Lowell Creek

Condition of Improvements
31 December 2022
Lowell Creek, Alaska
(CWIS No. 01140, 012838, 072856)

Authorization **(1)** Public Resolution No. 52, 9 February 1927 (69th Congress) as adopted, provided for the construction of an intake dam and timber flume through the city of Seward. **(2)** Public Law No. 336, 14 February 1933 (72nd Congress) as adopted, provided for the maintenance of the authorized project. **(3)** Flood Control Act, 25 August 1937 (Public Law 75-369, 49 Stat. 806) (House Doc. 154, 75th Congress, 1st Session) provides for the construction of a diversion dam 25 feet high and 400 feet long, and for a concrete lined tunnel 10 feet in diameter and 2,070 feet long through Bear Mountain to protect the city of Seward from the floodwaters of Lowell Creek. **(4)** Water Resources Development Act, 2007, Section 5032, LOWELL CREEK TUNNEL, SEWARD, ALASKA. (a) LONG-TERM MAINTENANCE AND REPAIR.—(1) MAINTENANCE AND REPAIR.—The Secretary shall assume responsibility for the long-term maintenance and repair of the Lowell Creek tunnel, Seward, Alaska. (2) DURATION OF RESPONSIBILITIES.—The responsibility of the Secretary for long-term maintenance and repair of the tunnel shall continue until an alternative method of flood diversion is constructed and operational under this section, or 15 years after the date of enactment of this Act, whichever is earlier. (b) STUDY.— The Secretary shall conduct a study to determine whether an alternative method of flood diversion in Lowell Canyon is feasible. (c) CONSTRUCTION.— (1) ALTERNATIVE METHODS.—If the Secretary determines under the study conducted under subsection (b) that an alternative method of flood diversion in Lowell Canyon is feasible, the Secretary shall carry out the alternative method. (2) FEDERAL SHARE.—The Federal share of the cost of carrying out an alternative method under paragraph (1) shall be the same as the Federal share of the cost of the construction of the Lowell Creek tunnel. (5) Water Resources Development Act, 2020, Section 532(c), LOWELL CREEK TUNNEL, SEWARD, ALASKA. Section 5032(a)(2) of the Water Resources Development Act of 2007 (Public Law 110-114, 121 Stat. 1205) is amended by striking “15” and inserting “20”.

Table 1

Existing Project	**Length** ft.	**Width** ft.	**Height** ft.
Diversion Dam	400		25
Tunnel	2070	10	10

Project Usage The completed diversion tunnel through Bear Mountain effectively controls Lowell Creek and eliminates flooding from this source in the city of Seward, Alaska.

Progress of Work

1937	The original intake structure and timber flume are found to be beyond economical repair in 1937. Total costs of the original project equaled $143,929.
1940	The existing project is completed except for placing concrete between the steel rails in the tunnel floor.
1944	The armor rails are found to be in bad condition due to failure of the hold-down bolts.
1945	The rails are welded to the steel channel cross-ties and finished with concrete to complete the project. Operation and maintenance is turned over to local interests. Annual inspections are to be conducted in compliance with the provisions of local cooperation.
1969	Emergency rehabilitation work on the tunnel is accomplished using Public Law 99 (84th Congress) funds.
1982	Inspection of the project reveals that the tunnel needs to be repaired.
1984	Repairs to the tunnel are effected by local interests.
1987	A post-storm inspection in April shows that major damage has occurred to the tunnel floor from heavy rainfall and debris the previous October.
1988	The tunnel is repaired under the rehabilitation authority of PL 99 (84th Congress) during the period January through April.
1989	Another major rainstorm occurs at Seward in August resulting in major damage to the tunnel. Repair work is again accomplished under PL 99 (84th Congress).
1993	An inspection during the low flow period in late winter indicates that the project is in good operational condition.
1995	Heavy rains in September wash out the bridge below the outlet works and transport a large quantity of debris through the tunnel.
1996	An inspection of the tunnel found no significant damage from the September 1995 flood. The project is in satisfactory operational condition.
1998	Corps inspectors find the project in fair operational condition. Concrete on the tunnel floor is showing signs of wear.
1999	An inspection in March reveals continued erosion of concrete on the tunnel floor. Maintenance will be required in the next 1 to 2 years.
2000	Congress appropriates $1 million for making repairs to the tunnel but the Corps lacks sufficient authorization to perform the work under the O&M program.
2001	The Secretary of the Army was authorized by Section 510 of the Water Resources and Development Act of 2000, Public Law 106-541, and the Energy and Water Development Appropriations Act, Public Law 106-60, to "carry out, on an emergency, one-time basis, necessary repairs of the Lowell Creek Tunnel in Seward, Alaska, at Federal expense and at a total cost of $3,000,000." A Project Cooperation Agreement is negotiated, and plans and specifications are prepared for a maintenance contract.

Progress of Work

2002	Contract is awarded to repair the tunnel entrance apron, relining portions of the eroded tunnel floor with high strength concrete, and replacement of the chain link fence near the tunnel entrance.
2003	Construction contract for tunnel repairs is completed in March.
2006	The tunnel is inspected on 24 March and showed approximately 0.1 feet of wear in the tunnel invert. The 2003 repairs are in good to excellent condition. The crown and tunnel walls are original construction and appear to be in satisfactory condition.
2007	The project is inspected by Corps and City personnel in March. Erosion in the tunnel was noted but nothing serious enough to warrant repair at this time. The City was notified by letter of the necessity to periodically inspect the diversion dam. WRDA 2007 passes and changes project authorization.
2008	The project is inspected by USACE and the City of Seward, Department of Public Works in March. The tunnel invert below station 2+00 remains in sound condition. The invert above station 2+00 is in operable condition but has received some damage. This damage is not significantly greater than the previous inspection.
2010	Lowell Creek Tunnel is inspected annually by the Corps and this year on 26 March. The damaged fence was repaired/replaced in August. The second periodic inspection of the dam inlet and outlet took place 21 October. The final dam rating is expected to be finished in March 2011
2011	The Corps Screen Portfolio and Risk Assessment team assigns a Dam Safety Action Classification rating of "3" in February with the Corps Senior Oversight Group concurring on the rating in March.
2012	The Lowell Creek Tunnel is inspected in April and concluded that the tunnel remains in sound condition with some minor scouring and possibly a more pronounced "V" shape. Approximately the first foot of the tunnel crown at the tunnel entrance has damage from freeze-thaw action and cracks along the tunnel continue to deteriorate. Widespread flooding in Seward happened in September.
2013	The annual inspection in April found significant wear as a result of the Fall 2012 storm; the entire tunnel invert showed more than the typical incremental wear and damage associated with another year of service. The report recommends planning a repair project.
2014	The annual inspection in April showed typical incremental wear in the tunnel. The draft Letter Report required by WRDA 2007 to authorize repairs was completed and distributed for Agency Technical Review.
2015	The annual inspection in March showed incremental wear in the tunnel in addition to the damage from the Fall 2012 storm. The report recommends repairs in the next 3-5 years. A Letter Report, as required by WRDA 2007, was approved by the Assistant Secretary of the Army (Civil Works) 21 December 2015 for assumption of operation and maintenance of Lowell Creek Tunnel.

Progress of Work

2016	Contract W911KB-16-C-0020 is awarded to M2C1 Construction in the amount of $1,944,248 for tunnel repairs. Contractor mobilizes in November, work to be performed during low flow period starting January 2017.
2017	Differing site conditions resulted in repairs being completed only at the intake transition and the top 200 feet of the tunnel between January and April and the contract amount increased to $3,711,503. A laser scan of the tunnel is completed in March to assist in quantifying the extent of invert repairs required in the remaining 2,000 feet of the tunnel. M2C1's contract is modified for the invert repairs in September at an additional $4,180,027. The contractor re-mobilizes to the site in November. A study, authorized by WRDA 2007, is initiated to determine whether an alternative method of flood diversion is feasible.
2018	M2C1 Construction continues repair work between January and April. The tunnel invert is re-lined with 10,000 psi silica fume concrete from station 2+62 to station 22+60. Wear of the invert was almost exclusively in the middle third of the tunnel invert where armor rails were removed by the 1984 repair contract. A minimum concrete thickness of 1-1/2 inches is placed along the lateral edges of the lining and thicker sections of concrete are placed towards the center of the tunnel. The repair surface restored the original 10-foot diameter profile of the invert. High strength 10,000 psi concrete is also placed at the base of the concrete channel walls below the tunnel outlet to fill areas that had been undercut by water flow. The feasibility study for an alternative method of flood diversion continues.
2019	There is no annual inspection conducted due to high stream flows. The feasibility study for an alternative method of flood diversion continues. A draft assessment report to evaluate the effects of continuing federal maintenance responsibility for the tunnel beyond 2022 is prepared as required by WRDA 2018, Sec. 1217.
2020	An annual inspection is conducted in March. A gouge is developing on the left side of the invert at about Station 0+75. Ice precluded a measurement of the length gouge but the visible area was 7" deep and 22" wide. A new flood diversion system to include a new 18-foot tunnel and refurbishing the existing tunnel is selected as the recommended plan for the alternate method of flood diversion. The assessment report started in 2019 is finalized in July and WRDA 2020, Sec. 532(c) extends federal maintenance responsibility for the tunnel to 2027
2021	An annual inspection is conducted in March. A gouge is developing on the left side of the invert at about Station 0+75. Lack of ice allowed the gouge to be measured at 7" deep, 1.3' wide at the bottom, 22" wide at the top, and 14' long. Federal funds were provided in Infrastructure Investment and Jobs Act, 2022 to initiate design of Lowell Creek Flood Diversion Dam, which includes an 18-foot diameter tunnel to pass 8,500 cubic feet per second (cfs) of flow, a new diversion dam with spillway, tunnel canopy and outfall, and refurbishing the existing tunnel to provide additional capacity in the event its needed to divert stream flow into Resurrection Bay.
2022	An annual inspection is conducted on April 6th, project was found to be in good condition with expected levels of wear to the inside of the tunnel.

Table 2 Cost to Date

Project	Description	Cost $
010140	CG Appropriation	416,382
	CG Costs	416,382
	CG Contributed Appropriation	421,218
	CG Contributed Costs	421,218
012838	O&M Appropriation CCS120	5,894,781
	O&M Costs CCS120	5,888,816
	O&M Appropriation CCS220	5,595,119
	O&M Costs CCS220	4,709,287

Lowell Creek Tunnel, Seward, Alaska

Inlet to the Lowell Creel Tunnel, March 2019

Looking upstream at Lowell Creek and the diversion dam, March 2019

Lowell Creek Tunnel, Seward, Alaska

Looking downstream inside tunnel, March 2018

Tunnel damage looking downstream, January 2017

Lowell Creek Tunnel, Seward, Alaska

Looking upstream at tunnel outlet, April 2016

The tunnel outlet, April 2016