ALASKA DISTRICT TRIP REPORT

Project: Denali Commission Mooring Points Phase 4

Description: Stevens Village Trip Report

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George Kalli and Nathan Epps traveled to the Yukon River community of Stevens Village, Alaska via a charter flight with Security Aviation to conduct a site visit related to potential installation of barge mooring points in the community. The team was met by Stevens Village resident Pete Hjelm upon arrival and given a tour of the existing fuel and freight transfer sites. Three barge landing sites were investigated during the site visit. An overview of the community and barge landing sites is included as Figure 1. A public meeting was not conducted since a majority of the local population appeared to be away from the village for most of the summer.

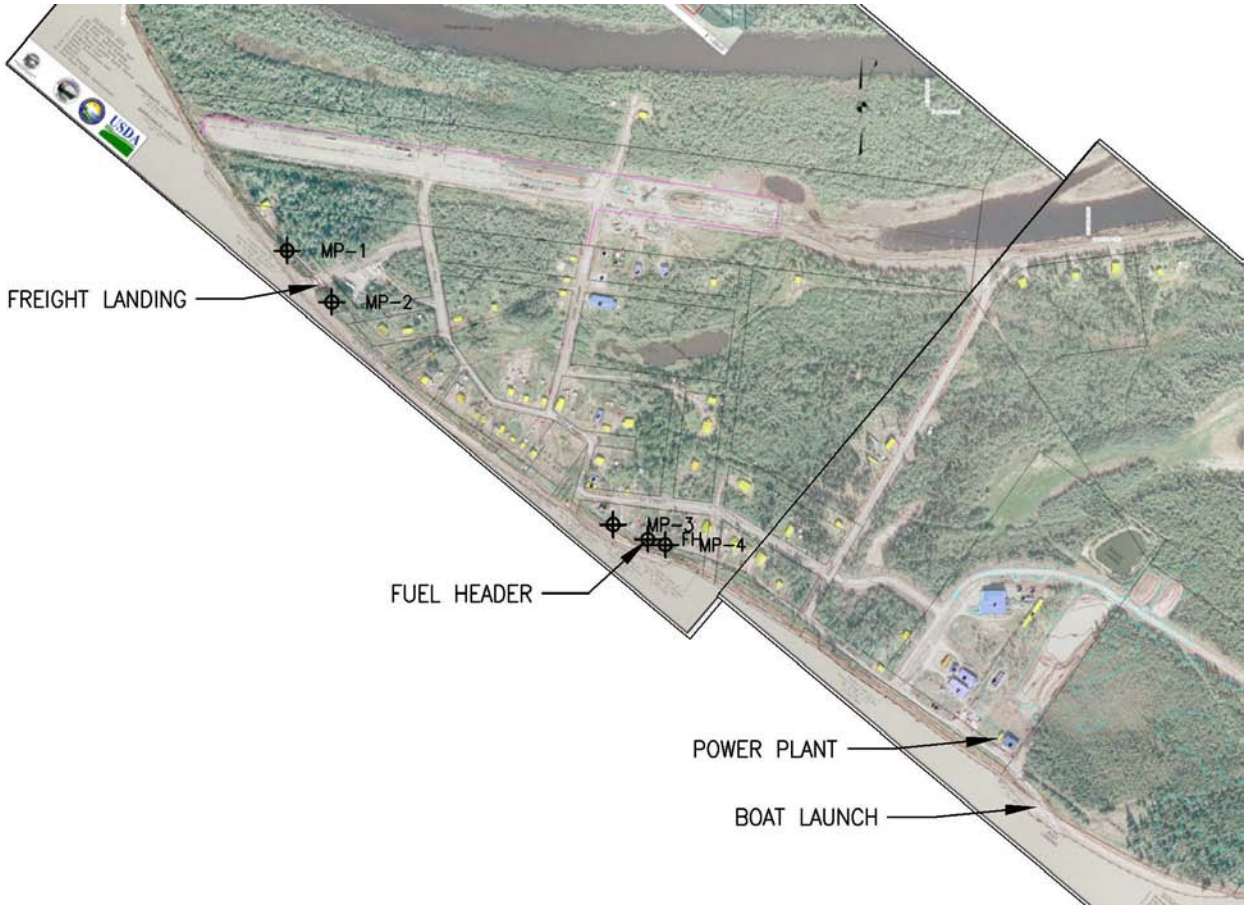

Figure 1. Stevens Village barge landing locations. The Yukon River flows from right to left.

GENERAL

Stevens Village is on the north bank of the Yukon River, 17 miles upstream of the Dalton Highway bridge crossing and 90 air miles northwest of Fairbanks. The winters are long and harsh, and the summers are short but warm. After freeze-up, the plateau is a source of cold, continental arctic air. The Yukon River is ice-free from the end of May through mid-September. The community has a population of 78 according to the 2010 U.S. Census.

The Yukon River provides a reliable source of gravel to the community. Gravel is extracted from shallow bars upstream of the village. Numerous piles of gravel were stockpiled in the community. There was an ongoing project to construct a road to a new landfill in Stevens Village at the time of the site visit. The contractor for this project was Cruz Construction.

Discovering the nature of permafrost conditions was a major concern on this trip. Pete Hjelm noted that when the telephone poles were installed, permafrost was encountered about 8 feet below ground level. Since the mooring points will be installed near the pole alignment, it is likely that permafrost will be encountered when installing these mooring points.

Due to the potential to encounter permafrost, the installation of freeze back piles as mooring points may be required in Stevens Village. Freeze back piles are a special pile installation procedure that takes advantage of frozen ground and essentially freezes the pile into the ground. The piles can typically be a pipe pile or H-pile section, which allows for backfill to be placed around the pile. The piles are installed by drilling a hole in the permafrost slightly larger than the pile then installing the pile into the hole. Once the hole is drilled to the desired depth, the pile is inserted and imported clean sand slurry is backfilled around the pile. The permafrost then freezes the sand and the pile into the ground. Equipment required for this process is a large drill rig for drilling the hole, a loader to transport material to the site, and a pile driver to drive the pile into the drilled hole. If drilling shows permafrost to be absent, then cuttings from the hole shall be placed back into the drilled hole and a standard driven mooring point should be installed in the same hole.

FREIGHT LANDING SITE

This landing consists of a gravel ramp perpendicular to the river (Photo 1) with a staging area on the upstream side of the access road to the ramp (Photo 2). Materials for a road construction project were stored at the staging area during the time of our visit. Two boats were beached above the water at this site during our visit.

A gently sloped, terraced beach of fine grained soil (Photo 3) was both upstream and downstream of the gravel ramp. The terraced beach indicated higher flows prior to our arrival.

A gravel road parallels the top of bank both upstream and downstream of the landing. Preliminary analysis of real estate ownership maps indicates that property on the river side of

this road is public property, while property on the opposite side is private. Power lines also parallel the road.

An approximately 10-foot-wide clearing is between the gravel road and top of bank 90 to 100 feet upstream of the ramp. Access between this clearing and the river is via a path at the downstream corner of the clearing.

An upstream, above grade freeze back pile mooring point (MP-2) is proposed along the upstream edge of the clearing, approximately 20 feet from the road and telephone wires and 32 feet from the top of bank (Photo 4, Figure 2). Coordinates of this location are 66.00780°N, 149.10167°W.

A downstream, above grade freeze back pile mooring point (MP-1) is recommended between the road and top of bank, approximately 165 feet downstream from the ramp (Figure 2). This location is heavily brushed and will require clearing (Photo 5). The proposed location is 15 to 20 feet inland from the top of bank and is adjacent to a white birch tree (Photo 6). Coordinates of this location are 66.00835°N, 149.10281°W.

Both mooring points at this site require clearing of brush on the bank. It is recommended to clear brush to 1 foot above ground in a 45-degree swath facing the river with the apex centered on the mooring point.

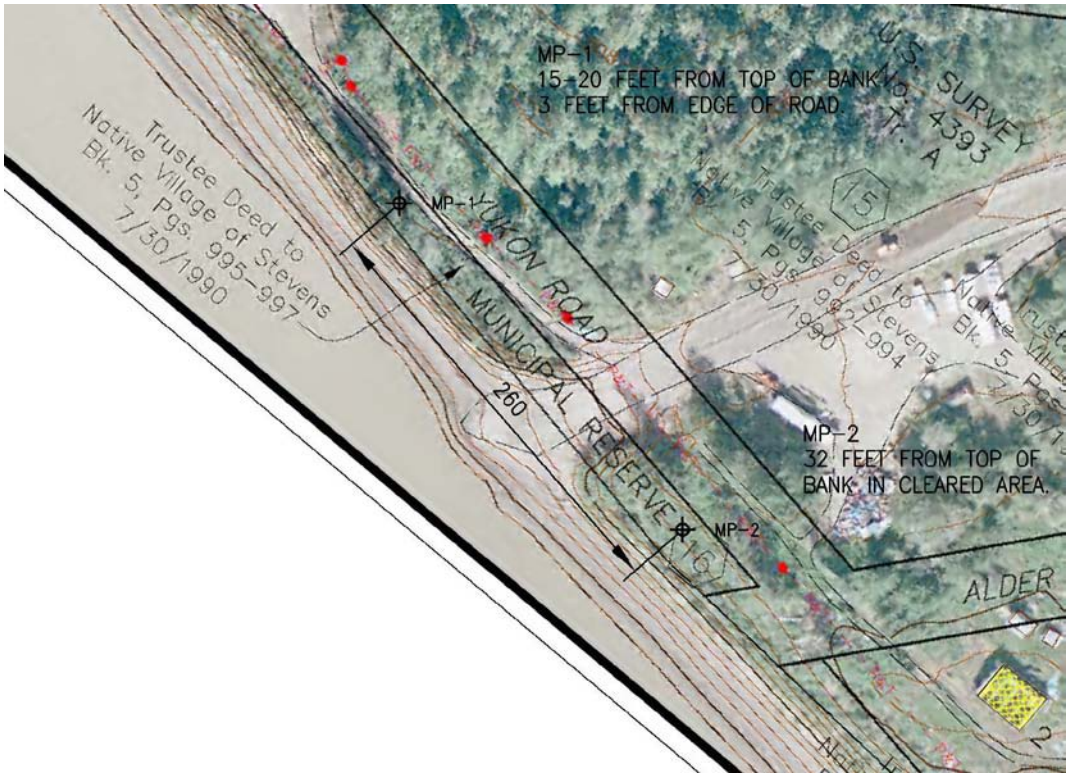

Figure 2. Freight landing mooring points

Photo 1. Freight landing ramp

Photo 2. Freight landing staging area

Photo 3. Terraced beach of fine grained soil upstream of freight landing ramp

Photo 4. Corps engineer standing at location of proposed upstream mooring point MP-2.

Photo 5. Corps planner standing near the top of the bank near downstream mooring point MP-1. Note heavy brush.

Photo 6. Corps planner standing near the location of downstream mooring point MP-1. The mooring point will be located about 3 feet from the edge of this road towards the river.

FUEL LANDING SITE

This landing was not indicated as the primary fuel landing in the Barge Landing System report. It was indicated as “alternate/former barge landing” and was not discussed with barge companies prior to visiting Stevens Village. Our escort, Pete Hjelm, indicated that this landing is the primary fuel landing in the village and confirmed this with other community members during our site visit. According to Pete Hjelm, a barge was moored at this landing approximately 3 weeks ago. At the time of our visit, no vessels were moored at this landing. A conversation with Jamie Mayrand of Crowley Marine following the site visit confirmed that this is the sole fuel landing in the village.

This landing site used to have a ramp angling down to the river; however, a majority of it was washed away during a high water event in 2009. The remains of the ramp still provide foot access between the river and the top of bank, but it is not suitable for any vehicular access (Photo 7). According to Pete Hjelm, this landing was the main freight landing for the village prior to the washout of the ramp.

The stream bank along this landing has a vertical portion approximately 20 feet high (Photo 8). Below this, a terraced beach of sand and fine grained soil extends approximately another 10 feet to the edge of the water (Photo 9). The terraced beach indicates higher flows prior to our arrival. There are numerous bank swallow nests within the vertical portion of the bank (Photo 8).

Signs of stream bank erosion in the form of small clumps of vegetation that have fallen from the top of bank were observed (Photo 9), but overall, erosion rates appear to be slow. The thalweg of the channel appeared to be on the opposite side of the channel during our visit.

An existing tie-down cable was observed just downstream of the top of what remains of the ramp (Photo 10). Coordinates of this location are 66.00541°N, 149.09444°W.

A fuel header is approximately 150 feet upstream of the tie down cable. The header itself is located on the ground with a small pit excavated beneath it (Photo 11). A small containment vessel is directly beneath the header. Coordinates for the fuel header are 66.00525°N, 149.09354°W.

A gravel road parallels the top of bank. Preliminary analysis of real estate ownership maps indicates that property on the river side of this road is public property, while property on the opposite side is private.

A private structure is adjacent to the top of the bank located downstream from the landing site (Photo 12).

A downstream, below grade freeze back pile mooring point (MP-3) is recommended adjacent to the existing tie down cable at coordinates 66.00541°N, 149.09444°W (Photos 12-13, Figure 3). An additional freeze back pile mooring point (MP-4) is recommended 220 feet upstream from

the proposed downstream mooring point at coordinates 66.00519°N, 149.09309°W. This mooring point should be an above grade installation. This location was selected based upon access from the river (Photo 14, Figure 3).

Both mooring points at this site require clearing of brush on the bank. It is recommended to clear brush to 1 foot above ground in a 45 degree swath facing the river with the apex centered on the mooring point.

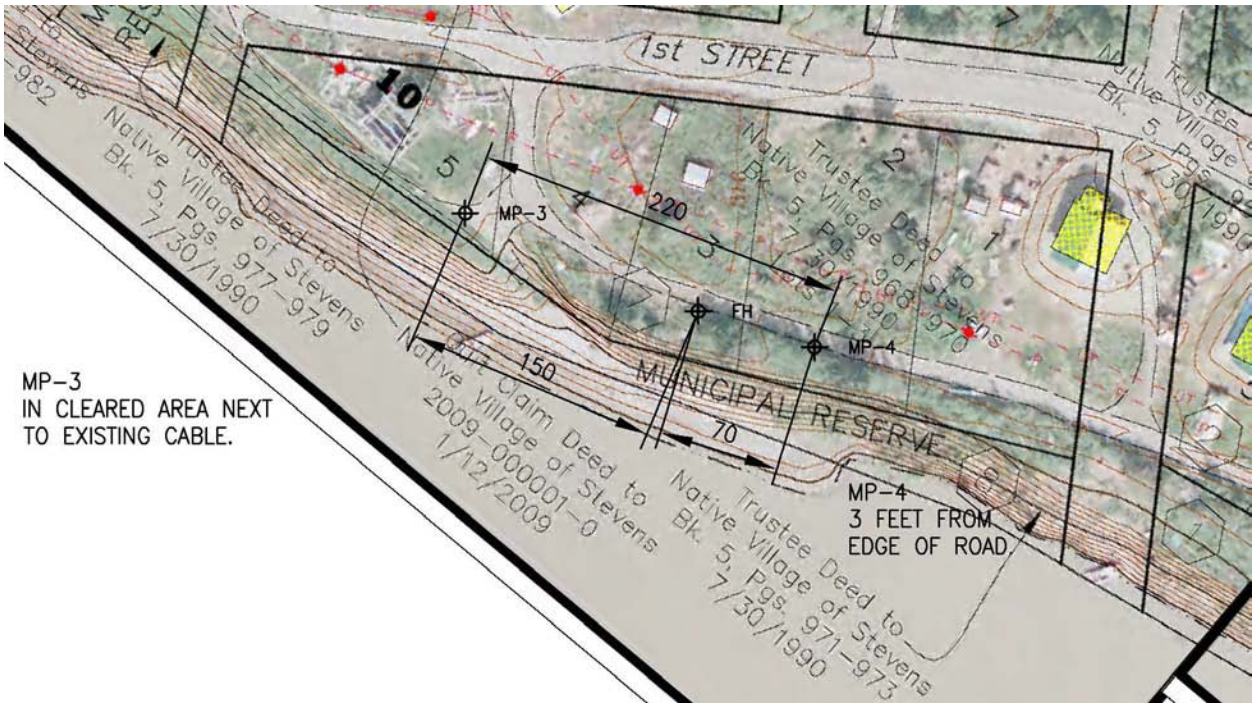

Figure 3. Fuel landing mooring points.

Photo 7. Remnants of ramp that provides foot access between Yukon River and top of bank

Photo 8. Vertical stream bank with bank swallow nests

Photo 9. Terraced beach between Yukon River and vertical streambank. Note small clumps of eroded vegetation.

Photo 10. Existing tie down cable at MP-3.

Photo 11. Fuel header

Photo 12. Corps engineer standing at proposed location of downstream mooring point MP-3, looking downstream. Note private structure to the right.

Photo 13. Corps engineer standing beside existing tie-down cable at the proposed location of downstream mooring point MP-3, looking upstream. The top of the ramp is beyond the Corps employee.

Photo 14: Corps planner standing near upstream mooring point MP-4. Some brush clearing will be needed to give the mooring lines a clear path from the vessel to the mooring point.

POWER PLANT LANDING SITE

This landing consists of a gravel ramp angling down to the river (Photo 15). The village power plant is adjacent to the top of the ramp. The village school, clinic, and fuel tank farm are also nearby (Figure 4).

Despite the proximity of the power plant and tank farm, a fuel header was not located by Corps personnel during the site visit.

A road parallels the top of bank both upstream and downstream of the landing (Figure 4). The narrow spacing between the roadway and the river bank downstream of the ramp precludes the installation of mooring points.

During our site visit, seven skiffs were moored at this landing.

The beach along the river upstream of the ramp consisted of sand and gravel (Photo 16) while the beach downstream consisted of fine grained soil (Photo 17).

The river near this landing appeared to be shallow. Emergent gravel bars were within the river channel. One can be seen in the distance in Photo 15.

A graveyard is upstream of this landing site (Figure 4).

Follow up with Jamie Mayrand of Crowley Marine confirmed that they do not service this landing. He suspected that the river would be too shallow here to serve as a barge landing.

This landing appears to serve as a skiff landing. Since it does not regularly accommodate barges, no mooring points are recommended for installation at this landing.

Figure 4. Stevens Village Power Plant Landing and adjacent facilities. Yukon River flows from right to left.

Photo 15. Power plant landing ramp looking upstream. Arrow indicates location of a gravel bar used as a material source by the community.

Photo 16. Looking upstream from power plant landing ramp

Photo 17. Looking downstream from power plant landing ramp

RECOMMENDATIONS

It is recommended that mooring points be installed at the freight landing site and the existing fuel header as described in this trip report. The power plant landing site is mainly used as a skiff landing. Installation of mooring points at the power plant landing is not recommended.

There is considerable uncertainty regarding the soil types and permafrost depths and locations. It is a good assumption that all mooring points in Stevens Village will likely require pre-drilling prior to installation. If the ground is frozen, any backfill within or around the pile will need to be a clean sand slurry which will freeze, causing the ground to adhere to the pile. This sand is not available locally and will have to be imported. If the ground is not frozen, the piles can be installed with conventional methods.