

Malin Road Culvert Rehabilitation Preliminary Construction Cost Estimate

Construction Effort Estimate:

	Days	Equip	Mat'l
1 Channel water through one pipe at a time for pipe rehabilitation			
a Place fabric and rip-rap to channel water through one pipe (~1/2 day per pipe, 3 people, backhoe, 3 yds rip-rap).	1	\$ 2,150.00 /mo	\$ 135.00
b Place temporary lining into pipe to prevent water intrusion during grouting (~1/2 day per pipe, 3 people).	1		
c Remove rip-rap after completion of project (~1 day, 3 people, backhoe).	1		
2 Place concrete and flowable grout at undermined portions of abutments, wingwalls and pipe outlets to fill these voids.			
a Remove debris and loose base material in undermined areas – do not over-excavate in these areas (~1 day, 3 people).	1	*	
b From streambed depth, excavate 1ft wide by 3'-6" deep trench at front face of wingwalls and abutments for placement of cutoff wall below streambed (~2 days, 3 people, 1 backhoe).	2	*	
c Place concrete into void areas behind abutments, wingwalls, below pipe outlets and formed cutoff wall (~4 days, 3 people, cement mixer, 2 yds concrete).	4	\$ 350.00 /wk	\$ 600.00
3 Inject grout behind and between the steel barrels from the corrosion holes to fill in all open gaps behind the barrels.			
a Fill in voided areas behind, between and below culvert pipes (~3 days, 3 people, grout pump, 10 cf grout).	3	\$ 530.00 /wk	\$ 42.50
b Trowel finish exposed areas (~1/2 day, 3 people).	0.5		
4 Install cutoff walls (e.g., concrete, riprap or gabions choked with grout or stone) at the culvert inlet and outlet.			
a Excavate to 3'-6" by 5' length below inlet and outlet (~2 days, 3 people, backhoe)	2	*	
b Install concrete or R-6 rip-rap cut-off wall – BD-632M Sht 6 w/o apron (~4 days, 3 people, 24 CY rip-rap)	4	*	\$ 1,080.00
c Replace streambed material – BD-632M (~1 day, 3 people)	1	*	
5 Repair spalled areas of concrete at locations of exposed steel – both reinforcement and concrete encased beams. Blast clean exposed steel, coat with epoxy paint and apply epoxy bonding compound prior to patching with concrete.			
a Remove delaminated concrete (~1 day, 3 people)	1		
b Clean exposed steel surfaces and coat with epoxy paint (~2 days, 3 people, compr, blast equip & matls)	2	\$ 291.00 /wk	\$ 100.00
c Apply epoxy bonding compound to repair surfaces, trowel concrete to patch spalled areas (~3 days, 3 people, 500SF epoxy paint, 500SF epoxy bonding compd)	3		\$ 247.50
6 Lining the pipes to strengthen and mitigate further corrosion and section loss to the pipe walls			
a Clean steel surfaces and remove rust laminations (~3 days, 3 people, compr, blast equip & matls)	3	*	
b Utilize Milliken spray applied tunnel lining, 50-year life (1.5" thick - Structural) (\$62,100 unit cost including design and mob.)	-		
c Finish ends into cutoff wall to mitigate potential for water penetration.	-		
Total Production Estimate:	29.5	\$ 3,321.00	\$ 2,205.00

Engineering Costs:

* Rental cost already included

Notes:

- Construction costs are based on anticipated methods/process used by the contractor and will likely vary in the final bid based on the contractor's means and methods of construction. Quantities are approximate based on the field view performed on March 26, 2014 and do not reflect actual surveyed field data.
- 1 person @ \$60/hr average * 8Hr Day * Crew of 3 - \$1440/day
- Labor rates, material & rentals include O & P

	\$ 72,400.00
Total Labor:	\$ 42,480.00
Total Equipment:	\$ 3,321.00
Total Materials:	\$ 2,205.00
Milliken Lining (50 yr life):	\$ 62,100.00
Traffic Control:	\$ 2,000.00
5% Mobilization:	\$ 5,605.30
15% Contingency:	\$ 16,815.90
Construction Subtotal:	\$ 134,527.20
Engineering Fee:	\$ 72,400.00
TOTAL 50 YEAR PROJECT COST:	\$ 206,927.20
Assume structure rehab cost in 50 yrs (3% per year at 50 years)	\$ 907,149.40
TOTAL 100 YEAR PROJECT COST	\$ 1,114,076.60