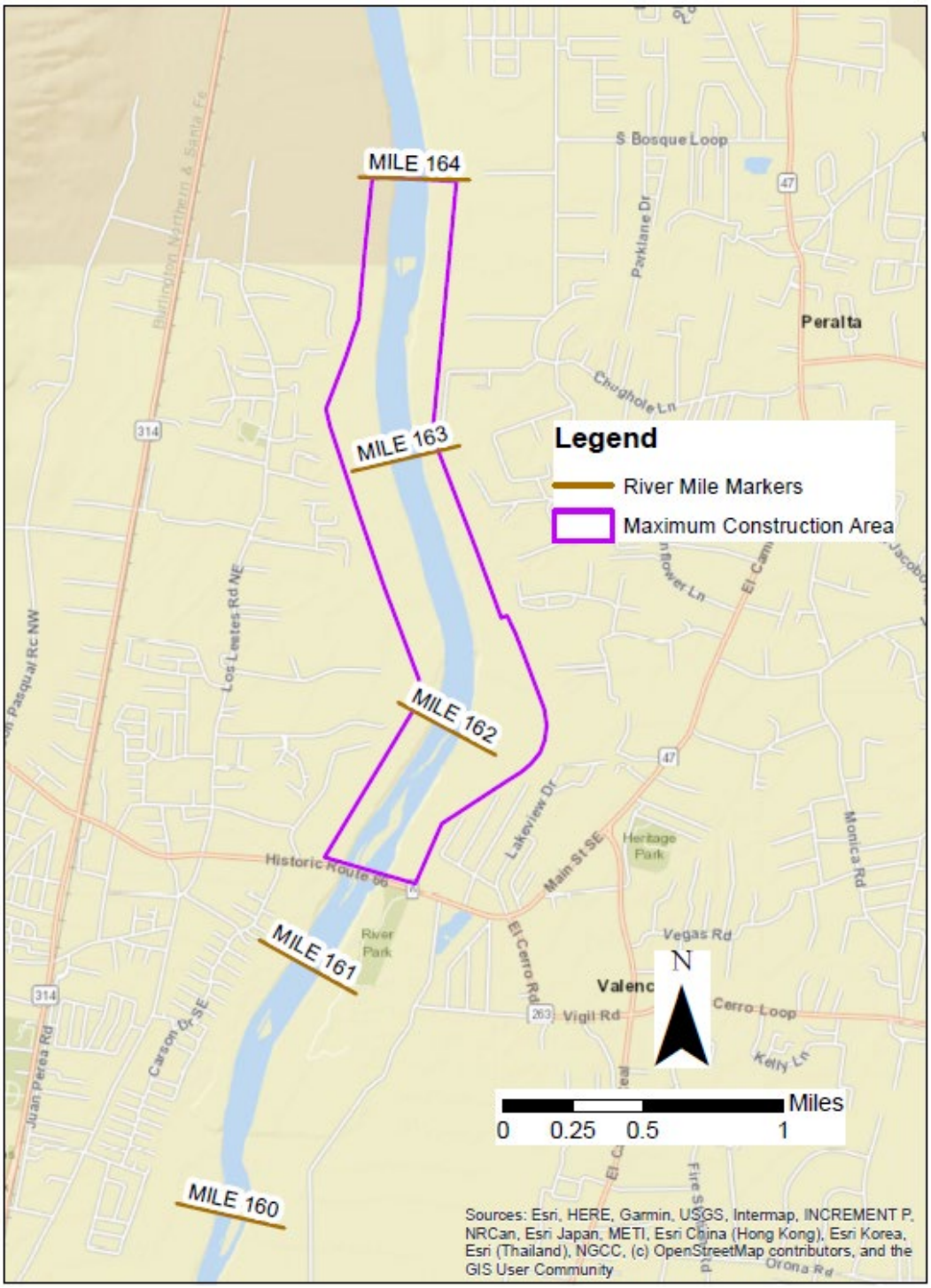

Figure 1: Project site location

1.3 Purpose

The purpose of the Los Lunas RM 163 project is to improve water conveyance through the Los Lunas subreach. The primary goal is to reduce the water surface elevation (WSE) by increasing channel capacity to prevent overbanking into the historic floodplain (defined here as the floodplain outside the 550-foot-wide channel established by jetty jacks in 1960s-1970s) at flows less than 3500 cfs between RM 164 and RM 162. This flow rate is a rough approximation of the 2-year flood flow as identified by Kuria and Klein, 2020. This type of work is considered River Maintenance Class 3a indicating that this work can be planned in advance and the consequences of no action are less likely to be substantial in the near term (the next normal spring runoff or within the next few years). Work can be described as preventative maintenance (Reclamation, 2014).

To keep the project within one construction season, the excavation is limited to less than 100,000 cubic yards (CY). However, more work is needed within the reach to improve conveyance capacity. Thus, this project will be a pilot project for a future width maintenance program which will include partner agency cooperation from MRGCD and the New Mexico Interstate Stream Commission (NMISC).

The secondary goals of this project are to consider the environmental and geomorphic benefits and impacts, and to be cost effective. Thus, project components were selected to include areas where encroaching vegetation and bar/island accretion have resulted in reduced channel capacity while keeping the excavations to less than 100,000 CY. Terraced banks were used to increase the inundated areas at lower flows in some of the areas where the project will be carried out, providing inundated nursery habitat for minnows.

2 Project Components

The project components consist of five bank lowering polygon areas withing the historic channel and one relic berm removal in the eastern historic floodplain. These project components will improve the channel conveyance by increasing the width of the river both on the west and east banks of the river. The relic berm will also be removed as it has been holding water on the floodplain against the levee and preventing the water from flowing downstream. The location of the five polygon areas where bank lowering will be done and removing of the relic berm are shown in Figure 2. These five polygon areas are identified by River miles (RM).

Table 1: Project components' identifying information

Project Component	River Mile Extents	Side of river	Type
RM 162 BL	RM 162.1 –162.9	West	Inset floodplain bank lowering
RM 163.1 BL	RM 163.1 – 163.3	West	Inset floodplain bank lowering
RM 163.3 East BL	RM 163.3 – 163.4	East	Inset floodplain bank lowering
RM 163.4 BL	RM 163.4 – 165.5	West	Inset floodplain bank lowering

Project Component	River Mile Extents	Side of river	Type
RM 163.6 BL	RM 163.6 – 163.8	West	Inset floodplain bank lowering
Berm removal	RM 163.4 – 163.6	East	Relic berm removal

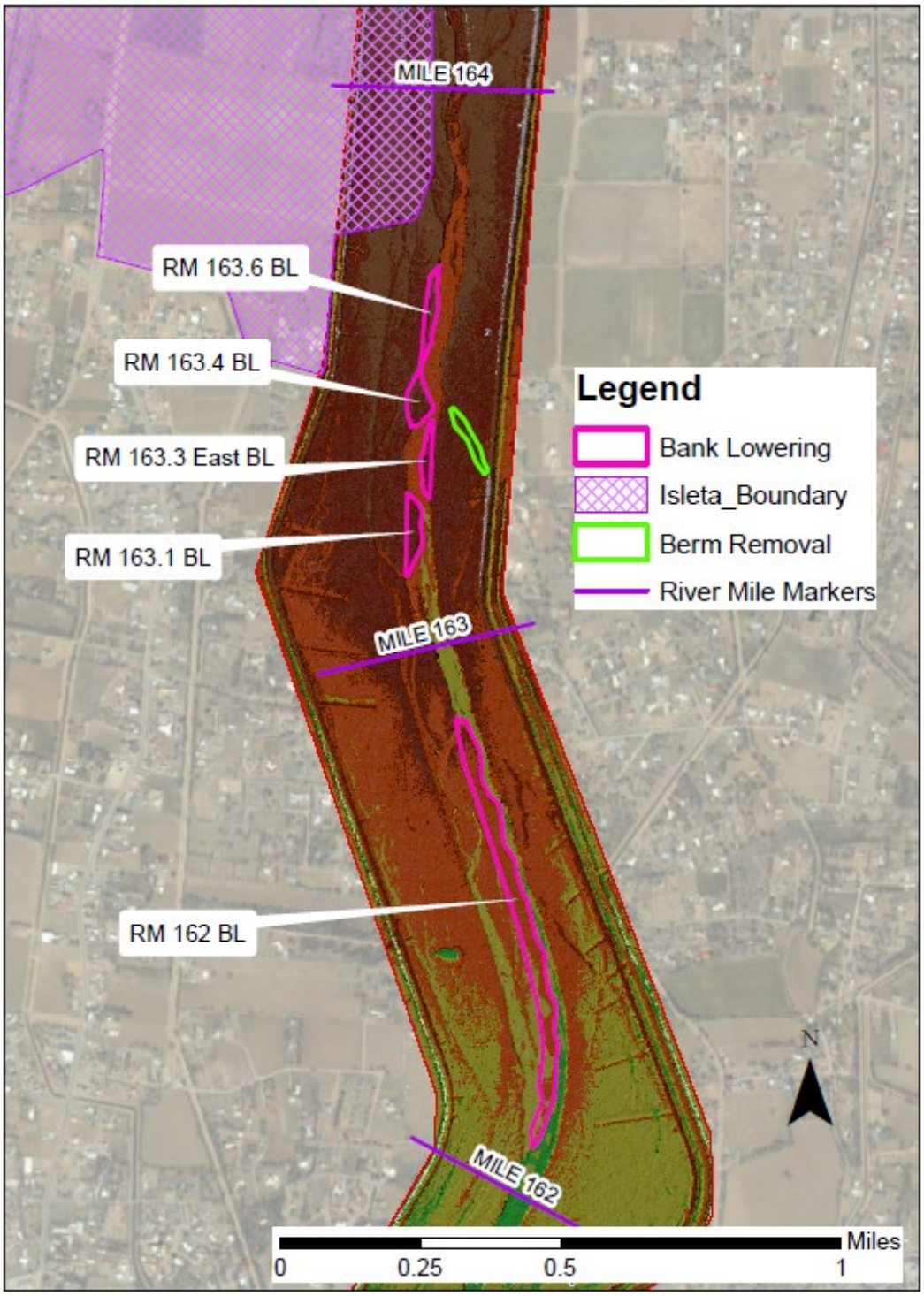

Figure 2: Project components

2.1 Dimensions

The inset floodplain bank lowering areas typically have a single elevation for the entire polygon as shown in Table 2. There are two exceptions where terracing is used for RM 162 and RM 163.6 as described below. The edges of the bank lowering polygons will gently slope to existing ground at 4:1 H: V.

The relic berm will be removed down to the elevation of the surrounding terrain, generally around elevation 4860.5 feet (ft).

Table 2: Project component dimensions

Project component	Average Original Elevation (ft)	Design Elevation (ft)	Length (ft)	Volume (CY)	Area (Acres)
RM 162 BL	4856	Varies (4851-4855)	Varies	57,402	13
RM 163.1 BL	4860	4857.5	720	7,652	2
RM 163.3 East BL	4861.5	4857.5	736	5,354	1
RM 163.4 BL	4861.5	4857	553	13,828	2
RM 163.6 BL	4863	Varies (4859.25-4860)	Varies	7,758	2
Berm removal	4863	4860.5	749	4,030	1
TOTAL	--	--	--	96,024	21

2.1.1 RM 162 BL

This bank lowering component consist of four terraces as shown in Figure 3. The length of the whole polygon from the upstream end to the most downstream is 4095 ft. The design or finished ground elevation of the first terrace is 4853 ft and is 2845 ft long. The second terrace has a design elevation of 4855 ft and is 2000 ft long. Third terrace is at an elevation of 4854 ft and is 1580 ft long. And fourth terrace is at an elevation of 4851 ft and is 1200 ft long. **Figure 4** shows the profile cross sections of these four terraces.

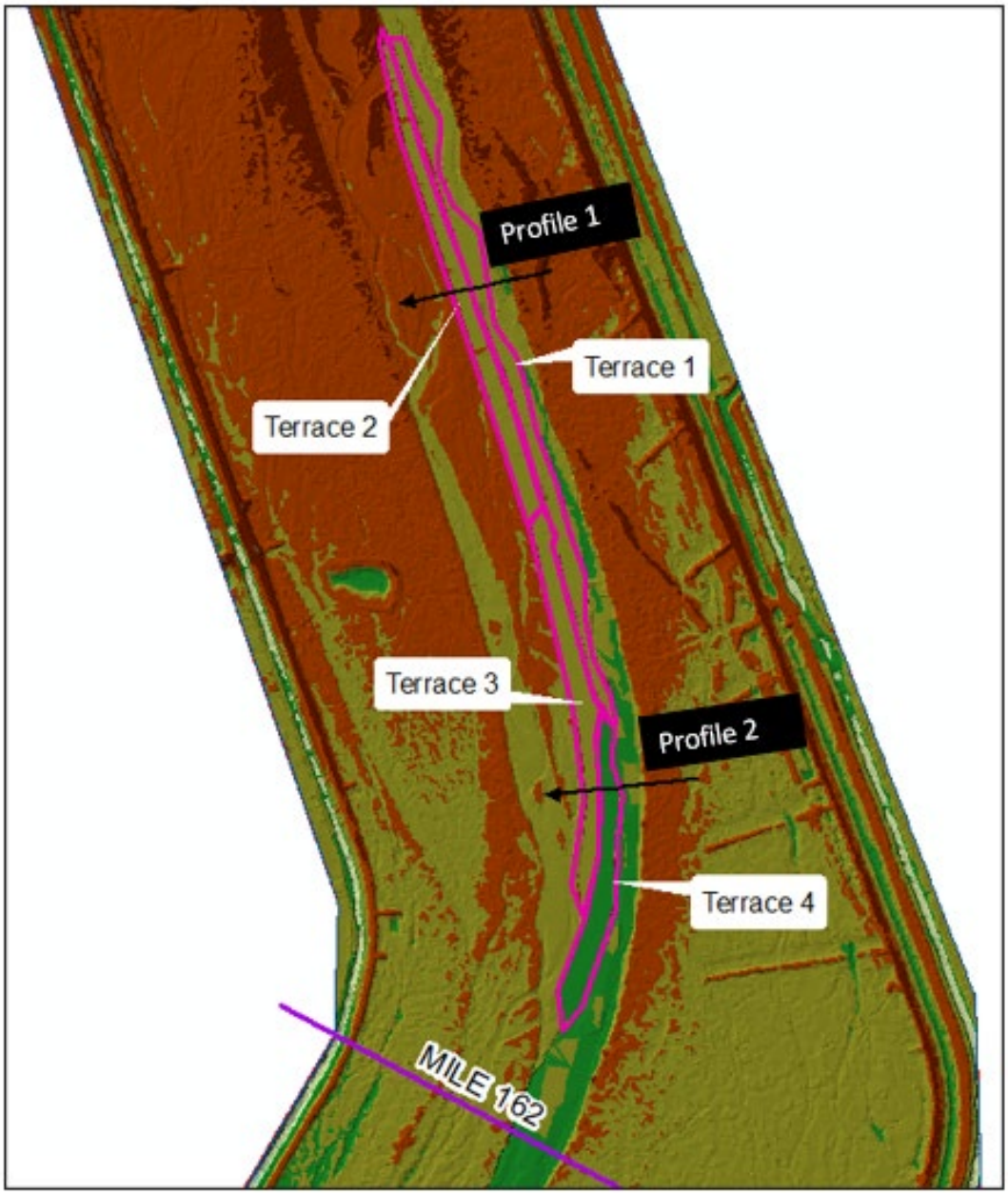

Figure 3: RM 162 BL component showing the four terraces

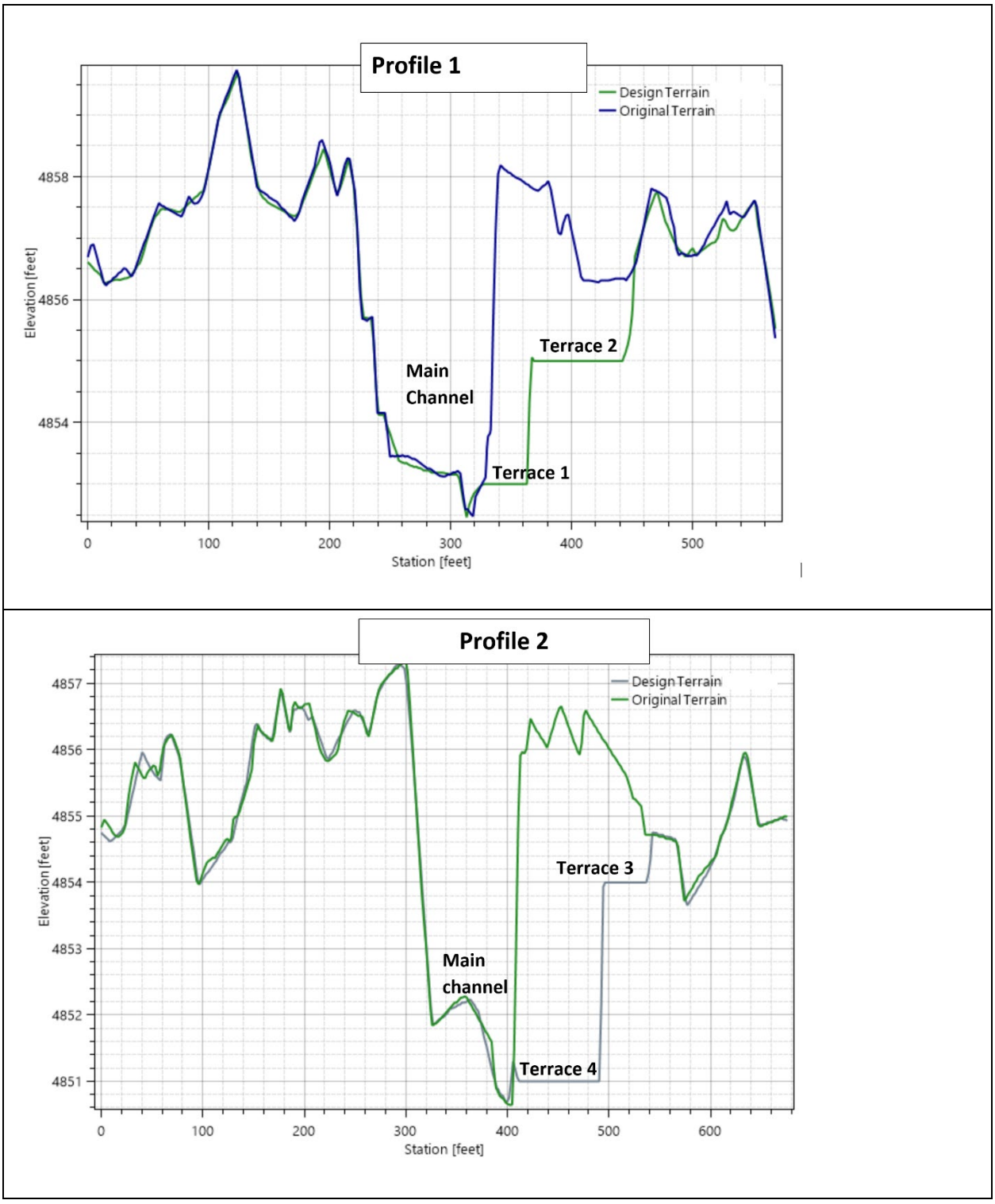

Figure 4: Profile 1 & 2 cross sections showing the elevation of the four terraces of RM 162 BL component. Also included is the elevation of the original terrain.

2.1.2 RM 163.6 BL

This bank lowering component consist of two terraces as shown in Figure 5Figure 3. The length of the polygon from the upstream end to the most downstream is 964 ft. The design elevation of

terrace 5 is 4859.25 ft and is 862 ft long. The design elevation for terrace 6 is 4860 ft and is 900 ft long. Figure 6 shows a cross section profile of this project component.

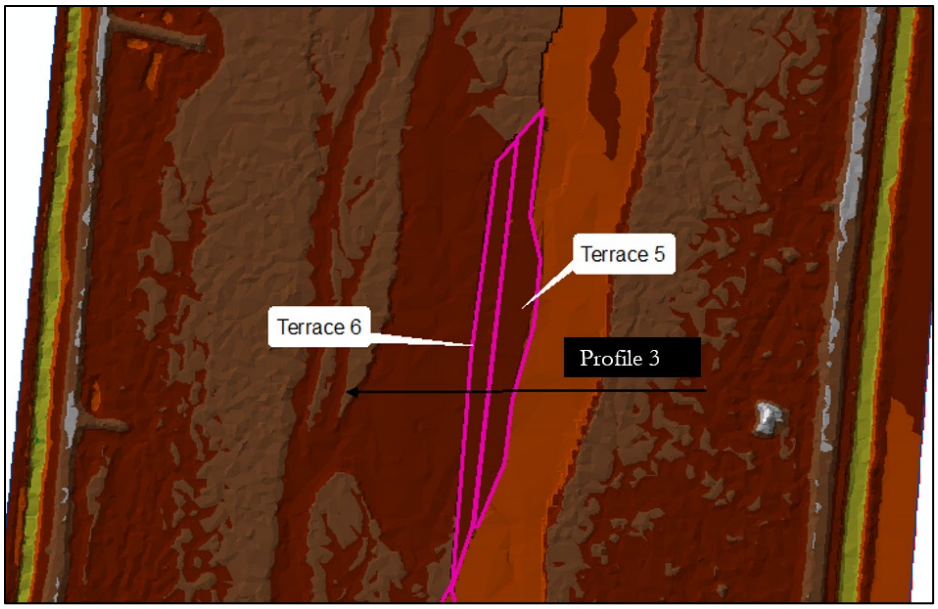

Figure 5: RM 163.6 BL component showing the two terraces

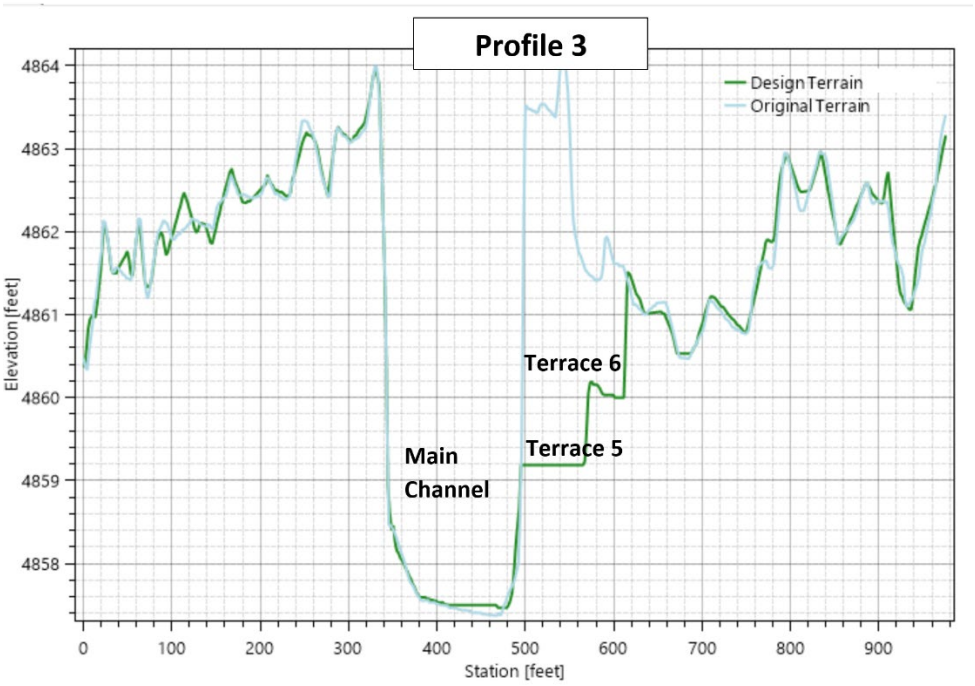

Figure 6: Profile 3 cross section showing elevation of the two terraces of RM 163.6 BL component. Also included is the elevation of original terrain

2.2 Inundation Flow Rates

Information on inundation flow rates has been provided here to demonstrate that the added channel capacity will impact not only high flows but also lower flows. Also, information on inundation flow rates demonstrates the nature of the aquatic habitat created.

These project components are intended to inundate at a variety of flow rates. Due to geomorphic response and hydrologic uncertainties, it is unknown which channel elevations will experience sedimentation the quickest. It is hypothesized that designing surfaces for a variety of flow rates will help extend the project longevity by increasing the probability that one of the components will experience lower sediment accumulation rates. Also, this diversity will provide habitat for the minnow at a variety of flow rates as well. The target inundation flow rates are provided in Table 3.

Some bank lowering components are relatively small and flat and transition from dry to fully inundated after only a minimal increase in flow. For these project components, only one inundation flow rate is shown in Table 3. Other project components begin inundating at one flow rate but don't become fully inundated until flows have risen significantly. For these components, the initial inundation flow rate is provided with the fully inundated flow rate in parenthesis in Table 3. The spatial distribution of the inundation of the project components is shown in Figure **7**.

Table 3: Inundation flow rates for the project components

Project component	Inundation flow rate (cfs)
RM 162 - Terrace elevation 4851	105
RM 162 - Terrace elevation 4853	105
RM 162 - Terrace elevation 4854	500 (1000)
RM 162 - Terrace elevation 4855	500 (1000)
RM 163.1	500
RM 163.3 East	105
RM 163.4	105
RM 163.6 – Terrace elevation 4859.2	500 (1000)
RM 163.6 – Terrace elevation 4860	1000 (1800)

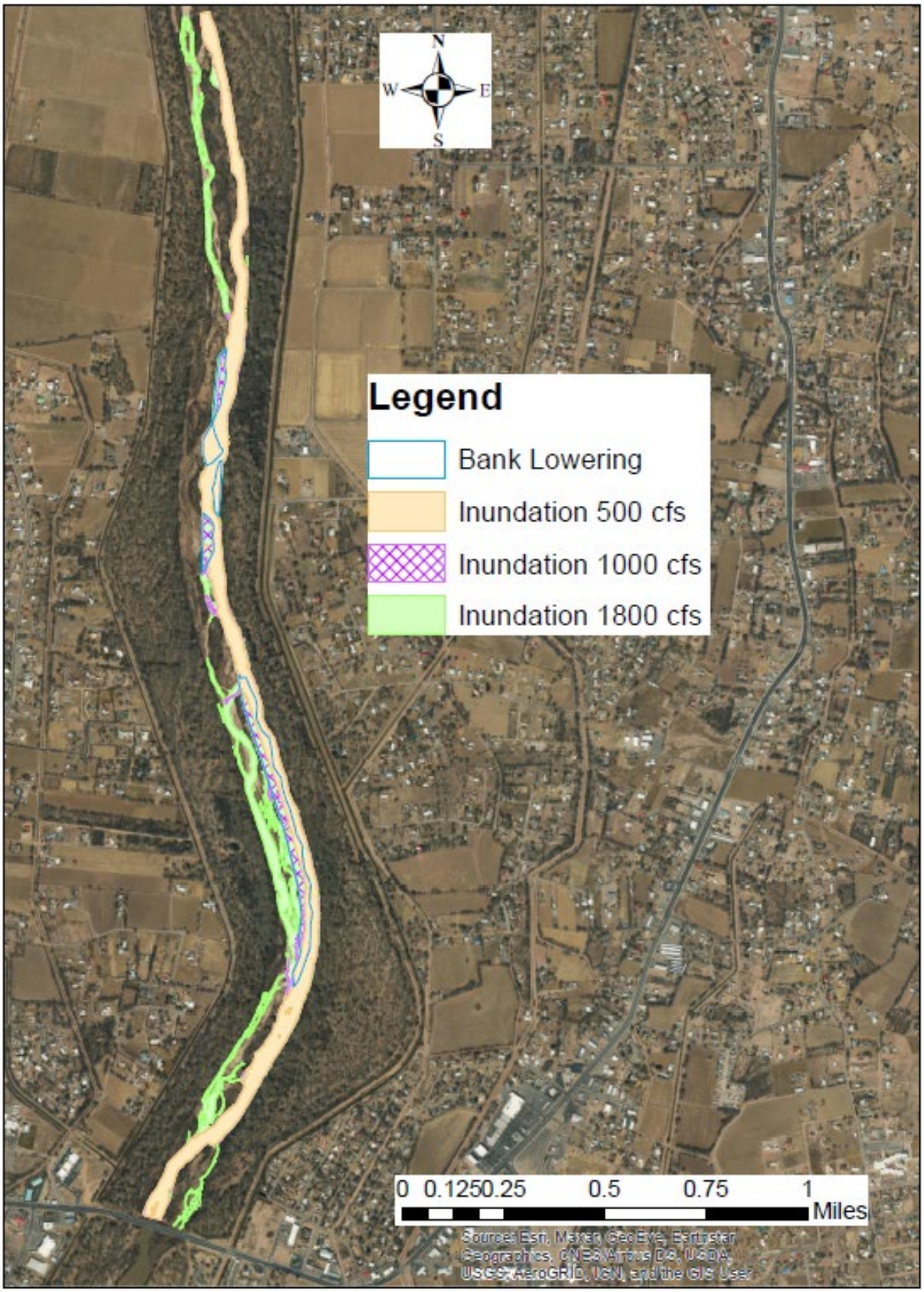

Figure 7: Spatial distribution of inundation of project components

3 Construction Operations

3.1 Site Access, Staging, and Spoils

Access to the project site for mobilization and demobilization will be through NM6 highway. Four of the bank lowering areas are located on the western floodplain between river miles RM 162 and RM 164. One bank lowering area and the relic berm removal are located on the eastern floodplain between river miles RM 163.3 and RM 163.6. Therefore, access to these construction sites will be through the spoil levee roads on both the West and East sides of the river respectively. Staging areas will be required on both sides of the river, and spoils will be placed on the levees on both sides of the river. Proposed access routes and staging areas are shown in Figure 8. Unless prior permission is obtained, no access through or disturbance of Isleta Pueblo land shall occur within the context of this project.

The access to the project area is through MRGCD gates. The public can access through these gates with paid permits, but the permit language reserves the right to restrict access for activities such as construction. During construction these gates will remain open in case of an emergency. Signs will be posted at the gates restricting the public from entering the gates and potentially entering the construction operations. There will also be signs indicating that there are heavy equipment entering the road. At each of the eastern and western temporary site access roads discussed in Section 3.1.1 and 3.1.2 there will be signs indicating active construction site just in case there are people travelling on official business.

3.1.1 Eastern Site Access

On the eastern floodplain a temporary access road will be developed on top of the berm area that is to be removed. The vegetation on the berm will be removed and masticated, and then the berm will be developed into an access road for the eastern bank lowering polygon. After the eastern bank lowering polygon is completed, the berm will be entirely removed. Figure 8 shows the access point. Assuming the roads are 30 feet wide with side slopes of 3:1, the anticipated site disturbance for the eastern access road is 0.13 acre.

3.1.2 Western Site Access

Due to the long distance between work sites on the western floodplain, there will be multiple access points from the western levee road to create loops that minimize haul distances from the bank lowering area to the levee. There will be one temporary north/south road constructed (which is hereafter called the river access road) to connect the bank lowering areas within the western inset floodplain. To connect the river access road back to the levee, a maximum of five east/west "bosque access roads" will be required. The proposed access roads are shown in Figure **8** and discussed in more detail below. The final location and specific number of these roads will be determined at the time of construction.

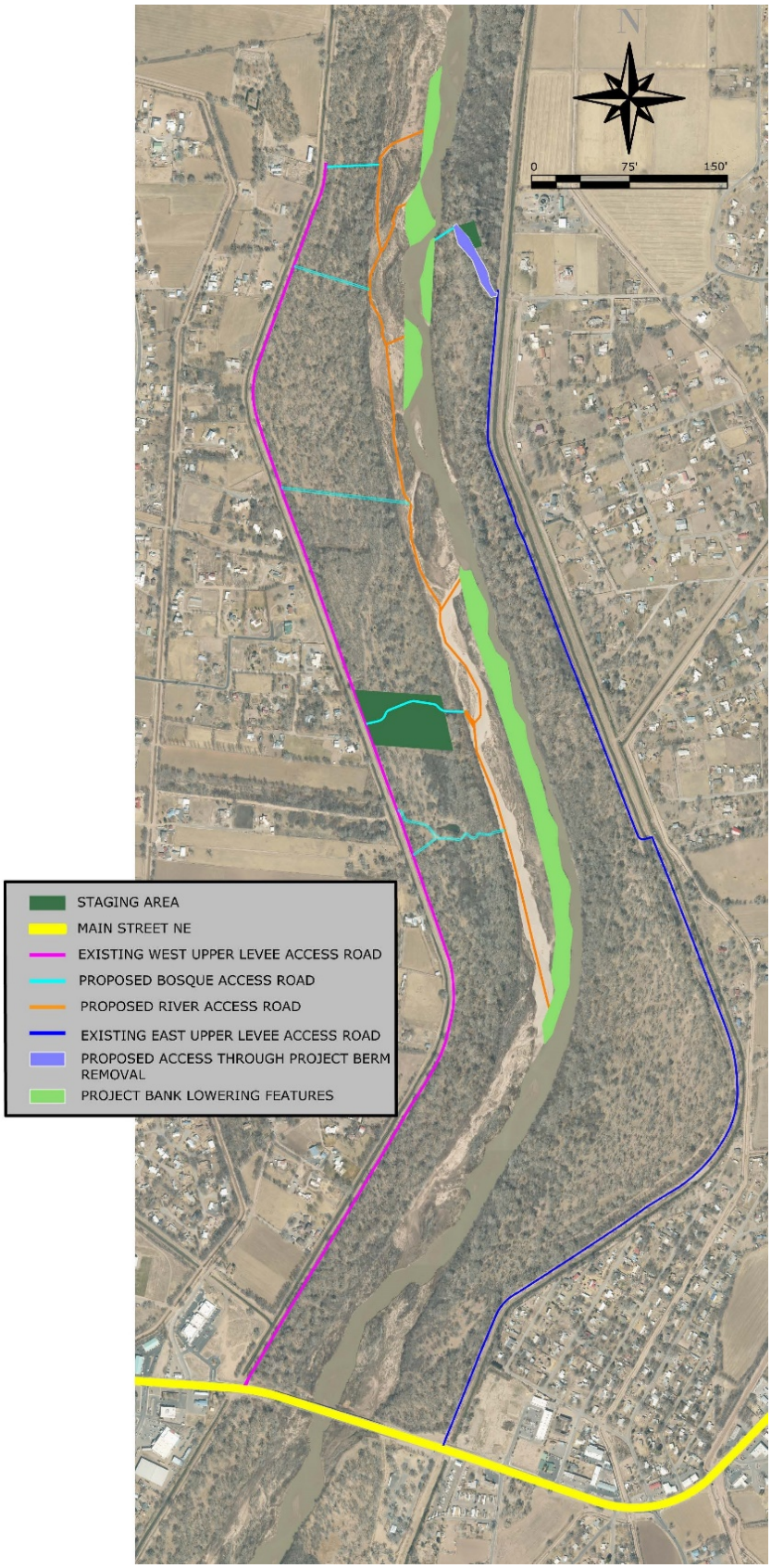

Figure 8: Project site access and staging areas

3.1.2.1 North/South River Access Road

The southern portion of the proposed north/south river access road is located mainly on bare sand, while the northern portion is sparsely populated with small vegetation, and thus the river access road development is anticipated to have minimal disturbance. Since this river access road is on the floodplain, fill materials excavated from the components on the westside will be used to improve the road by placing a layer of fill material up to 6 inches thick. Assuming the river access road is 15 feet wide, the anticipated disturbance of the river access road is less than 2.7 acres.

Modeling results indicate that the proposed north/south river access road will start becoming inundated at about 1200 cfs. Construction operations will need to stop if flows in the river get this high. There is a chance that the flows will reach 1200 cfs towards the end of the typical construction period in March or April; thus, the western project area will be constructed first followed by the eastern project area.

3.1.2.2 East/West Bosque Access Roads

The proposed east-west bosque access roads connect the north/south river access road to the levee road. Four of the five proposed bosque access roads do not currently exist and would disturb vegetation to provide the necessary and safe vertical and horizontal clearance of the construction equipment. These four road sites were selected because they are either located in areas with sparse trees or they are in areas with non-native tree species. The amount of disturbance required for road development varies and includes understory mastication, tree limbing, native tree removal, and non-native tree removal.

The five proposed access roads will require ramps from the levee down to the bosque elevation. The ramps will be comprised of spoil materials brought in from the eastern floodplain spoils or from another source. After construction, these ramps will likely be left in place to improve bosque access for multiple purposes including vegetation management, data collection, and fire fighting. If they need to be removed, they will be removed by spreading the materials on the levee roads.

Assuming the roads are 15 feet wide, and if all five identified roads are developed, the anticipated site temporary disturbance for the western bosque access roads is less than 1.5 acres.

3.1.3 Equipment Staging

Due to the long distance between the western and eastern floodplains, as well as to avoid river crossings, an equipment staging area will be developed on each side of the river.

Both the western and eastern floodplain have sparse mature cottonwood trees with grass in some areas. Project staging areas are shown in Figure 9 and Figure 10 where it is expected that few cottonwood trees need to be trimmed or removed. The staging area on the western floodplain is anticipated to disturb less than 1 acre but a 7-acre area has been delineated to provide as much room as possible to avoid disturbing mature native vegetation. The staging area on the eastern floodplain is approximately 1 acre.

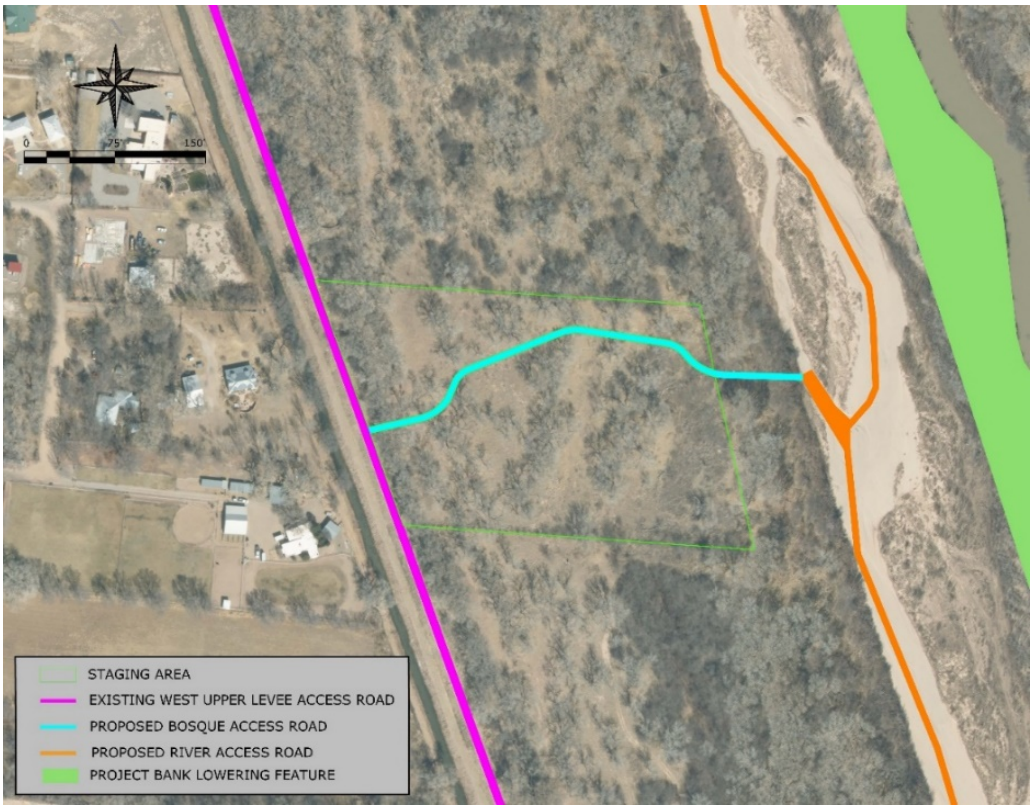

Figure 9: West side staging area

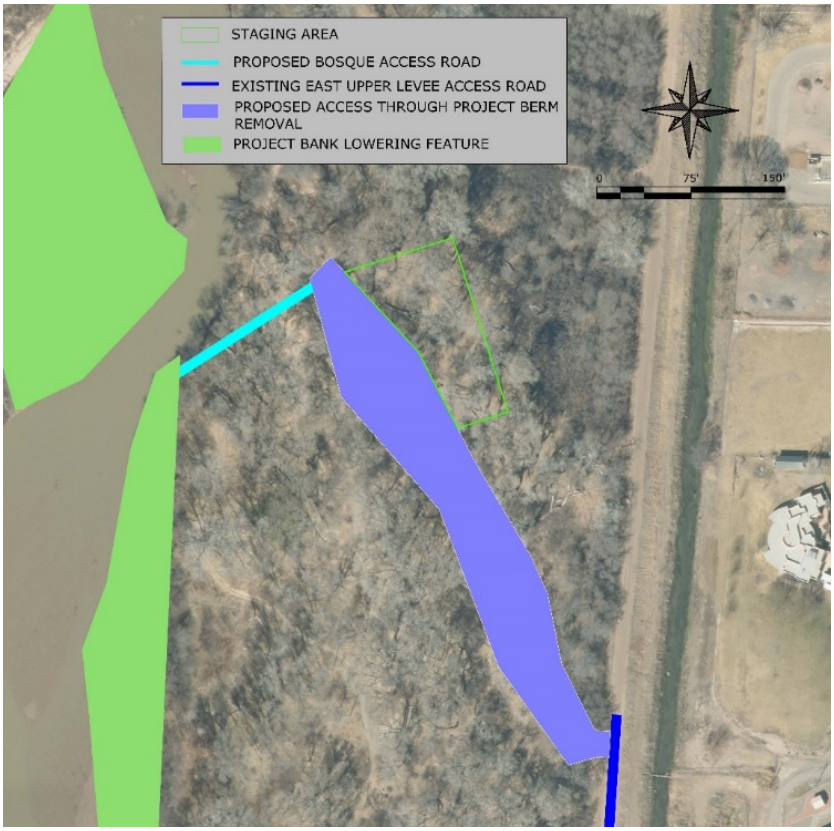

Figure 10: East side staging area

3.1.4 Mobilization and River Crossings

The project will be mobilized by bringing in the following likely construction equipment to the project site (actual available land-based construction equipment may vary by type and quantity):

- (1) 30-ton articulated water truck
- (2) on-road water trucks
- Up to (4) 30-ton articulated dump trucks
- Up to (4) 10-yd tandem dump trucks
- 1 motor grader
- (2) D-7 dozer
- (1) 40-ton excavator
- (2) 6-inch water pumps

Tracked equipment will be unloaded at the northwest gate of NM6 bridge and will drive up to the western staging area. Due to the difficult/safety issues of loaded trailers making left turns on the high traffic NM6, when the work on the western project bank lowering components are complete, it is preferred to have the equipment cross the river at a shallow location next to RM 163.3 East BL. Figure 11 shows the proposed river crossing location. Assuming the river crossing will happen around April and the river flows are about 1200 cfs, then the river water depth will be about 2 feet. When the eastern project components are completed, the equipment will drive to the northeast gate of NM6 bridge and be loaded onto trailers for demobilization.

If spring flows are too high when the equipment is ready to cross the river from the western side to the eastern side, the equipment will have to be transferred through the levee roads and via NM6 bridge instead.

The river crossing area is 0.14 acres and it is anticipated that 4 pieces of equipment (1 dozers, 1 excavator, and 2 articulating dump trucks) will cross. Thus, the total wetted impact area from equipment river crossings is 0.56 acres.

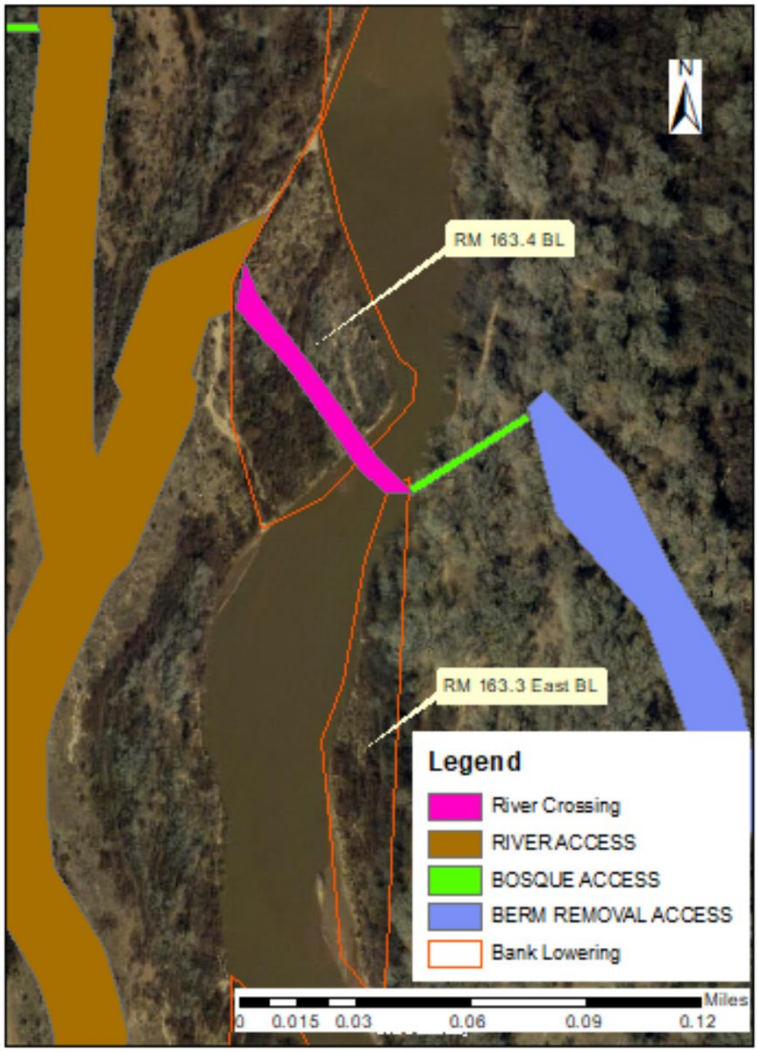

Figure 11: Western side to Eastern side river crossing location for the equipment

3.1.5 Dust Abatement

Water for dust abatement will be obtained from either the river or the riverside drains and appropriate BMPs (Section 5) will be utilized. If the water is obtained from riverside drains, a pad will need to be built up adjacent to the drains to place the water pump. The pump may disturb the residential areas nearby. Pumping from the riverside drains will require coordination with MRGCD. If the water is obtained from the river, a suitable location where it is flat and firm will be identified. Neither of these locations will require vegetation removal other than grasses and shrubs. Wetlands will not be impacted.

Reclamation has a surface water permit for pumping from the river (SP-04955). The volume of water pumped is reported weekly in the construction supervisor's reports, and the volume is compiled annually for reporting to the Office of the State Engineer (OSE).

3.1.6 Biomass and Spoils Disposal

Construction of the bank lowering areas will begin by masticating all vegetation within the bank lowering areas using land-based equipment. Vegetation within the bank lowering areas consists of

upland vegetation, willows, and mature cottonwoods, with willows dominating at the bankline. Some juvenile native trees are in the construction alignment and will also be masticated or removed by other means. The juvenile native trees within the construction areas vary in size but may have a diameter at breast height (DBH) as high as six to eight inches. Replacement of these native trees will be done in accordance with Best Management Practices (BMPs) (Section 5).

Masticated (mulched material) vegetation that is mixed in with the soil will be spoiled in the low spots on the bosque side of the levee. Additional excavated material will be hauled to the levee road where it will be spread out on the top and the riverside-drain-side of the levee. This area of disposal is shown in Figure **12**. The westside disposal area is approximated as a maximum of 15 acres while the eastside is approximated as 20 acres. No spoils will be dumped beyond the Isleta boundary on the westside levee. Another possible option for spoiling excavated materials is to stockpile the material at a location identified by MRGCD, and MRGCD will utilize the spoils later as needed for irrigation/agricultural facility maintenance. A third potential option is to spoil the excavated materials next to the levee on the bosque side of the levee.

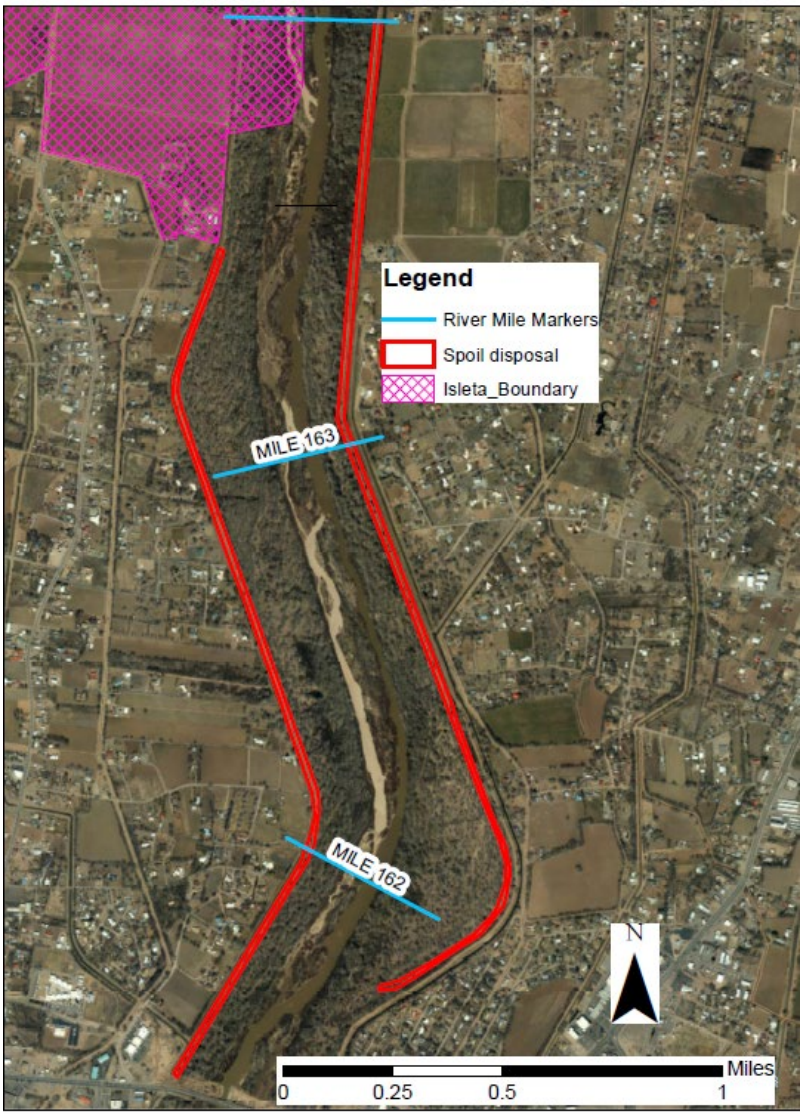

Figure 12: Spoil disposal areas on the levee roads and riverside-drain-side

If the western excavated bar material will be spoiled from the NM6 bridge to the southern tip of the Isleta Pueblo boundary, the spoil depth will be 3.6 feet above the existing ground elevation of the levee and cover 15 acres, considering an average 60 ft width and a length of about 2 miles. This includes the levee crest, riverside-drain-side, and the lower road next to the side drains. The spoil material could be spoiled higher and thus cover less acreage. No disturbance of Isleta Pueblo land is anticipated within the context of this project.

If the material is spoiled one foot deep for the area described above, there would be approximately 62,000 CY of material leftover, which may be placed in stockpiles for later use by MRGCD, or it may be spoiled in the low spots on the bosque side of the levee. If this is done, the spoils will not be placed on wetlands, and the spoils will likely be placed around mature native trees, not up against them. Non-native trees may be removed for spoiling operations. If any mature native trees are removed for spoiling operations, they will be replaced in accordance with BMPs. The spoils may be placed up to 50 feet wide against the bosque side of the levee, up to 6 feet deep, along as much as 2 miles of levee. The maximum area of disturbance for spoiling in the low spots is 12 acres.

The eastern excavated bar material is anticipated to be spoiled on approximately one mile of levee surrounding the eastern project area near RM 163.3. This would result in a spoil depth of 0.7 feet and would cover 8 acres considering a 70 ft width. The maximum spoil area would be 0.3 feet high and cover 19 acres.

Removed mature cottonwood trees and rootwads may be disposed of in a variety of ways. Reclamation may haul and stockpile them onsite or at a Reclamation stockpile facility (Bernalillo, Escondida, etc.) for later use at a different project. They may be stockpiled along the levee system for MRGCD's utilization or disposal. They may be chipped and used as mulch. A few of the logs could be placed in the bank lowering areas as aquatic habitat according to engineering and environmental BMPs. They may also be strategically placed in areas accessible to the public for use as firewood.

When removing the relic berm on the eastern floodplain, some of the mature cottonwoods that are on the sides of the berm may be saved by not excavating the berm in the immediate vicinity of the tree. This is acceptable if the saved trees and surrounding mound does not impede downstream flow through the area.

3.1.7 Jetty Jack Removal

While there is no planned removal of jetty jacks, any jetty jacks encountered within the project areas or in the way of access road development will be removed. If jetty jacks are mostly buried and within an access road alignment, spoil material may be brought in to cover the jetty jack instead of removing it.

Removed jetty jacks will be stockpiled, and MRGCD will salvage the removed jetty jacks.

3.1.8 Utilities

Prior to starting construction, the construction crew chief will notify 811 to locate and stake utilities within the project area. The Bosque Farms Wastewater Treatment Plant (Plant) has an outfall located approximately 90 feet north of the eastern staging area. Reclamation will coordinate with the Plant prior to construction and additional stakes and flagging will be placed if necessary to ensure avoidance of this area.

3.2 Construction Methods

The bank lowering construction method will depend on the amount of flow in the main channel. The preferred method is to use low ground pressure or conventional bulldozers to push the material into piles starting on the channel side and working in. This method will only be used if the flow in the channel is low enough that the bulldozers can work completely in the dry. This method would have zero acres of wetted impact.

If the flow is too high for the bulldozers to work in the dry, they will excavate material with either dozer or excavator, leaving a berm in place adjacent to the wet channel such that the work occurs in the dry. Then that berm will be removed by an excavator (wetted impact). The river-side perimeter of the bank lowering polygons is approximately 7,660 feet. Assuming the berm width is 5 feet, and assuming the excavator bucket scoops twice per location to reach the desired grade, the wetted impact is at most 1.8 acres. This wetted impact may be less depending on the inundation extents at the time of excavation (some areas may be in the wet while other areas are still dry).

The excavated material will then be loaded in a 30-ton articulating dump truck and hauled to the spoiling area along the levees.

To spoil on the levee, the spoil material will be placed in lifts, wetted, and compacted with the equipment tires or tracks. MRGCD may wish to compact and shape the levee themselves after Reclamation places it with the dump or articulated trucks.

3.3 Vegetation Removal and Replacement

The site disturbance is expected to be 52 acres, which includes 21 acres for the construction area, 9 acres of staging and access, and 23 acres for spoil disposal. The maximum possible quantity of site disturbance would be 595 acres (shown in Figure 1) which includes 28 acres for the construction area, 18 acres of staging and access, and 34 acres for spoil disposal. These areas are delineated larger than necessary to allow for field adjustments due to changes in conditions.

Vegetation within the maximum construction footprint consists of upland vegetation, willows, and cottonwoods, with willows dominating at the bankline. Some juvenile native trees are in the construction alignment and will also be masticated or removed by other means. The construction alignment will be masticated to remove all vegetation from the surface. Vegetation clearing involves the removal of vegetation with some amount of subsurface disturbance of the vegetation roots. Native vegetation will be replaced in accordance with the BMPs in section 5.0.

The amount of disturbance required for road development varies and includes understory mastication, tree limbing, native tree removal, small vegetation, and non-native tree removal. After construction works are completed, if certain access routes are not desired to be kept for permanent access, they will be reseeded in accordance with the BMPs in section 5.0.

Vegetation within the staging and spoils area consists of sparse mature cottonwood trees with grass. The staging area has been delineated as big as 7 acres to provide as much room as possible to avoid

removing and disturbing mature native vegetation. If native vegetation is disturbed, it will be replaced in accordance with the BMPs in section 5.0.

3.4 Construction Sequencing

To facilitate construction at this site, the following steps are expected, although not necessarily in the exact sequence as provided.

1. Place restricted site access signage at entrances and exits to construction sites on both sides of the river.
2. Prepare access roads and equipment staging areas on the western bank. Prepare water pump for dust abatement.
3. Place clearing and grubbing staking on the western bank to determine the boundaries of the planned bank lowering according to the design construction drawing set.
4. Masticate the vegetation within the extents of the staked bank lowering.
5. Place construction staking on the western bank to determine the boundaries and cut values of the planned bank lowering.
6. Begin excavation of the planned bank lowering and hauling of spoil materials to the designated spoil or stockpile area on the western bank.
7. Transfer the equipment to the eastern bank either through river crossing or levee roads depending on the spring flows.
8. Repeat steps 2 to 6 above but on the eastern bank.
9. Once the eastern bank lowering is completed, remove relic berm while retaining access to the staging area. When all project components are complete, remove all construction staking and flagging material.
10. Reseed disturbed areas.
11. Remove water pump for dust abatement.
12. Remove construction access signage from both banks and demobilize all heavy equipment.

3.5 Construction Hours

The bank lowering components are located far enough from the residential neighborhoods on the other side of the riverside drains that the construction noise is likely to be minimal. However, the levee spoiling and berm removal noise may reach the residential neighborhoods. The noise will be mitigated by only conducting construction between 7 am and 5:30 pm, Monday through Thursday. It is possible that overtime construction may be authorized for Fridays and weekends (between 7 am and 5:30 pm) to complete the work in a shorter time frame. Thus, construction noise would have a shorter duration as well.

3.6 Construction Duration and Schedule

Work is expected to be completed within a four-month timeframe. The anticipated construction start date is January 2022 and expected to be completed by April 15, 2022. However, these dates are

subject to change depending on availability of resources and environmental permitting. If delayed, construction could occur between September 1, 2022 and April 15, 2023.

It is recommended that the western project area be constructed before the eastern project area since the western project area may inundate as spring flows start to rise.

4 Material Quantities

These material quantities are summarized from previous sections of this Project Description. The site disturbance is expected to be 52 acres, which includes 21 acres for the construction footprint, 8 acres for staging and access roads, and 23 acres for levee spoiling. The maximum possible quantity of site disturbance when including the maximum project footprint would be 595 acres as shown in Figure 1. These areas are delineated larger than necessary to allow for field adjustments due to changes in conditions.

The anticipated cottonwood tree removal is based on visual estimates from aerial imagery. There are no mature cottonwoods within the inset floodplain including bank lowering areas and access roads.

Table 4: Expected and maximum quantities of site/vegetation disturbance

	Units	Expected Quantity	Maximum Quantity
Total bank lowering area	Acres	20	26
Total berm removal area	Acres	1	2
Total access routes area	Acres	5	10
Total staging area	Acres	1	8
Total spoils area	Acres	23	50
Total site disturbance / vegetation clearing	Acres	49	595
Anticipated mature cottonwood/Goodings willow tree removal – Berm removal*	Trees	10	15
Anticipated mature cottonwood/Goodings willow tree removal – eastern access road and staging area*	Trees	7	11
Anticipated mature cottonwood/Goodings willow tree removal – western access roads and staging area*	Trees	10	15
Total anticipated mature cottonwood/Goodings willow tree removal	Trees	27	41
Total excavated volume – east side	CY	9,384	12,000

	Units	Expected Quantity	Maximum Quantity
Total excavated volume – west side	CY	86,640	108,000
Total excavated volume	CY	96,024	120,000
Total wetted impacts	acres	0.56	3

*The mature cottonwood/Goodings willow tree removal estimates are based on a visual count from aerial imagery. Actual specific counts will be made immediately prior to construction; if possible, construction crews will remove less.

5 Best Management Practices (BMPs)

The following BMPs will be used at the site to minimize the risk of effects from the RM 163 bank lowering project.

General BMPs:
Timing of the Proposed Action

1. Reclamation will seek to avoid impacts to birds protected by the Migratory Bird Treaty Act (16 United States Code [U.S.C.] 703; MBTA), including the Federally listed Endangered Southwestern willow flycatcher (*Empidonax traillii extimus*; flycatcher) and Threatened Western yellow-billed cuckoo (*Coccyzus americanus*; cuckoo), by conducting work activities outside of the normal breeding and nesting season (April 15 to August 15, or September 1 for work in suitable cuckoo habitat).

    1.1. If work is necessary between April 15 and August 15 (or September 1 for work in suitable cuckoo habitat), suitable/occupied migratory bird habitat will be avoided during the construction activities as much as possible, utilizing the most current annual survey results in conjunction with habitat suitability designations. Reclamation will use current flycatcher and cuckoo monitoring data to avoid work within 0.25 miles of an active nest as much as possible. Coordination and consultation with the U.S. Fish and Wildlife Service (Service) will occur prior to such work activities.

    1.2. Reseeding or revegetation may be accomplished by hand or by mechanized means. Planting via mechanized means includes using a hand-held or tractor-mounted auger. If mechanized means are used for either reseeding or replanting in the April 15 to August 15 timeframe (or September 1 for work in suitable cuckoo habitat), migratory nesting bird surveys will be conducted immediately prior to the work to determine if any breeding birds are present. If birds are detected, Reclamation will coordinate with the Service to determine appropriate next steps.

Water Quality

2. Reclamation will obtain all applicable permits and authorizations prior to implementation of the project, including those regulated under Section 401 (Water Quality Certification) and Section 404 (Permit Authorization for Dredge or Fill) of the Clean Water Act (CWA). Reclamation will comply with the requirements of all permits and authorizations of the CWA and any other permits associated with water quality for the project, including required reporting to the appropriate authorities as needed and will not begin work until all required permits and authorizations are obtained.

3. Reclamation will visually monitor for water quality in the areas below areas of river work before and during the workday. Water quality will be monitored during construction and after equipment operates in the river channel. Monitoring will include visual observations and may include direct sampling, as appropriate.

    3.1. If direct sampling is needed, water-quality parameters to be tested include pH, temperature, dissolved oxygen, and turbidity. Parameters will be measured both upstream and downstream of the work area.

    3.2. Responses to changes in water-quality measures exceeding the applicable standards would include reporting the measurements to the New Mexico Environment Department Surface Water Quality Bureau and moving construction activities away from the shore.

Equipment and Operations

4. Reclamation-led work activities that have the potential for adverse impacts will be monitored by properly trained Reclamation personnel in order to ensure compliance.

5. Reclamation will excavate an area as few times as possible to minimize disturbance of sediment. When excavating within the wetted channel, the following practices will be used to minimize disturbance of sediment:

    5.1. Minimize movement of excavator tracks;

    5.2. Minimize excavator bucket contact with riverbed when not excavating.

6. Each individual operator will be briefed on local environmental considerations specific to the project tasks.

7. Minimize impact of hydrocarbons: To minimize potential for spills into or contamination of aquatic habitat:

    7.1. Hydraulic lines will be checked each morning for leaks and periodically throughout each work day. Any leaky or damaged hydraulic hoses will be replaced.
    7.2. All fueling will take place outside the active floodplain, where possible. All fueling will occur with a spill kit ready. If amphibious excavators are used, fueling will occur at the Rio Grande using airboats equipped with lined fuel containment. Fuel, hydraulic fluids, and

other hazardous materials may be stored on site overnight, but outside the normal floodplain, not near the river or any location where a spill could affect the river.

7.3. All equipment will undergo high-pressure spray cleaning and inspection prior to initial operation in the project area.

7.4. Equipment will be parked on pre-determined locations on high ground away from the river overnight, on weekends, and holidays.

7.5. Spill protection kits will be onsite, and operators will be trained in the correct deployment of the kits.

7.6. External hydraulic lines are composed of braided steel covered with rubber. When there is increased risk of puncture such as during mastication while removing vegetation, external hydraulic lines will be covered with additional puncture-resistant material, such as steel-mesh guards, Kevlar, etc. to offer additional protection.

8. Equipment will be removed from the channel in the event of high storm surges.

9. To allow fish time to leave the area before in-water work begins, equipment will initially enter the water slowly. In-water work will be fairly continuous during workdays, so that fish are less likely to return to the area once work has begun.

10. Riprap to be placed in the water will be reasonably clean to the extent possible. If there are large clumps of soil bigger than 1 foot within the riprap, those clumps will be set aside during the loading or placing operations.

Access and Staging

11. Impacts to terrestrial habitats will be minimized by using existing roads whenever possible. In general, equipment operation will take place in the most open area available, and all efforts will be made to minimize damage to native vegetation and wetlands (also see BMP titled *Vegetation Replanting and Control* below).

12. All necessary permits for access points, staging areas, and study sites will be acquired prior to construction activity.

Vegetation Replanting and Control

13. A variety of revegetation strategies may be used: stem and pole cuttings (provided by the Pueblo); long stem transplants (provided by the Pueblo); and upland planting with and without a polymer, zeolite, or similar compound to maximize soil water retention (Dreesen, 2008). Planting techniques may vary from site to site, and may consist of buckets, augers, stingers, and/or water jets mounted on construction equipment. In some areas, a trench may be constructed to facilitate the placement of a significant number of plants, specifically stem and pole cuttings. Seeding would be accomplished using a native seed drill, where feasible, and spread with a protective covering which would provide moisture to the seeds.

14. Vegetation control may consist of mechanical removal, burning, mowing, and/or herbicide treatment. Herbicides will be used when non-chemical methods are unsuccessful or are not economically feasible (see section Herbicide and Pesticide Use below).

14.1. Vegetation control will be completed between August 15 (or September 1 for work in suitable cuckoo habitat) and April 15. Any need for deviations from this work window will be considered on a project-specific basis and coordinated with the Service. If work is planned within two weeks before April 15 or after August 15 (or September 1 for work in suitable cuckoo habitat), Reclamation will conduct additional analysis and surveys (-if warranted), to determine the presence of breeding flycatchers, cuckoos, or other breeding birds protected under the MBTA. Reclamation and/or the appropriate project partner will coordinate monitoring and work activities with the Service, as appropriate, if bird nests are found.

15. Native vegetation at work sites will be avoided to the extent possible. If large, native woody vegetation (primarily cottonwood > 6 inch DBH) needs to be trimmed or removed, they will be replaced at a ratio of 10:1. When and where possible, small, native woody vegetation will be removed or harvested at the appropriate season to use for revegetation work at another location in the project area or at another project site. Native vegetation that cannot be replanted may be mulched (mulch will be removed or spread on site at a depth of three inches or less) or temporarily stockpiled and used to create dead tree snags or brush piles in the project area upon completion.

16. Nonnative vegetation that is removed at work sites will be mulched, burned, or removed offsite to an approved location. Mulched vegetation may also be spread on site at a depth of three inches or less.

Herbicide and Pesticide Use

17. The use of chemical herbicides or pesticides may be necessary to control undesirable plant species around stockpile sites and storage yards and also to prevent the spread of invasive species in areas cleared for maintenance activities. It also may be necessary to spray or control: arthropods (spiders, ants, cockroaches, and crickets) that pose a safety problem or are a nuisance in buildings and facilities; birds (pigeons and swallows) roosting in building structures that are considered a nuisance; and mice that get into structures and/or equipment. Since the application of herbicides and chemical spraying is tightly controlled by State and Federal agencies, Reclamation will follow all State and Federal laws and regulations applicable to the application of herbicides, including guidelines described by White (2007). Herbicides or pesticides will not be directly applied to or near water unless they are labeled for aquatic use and appropriate buffers will be observed. Communication with the Service will occur prior to any application to sites with threatened or endangered wildlife species. Reclamation will follow the Albuquerque Area Office Integrated Pest Management Plan and Pesticide General Permit (Reclamation, 2015) when applying herbicides or pesticides. The non-Reclamation project partners will follow their agencies' herbicide/pesticide guidance, if applicable. Herbicides or pesticides may be applied using low pressure spray rigs mounted to OHVs, trucks and trailers with spray bars, or backpack sprayers (for spot applications). Treatments will be conducted by trained and approved personnel observing appropriate buffer distances and label directions. Treatment will not take place when winds exceed 10 miles per hour or when rain is forecasted for the local area within 48 hours of application. Care will be taken when mixing or applying any herbicide to avoid runoff onto the ground or into the water. Surfactants may also be added to certain herbicides to maximize herbicide/pesticide performance and minimize retreatments.

Dust Abatement

18. If water is needed for dust abatement or to facilitate grading of roads, water may be pumped from the Rio Grande, irrigation drains, sumps, or secondary channels adjacent to the river. During irrigation season (March 1 to October 31), water will not be pumped from the river but will be pumped from the irrigation drains if possible. If pumping from the river is is required between April 15 and August 15 (or September 1 in suitable cuckoo habitat), and is needed between May 1 and July 1 (emergencies only), Reclamation and/or the appropriate project partner(s) will coordinate with the Service to avoid impacts to minnow eggs and larvae. Outside of the irrigation season, an amount not to exceed 5% of river flows at the time of pumping may be drawn from the Rio Grande. Pumping is short duration (minutes) for filling whatever water transport equipment is used. Sumps or secondary channels adjacent to the river will be used, whenever feasible. Pump intake pipes will use a 0.25 inch (0.64 centimeter [cm]) mesh screen at the opening of the intake hose to minimize entrainment of aquatic organisms.

Other Measures

19. All treatment and control areas will be monitored for three years following construction to determine the effectiveness of the methods implemented and identify project-related hydrologic and geomorphic alterations. The monitoring will consist of biological, vegetative, geomorphic, and hydrologic monitoring, as appropriate to the project design and purpose.

20. All project spoils and waste will be disposed of offsite at approved locations or may be used on site as appropriate to the project purpose, consistent with applicable environmental requirements.

21. All work projects will have a contract in place for the rental of portable restroom facilities during the duration of the project.

6 Adaptive Maintenance Plan

6.1 Monitoring Frequency

An as-built survey will be conducted within one month of construction completion. This as-built survey will establish specific cross sections for future geomorphic and hydraulic monitoring. These cross sections will be surveyed after each spring runoff for the next 3 years unless the volume of spring runoff does not warrant a survey (as determined by project engineer).

Environmental monitoring will be conducted as described in the environmental permitting documents.

6.2 Expected Outcomes, Triggers, and Adaptive Maintenance

6.2.1 Sedimentation

It is anticipated that the bank lowering areas will experience sedimentation and become vegetated consistent with similar projects involving habitat restoration and the creation of inundation surfaces. This sedimentation may be in the form of bank-attached bars or islands. The sedimentation rates and patterns will be observed through the annual cross section monitoring surveys.

If sedimentation is experienced, it is likely that no adaptive maintenance will be performed even if it is a large volume. Large volumes of rapid sedimentation would demonstrate that inset floodplain bank lowering is an ineffective strategy for creating conveyance capacity in this subreach, and a new method or strategy would need development and implementation.

Maintenance will likely not be performed on areas experiencing small amounts of sedimentation because the effort would be better spent on additional conveyance capacity projects elsewhere in the subreach. This bank lowering project would be better left undisturbed to develop and progress through various age classes of vegetation while new age classes are developed through bank lowering projects elsewhere in the subreach.

Although sedimentation maintenance is unlikely, it may occur if an assessment of the situation determines maintenance is needed and cost effective.

6.2.2 Bank Erosion

Bank erosion is also a possibility, albeit an unlikely one. Bank erosion would be most likely to occur in the areas where vegetation was disturbed for construction.

It is highly unlikely that bank erosion will proceed past the historic banks where jetty jacks are currently embedded, but if the historic banks do erode then additional bank stabilization work may be required.

Bank erosion within the inset floodplain would be a positive outcome as this provides additional channel capacity and creates vegetative and channel diversity for habitat.

7 Citations

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8 Document Revision History

June 4, 2021: Initial version distributed internally for review (Draft Project Description).

July 1, 2021: Revised version distributed externally for review (Draft Project Description).

July 19, 2021: Final version completed and distributed (Final Project Description).