








Site Photo		
Vulnerable Section	General View of River Side	
	Facing Downstream and Side	Facing Upstream Side
		
	General View of Top	
	Facing Downstream and Side	Facing Upstream Side
		
	General View of Landside	
	Facing Downstream and Side	Facing Upstream Side
		
	Close View of Deformation	
		
Close View of Damages		
Not Applicable		

	<p>Photo with 360° angles</p> 	
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream and Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream and Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Landside</p>	
	<p>Facing Downstream and Side</p> 	<p>Facing Upstream Side</p> 

	<p>Photo with 360° angles</p> 
<p>Downstream End of the Bund</p>	<p>General View</p> <p>(Not Applicable)</p>
	<p>Photo with 360° angles</p> <p>(Not Applicable)</p>
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p> 
	<p>Photo with 360° angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
01/3/2024	Visual Inspection	<ul style="list-style-type: none"> • Design parameters (top level, top width, and side slopes) of the bund was not well maintained. • Shero Minor is flowing towards country side of the bund. • Cultivated area is situated on the country side which is approximately 15 feet below the top level of bund. • Basti Dulhar is located on the country side of the bund.  <p>Shero Minor is flowing towards country side of the bund</p>  <p>Cultivated area on the country side</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Pass	Free board height is 7 feet.
			Bund Width	Pass	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	Fail	Floodplain length is about 3300 feet.
		Topographic Feature	Breach Record	Yes	It has breached in the past.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Proactive Type R	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	0	Free board height is 7 feet.
			Bund Width	0	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	1	Floodplain length is about 3300 feet.
	Quality Score			1/9	

Note) HGL: hydraulic gradient line

Khanwah Flood Bund RD 77+000 to RD 78+000

Creation Date: 29/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Muzaffargarh Canal Division	Muzaffargarh Canal Circle
Sr. No.	River Name	River System	Bank
P-013a	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Khanwah Flood Bund		RD 73+000 to 77+000	29°15'72.57"N, 70°72'52.63"E
Name of Vulnerable Point	Khanwah Flood Bund at RD 73+000 to 77+000_1		
Reason for the Vulnerability	<ul style="list-style-type: none"> This is the confluence point of River Chenab and Indus. This Flood Bund was constructed in 2016. During 2010 flood, without Khanwah flood bund on the left bank of River Indus and Chandarban flood bund on the right bank of River Chenab, both rivers meet on the upstream point and whole village was submerged. Severe erosive action is occurring in this reach. 		
Flow Condition ¹	<ul style="list-style-type: none"> Extreme turbulent flow is observed along the bund in the immediate vicinity in this reach. 		
Site Condition in the Country Side ²	There is a deep pit near this reach on the country side.		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³





Category	Quality Score
Proactive Type R	1/9







¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points

² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)




³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund																																																																														
Basic Dimensions and Materials	Item	Existing	Proposed																																																																											
	Top Elevation	328.00 feet	Not Applicable —																																																																											
	H.F.L	320.60 feet																																																																												
	Free Board Height	7.40 feet																																																																												
	Top Width	25 feet																																																																												
	River Side Slope	1:3																																																																												
	Country Side Slope	1:3																																																																												
	Longitudinal Length	78000 feet																																																																												
	Slope Protection Material	Earthen (Silty clay)																																																																												
	Covering Material/ Pavement on the Top	Earthen (Silty clay)																																																																												
	Embankment Material	Earthen (Silty clay)																																																																												
Ancillary Structure (Drainage Ditch, and Spurs)	Nil																																																																													
Typical Cross Section	<table border="1"> <thead> <tr> <th>Work Done</th> <th>Level</th> <th>Dist. from station</th> <th>Existing Level</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>-76.00</td> <td>314.11</td> <td></td> </tr> <tr> <td></td> <td></td> <td>-47.00</td> <td>317.39</td> <td></td> </tr> <tr> <td></td> <td></td> <td>-40.00</td> <td>321.94</td> <td></td> </tr> <tr> <td></td> <td></td> <td>-30.00</td> <td>326.17</td> <td></td> </tr> <tr> <td></td> <td></td> <td>-25.00</td> <td>326.60</td> <td></td> </tr> <tr> <td></td> <td></td> <td>-12.00</td> <td>326.80</td> <td></td> </tr> <tr> <td></td> <td></td> <td>0.00</td> <td>325.95</td> <td></td> </tr> <tr> <td></td> <td></td> <td>12.00</td> <td>319.34</td> <td></td> </tr> <tr> <td></td> <td></td> <td>19.00</td> <td>318.76</td> <td></td> </tr> <tr> <td></td> <td></td> <td>26.00</td> <td>317.69</td> <td></td> </tr> <tr> <td></td> <td></td> <td>30.00</td> <td>310.12</td> <td></td> </tr> <tr> <td></td> <td></td> <td>36.00</td> <td>310.12</td> <td></td> </tr> <tr> <td></td> <td></td> <td>46.00</td> <td>308.12</td> <td></td> </tr> <tr> <td></td> <td></td> <td>56.00</td> <td>308.12</td> <td></td> </tr> </tbody> </table>			Work Done	Level	Dist. from station	Existing Level	Level			-76.00	314.11				-47.00	317.39				-40.00	321.94				-30.00	326.17				-25.00	326.60				-12.00	326.80				0.00	325.95				12.00	319.34				19.00	318.76				26.00	317.69				30.00	310.12				36.00	310.12				46.00	308.12				56.00	308.12	
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Vulnerable Section	General View of River Side	
	Facing Downstream and Side	Facing Upstream Side
		
	General View of Top	
	Facing Downstream and Side	Facing Upstream Side
		
	General View of Landside	
	Facing Downstream and Side	Facing Upstream Side
		
	Close View of Deformation	
		

	<p>Close View of Damages</p> 	
	<p>Photo with 360° angles</p> 	
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream and Side</p> 	<p>Facing Upstream Side</p>  <p>29.1571, 70.7253, 60.2m, 195°</p>
	<p>General View of Top</p>	
	<p>Facing Downstream and Side</p> 	<p>Facing Upstream Side</p>  <p>29.15711, 70.7253, 59.2m, 322°</p>

	<p>General View of Landside</p> <p>Facing Downstream and Side</p>  <p>Facing Upstream Side</p> 
	<p>Photo with 360° angles</p> 
<p>Downstream End of the Bund</p>	<p>General View</p> 
	<p>Photo with 360° angles</p> 
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end) (Not Applicable)</p> <p>Photo with 360° angles (Not Applicable)</p>

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
29/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Main river creek flowing along this Reach. • Deep pit / standing water is present on the country side. • Top width on this reach has not been properly maintained. • Erosive action has been observed along this reach.  <p>Main river creek is flowing along this reach</p>  <p>Deep pit / standing water on the country side</p>  <p>Erosive action along this reach was observed</p>	a

Note:

The Punjab Irrigation Department continuously monitoring the flood bund especially during flood season. There is a need to maintain the said reach as per design parameters.

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Pass	Free board height is 7.4 feet.
			Bund Width	Pass	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	Fail	Floodplain length is about 200 feet.
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	YES	It's been affected by strong water flow since before 2010 flood.
	Category			Proactive Type R	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	0	Free board height is 7.4 feet.
			Bund Width	0	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	1	Floodplain length is about 200 feet.
	Quality Score			1/9	

Note) HGL: hydraulic gradient line

Khanwah Flood Bund RD 73+000 to RD 74+000

Creation Date: 29/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Muzaffargarh Canal Division	Muzaffargarh Canal Circle
Sr. No.	River Name	River System	Bank
P-013b	Indus River	Indus River	Left
Bund Name		R.D.	GPS Coordinates
Khanwah Flood Bund		RD 73+000 to 77+000	29°16'75.91"N, 70°72'41.12"E
Name of Vulnerable Point	Khanwah Flood Bund at RD 73+000 to 77+000_2		
Reason for the Vulnerability	<ul style="list-style-type: none"> Apron of the bund has been damaged due to direct impact of River Indus. There are 2 studs at RD 74+400 and 74+600, nose portion of both studs damaged. During flood, similar to the 2010 event, this flood bund may face significant threat. 		
Flow Condition ¹	<ul style="list-style-type: none"> Extreme turbulent flow has been observed along the bund in the immediate vicinity in this reach. 		
Site Condition in the Country Side ²	<ul style="list-style-type: none"> There is cultivated area is situated on the country side of the bund. The natural surface level is approximately 12 feet below the top level of the bund. This flood bund was constructed in 2016. During 2010 flood, without Khanwah flood bund on the left bank of River Indus and Chandarban flood bund on the Right bank of River Chinab, both rivers meet on the upstream point and whole village was submerged. 		
Layout Plan (Source of Satellite Image: Google Earth)			
Evaluation ³			
Category		Quality Score	
Proactive Type R		3/9	

¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points

² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)




³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

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Site Photo		
Vulnerable Section	General View of River Side	
	Facing Downstream and Side	Facing Upstream Side
		
	General View of Top	
	Facing Downstream and Side	Facing Upstream Side
		 29.16754, 70.72404, 55.6m, 8°
	General View of Landside	
	Facing Downstream and Side	Facing Upstream Side
		
	Close View of Deformation	
		

	<p>Close View of Damages</p> 	
	<p>Photo with 360° angles</p> 	
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream and Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream and Side</p> 	<p>Facing Upstream Side</p> 

	<p data-bbox="475 163 770 192">General View of Landside</p> <table border="1" data-bbox="475 203 1332 510"> <tr> <td data-bbox="475 203 914 510"> <p data-bbox="475 215 807 244">Facing Downstream and Side</p>  </td> <td data-bbox="914 203 1332 510"> <p data-bbox="930 215 1182 244">Facing Upstream Side</p>  </td> </tr> </table> <p data-bbox="475 528 735 557">Photo with 360° angles</p> 	<p data-bbox="475 215 807 244">Facing Downstream and Side</p> 	<p data-bbox="930 215 1182 244">Facing Upstream Side</p> 
<p data-bbox="475 215 807 244">Facing Downstream and Side</p> 	<p data-bbox="930 215 1182 244">Facing Upstream Side</p> 		
<p data-bbox="240 976 443 1032">Downstream End of the Bund</p>	<p data-bbox="475 976 632 1005">General View</p>  <p data-bbox="475 1476 735 1505">Photo with 360° angles</p> 		
<p data-bbox="240 1901 443 1957">Upstream End of the Bund</p>	<p data-bbox="475 1901 1166 1957">General View (In the case that the VP is located near the end) (Not Applicable)</p> <p data-bbox="475 1975 1007 2031">Photo with 360° angles (Not Applicable)</p>		

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
29/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Main river creek is flowing along this Reach. • Cultivated area is present on the country side. • Top width on this reach was not properly maintained. • Erosive action along this reach, particularly along the 2 stone studs.  <p>Main river creek is flowing along this Reach</p>  <p>Cultivated area on the country side</p>  <p>Erosive action along this reach</p>	a

Note:

The Punjab Irrigation Department is continuously monitoring the flood bund especially during flood season. The said reach needs to be maintained according to the design parameters.

⁴ Current Status, Effect of the Existing Structural Countermeasure Such As Spurs/studs, Sheet Piles for Seepage Control etc and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Fail	Free board height is 6.6 feet.
			Bund Width	Pass	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	Fail	The river touch the bund
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	YES	It's been affected by strong water flow since before 2010 flood.
	Category			Proactive Type R	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	1	Free board height is 6.6 feet.
			Bund Width	0	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	2	The river touch the bund
	Quality Score			3/9	

Note) HGL: hydraulic gradient line

Inverted Hockey Spur of 1-R Minor at RD 61+500

Creation Date: 29/2/2024




Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Muzaffargarh Canal Division	Muzaffargarh Canal Circle
Sr. No.	River Name	River System	Bank
P-014	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Khanwah Flood Bund		RD 61 +500	29°52'95."N, 70°72'94.98"E
Name of Vulnerable Point	Inverted Hockey spur at RD 61 +500		
Reason for the Vulnerability	<ul style="list-style-type: none"> • During 2022 flood, the River Indus eroded solid portion and shank of inverted hockey spur. 		
Flow Condition ¹	<ul style="list-style-type: none"> • Extreme turbulent flow was observed along the spur/bund at this RD. • A small river creek is located in the immediate vicinity of the spur, and when discharge increases, this small creek becomes the main creek. 		
Site Condition in the Country Side ²	<ul style="list-style-type: none"> • Village Rampur-2 and a police station were observed towards country side the bund. 		
Layout Plan (Source of Satellite Image: Google Earth)			
Evaluation ³			
Category		Quality Score	
Monitoring		3/9	








¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.






² Site Condition Around the Vulnerable Points Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).


³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

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MM/YYY Y	Type of Damage	Description																																																																																																											
2022	Solid portion and shank portion damaged	Solid portion and shank portion were damaged during 2022 flood.																																																																																																											
Record of Rehabilitation/ Improvement																																																																																																													
MM/YYY Y	Project Name and its Description	Cost	Source of Funding																																																																																																										
2023	Solid portion and shank portion restoration	RS. 65 Million	Maintenance and Repair works of PID																																																																																																										
Plan for Rehabilitation/ Improvement																																																																																																													
MM/YYY Y	Project Name and its Description	Cost	Source of Funding																																																																																																										
	Nil																																																																																																												

Site Photo		
Vulnerable Section	General View of River Side	
	Facing Downstream Side	Facing Upstream Side
		
	General View of Top	
	Facing Downstream Side	Facing Upstream Side
		
	General View of Landside	
	Facing Downstream Side	Facing Upstream Side
		
	Close View of Deformation	
Not Applicable		
Close View of Damages		
Not Applicable		

	<p>Photo with 360° angles</p> 	
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Landside</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 

	<p>Photo with 360⁰ angles</p> 
<p>Downstream End of the Bund</p>	<p>General View</p> 
	<p>Photo with 360⁰ angles</p> 
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p> 
	<p>Photo with 360⁰ angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
29/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Reserve stock of stone are present at the shank of the spur. • Main river creek is situated approximately 2 km away from the spur. • 282 feet nose portion stone pitched on riveride. • Village Rampur-2 and police station were observed towards country side the bund. 	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		No	The inundation analysis indicates that the flood damage is not severe.
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Pass	Free board height is 7 feet.
			Bund Width	Fail	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	Fail	The river touch the bund
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Monitoring	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	0	Free board height is 7 feet.
			Bund Width	1	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	2	The river touch the bund
	Quality Score			3/9	

Note) HGL: hydraulic gradient line

Khanwah Flood Bund RD 9+000

Creation Date: 29/2/2024

















Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Muzaffargarh Canal Division	Muzaffargarh Canal Circle
Sr. No.	River Name	River System	Bank
P-015	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Khanwah Flood Bund		RD 9+000	29°33'81.09"N, 70°71'26.12"E
Name of Vulnerable Point	J Head Spur No.6 at RD 9+000 of Khanwah Flood Bund		
Reason for the Vulnerability	<ul style="list-style-type: none"> • There is a J Head Spur Number 6 at this RD, the Apron and solid portion of J head spur damaged during 2010 and 2022 flood. • Erosive action was observed on the upstream side of the spur. 		
Flow Condition ¹	<ul style="list-style-type: none"> • Extreme turbulent flow was observed along the spur /bund at this RD. • The main river creek was located in the immediate vicinity of the bund/spur. 		
Site Condition in the Country Side ²	<ul style="list-style-type: none"> • Basti Jaskani and Basti Lagah observed towards country side of the bund. • There is a cropped area on the country side of the bund. 		
Layout Plan (Source of Satellite Image: Google Earth)			
Evaluation ³			
Category		Quality Score	
Emergent Type R		7/9	


¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.

² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).

³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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<td>DISTANCE</td> <td>427.80</td> </tr> <tr> <td>LEVEL</td> <td>111.26</td> </tr> <tr> <td>DISTANCE</td> <td>442.06</td> </tr> <tr> <td>LEVEL</td> <td>110.26</td> </tr> <tr> <td>DISTANCE</td> <td>456.32</td> </tr> <tr> <td>LEVEL</td> <td>109.26</td> </tr> <tr> <td>DISTANCE</td> <td>470.58</td> </tr> <tr> <td>LEVEL</td> <td>108.26</td> </tr> <tr> <td>DISTANCE</td> <td>484.84</td> </tr> <tr> <td>LEVEL</td> <td>107.26</td> </tr> <tr> <td>DISTANCE</td> <td>499.10</td> </tr> <tr> <td>LEVEL</td> <td>106.26</td> </tr> <tr> <td>DISTANCE</td> <td>513.36</td> </tr> <tr> <td>LEVEL</td> <td>105.26</td> </tr> <tr> <td>DISTANCE</td> <td>527.62</td> </tr> <tr> <td>LEVEL</td> <td>104.26</td> </tr> <tr> <td>DISTANCE</td> <td>541.88</td> </tr> <tr> <td>LEVEL</td> <td>103.26</td> </tr> <tr> <td>DISTANCE</td> <td>556.14</td> </tr> <tr> <td>LEVEL</td> <td>102.26</td> </tr> <tr> <td>DISTANCE</td> <td>570.40</td> </tr> <tr> <td>LEVEL</td> <td>101.26</td> </tr> <tr> <td>DISTANCE</td> <td>584.66</td> </tr> 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LEVEL = 340.78	TOP = 30'	EXISTING DATA	PRE-EXECUTION	LEVEL	142.21	DISTANCE	6.00	LEVEL	141.26	DISTANCE	14.26	LEVEL	140.26	DISTANCE	28.52	LEVEL	139.26	DISTANCE	42.78	LEVEL	138.26	DISTANCE	57.04	LEVEL	137.26	DISTANCE	71.30	LEVEL	136.26	DISTANCE	85.56	LEVEL	135.26	DISTANCE	99.82	LEVEL	134.26	DISTANCE	114.08	LEVEL	133.26	DISTANCE	128.34	LEVEL	132.26	DISTANCE	142.60	LEVEL	131.26	DISTANCE	156.86	LEVEL	130.26	DISTANCE	171.12	LEVEL	129.26	DISTANCE	185.38	LEVEL	128.26	DISTANCE	199.64	LEVEL	127.26	DISTANCE	213.90	LEVEL	126.26	DISTANCE	228.16	LEVEL	125.26	DISTANCE	242.42	LEVEL	124.26	DISTANCE	256.68	LEVEL	123.26	DISTANCE	270.94	LEVEL	122.26	DISTANCE	285.20	LEVEL	121.26	DISTANCE	299.46	LEVEL	120.26	DISTANCE	313.72	LEVEL	119.26	DISTANCE	327.98	LEVEL	118.26	DISTANCE	342.24	LEVEL	117.26	DISTANCE	356.50	LEVEL	116.26	DISTANCE	370.76	LEVEL	115.26	DISTANCE	385.02	LEVEL	114.26	DISTANCE	399.28	LEVEL	113.26	DISTANCE	413.54	LEVEL	112.26	DISTANCE	427.80	LEVEL	111.26	DISTANCE	442.06	LEVEL	110.26	DISTANCE	456.32	LEVEL	109.26	DISTANCE	470.58	LEVEL	108.26	DISTANCE	484.84	LEVEL	107.26	DISTANCE	499.10	LEVEL	106.26	DISTANCE	513.36	LEVEL	105.26	DISTANCE	527.62	LEVEL	104.26	DISTANCE	541.88	LEVEL	103.26	DISTANCE	556.14	LEVEL	102.26	DISTANCE	570.40	LEVEL	101.26	DISTANCE	584.66	LEVEL	100.26	DISTANCE	598.92	LEVEL	99.26	DISTANCE	613.18	LEVEL	98.26	DISTANCE	627.44	LEVEL	97.26	DISTANCE	641.70	LEVEL	96.26	DISTANCE	655.96	LEVEL	95.26	DISTANCE	670.22	LEVEL	94.26	DISTANCE	684.48	LEVEL	93.26	DISTANCE	698.74	LEVEL	92.26	DISTANCE	713.00	LEVEL	91.26	DISTANCE	727.26	LEVEL	90.26	DISTANCE	741.52	LEVEL	89.26	DISTANCE	755.78	LEVEL	88.26	DISTANCE	770.04	LEVEL	87.26	DISTANCE	784.30	LEVEL	86.26	DISTANCE	798.56	LEVEL	85.26	DISTANCE	812.82	LEVEL	84.26	DISTANCE	827.08	LEVEL	83.26	DISTANCE	841.34	LEVEL	82.26	DISTANCE	855.60	LEVEL	81.26	DISTANCE	869.86	LEVEL	80.26	DISTANCE	884.12	LEVEL	79.26	DISTANCE	898.38	LEVEL	78.26	DISTANCE	912.64	LEVEL	77.26	DISTANCE	926.90	LEVEL	76.26	DISTANCE	941.16	LEVEL	75.26	DISTANCE	955.42	LEVEL	74.26	DISTANCE	969.68	LEVEL	73.26	DISTANCE	983.94	LEVEL	72.26	DISTANCE	998.20	LEVEL	71.26	DISTANCE	1012.46	LEVEL	70.26	DISTANCE	1026.72	LEVEL	69.26	DISTANCE	1040.98	LEVEL	68.26	DISTANCE	1055.24	LEVEL	67.26	DISTANCE	1069.50	LEVEL	66.26	DISTANCE	1083.76	LEVEL	65.26	DISTANCE	1098.02	LEVEL	64.26	DISTANCE	1112.28	LEVEL	63.26	DISTANCE	1126.54	LEVEL	62.26	DISTANCE	1140.80	LEVEL	61.26	DISTANCE	1155.06	LEVEL	60.26	DISTANCE	1169.32	LEVEL	59.26	DISTANCE	1183.58	LEVEL	58.26	DISTANCE	1197.84	LEVEL	57.26	DISTANCE	1212.10	LEVEL	56.26	DISTANCE	1226.36	LEVEL	55.26	DISTANCE	1240.62	LEVEL	54.26	DISTANCE	1254.88	LEVEL	53.26	DISTANCE	1269.14	LEVEL	52.26	DISTANCE	1283.40	LEVEL	51.26	DISTANCE	1297.66	LEVEL	50.26	DISTANCE	1311.92	LEVEL	49.26	DISTANCE	1326.18	LEVEL	48.26	DISTANCE	1340.44	LEVEL	47.26	DISTANCE	1354.70	LEVEL	46.26	DISTANCE	1368.96	LEVEL	45.26	DISTANCE	1383.22	LEVEL	44.26	DISTANCE	1397.48	LEVEL	43.26	DISTANCE	1411.74	LEVEL	42.26	DISTANCE	1426.00	LEVEL	41.26	DISTANCE	1440.26	LEVEL	40.26	DISTANCE	1454.52	LEVEL	39.26	DISTANCE	1468.78	LEVEL	38.26	DISTANCE	1483.04	LEVEL	37.26	DISTANCE	1497.30	LEVEL	36.26	DISTANCE	1511.56	LEVEL	35.26	DISTANCE	1525.82	LEVEL	34.26	DISTANCE	1540.08	LEVEL	33.26	DISTANCE	1554.34	LEVEL	32.26	DISTANCE	1568.60	LEVEL	31.26	DISTANCE	1582.86	LEVEL	30.26	DISTANCE	1597.12	LEVEL	29.26	DISTANCE	1611.38	LEVEL	28.26	DISTANCE	1625.64	LEVEL	27.26	DISTANCE	1639.90	LEVEL	26.26	DISTANCE	1654.16	LEVEL	25.26	DISTANCE	1668.42	LEVEL	24.26	DISTANCE	1682.68	LEVEL	23.26	DISTANCE	1696.94	LEVEL	22.26	DISTANCE	1711.20	LEVEL	21.26	DISTANCE	1725.46	LEVEL	20.26	DISTANCE	1739.72	LEVEL	19.26	DISTANCE	1753.98	LEVEL	18.26	DISTANCE	1768.24	LEVEL	17.26	DISTANCE	1782.50	LEVEL	16.26	DISTANCE	1796.76	LEVEL	15.26	DISTANCE	1811.02	LEVEL	14.26	DISTANCE	1825.28	LEVEL	13.26	DISTANCE	1839.54	LEVEL	12.26	DISTANCE	1853.80	LEVEL	11.26	DISTANCE	1868.06	LEVEL	10.26	DISTANCE	1882.32	LEVEL	9.26	DISTANCE	1896.58	LEVEL	8.26	DISTANCE	1910.84	LEVEL	7.26	DISTANCE	1925.10	LEVEL	6.26	DISTANCE	1939.36	LEVEL	5.26	DISTANCE	1953.62	LEVEL	4.26	DISTANCE	1967.88	LEVEL	3.26	DISTANCE	1982.14	LEVEL	2.26	DISTANCE	1996.40	LEVEL	1.26	DISTANCE	2010.66	LEVEL	0.26	DISTANCE	2024.92
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Close View of Deformation					
 <p>Large Rain cuts in the sloping portion</p>					

	<p>Close View of Damages</p>  <p>Apron damaged (cannot be observed)</p>	
	<p>Photo with 360° angles</p> 	
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 

	<p>General View of Landside</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>Photo with 360° angles</p> 	
<p>Downstream End of the Bund</p>	<p>General View</p> 	
	<p>Photo with 360° angles</p> 	



Upstream End
of the Bund

General View (In the case that the VP is located near the end)



Photo with 360° angles



Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
29/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Reserve stock of stone present at J Head Spur No. 6 at RD 9+000 of the bund. • Main river creek is flowing along this RD. • River side is stone pitched. • Basti Jaskani and Basti Lagah observed towards country side of the bund. • There is a cropped area on the country side of the bund. • Top width on this reach has not been properly maintained. • Damage to the slope due to the rain cut was observed. • Damage of the apron have been reported. <div style="text-align: center;">  <p>Reserve stock of stone present at J Head Spur</p>  <p>Cultivated area on the country side of the bund</p> </div>	c

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		YES	The bund body is currently damaged.
		Bund Dimension	Bund Height	Fail	Free board height is 5.6 feet.
			Bund Width	Fail	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	Fail	The river touch the bund
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	YES	It's been affected by strong water flow since before 2010 flood.
	Category			Emergent Type R	
	For Evaluation Score	Bund Damage		3	The bund body is currently damaged.
		Bund Dimension	Bund Height	1	Free board height is 5.6 feet.
			Bund Width	1	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	2	The river touch the bund
	Quality Score			7/9	

Note) HGL: hydraulic gradient line

Khanwah Flood Bund RD 15+650

Creation Date: 29/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Muzaffargarh Canal Division	Muzaffargarh Canal Circle
Sr. No.	River Name	River System	Bank
P-016	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Khanwah Flood Bund		RD 15+650	29°31'81.91"N, 70°71'18.67"E
Name of Vulnerable Point	Inverted hockey spur at RD 15+650 of Khanwah Flood Bund		
Reason for the Vulnerability	<ul style="list-style-type: none"> • There is inverted hockey spur at this RD, the Apron of which damaged. • Erosive action was observed on the upstream side of the stud. 		
Flow Condition ¹	<ul style="list-style-type: none"> • Extreme turbulent flow was observed along the stud /bund at this RD. • The depth of the River Indus is approximately 30 feet in the immediate vicinity along this reach. 		
Site Condition in the Country Side ²	<ul style="list-style-type: none"> • Town Gubbar Arain is located on the country side of the bund. 		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³

Category	Quality Score
Proactive Type R	4/9

¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.

² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).



³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase



Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	337.00 feet	Not Applicable —
	H.F.L	333.87 feet	
	Free Board Height	3.13 feet	
	Top Width	30 feet	
	River Side Slope	1:3	
	Country Side Slope	1:2	
	Longitudinal Length	317 feet	
	Slope Protection Material	Earthen (Silty clay)	
	Covering Material/ Pavement on the Top	Earthen (Silty clay)	
	Embankment Material	Earthen (Silty clay)	
	Ancillary Structure (Drainage Ditch, and Spurs)	Nil	
Typical Cross Section			
	<p>RESTORATION OF INVERTED HOCKEY STUD AT RD:15+650 OF KHANWAH FLOOD BUND. X-SECTION AT RD :0+274</p> <p>TOP = 20' TOP LEVEL = 337.000</p> <p>APPRON WIDTH = 20' APPRON TOP LEVEL = 328.00</p> <p>APPRON WIDTH = 20' APPRON TOP LEVEL = 328.00</p> <p>SLOPE 1:1</p> <p>SUB ENGINEER</p> <p>SUB DIVISIONAL OFFICER JATOI CANAL SUB DIVISION JATOI</p> <p>EXECUTIVE ENGINEER MUZAFFARGARH CANAL DIVISION MUZAFFARGARH</p>		
History of Damages			
MM/YYYY	Type of Damage	Description	
	Nil		
Record of Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		
Plan for Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		

Note:

At RD 13+5000 of this bund, a J-Head is under construction, due to this spur the trend of the river will be away from the bund at RD 15+650.

Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
	Facing Downstream Side	Facing Upstream Side			
					
	General View of Top				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
Facing Downstream Side	Facing Upstream Side				
					
General View of Landside					
<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side			
Facing Downstream Side	Facing Upstream Side				
					
Close View of Deformation					

	<p>Close View of Damages</p>  <p>Erosive action</p>					
	<p>Photo with 360° angles</p> 					
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p> <table border="1" data-bbox="437 1106 1361 1234"> <tr> <td data-bbox="437 1106 911 1234"> <p>Facing Downstream Side Not Applicable (length of the stud is 317 feet)</p> </td> <td data-bbox="911 1106 1361 1234"> <p>Facing Upstream Side Not Applicable (length of the stud is 317 feet)</p> </td> </tr> </table>		<p>Facing Downstream Side Not Applicable (length of the stud is 317 feet)</p>	<p>Facing Upstream Side Not Applicable (length of the stud is 317 feet)</p>		
<p>Facing Downstream Side Not Applicable (length of the stud is 317 feet)</p>	<p>Facing Upstream Side Not Applicable (length of the stud is 317 feet)</p>					
<p>Typical Section (Not Applicable because length of the spur is only 317 feet)</p>	<p>General View of Top</p> <table border="1" data-bbox="437 1279 1361 1406"> <tr> <td data-bbox="437 1279 911 1406"> <p>Facing Downstream Side Not Applicable (length of the stud is 317 feet)</p> </td> <td data-bbox="911 1279 1361 1406"> <p>Facing Upstream Side Not Applicable (length of the stud is 317 feet)</p> </td> </tr> </table> <p>General View of Landside</p> <table border="1" data-bbox="437 1451 1361 1579"> <tr> <td data-bbox="437 1451 911 1579"> <p>Facing Downstream Side Not Applicable (length of the stud is 317 feet)</p> </td> <td data-bbox="911 1451 1361 1579"> <p>Facing Upstream Side Not Applicable (length of the stud is 317 feet)</p> </td> </tr> </table> <p>Photo with 360° angles Not Applicable (length of the stud is 317 feet)</p>		<p>Facing Downstream Side Not Applicable (length of the stud is 317 feet)</p>	<p>Facing Upstream Side Not Applicable (length of the stud is 317 feet)</p>	<p>Facing Downstream Side Not Applicable (length of the stud is 317 feet)</p>	<p>Facing Upstream Side Not Applicable (length of the stud is 317 feet)</p>
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<p>Facing Downstream Side Not Applicable (length of the stud is 317 feet)</p>	<p>Facing Upstream Side Not Applicable (length of the stud is 317 feet)</p>					
<p>Downstream End of the Bund</p>	<p>General View Not Applicable</p> <p>Photo with 360° angles Not Applicable</p>					
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end) Not Applicable</p> <p>Photo with 360° angles Not Applicable</p>					

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
29/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Main river creek is flowing along this RD. • The Town of Gabbar Arain is located on the country side. • Top width on this reach was not properly maintained. • Erosive action along the inverted hockey stud at this RD.  <p>Main river creek is flowing along this RD</p> 	A

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Fail	Free board height is 3.1 feet.
			Bund Width	Fail	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	Fail	The river touch the bund
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	YES	It's been affected by strong water flow since before 2010 flood.
	Category			Proactive Type R	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	1	Free board height is 3.1 feet.
			Bund Width	1	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	2	The river touch the bund
	Quality Score			4/9	

Note) HGL: hydraulic gradient line

Mole Head prong of J-Head Spur R-3

Creation Date: 28/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	River Diversion Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-017	Indus River	Indus River	Right
Bund Name		R.D	GPS Coordinates
J-Head Spur R-3		-	30°07'57.41"N, 70°79'95.8"E
Name of Vulnerable Point	Mole Head Prong of J-Head Spur R-3 (Right side) 700 feet		
Reason for the Vulnerability	<ul style="list-style-type: none"> The river is directly impacting the spur. 		
Flow Condition ¹	<ul style="list-style-type: none"> Main creek is flowing in the immediate vicinity of the J-head spur. As per Federal Flood Commission standard, the recommended Free Board is 6 feet. 		
Site Condition in the Country Side ²	<ul style="list-style-type: none"> There is a cultivated area on country side of the spur. 		
Layout Plan (Source of Satellite Image: Google Earth)			
Evaluation ³			
Category		Quality Score	
Monitoring		3/9	

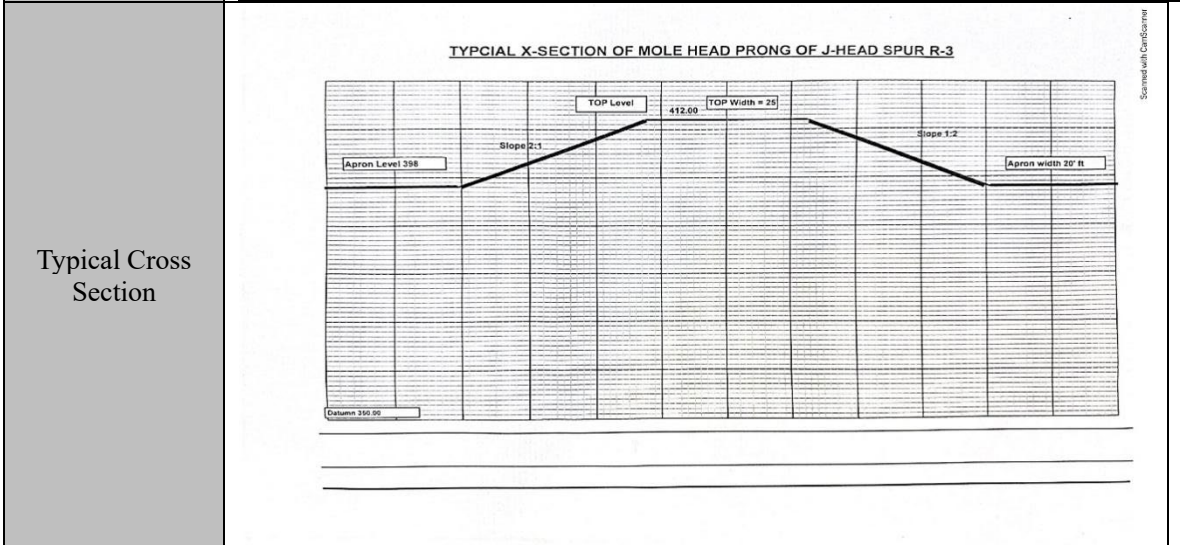
¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.

² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)

³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund

Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	412.00 feet	Not Applicable -
	H.F.L	405.00 feet	
	Free Board Height	7.00 feet	
	Top Width	30 feet	
	River Side Slope	1:2	
	Country Side Slope	1:2	
	Longitudinal Length	700 feet	
	Slope Protection Material	Stone pitched on either side	
	Covering Material/ Pavement on the Top	Earthen (Silty clay)	
	Embankment Material	Earthen (Silty clay)	
	Ancillary Structure (Drainage Ditch, and Spurs)	Nil	



History of Damages




















MM/YYYY	Type of Damage	Description
	Nil	

Record of Rehabilitation/ Improvement

MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		



Plan for Rehabilitation/ Improvement

MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		

Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
	Facing Downstream Side	Facing Upstream Side			
					
	General View of Top				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
	Facing Downstream Side	Facing Upstream Side			
					
	General View of Landside				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
Facing Downstream Side	Facing Upstream Side				
					
Close View of Deformation	Not Applicable				
Close View of Damages	Not Applicable				
Photo with 360° angles					

<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Landside</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
<p>Photo with 360° angles</p> 		
<p>Downstream End of the Bund</p>	<p>General View</p> 	

	<p>Photo with 360° angles</p> 
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p> 
	<p>Photo with 360° angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
28/2/2024	Visual Inspection	<ul style="list-style-type: none"> • River is flowing in the immediate vicinity of the spur. • Cultivated area is present towards the inner side of the prong of J-Head spur.  <p>River is flowing in the immediate vicinity of the spur</p>  <p>Cropped area towards the inner side of the prong of J-Head spur</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		No	The inundation analysis indicates that the flood damage is not severe.
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Pass	Free board height is 7 feet.
			Bund Width	Fail	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	Fail	The river touch the bund
		Topographic Feature	Breach Record	No	There is no breach record.
	Flow Impact		NO	It hasn't been affected by strong water flow since before 2010 flood.	
	Category			Monitoring	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	0	Free board height is 7 feet.
			Bund Width	1	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	2	The river touch the bund
Quality Score			3/9		

Note) HGL: hydraulic gradient line

Down Stream Flood Bund RD 5+000

Creation Date: 28/2/2024



















Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	River Diversion Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-018a	Indus River	Indus River	Left
Bund Name	R.D	GPS Coordinates	
D/S flood bund	RD 57+000 to 62+000 and 4+000 to 7+000	30°05'12.36"N, 70°83'57.21"E	
Name of Vulnerable Point	D/S Flood Bund (Left side) at RD 57+000 to 62+000 and 4+000 to 7+000 (D/S Ghazi Ghat Bridge) _1		
Reason for the Vulnerability	<ul style="list-style-type: none"> • There is a Cross spur at this RD. • The apron and sloping portion of cross spur were damaged in the flood 2022. • When discharge exceeds 150,000 cusecs, the river flows in the immediate vicinity of this bund. 		
Flow Condition ¹	<ul style="list-style-type: none"> • No flow conditions. • River flows approximately 700 feet away from this cross spur. 		
Site Condition in the Country Side ²	<ul style="list-style-type: none"> • There is a cultivated area on either side of the spur. 		
Layout Plan (Source of Satellite Image: Google Earth)			
Evaluation ³			
Category	Quality Score		
Monitoring	4/9		








¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.




² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).


³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	404 feet	Not Applicable —
	H.F.L	399.50 feet	
	Free Board Height	4.50 feet	
	Top Width	32 feet	
	River Side Slope	1:2	
	Country Side Slope	1:2	
	Longitudinal Length	5000 feet	
	Slope Protection Material	Stone pitched on River Side	
	Covering Material/ Pavement on the Top	Earthen (Silty clay)	
	Embankment Material	Earthen (Silty clay)	
	Ancillary Structure (Drainage Ditch, and Spurs)	Nil	
Typical Cross Section	<p style="text-align: center;">TYPICAL X-SECTION OF DOWNSTREAM GHAZI GHAT FLOOD BUND AT RD:5+000</p>		
	<p style="text-align: center;">Datum: 370.00</p>		
History of Damages			
MM/YYY Y	Type of Damage	Description	
2022	Apron of the cross spur damaged	Apron of the cross spur damaged in 2022 flood.	
Record of Rehabilitation/ Improvement			
MM/YYY Y	Project Name and its Description	Cost	Source of Funding
2023	Apron, pitching of the cross-spur restoration	Rs. 114 Million	Maintenance and Repair works of PID
Plan for Rehabilitation/ Improvement			
MM/YYY Y	Project Name and its Description	Cost	Source of Funding
	Nil		

Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
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	General View of Top				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td> 30.051, 70.83583, 75.6m, 345°</td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		 30.051, 70.83583, 75.6m, 345°
	Facing Downstream Side	Facing Upstream Side			
		 30.051, 70.83583, 75.6m, 345°			
	General View of Landside				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td> 30.051, 70.83583, 75.6m, 345°</td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		 30.051, 70.83583, 75.6m, 345°
Facing Downstream Side	Facing Upstream Side				
	 30.051, 70.83583, 75.6m, 345°				
Close View of Deformation	Not Applicable				
Close View of Damages	Not Applicable				

	<p>Photo with 360° angles</p> 	
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
<p>General View of Landside</p>		
<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 	

	<p>Photo with 360° angles</p> 
<p>Downstream End of the Bund</p>	<p>General View</p> <p style="text-align: center;">Not Applicable</p>
<p>Upstream End of the Bund</p>	<p>Photo with 360° angles</p> <p style="text-align: center;">Not Applicable</p>
	<p>General View (In the case that the VP is located near the end)</p>  <p>Photo with 360° angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
28/2/2024	Visual Inspection	<ul style="list-style-type: none"> • River is approximately 700 feet away from the spur. • Cultivated area is situated on both sides of the cross spur. • River side slope is stone pitched and country side slope is earthen.  <p>Stone pitched river side slope and Cropped area on either side of the cross spur</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		No	The inundation analysis indicates that the flood damage is not severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Fail	Free board height is 4.5 feet.
			Bund Width	Fail	The HGL is exposed above the ground.
			Flood Plain Length	Fail	Floodplain length is about 700 feet.
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	YES	It's been affected by strong water flow since before 2010 flood.
	Category			Monitoring	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	1	Free board height is 4.5 feet.
			Bund Width	2	The HGL is exposed above the ground.
			Flood Plain Length	1	Floodplain length is about 700 feet.
	Quality Score			4/9	

Note) HGL: hydraulic gradient line

Down Stream Flood Bund RD 57+000

Creation Date: 28/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	River Diversion Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-018b	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
D/S Flood Bund		RD 57+000 to 62+000 and 4+000 to 7+000	29°92'20.63"N, 70°83'88.49"E
Name of Vulnerable Point	D/S Flood Bund (Left side) at RD 57+000 to 62+000 and 4+000 to 7+000 (D/S Ghazi Ghat Bridge) _2		
Reason for the Vulnerability	<ul style="list-style-type: none"> The said reach is no longer vulnerable as the river is flowing 2000 feet away from the bund at this RD. There is no breach history of the bund at this RD. 		
Flow Condition ¹	<ul style="list-style-type: none"> No flow conditions. River flows approximately 2000 feet away from this RD. 		
Site Condition in the Country Side ²	<ul style="list-style-type: none"> Cultivated areas are present on both sides of the bund 		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³



















Category	Quality Score
Monitoring	1/9

¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.




² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).



³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	395 feet	Not Applicable
	H.F.L	388.00 feet	
	Free Board Height	7.00 feet	
	Top Width	32 ft	
	River Side Slope	1:3	
	Country Side Slope	1:2	
	Longitudinal Length	62000 feet	
	Slope Protection Material	Earthen (clay)	
	Covering Material/ Pavement on the Top	Pavement on the Top	
	Embankment Material	Earthen (clay)	
Ancillary Structure (Drainage Ditch, and Spurs)	No		
Typical Cross Section	<p style="text-align: center;">TYPICAL X-SECTION OF DOWNSTREAM GHAZI GHAT FLOOD BUND AT RD:60+000</p>		
	History of Damages		
MM/YYY Y	Type of Damage	Description	
	Nil		
Record of Rehabilitation/ Improvement			
MM/YYY Y	Project Name and its Description	Cost	Source of Funding
	Nil		
Plan for Rehabilitation/ Improvement			
MM/YYY Y	Project Name and Description	Cost	Source of Funding
	Nil		

Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
	Facing Downstream Side	Facing Upstream Side			
					
	General View of Top				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
	Facing Downstream Side	Facing Upstream Side			
					
	General View of Landside				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td> 29.92196, 70.83889, 74.9m, 193°</td> <td> <i>D/S flood bund RD 57</i> 29.92198, 70.83889, 73.5m, 328°</td> </tr> </table>	Facing Downstream Side	Facing Upstream Side	 29.92196, 70.83889, 74.9m, 193°	 <i>D/S flood bund RD 57</i> 29.92198, 70.83889, 73.5m, 328°
Facing Downstream Side	Facing Upstream Side				
 29.92196, 70.83889, 74.9m, 193°	 <i>D/S flood bund RD 57</i> 29.92198, 70.83889, 73.5m, 328°				
Close View of Deformation	Not Applicable				
Close View of Damages	Not Applicable				

	<p>Photo with 360° angles</p> 	
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Landside</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 

	<p>Photo with 360° angles</p> 
<p>Downstream End of the Bund</p>	<p>General View</p> <p style="text-align: center;">Not Applicable</p>
<p>Upstream End of the Bund</p>	<p>Photo with 360° angles</p> <p style="text-align: center;">Not Applicable</p>
	<p>General View (In the case that the VP is located near the end)</p>  <p>Photo with 360° angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
28/2/2024	Visual Inspection	<ul style="list-style-type: none"> • River is situated approximately 2000 feet away from the spur. • Cultivated area is present on both sides of the bund. • There is a metaled road on the top of bund.  <p>Cropped area on either side of the bund</p>  <p>Metaled road on the top of bund</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		No	The inundation analysis indicates that the flood damage is not severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Pass	Free board height is 7 feet.
			Bund Width	Pass	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	Fail	Floodplain length is about 2000 feet.
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Monitoring	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	0	Free board height is 7 feet.
			Bund Width	0	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	1	Floodplain length is about 2000 feet.
	Quality Score			1/9	

Note) HGL: hydraulic gradient line

Down Stream Flood Bund RD 60+000

Creation Date: 28/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	River Diversion Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-018c	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
D/S Flood Bund		RD 57+000 to 62+000 and 4+000 to 7+000	29°91'54.01"N, 70°84'04.58"E
Name of Vulnerable Point	D/S Flood Bund (Left side) at RD 57+000 to 62+000 and 4+000 to 7+000 (D/S Ghazi Ghat Bridge)-3		
Reason for the Vulnerability	<ul style="list-style-type: none"> The said reach is no longer vulnerable, as the river is flowing 3000 feet away from the bund at this RD. There is no breach history of the bund at this RD. 		
Flow Condition ¹	<ul style="list-style-type: none"> No flow conditions. River flows approximately 3000 feet away from this cross spur. 		
Site Condition in the Country Side ²	<ul style="list-style-type: none"> Cultivated areas are present on both sides of the bun 		
Layout Plan (Source of Satellite Image: Google Earth)			
Evaluation ³			
Category	Quality Score		
Monitoring	1/9		



¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.




² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).



³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures , Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund																			
Basic Dimensions and Materials	Item	Existing	Proposed																
	Top Elevation	395 feet	Not Applicable —																
	H.F.L	388.00 feet																	
	Free Board Height	7.00 feet																	
	Top Width	32 feet																	
	River Side Slope	1:3																	
	Country Side Slope	1:2																	
	Longitudinal Length	62000 feet																	
	Slope Protection Material	Earthen (clay)																	
	Covering Material/ Pavement on the Top	Pavement on the Top																	
	Embankment Material	Earthen (clay)																	
Ancillary Structure (Drainage Ditch, and Spurs)	Nil																		
Typical Cross Section	<p style="text-align: center;">TYPICAL X-SECTION OF DOWNSTREAM GHAZI GHAT FLOOD BUND AT RD:60+000</p>																		
	<p style="text-align: center;">History of Damages</p> <table border="1"> <thead> <tr> <th>MM/YYY Y</th> <th>Type of Damage</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td></td> <td>Nil</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>			MM/YYY Y	Type of Damage	Description		Nil											
MM/YYY Y	Type of Damage	Description																	
	Nil																		
<p style="text-align: center;">Record of Rehabilitation/ Improvement</p> <table border="1"> <thead> <tr> <th>MM/YYY Y</th> <th>Project Name and its Description</th> <th>Cost</th> <th>Source of Funding</th> </tr> </thead> <tbody> <tr> <td></td> <td>Nil</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				MM/YYY Y	Project Name and its Description	Cost	Source of Funding		Nil										
MM/YYY Y	Project Name and its Description	Cost	Source of Funding																
	Nil																		
<p style="text-align: center;">Plan for Rehabilitation/ Improvement</p> <table border="1"> <thead> <tr> <th>MM/YYY Y</th> <th>Project Name and its Description</th> <th>Cost</th> <th>Source of Funding</th> </tr> </thead> <tbody> <tr> <td></td> <td>Nil</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				MM/YYY Y	Project Name and its Description	Cost	Source of Funding		Nil										
MM/YYY Y	Project Name and its Description	Cost	Source of Funding																
	Nil																		

Site Photo	
Vulnerable Section	General View of River Side
	Facing Downstream Side
	
	Facing Upstream Side
	
	General View of Top
	Facing Downstream Side
	
	Facing Upstream Side
	
General View of Landside	
Facing Downstream Side	
	
Facing Upstream Side	
	
Close View of Deformation	Not Applicable
Close View of Damages	Not Applicable

	<p>Photo with 360° angles</p> 	
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
<p>General View of Landside</p>		
<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 	

	<p>Photo with 360⁰ angles</p> 
<p>Downstream End of the Bund</p>	<p>General View</p> <p style="text-align: center;">Not Applicable</p>
<p>Upstream End of the Bund</p>	<p>Photo with 360⁰ angles</p> <p style="text-align: center;">Not Applicable</p>
	<p>General View (In the case that the VP is located near the end)</p>  <p>Photo with 360⁰ angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
28/2/2024	Visual Inspection	<ul style="list-style-type: none"> • River is situated approximately 3000 feet away from the spur. • Cultivated area is present on both sides of the bund. • There is a metaled road on the top of bund.  <p>Cropped area on either side of the bund</p>  <p>Metaled road on the top of bund</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		No	The inundation analysis indicates that the flood damage is not severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Pass	Free board height is 7 feet.
			Bund Width	Pass	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	Fail	Floodplain length is about 3000 feet.
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Monitoring	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	0	Free board height is 7 feet.
			Bund Width	0	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	1	Floodplain length is about 3000 feet.
	Quality Score			1/9	

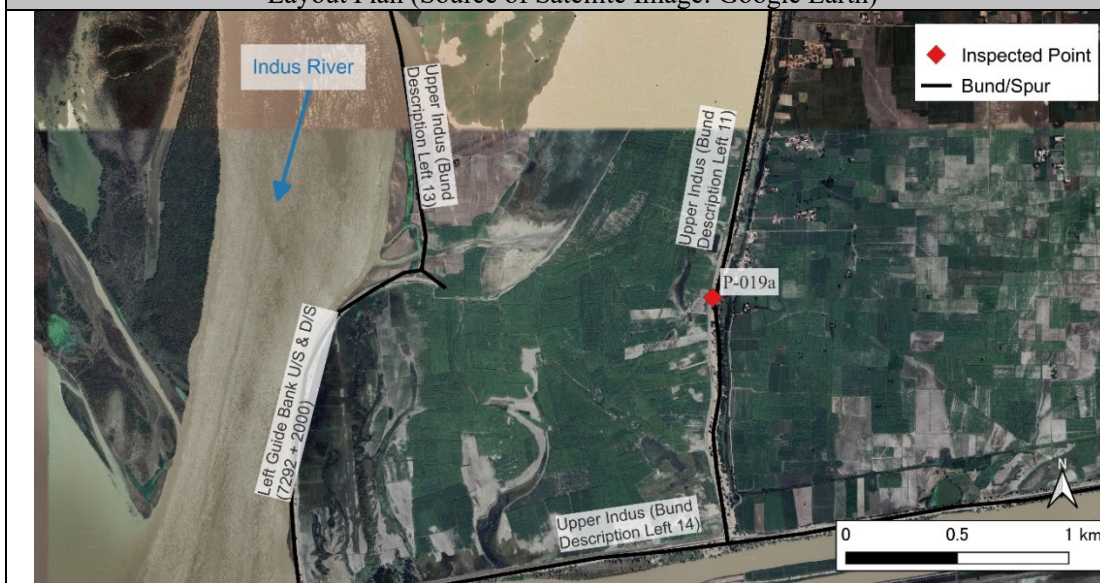
Note) HGL: hydraulic gradient line

Left Marginal Bund at RD 5 + 000

Creation Date: 25/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-019a	Indus River	Indus River	Left
Bund Name		R.D.	GPS Coordinates
Left Marginal Bund		RD 0+000 to50+000	30°52'94.77"N, 70°87'52.36"E
Name of Vulnerable Point	Left Marginal Bund 0+000 to50+000_1		
Reason for the Vulnerability	<ul style="list-style-type: none"> Main creek is situated one km away from the said reach. During 2010 flood, Left Marginal bund breached at RD 32+000 to RD 40+000. At this reach, water flow along the bund. 		
Flow Condition ¹	<ul style="list-style-type: none"> Main river creek is situated 1 km away from the said reach. 		
Site Condition in the Country Side ²	Cultivated areas are present on both sides of the bun.		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³







Category	Quality Score
Proactive Type C	3/9









¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.



² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).



³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	464.00 feet	Not Applicable
	H.F.L	458.00 feet	
	Free Board Height	6.00 feet	
	Top Width	25 feet	
	River Side Slope	1:2	
	Country Side Slope	1:2	
	Longitudinal Length	134700 feet	
	Slope Protection Material	Stone pitching on River side	
	Covering Material/ Pavement on the Top	Shingle on the Top	
Embankment Material	Earthen (Clay)		
Ancillary Structure (Drainage Ditch, and Spurs)	Taunsa Barrage is Approximately 2 km away		
Typical Cross Section			
History of Damages			
MM/YYYY	Type of Damage	Description	
	Nil		
Record of Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		
Plan for Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		

Site Photo	
Vulnerable Section	General View of River Side
	Facing Downstream Side
	
	Facing Upstream Side
	
	General View of Top
	Facing Downstream Side
	
	Facing Upstream Side
	
General View of Landside	
Facing Downstream Side	
	
Facing Upstream Side	
	
Close View of Deformation	Not Applicable
Close View of Damages	Not Applicable

	<p>Photo with 360° angles</p> 	
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Landside</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>Photo with 360° angles</p> 	

<p>Downstream End of the Bund</p>	<p>General View</p> <p style="text-align: center;">Not Applicable</p>
	<p>Photo with 360° angles</p> <p style="text-align: center;">Not Applicable</p>
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p> 
	<p>Photo with 360° angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
25/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Gauge pillar is observed on the river side • Main river creek is approximately one km away from the said reach. • Natural surface level is approximately 20 feet away from the top level. • Cultivated Areas are observed on the country side of the bund. • A temporarily cultivated area is observed in the river bed.  <p>Gauge pillar & temporarily cropped area observed in the river bed</p>  <p>Cultivated area observed on the country side</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Fail	Free board height is 6 feet.
			Bund Width	Fail	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	Fail	Floodplain length is about 5400 feet.
		Topographic Feature	Breach Record	No	There is no breach record.
	Flow Impact		NO	It hasn't been affected by strong water flow since before 2010 flood.	
	Category			Proactive Type C	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	1	Free board height is 6 feet.
			Bund Width	1	The HGL is exposed above the ground.
			Flood Plain Length	1	Floodplain length is about 5400 feet.
Quality Score			3/9		

Note) HGL: hydraulic gradient line

Spur T1 RD 11+000 of Left Marginal Bund

Creation Date: 25/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-019b	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Left Marginal Bund		RD 0+000 to50+000	30°54'67.76"N, 70°87'86.01"E
Name of Vulnerable Point	Left Marginal Bund 0+000-50+000_2		
Reason for the Vulnerability	<ul style="list-style-type: none"> This point is critical due to wave action of small creek and hence T-Head spur was constructed to prevent Left Marginal Bund from wave action, the length of which is 6700 feet. 		
Flow Condition ¹	<ul style="list-style-type: none"> Main river creek is 200 meters away from the said reach. 		
Site Condition in the Country Side ²	Cultivated areas are present on both sides of the bund		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³

Category	Quality Score
Proactive Type C	4/9

¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.




² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).


³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	462.59 feet	Not Applicable
	H.F.L	456.00 feet	
	Free Board Height	6.59 feet	
	Top Width	33 feet	
	River Side Slope	1:2	
	Country Side Slope	1:3	
	Longitudinal Length	134700 feet	
	Slope Protection Material	Stone pitching on River side	
	Covering Material/ Pavement on the Top	Shingle on the top	
Embankment Material	Earthen (Clay)		
Ancillary Structure (Drainage Ditch, and Spurs)	Nil		
Typical Cross Section			
History of Damages			
MM/YYYY	Type of Damage	Description	
	Nil		
Record of Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		
Plan for Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		

Site Photo	
Vulnerable Section	General View of River Side
	Facing Downstream Side
	
	Facing Upstream Side
	
	General View of Top
	Facing Downstream Side
	
	Facing Upstream Side
	
General View of Landside	
Facing Downstream Side	
	
Facing Upstream Side	
	
Close View of Deformation	Not Applicable
Close View of Damages	Not Applicable

	<p>Photo with 360° angles</p> 	
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Landside</p>	
<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 	

	<p>Photo with 360° angles</p> 
<p>Downstream End of the Bund</p>	<p>General View</p> <p style="text-align: center;">Not Applicable</p> <p>Photo with 360° angles</p> <p style="text-align: center;">Not Applicable</p>
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p>  <p>Photo with 360° angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
25/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Main river creek is approximately 200 meters away from the said reach. • Natural surface level is approximately 25 feet from the top level. • Cultivated areas are observed on the country side of the bund.  <p>Cultivated area are observed on the country side</p>	A

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Fail	Free board height is 6.6 feet.
			Bund Width	Fail	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	Fail	The river touch the bund
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Proactive Type C	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	1	Free board height is 6.6 feet.
			Bund Width	1	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	2	The river touch the bund
	Quality Score			4/9	

Note) HGL: hydraulic gradient line

Left Marginal Bund at RD 21 + 000

Creation Date: 25/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-019c	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Left Marginal Bund		RD 0+000 to50+000	30°57'34.85"N, 70°88'37.92"E
Name of Vulnerable Point	Left Marginal Bund 0+000 to50+000_3		
Reason for the Vulnerability	<ul style="list-style-type: none"> Main creek is situated one km away from this RD. During 2010 flood, Left Marginal bund breached at RD 32+000 to RD 40+000. At this reach, water flow along the bund. Now this RD is no longer vulnerable as the sheet piling has been installed from RD 18+000 to RD 46+000 in between 2020-2021. 		
Flow Condition ¹	<ul style="list-style-type: none"> Main river creek is situated approximately one km away from this RD. 		
Site Condition in the Country Side ²	Cultivated areas are present on both sides of the bund.		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³

Category	Quality Score
Proactive Type C	3/9

¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.




² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).



³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	464.00 feet	Not Applicable
	H.F.L	458.00 feet	
	Free Board Height	6.00 feet	
	Top Width	25 feet	
	River Side Slope	1:2	
	Country Side Slope	1:3	
	Longitudinal Length	134700 feet	
	Slope Protection Material	Stone pitching on River side	
	Covering Material/ Pavement on the Top	Metaled Road	
	Embankment Material	Earthen (Clay)	
Ancillary Structure (Drainage Ditch, and Spurs)	Nil		
Typical Cross Section	<p>The diagram shows a cross-section of the bund. On the left is the River Side with elevations from 436.00 to 458.00. On the right is the Country Side with elevations from 436.00 to 458.00. The top width is 25 feet. The River Side slope is 1:2, and the Country Side slope is 1:3. A 15-foot wide gravel shoulder is shown on top. A sheet pile is indicated on the River Side. Labels include 'PROPOSED 1'-STONE PITCHING & 1'-STONE FB 7'', 'HELV 2018', 'EXISTING SIDE PITCHING', 'SHEET PILE', and 'SHINGLE 15 W''. A note states 'All dimensions are in feet, unless otherwise indicated.' A legend identifies 'Existing' as a dashed line and 'Design' as a solid line. The title is 'LEFT MARGINAL BUND TAUNSA BARRAGE' and the scale is '1\"=15\''.</p>		
History of Damages			
MM/YYYY	Type of Damage	Description	
	Nil		
Record of Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
2020-2021	Sheet piling installed from RD 18+000 to RD 46+000.	Not provided by field staff	Project Implementation Unit (PIU)
Plan for Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		

Site Photo	
Vulnerable Section	General View of River Side
	Facing Downstream Side
	
	Facing Upstream Side
	
	General View of Top
	Facing Downstream Side
	
	Facing Upstream Side
	
General View of Landside	
Facing Downstream Side	
	
Facing Upstream Side	
	
Close View of Deformation	Not Applicable
Close View of Damages	Not Applicable

	<p>Photo with 360° angles</p> 	
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Landside</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 

	<p>Photo with 360° angles</p> 
<p>Downstream End of the Bund</p>	<p>General View</p> <p style="text-align: center;">Not Applicable</p>
<p>Upstream End of the Bund</p>	<p>Photo with 360° angles</p> <p style="text-align: center;">Not Applicable</p>
	<p>General View (In the case that the VP is located near the end)</p>  <p>Photo with 360° angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
25/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Main river creek is situated approximately one km away from the said reach. • Natural surface level is approximately 25 feet below the top level. • Cultivated area is observed on the country side of the bund. • Temporarily cultivated area is observed in the river bed. • Tibba Tie bund originates towards the country side from the RD 21+000 of Left Marginal Bund.  <p>Cultivated area is observed on the country side of the bund</p>  <p>Temporarily cultivated area is present in the river bed</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such As Spurs/studs, Sheet Piles for Seepage Control etc and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Fail	Free board height is 6 feet.
			Bund Width	Fail	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	Fail	Floodplain length is about 3200 feet.
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Proactive Type C	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	1	Free board height is 6 feet.
			Bund Width	1	The HGL is exposed above the ground.
			Flood Plain Length	1	Floodplain length is about 3200 feet.
	Quality Score			3/9	

Note) HGL: hydraulic gradient line

Left Marginal Bund at RD 33 + 000

Creation Date: 25/2/2024




















Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-019d	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Left Marginal Bund		RD 0+000 to50+000	30°60'31.37"N, 70°89'36.58"E
Name of Vulnerable Point	Left Marginal Bund RD 0+000 to50+000_4		
Reason for the Vulnerability	<ul style="list-style-type: none"> • Main creek is situated approximately 3.5 km away from this RD. • During 2010 flood, Left Marginal bund breached due to seepage resulting an overtopping at RD 32+000 to RD 40+000. • Now this RD is no longer vulnerable, as the sheet piling has been installed from RD 18+000 to RD 46+000 in-between 2020-2021. 		
Flow Condition ¹	<ul style="list-style-type: none"> • Main river creek is situated approximately 3.5 km away from this RD. • The recommended free board of Left Marginal Bund is 6 feet as per recommendation of Federal Flood Commission. • HFL of Left Marginal Bund is 458.00 ft. The available Free Board is 6.00 feet. 		
Site Condition in the Country Side ²	A deep pit/pond, approximately 60 feet in depth, has been observed on the countryside of the bund since the 2010 flood.		
Layout Plan (Source of Satellite Image: Google Earth)			
Evaluation ³			
Category		Quality Score	
Proactive Type R		3/9	









¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.

² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).



³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	464.00 feet	Not Applicable
	H.F.L	458.00 feet	
	Free Board Height	6.00 feet	
	Top Width	25 feet	
	River Side Slope	1:2	
	Country Side Slope	1:3	
	Longitudinal Length	134700 feet	
	Slope Protection Material	Stone pitching on River side	
	Covering Material/ Pavement on the Top	Metaled Road	
Embankment Material	Earthen (Clay)		
Ancillary Structure (Drainage Ditch, and Spurs)			
Typical Cross Section			
	<p>LEFT MARGINAL BUND TAUNSA BARRAGE TYPICAL X-SECTION AT RD 32+000</p> <p>NOTE: 1 All dimensions are in feet, unless otherwise indicated. LEGEND: Existing (dashed line), Design (solid line). Scale 1"=15"</p>		
History of Damages			
MM/YYYY	Type of Damage	Description	
2010	Left Marginal bund breached	During 2010 flood, Left Marginal bund breached due to seepage and overtopping at RD 32+000 to RD 40+000.	
Record of Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
2020-2021	Sheet piling installed from RD 18+000 to RD 46+000.	Not provided by field staff	Project Implementation Unit (PIU)
Plan for Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		

Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
	Facing Downstream Side	Facing Upstream Side			
					
	General View of Top				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
	Facing Downstream Side	Facing Upstream Side			
					
	General View of Landside				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
Facing Downstream Side	Facing Upstream Side				
					
Close View of Deformation	Not Applicable				
Close View of Damages	Not Applicable				
Photo with 360° angles					

<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Landside</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
<p>Photo with 360° angles</p> 		
<p>Downstream End of the Bund</p>	<p>General View</p> 	

	<p>Photo with 360⁰ angles</p> 
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p> 
	<p>Photo with 360⁰ angles</p> 

Observation Record ⁴ (Current Status, Effect of Countermeasure, Development of erosion, Deformation, Deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
25/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Main river creek is situated approximately 3.5 km away from this RD. • There is a deep pit / pond with approximately depth of 60 feet observed towards country side of the bund after 2010 flood. • Shingle has been observed on the top the bund from RD 27+000 to RD 46+000. • Temporarily cultivated area observed in the river bed.  <p>There is a deep pit/pond with approximately depth of 60 ft. towards country side of the bund</p>  <p>Temporarily cultivated area in the river bed</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Fail	Free board height is 6 feet.
			Bund Width	Fail	The HGL is exposed above the ground.
			Flood Plain Length	Fail	Floodplain length is about 2700 feet.
		Topographic Feature	Breach Record	Yes	It has breached in the past.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Proactive Type R	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	1	Free board height is 6 feet.
			Bund Width	1	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	1	Floodplain length is about 2700 feet.
	Quality Score			3/9	

Note) HGL: hydraulic gradient line

T-Head Spur T-3 Upstream Left RD 19+200 of Left Marginal Bund

Creation Date: 25/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-020	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Left Marginal Bund		RD 19 +200	30°56'71.3"N, 70°86'12.22"E
Name of Vulnerable Point	T-Head Spur T-3 upstream left RD 19+200 of LMB		
Reason for the Vulnerability	<ul style="list-style-type: none"> This point is vulnerable due to wave action of small creek, and hence T-head spur was constructed to prevent Left Marginal Bund From wave action, the length of which is 7134 feet. In 2023 flood, due to erosive action of river water, a 300 feet. Apron launched towards upstream side of the T-head spur. 		
Flow Condition ¹	<ul style="list-style-type: none"> Main river creek is observed in the immediate vicinity of the armored portion of T-Head Spur. 		
Site Condition in the Country Side ²	Cultivated area has been observed on either side of T-3 spur up to length of 4+000 out of 7+134.		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³







Category	Quality Score
Emergent Type C	6/9















¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.






² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).



³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	464.54 feet	Not Applicable —
	H.F.L	456.00 feet	
	Free Board Height	8.54 feet	
	Top Width	30 feet	
	River Side Slope	1:2	
	Country Side Slope	1:3	
	Longitudinal Length	7134 feet	
	Slope Protection Material	Stone pitching on upstream side	
	Covering Material/ Pavement on the Top	Reserve stock of stone on the top of T-3 Spur	
	Embankment Material	Earthen (Silt and Clay)	
	Ancillary Structure (Drainage Ditch, and Spurs)	Nil	
Typical Cross Section			
	History of Damages		
MM/YYY Y	Type of Damage	Description	
2023	Apron Launched	300 feet Apron launched towards upstream side of the T-Head Spur	
Record of Rehabilitation/ Improvement			
MM/YYY Y	Project Name and its description	Cost	Source of Funding
	Nil (Proposal of rehabilitation is under consideration but not submitted yet)		
Plan for Rehabilitation/ Improvement			
MM/YYY Y	Project Name and its Description	Cost	Source of Funding
	Nil		

Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
Facing Downstream Side	Facing Upstream Side				
					
General View of Top					
<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>		Facing Downstream Side	Facing Upstream Side		
Facing Downstream Side	Facing Upstream Side				
					
General View of Landside					
<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>		Facing Downstream Side	Facing Upstream Side		
Facing Downstream Side	Facing Upstream Side				
					
Close View of Deformation					
					

	<p>Close View of Damages</p>  <p>Apron launched partly (It is invisible due to flowing water)</p>			
	<p>Photo with 360° angles</p> 			
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p> <table border="1" data-bbox="424 1211 1362 1518"> <tr> <td data-bbox="424 1211 903 1518"> <p>Facing Downstream Side</p>  </td> <td data-bbox="903 1211 1362 1518"> <p>Facing Upstream Side</p>  </td> </tr> </table>		<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 			
	<p>General View of Top</p> <table border="1" data-bbox="424 1570 1362 1912"> <tr> <td data-bbox="424 1570 903 1912"> <p>Facing Downstream Side</p>  </td> <td data-bbox="903 1570 1362 1912"> <p>Facing Upstream Side</p>  </td> </tr> </table>		<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 			

	General View of Landside	
	Facing Downstream Side 	Facing Upstream Side 
	Photo with 360° angles 	
Downstream End of the Bund	General View Not Applicable	
	Photo with 360° angles Not Applicable	
Upstream End of the Bund	General View (In the case that the VP is located near the end) 	
	Photo with 360° angles 	

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
25/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Main river creek is observed in close proximity to the armored portion of T-Head spur. • Cropped area are present on both sides of T-3 spur up to length of 4+000 out of 7+134. • A reserve stock of stones is available along the top of T-head spur. • Damages on the apron and slope have been reported.  <p style="text-align: center;">Main river creek</p>  <p style="text-align: center;">Cultivated area is present on both sides of T-3 spur</p>	c

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		YES	The bund body is currently damaged.
		Bund Dimension	Bund Height	Pass	Free board height is 8.5 feet.
			Bund Width	Fail	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	Fail	The river touch the bund
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Emergent Type C	
	For Evaluation Score	Bund Damage		3	The bund body is currently damaged.
		Bund Dimension	Bund Height	0	Free board height is 8.5 feet.
			Bund Width	1	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	2	The river touch the bund
	Quality Score			6/9	

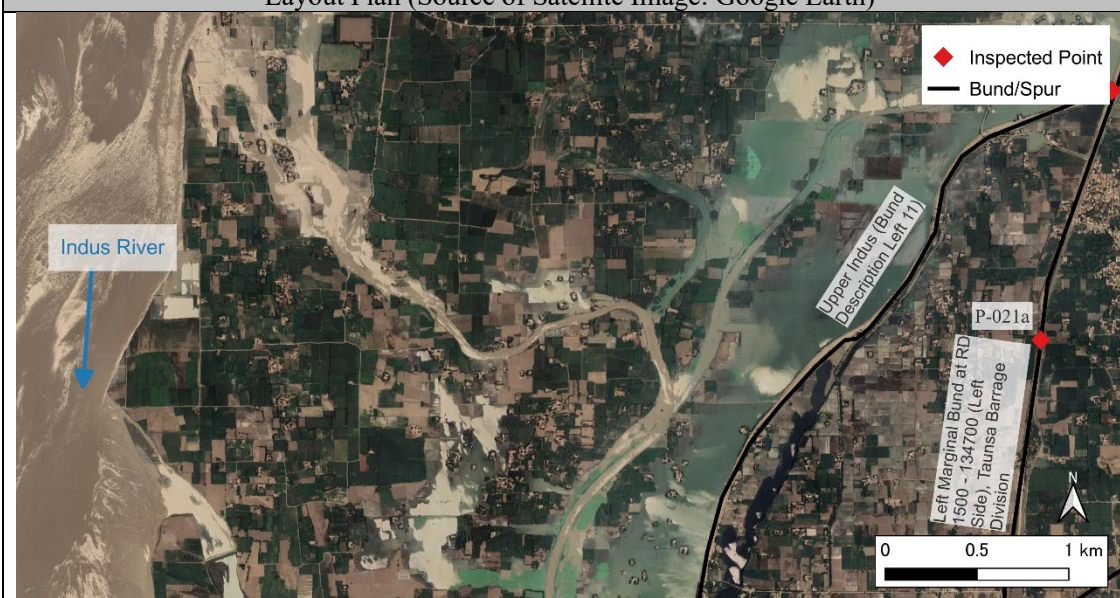
Note) HGL: hydraulic gradient line

RD 5+000 of Sanawan Flood Bund

Creation Date: 25/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-021a	Indus River	Indus River	Left
Bund Name		R.D.	GPS Coordinates
Sanawan Bund		RD 0+000 to 40+000	30°61'96.38"N, 70°91'29.68"E
Name of Vulnerable Point	Sanawan Bund at RD 0+000 to 40+000_1		
Reason for the Vulnerability	<ul style="list-style-type: none"> Sanawan Flood Bund is the second defense line. Since 2010, Indus River did not reached this area, and the said reach is no longer considered vulnerable due to installation of sheet piles at Left Marginal Bund from RD 18 + 000 to RD 46+000. 		
Flow Condition ¹	<ul style="list-style-type: none"> The river flows approximately 6.5 km away from this location. 		
Site Condition in the Country Side ²	There is a cultivated areas situated on both sides of the bund.		

Layout Plan (Source of Satellite Image: Google Earth)






















Evaluation ³	
Category	Quality Score
Monitoring	0/9


¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.




² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).


³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund													
Basic Dimensions and Materials	Item	Existing	Proposed										
	Top Elevation	463.32 feet	Not Applicable -										
	H.F. L	456.22 feet											
	Free Board Height	7.10 feet											
	Top Width	25 feet											
	River Side Slope	1:3											
	Country Side Slope	1:2											
	Longitudinal Length	41000 feet											
	Slope Protection Material	Earthen (Clay)											
	Covering Material/ Pavement on the Top	Earthen (Clay)											
	Embankment Material	Earthen (Clay)											
	Ancillary Structure (Drainage Ditch, and Spurs)	Nil											
Typical Cross Section	<p style="text-align: center;"><u>X-SECTION AT RD. 5000</u></p> <p style="text-align: right;">AREA OF EARTH WORK</p> $A = \frac{25 + 34.75}{2} \times 1.95 = 58.25 \text{ sq ft}$ $B = \frac{10 + 0.8}{2} \times 16.37 = 106.40 \text{ sq ft}$ $C = \frac{3.7 + 1.5}{2} \times 17.54 = 115.94 \text{ sq ft}$ $T = 280.59 \text{ sq ft}$ <table border="1" style="width: 100%; text-align: center;"> <tr> <td>78 - 447.60</td> <td>59 - 447.65</td> <td>39 - 449.75</td> <td>22 - 455.10</td> <td>9 - 461.50</td> <td>0 - 461.30</td> <td>9 - 461.30</td> <td>31 - 454.95</td> <td>53 - 448.75</td> <td>64 - 445.45</td> </tr> </table>			78 - 447.60	59 - 447.65	39 - 449.75	22 - 455.10	9 - 461.50	0 - 461.30	9 - 461.30	31 - 454.95	53 - 448.75	64 - 445.45
	78 - 447.60	59 - 447.65	39 - 449.75	22 - 455.10	9 - 461.50	0 - 461.30	9 - 461.30	31 - 454.95	53 - 448.75	64 - 445.45			
History of Damages													
MM/YYYY	Type of Damage	Description											
	Nil												
Record of Rehabilitation/ Improvement													
MM/YYYY	Project Name and its Description	Cost	Source of Funding										
	Nil												
Plan for Rehabilitation/ Improvement													
MM/YYYY	Project Name and its Description	Cost	Source of Funding										
	Nil												

Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
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	General View of Top				
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	Facing Downstream Side	Facing Upstream Side			
					
	General View of Landside				
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	Facing Downstream Side	Facing Upstream Side			
					
Close View of Deformation	Not Applicable				
Close View of Damages	Not Applicable				
Photo with 360° angles					

Typical Section (Adjacent to the Vulnerable Point)	General View of River Side	
	Facing Downstream Side 	Facing Upstream Side 
	General View of Top	
	Facing Downstream Side 	Facing Upstream Side 
	General View of Landside	
	Facing Downstream Side 	Facing Upstream Side 
Photo with 360° angles 		
Downstream End of the Bund	General View 	

	<p>Photo with 360° angles</p> 
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p> 
	<p>Photo with 360° angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
25/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Upper Kot Sultan Disty. (inundation channel from River Indus) was situated on the country side of this reach. • Cultivated area has been observed on either side of the bund. Natural surface level is approximately 18 feet. • Sanawan Flood Bund is the second defense line towards left side.  <p>Cultivated area is situated on both sides of the bund</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Pass	Free board height is 7.1 feet.
			Bund Width	Pass	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	Pass	Floodplain length is about 21400 feet.
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Monitoring	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	0	Free board height is 7.1 feet.
			Bund Width	0	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	0	Floodplain length is about 21400 feet.
	Quality Score			0/9	

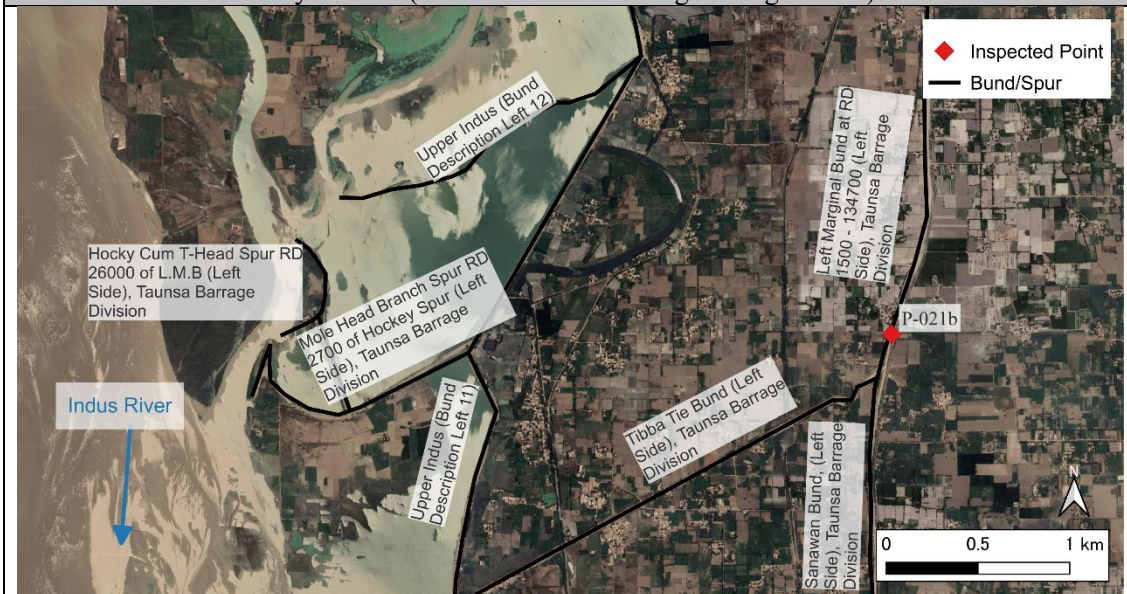
Note) HGL: hydraulic gradient line

RD 17+000 of Sanawan Bund

Creation Date: 25/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-021b	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Sanawan Bund		RD 0+000 to 40+000	30°58'65.03"N, 70°90'86.2"E
Name of Vulnerable Point	Sanawan Bund at RD 0+000 to 40+000_2		
Reason for the Vulnerability	<ul style="list-style-type: none"> Sanawan Flood Bund is the second defense line. Since 2010, Indus River has not reached this reach, and the said reach is no longer considered as vulnerable due to provision of sheet piles at Left Marginal Bund from RD 18+000 to RD 46+000. Moreover, River is 7 km away from this reach. 		
Flow Condition ¹	<ul style="list-style-type: none"> The river flows approximately 7 km away from this location. 		
Site Condition in the Country Side ²	There is a cultivated areas situated on both sides of the bund.		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³











Category	Quality Score
Monitoring	0/9

¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.





² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point)


³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund																																														
Basic Dimensions and Materials	Item	Existing	Proposed																																											
	Top Elevation	461.71 feet	Not Applicable —																																											
	H.F.L	454.71 feet																																												
	Free Board Height	7.00 feet																																												
	Top Width	25 feet																																												
	River Side Slope	1:3																																												
	Country Side Slope	1:2																																												
	Longitudinal Length	41000 feet																																												
	Slope Protection Material	Earthen (Clay)																																												
	Covering Material/ Pavement on the Top	Earthen (Clay)																																												
	Embankment Material	Earthen (Clay)																																												
	Ancillary Structure (Drainage Ditch, and Spurs)	Nil																																												
Typical Cross Section																																														
	<p style="text-align: center;">History of Damages</p> <table border="1"> <thead> <tr> <th>MM/YYYY</th> <th>Type of Damage</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td></td> <td>Nil</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p style="text-align: center;">Record of Rehabilitation/ Improvement</p> <table border="1"> <thead> <tr> <th>MM/YYYY</th> <th>Project Name and its Description</th> <th>Cost</th> <th>Source of Funding</th> </tr> </thead> <tbody> <tr> <td></td> <td>Nil</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p style="text-align: center;">Plan for Rehabilitation/ Improvement</p> <table border="1"> <thead> <tr> <th>MM/YYYY</th> <th>Project Name and its Description</th> <th>Cost</th> <th>Source of Funding</th> </tr> </thead> <tbody> <tr> <td></td> <td>Nil</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			MM/YYYY	Type of Damage	Description		Nil								MM/YYYY	Project Name and its Description	Cost	Source of Funding		Nil											MM/YYYY	Project Name and its Description	Cost	Source of Funding		Nil									
MM/YYYY	Type of Damage	Description																																												
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Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
	Facing Downstream Side	Facing Upstream Side			
					
	General View of Top				
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	Facing Downstream Side	Facing Upstream Side			
					
	General View of Landside				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
Facing Downstream Side	Facing Upstream Side				
					
Close View of Deformation	Not Applicable				
Close View of Damages	Not Applicable				
Photo with 360° angles					

Typical Section (Adjacent to the Vulnerable Point)	General View of River Side	
	Facing Downstream Side 	Facing Upstream Side 
	General View of Top	
	Facing Downstream Side 	Facing Upstream Side 
	General View of Landside	
	Facing Downstream Side 	Facing Upstream Side 
	Photo with 360° angles 	

<p>Downstream End of the Bund</p>	<p>General View</p>  <p>Photo with 360° angles</p> 
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p>  <p>Photo with 360° angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
25/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Upper Kot Sultan Disty. (Inundation channel from River Indus) was on the country side of this reach. • Cultivated area has been observed on both sides of the bund. • Natural surface level is approximately 28 feet below the top level. • RD 0+000 of Tibba Tie bund started from RD 17 +500 of Sanawan Flood Bund. • Sanawan Flood Bund is the second defense line towards left side.  <p>Cultivated area is situated on both sides of the bund</p>	A

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Pass	Free board height is 7 feet.
			Bund Width	Pass	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	Pass	Floodplain length is about 9600 feet.
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Monitoring	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	0	Free board height is 7 feet.
			Bund Width	0	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	0	Floodplain length is about 9600 feet.
	Quality Score			0/9	

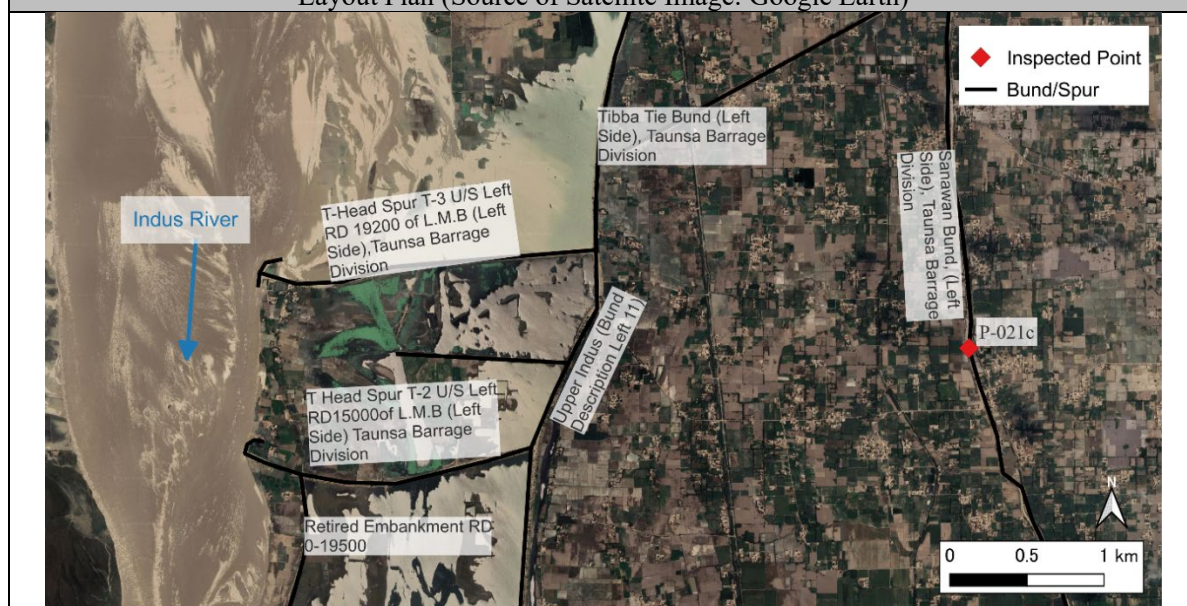
Note) HGL: hydraulic gradient line

RD 25 +500 of Sanawan Bund

Creation Date: 25/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-021c	Indus River	Indus River	Left
Bund Name		R.D.	GPS Coordinates
Sanawan Bund		RD 0+000 to 40+000	30°56'25.67"N, 70°90'88.61"E
Name of Vulnerable Point	Sanawan Bund at RD 0+000 to 40+000_3		
Reason for the Vulnerability	<ul style="list-style-type: none"> Sanawan Flood Bund is the second defense line. Since 2010, Indus River has not reached this area, and the said reach is no longer considered as vulnerable due to provision of sheet piles at Left Marginal Bund from RD 18+000 to RD 46+000. Moreover, river is 6 to 7 km away from this reach. 		
Flow Condition ¹	<ul style="list-style-type: none"> The river flows approximately 6 to 7 km away from this location. 		
Site Condition in the Country Side ²	There is a cultivated area is present on both sides of the bund.		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³




















Category	Quality Score
Monitoring	0/9








¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.





² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).


³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	460.49 feet	Not Applicable
	H.F.L	453.49 feet	
	Free Board Height	7.00 feet	
	Top Width	25 feet	
	River Side Slope	1:3	
	Country Side Slope	1:2	
	Longitudinal Length	41000 feet	
	Slope Protection Material	Earthen (Clay)	
	Covering Material/ Pavement on the Top	Earthen (Clay)	
	Embankment Material	Earthen (Clay)	
	Ancillary Structure (Drainage Ditch, and Spurs)	Nil	
Typical Cross Section			
	History of Damages		
MM/YYYY	Type of Damage	Description	
	Nil		
Record of Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		
Plan for Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		

Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
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	General View of Top				
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	General View of Landside				
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Facing Downstream Side	Facing Upstream Side				
					
Close View of Deformation	Not Applicable				
Close View of Damages	Not Applicable				
Photo with 360° angles					

Typical Section (Adjacent to the Vulnerable Point)	General View of River Side	
	Facing Downstream Side 	Facing Upstream Side 
	General View of Top	
	Facing Downstream Side 	Facing Upstream Side 
	General View of Landside	
	Facing Downstream Side 	Facing Upstream Side 
	Photo with 360° angles 	

<p>Downstream End of the Bund</p>	<p>General View</p> 
	<p>Photo with 360° angles</p> 
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p> 
	<p>Photo with 360° angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
25/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Upper Kot Sultan Disty (Inundation channel from River Indus) was on the approximately 40 feet in country side of this reach. • Cultivated area has been observed on both sides of the bund. • Natural surface level is approximately 25 feet below the top level. • Sanawan Flood Bund is the second defense line towards left side.  <p>Cultivated area is present on both sides of the bund</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Pass	Free board height is 7 feet.
			Bund Width	Pass	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	Pass	Floodplain length is about 15300 feet.
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Monitoring	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	0	Free board height is 7 feet.
			Bund Width	0	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	0	Floodplain length is about 15300 feet.
	Quality Score			0/9	

Note) HGL: hydraulic gradient line

RD 36+000 of Sanawan Bund

Creation Date: 25/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-021d	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Sanawan Bund		RD 0+000 to 40+000	30°53'62.86"N, 70°91'76.15"E
Name of Vulnerable Point	Sanawan Bund at RD 0+000 to 40+000_4		
Reason for the Vulnerability	<ul style="list-style-type: none"> Sanawan Flood Bund is the second defense line. Since 2010, Indus River has not reached this area, and the said reach is no longer considered vulnerable due to installation of sheet piles at Left Marginal Bund from RD 18+000 to RD 46+000. Moreover, River is situated 5 km away from this reach. 		
Flow Condition ¹	<ul style="list-style-type: none"> The river flows approximately 5 km away from this location. 		
Site Condition in the Country Side ²	There is a cultivated area present on both sides of the bund.		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³










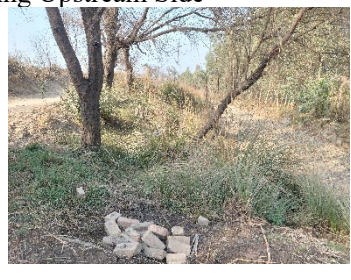
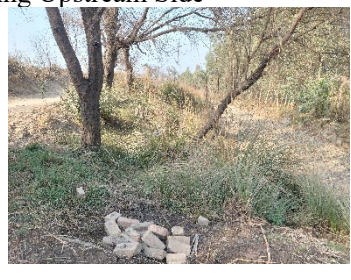
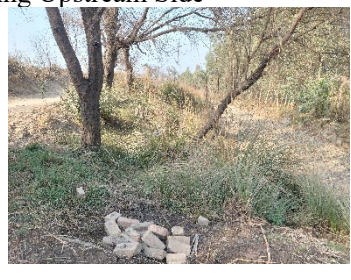

Category	Quality Score
Monitoring	0/9








¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.





² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).



³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	459.14 feet	Not Applicable -
	H.F.L	452.14 feet	
	Free Board Height	7.00 feet	
	Top Width	25 feet	
	River Side Slope	1:3	
	Country Side Slope	1:2	
	Longitudinal Length	41000 feet	
	Slope Protection Material	Earthen (Clay)	
	Covering Material/ Pavement on the Top	Metaled Road	
	Embankment Material	Earthen (Clay)	
	Ancillary Structure (Drainage Ditch, and Spurs)	Nil	
Typical Cross Section			
History of Damages			
MM/YYYY	Type of Damage	Description	
	Nil		
Record of Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		
Plan for Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		

Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
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	General View of Top				
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	General View of Landside				
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Facing Downstream Side	Facing Upstream Side				
					
Close View of Deformation	Not Applicable				
Close View of Damages	Not Applicable				
Photo with 360° angles					

<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Landside</p>	
<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 	
<p>Photo with 360° angles</p> 		

<p>Downstream End of the Bund</p>	<p>General View</p>  <p>Photo with 360° angles</p> 
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p>  <p>Photo with 360° angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
25/2/2024	Visual Inspection	<ul style="list-style-type: none"> Upper Kot Sultan Disty Inundation channel from River Indus) was in country side of this reach. Cultivated area has been observed on both sides of the bund. Natural surface level is situated approximately 25 feet below the top level. Sanawan Flood Bund is the second defense line towards left side. Dowel provided at this RD 36+000 towards river side for provision of local access road at Sanawan Flood Bund.  <p>Cultivated area is present on both sides of the bund</p>  <p>Dowel provided at this RD 36+000 towards river side</p>	A

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Pass	Free board height is 7 feet.
			Bund Width	Pass	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	Pass	Floodplain length is about 19800 feet.
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Monitoring	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	0	Free board height is 7 feet.
			Bund Width	0	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	0	Floodplain length is about 19800 feet.
	Quality Score			0/9	

Note) HGL: hydraulic gradient line

Taunsa Punjnad Link Canal RD 9+000

Creation Date: 25/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-022a	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Left Bank of T.P. Link		RD 9+000 to 19+000	30°51'97.95"N, 70°87'62.42"E
Name of Vulnerable Point	Left Bank of T.P. Link Canal at RD 9+000 to 19+000_1		
Reason for the Vulnerability	<ul style="list-style-type: none"> • Since 2010, Indus River has not reached this area, as the said reach is no longer considered vulnerable due to installation of sheet piles at Left Marginal Bund from RD 18+000 to RD 46+000. • Moreover, River is 4 km away from this reach. 		
Flow Condition ¹	<ul style="list-style-type: none"> • The river flows approximately 4 km away from this location. 		
Site Condition in the Country Side ²	The Taunsa Punjnad Link Canal is located on the countryside of the bund.		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³



















Category	Quality Score
Proactive Type R	1/9








¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.




² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).



³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	453.00 feet	Not Applicable —
	H.F.L	448.00 feet	
	Free Board Height	5.00 feet	
	Top Width	45 feet	
	River Side Slope	1:3	
	Country Side Slope	Left Flank of Taunsa Punjnad Link	
	Longitudinal Length	191000 feet	
	Slope Protection Material	Earthen (Sand and Clay)	
	Covering Material/ Pavement on the Top	Metaled Road (Taunsa Barrage to Head Muhammad Wala)	
	Embankment Material	Earthen (Sand and Clay)	
Ancillary Structure (Drainage Ditch, and Spurs)	3 km from barrage		
Typical Cross Section			
History of Damages			
MM/YYYY	Type of Damage	Description	
2010	Overtopping	Left bank of Taunsa Punjnad Link overtopped at RD 9+000	
Record of Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
2010	Restoration of Left bank of Taunsa Punjnad Link at RD 9+000	Not Provided by PID	Maintenance and Repair works of PID
Plan for Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		

Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
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	General View of Top				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
	Facing Downstream Side	Facing Upstream Side			
					
	General View of Landside				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
Facing Downstream Side	Facing Upstream Side				
					
Close View of Deformation	Not Applicable				
Close View of Damages	Not Applicable				

	<p>Photo with 360° angles</p> 	
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Landside</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 

	<p>Photo with 360° angles</p> 
<p>Downstream End of the Bund</p>	<p>General View</p> <p style="text-align: center;">Not Applicable</p>
	<p>Photo with 360° angles</p> <p style="text-align: center;">Not Applicable</p>
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p>  <p>Photo with 360° angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
25/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Taunsa Punjnad Link Canal is observed on the country side. • A metaled road connecting Taunsa Barrage to Head Muhammad Wala runs along the top of the said reach. • Cultivated area has been observed on the river side of the bund.  <p>Taunsa Panjnad Link Canal on left side</p>  <p>Metaled road is connecting Taunsa Barrage to Head Muhammad Wala at the top of the bund</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Fail	Free board height is 5 feet.
			Bund Width	Pass	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	Pass	Floodplain length is about 6500 feet.
		Topographic Feature	Breach Record	Yes	It has breached in the past.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Proactive Type R	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	1	Free board height is 5 feet.
			Bund Width	0	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	0	Floodplain length is about 6500 feet.
	Quality Score			1/9	

Note) HGL: hydraulic gradient line

Taunsa Punjnad Link Canal RD 15+000

Creation Date: 25/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-022b	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Left Bank of T.P. Link		RD 9+000 to 19+000	30°52'13.38"N, 70°88'90.26"E
Name of Vulnerable Point	Left Bank of T.P. Link Canal at RD 9+000 to 19+000_2		
Reason for the Vulnerability	<ul style="list-style-type: none"> • In 2010 flood, left bank of Taunsa Punjnad Link breached due to overtopping at RD 9+000 • Since 2010, Indus River has not reached this area, and the said reach is no longer considered vulnerable due to installation of sheet piles at Left Marginal Bund from RD 18+000 to RD 46+000. • Moreover, River is one km away from this reach. 		
Flow Condition ¹	<ul style="list-style-type: none"> • The river flows approximately one km away from this location. 		
Site Condition in the Country Side ²	The Taunsa Punjnad Link Canal is located on the countryside of the bund.		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³



















Category	Quality Score
Proactive Type R	1/9

1 Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.




2 Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).




3 Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	453.00 feet	Not Applicable —
	H.F.L	448.00 feet	
	Free Board Height	5.00 feet	
	Top Width	45 feet	
	River Side Slope	1:3	
	Country Side Slope	Left Flank of Taunsa Panjnad Link	
	Longitudinal Length	191000 feet	
	Slope Protection Material	Earthen (Sand and Clay)	
	Covering Material/ Pavement on the Top	Metaled Road (Taunsa Barrage to Head Muhammad Wala)	
	Embankment Material	Earthen (Sand and Clay)	
Ancillary Structure (Drainage Ditch, and Spurs)	Nil		
Typical Cross Section			
History of Damages			
MM/YYYY	Type of Damage	Description	
2010	Overtopping	Left bank of Taunsa Punjnad Link breached due to overtopping at RD 9+000	
Record of Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
2010	Restoration of Left bank of Taunsa Punjnad Link at RD 9+000	Not Provided by PID	Maintenance and Repair works of PID
Plan for Rehabilitation/ Improvement			
MM/YYYY	Project Name and Description	Cost	Source of Funding
	Nil		

Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
	Facing Downstream Side	Facing Upstream Side			
					
	General View of Top				
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	Facing Downstream Side	Facing Upstream Side			
					
	General View of Landside				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
Facing Downstream Side	Facing Upstream Side				
					
Close View of Deformation	Not Applicable				
Close View of Damages	Not Applicable				

	<p>Photo with 360° angles</p> 	
<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Landside</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 

	<p>Photo with 360° angles</p> 
<p>Downstream End of the Bund</p>	<p>General View</p> <p style="text-align: center;">Not Applicable</p> <p>Photo with 360° angles</p> <p style="text-align: center;">Not Applicable</p>
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p>  <p>Photo with 360° angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
25/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Taunsa Punjnad Link Canal is observed on the country side. • A metaled road connecting Taunsa Barrage to Head Muhammad Wala runs along the top of the said reach. • Cultivated area are observed on the river side of the bund.  <p>Taunsa Punjnad Link Canal observed on the country side</p>  <p>Metaled road is connecting Taunsa Barrage to Head Muhammad Wala at the top of the bund</p>  <p>Cultivated area is present on the river side of the bund</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Fail	Free board height is 5 feet.
			Bund Width	Pass	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	Pass	Floodplain length is about 10600 feet.
		Topographic Feature	Breach Record	Yes	It has breached in the past.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Proactive Type R	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	1	Free board height is 5 feet.
			Bund Width	0	The soil cover thickness over HGL exceeds the guideline value (Soil Depth \geq 2 feet)
			Flood Plain Length	0	Floodplain length is about 10600 feet.
	Quality Score			1/9	

Note) HGL: hydraulic gradient line

Link Bund Upstream Right side J-Head Spur No. 1 at RD 0+000

Creation Date: 25/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-023a	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Link Bund U/S right side		RD 0+000 to 9+000	30°54'20.91"N, 70°81'16.47"E
Name of Vulnerable Point	Link Bund U/S right side with allied spur 2-A Spur No. 1 RD 0+000 to 9+000 1		
Reason for the Vulnerability	<ul style="list-style-type: none"> The said point is no longer vulnerable as there is no breach history of this bund. 		
Flow Condition ¹	<ul style="list-style-type: none"> There is no flow on River side of the bund. 		
Site Condition in the Country Side ²	Cultivated areas is present on both sides of bund.		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³

















Category	Quality Score
Proactive Type C	3/9

¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.



² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).


³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	464.00 feet	Not Applicable —
	H.F.L	458.00 feet	
	Free Board Height	6.00 feet	
	Top Width	25 feet	
	River Side Slope	1:2	
	Country Side Slope	1:3	
	Longitudinal Length	18500 feet	
	Slope Protection Material	Stone pitching on upstream side	
	Covering Material/ Pavement on the Top	Metaled road	
	Embankment Material	Earthen (Silt and Clay)	
	Ancillary Structure (Drainage Ditch, and Spurs)	Nil	
Typical Cross Section *(Prepared by the team, not provided by PID)	<p>J-HEAD SPUR NO 1 OF LINK BUND</p> <p>Top Elevation 464.00 ft 25' Top Width</p> <p>1:2 1:3</p> <p>NSL 449.00 ft</p>		
	History of Damages		
MM/YYYY	Type of Damage	Description	
	Nil		
Record of Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		
Plan for Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		

Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
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	General View of Top				
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	General View of Landside				
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Facing Downstream Side	Facing Upstream Side				
					
Close View of Deformation	Not Applicable				
Close View of Damages	Not Applicable				
Photo with 360° angles					

<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Landside</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
<p>Photo with 360° angles</p> 		
<p>Downstream End of the Bund</p>	<p>General View</p> 	

	<p>Photo with 360⁰ angles</p> 
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p> 
	<p>Photo with 360⁰ angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
25/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Main river creek is situated approximately 2 km away from this location. • Cultivated area has been observed on both sides of the bund  <p>Cultivated area is present around the spur</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Fail	Free board height is 6 feet.
			Bund Width	Fail	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	Fail	Floodplain length is about 1100 feet.
		Topographic Feature	Breach Record	No	There is no breach record.
	Flow Impact		NO	It hasn't been affected by strong water flow since before 2010 flood.	
	Category			Proactive Type C	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	1	Free board height is 6 feet.
			Bund Width	1	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	1	Floodplain length is about 1100 feet.
Quality Score			3/9		

Note) HGL: hydraulic gradient line

Link Bund Upstream Right side J-Head Spur Number 2-A at RD 12+000

Creation Date: 25/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-023b	Indus River	Indus River	Right
Bund Name		R.D	GPS Coordinates
Link Bund U/S right side		RD 0+000 to 9+000	30°54'70.87"N, 70°80'29.13"E
Name of Vulnerable Point	Link Bund U/S right side with allied spur 2-A Spur No. 1 RD 0+000 to 9+000 2		
Reason for the Vulnerability	<ul style="list-style-type: none"> J-Head Spur was vulnerable in 2023 as the small creek damaged the apron. 		
Flow Condition ¹	<ul style="list-style-type: none"> Small river creek observed towards right side of the spur. Main river creek is situated approximately 2 km away. 		
Site Condition in the Country Side ²	Cultivated area is present on the country side which 12 feet below the top level of spur.		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³




















Category	Quality Score
Proactive Type C	2/9

¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.




² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).



³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	464.00 feet	Not Applicable —
	H.F.L	458.00 feet	
	Free Board Height	6.00 feet	
	Top Width	30 feet	
	River Side Slope	1:3	
	Country Side Slope	1:3	
	Longitudinal Length	12000 feet	
	Slope Protection Material	800 feet portion stone pitched at the tail of spur	
	Covering Material/ Pavement on the Top	Earthen (Silt and Clay)	
	Embankment Material	Earthen (Silt and Clay)	
Ancillary Structure (Drainage Ditch, and Spurs)	Nil		
Typical Cross Section *(Prepared by the team and not provided by the PID)	<p style="text-align: center;">J-HEAD SPUR NO 2A OF LINK BUND</p>		
	History of Damages		
MM/YYY Y	Type of Damage	Description	
2023	Apron damaged	In 2023 flood, Apron damaged (70 feet length)	
Record of Rehabilitation/ Improvement			
MM/YYY Y	Project Name and its Description	Cost	Source of Funding
2023	Apron restored, design parameters (side slope, stone pitching, and top width) restored.	Rs. 125 Million	Maintenance and Repair works of PID
Plan for Rehabilitation/ Improvement			
MM/YYY Y	Project Name and its Description	Cost	Source of Funding
	Nil		

Site Photo					
Vulnerable Section	General View of River Side				
	<table border="1"> <tr> <td>Facing Downstream Side</td> <td>Facing Upstream Side</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Facing Downstream Side	Facing Upstream Side		
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	General View of Top				
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	Facing Downstream Side	Facing Upstream Side			
					
	General View of Landside				
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Facing Downstream Side	Facing Upstream Side				
					
Close View of Deformation	Not Applicable				
Close View of Damages	Not Applicable				
Photo with 360° angles					

<p>Typical Section (Adjacent to the Vulnerable Point)</p>	<p>General View of River Side</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Top</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
	<p>General View of Landside</p>	
	<p>Facing Downstream Side</p> 	<p>Facing Upstream Side</p> 
<p>Photo with 360° angles</p> 		
<p>Downstream End of the Bund</p>	<p>General View</p> 	

	<p>Photo with 360⁰ angles</p> 
<p>Upstream End of the Bund</p>	<p>General View (In the case that the VP is located near the end)</p> 
	<p>Photo with 360⁰ angles</p> 

Observation Record ⁴ (Current status, effect of countermeasure, development of erosion, deformation, deterioration)			
DD/MM/YYYY	Inspection Type	Description and Photo	Damage ⁵
25/2/2024	Visual Inspection	<ul style="list-style-type: none"> • Main river creek is located approximately 2 km from this location. • Reserve stock of stones is observed from RD 4+000 to RD 8+000 on the top of spur. • Cultivated areas are present on both sides of the bund • Cultivated areas are present on the country side which 12 feet below the top level of spur.  <p>Reserve stone of stock on top of bund</p>  <p>Cultivated area is present around the bund</p>	a

⁴ Current Status, Effect of the Existing Structural Countermeasure Such as Spurs/studs, Sheet Piles for Seepage Control etc. and Development of Erosion, Deformation, Deterioration of the Existing Bund

⁵ a: No Deformation, b: No deformations are observed on the bund body, except for gully erosion caused by raindrops or the detachment of the bund's stone pitching, c: The bund or the apron has been damaged, and L: Leakage from the bund has been identified

Evaluation Process					
DD/MM/YYYY	Item		Result	Reason	
	Criteria For Evaluation Flow	Flood Damage		Yes	The inundation analysis indicates that the flood damage is severe
		Bund Damage		NO	There is no significant damage at present.
		Bund Dimension	Bund Height	Fail	Free board height is 6 feet.
			Bund Width	Fail	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	Fail	The river touch the bund
		Topographic Feature	Breach Record	No	There is no breach record.
			Flow Impact	NO	It hasn't been affected by strong water flow since before 2010 flood.
	Category			Proactive Type C	
	For Evaluation Score	Bund Damage		0	There is no significant damage at present.
		Bund Dimension	Bund Height	1	Free board height is 6 feet.
			Bund Width	1	Evaluation is not possible based on the typical cross-section.
			Flood Plain Length	0	The river touch the bund
	Quality Score			2/9	

Note) HGL: hydraulic gradient line

Link Bund Upstream Right side RD 8+000

Creation Date: 25/2/2024

Province	Zone	Division	Circle
Punjab	Dera Ghazi Khan Zone	Taunsa Barrage Division	Taunsa Canal Circle
Sr. No.	River Name	River System	Bank
P-023c	Indus River	Indus River	Left
Bund Name		R.D	GPS Coordinates
Link Bund U/S right side		RD 0+000 to 9+000	30°53'33.77"N, 70°78'63.37"E
Name of Vulnerable Point	Link Bund U/S right side with allied spur 2-A Spur No. 1 RD 0+000 to 9+000 3		
Reason for the Vulnerability	<ul style="list-style-type: none"> The said point is no longer vulnerable, as there is no breach history of this bund. River is situated approximately 3 km away from this RD. 		
Flow Condition ¹	<ul style="list-style-type: none"> There is no flow on River side of the bund. 		
Site Condition in the Country Side ²	Cultivated areas were observed on both sides of the bund..		

Layout Plan (Source of Satellite Image: Google Earth)



Evaluation³

Category	Quality Score
Proactive Type C	2/9

¹ Water Flow Direction and Conditions During Floods Around the Listed Vulnerable Points.

² Site Condition Around the Vulnerable Points (Rough Distance Between Main Water Channel and the Bund, Land Use Behind the Point, Important Facility Adjacent to the Point).

³ Emergent Type R: Emergent Phase Requiring Robust Countermeasures, Emergent Type C: Emergent Phase Requiring Common Countermeasures, Proactive Type R: Proactive Phase Requiring Robust Countermeasures, Proactive Type C: Proactive Phase Requiring Common Countermeasures, Monitoring: Monitoring Phase

Basic Information of the Bund			
Basic Dimensions and Materials	Item	Existing	Proposed
	Top Elevation	464.00 feet	Not Applicable —
	H.F.L	458.00 feet	
	Free Board Height	6.00 feet	
	Top Width	25 feet	
	River Side Slope	1:2	
	Country Side Slope	1:3	
	Longitudinal Length	18500 feet	
	Slope Protection Material	Stone pitching on upstream side	
	Covering Material/ Pavement on the Top	Metaled road	
	Embankment Material	Earthen (Silt and Clay)	
	Ancillary Structure (Drainage Ditch, and Spurs)	No	
Typical Cross Section *(Prepared by the team and, not provided by PID)	<p style="text-align: center; color: magenta;">LINK BUND UP STREAM RIGHT SIDE RD 8+000</p> <p style="text-align: center;">Top Elevation 464.00 ft 25' Top Width</p> <p style="text-align: center;">1:2 1:3</p> <p style="text-align: right;">NSL 449.00 ft</p>		
History of Damages			
MM/YYYY	Type of Damage	Description	
	Nil		
Record of Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		
Plan for Rehabilitation/ Improvement			
MM/YYYY	Project Name and its Description	Cost	Source of Funding
	Nil		