Northern Water
Northern Integrated Supply Project

Larimer County Analysis – Supplement 1 to Technical Memorandum No. 9

Traffic Impact Study

Prepared for:
Larimer County

Prepared by:
Northern Integrated Supply Project
Water Activity Enterprise

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MEMORANDUM

Northern Integrated Supply Project
Glade Reservoir
State Highway 14 ROW Impacts

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From: Tim Engemoen, Black & Veatch

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Introduction

This memorandum presents a summary of the temporary and permanent impacts to the State Highway 14 (Hwy. 14) right-of-way (ROW) associated with the Poudre Valley Canal (PVC) upgrades and the Owl Creek drainage improvements.

Project Background

The Northern Integrated Supply Project (NISP) will provide a new raw water supply to several municipal water providers in Northern Colorado. NISP includes the following facilities located in Larimer County: the Glade Unit; the Glade Pump Station; raw water distribution piping; and the relocation of U.S. Highway 287. The Glade Unit features the Glade Reservoir Dam, which is an earthen embankment that will impound an off-channel reservoir complete with the hydraulic structures required by the State Engineer's Office: the High Level Outlet Works (HLOW); Low Level Outlet Works (LLOW); and spillway. Glade Reservoir Dam is located just to the north of the junction of U.S Highway 287 and State Highway 14, about 10 miles northwest of Fort Collins. The Glade Unit includes an expansion of the existing Poudre Valley Canal (PVC) and a new forebay constructed downstream of the dam at an elevation that will allow delivery of water from the PVC by gravity. A Control Gate structure will be constructed to control flow to the existing portion of the PVC downstream of the forebay. The existing PVC Diversion Structure will be demolished and rebuilt to allow increased diversion of flow from the Poudre River. A portion of the existing Munroe Gravity Canal alignment will be inundated by Glade Reservoir, this open canal will be replaced by the Munroe Canal Bypass (MCB), a conduit and several control structures that will convey flow beneath the reservoir. The Glade Unit also includes: the Glade Pump Station, which will pump water from the forebay into Glade Reservoir; the Electrical/Control building that will distribute power throughout the site and provide control of the various hydraulic features; the Surge Building that will house surge tanks to protect the pump station discharge conduit; and numerous buried conduits with control valve vaults that connect these facilities. Raw water will be conveyed off site via several buried conduits that are discussed in separate reports. The Glade Unit will include

recreational amenities for the general public, including a Visitor Center, campgrounds, a boat ramp, trails and restroom facilities.

Glade Reservoir will submerge a portion of the existing U.S. Highway 287 alignment which will be relocated to the east of the reservoir. An existing power transmission line and several power distribution lines will be inundated by the reservoir which will be relocated as part of the Glade Unit construction. A general location map of the Glade Unit facilities is presented on Figure 1.

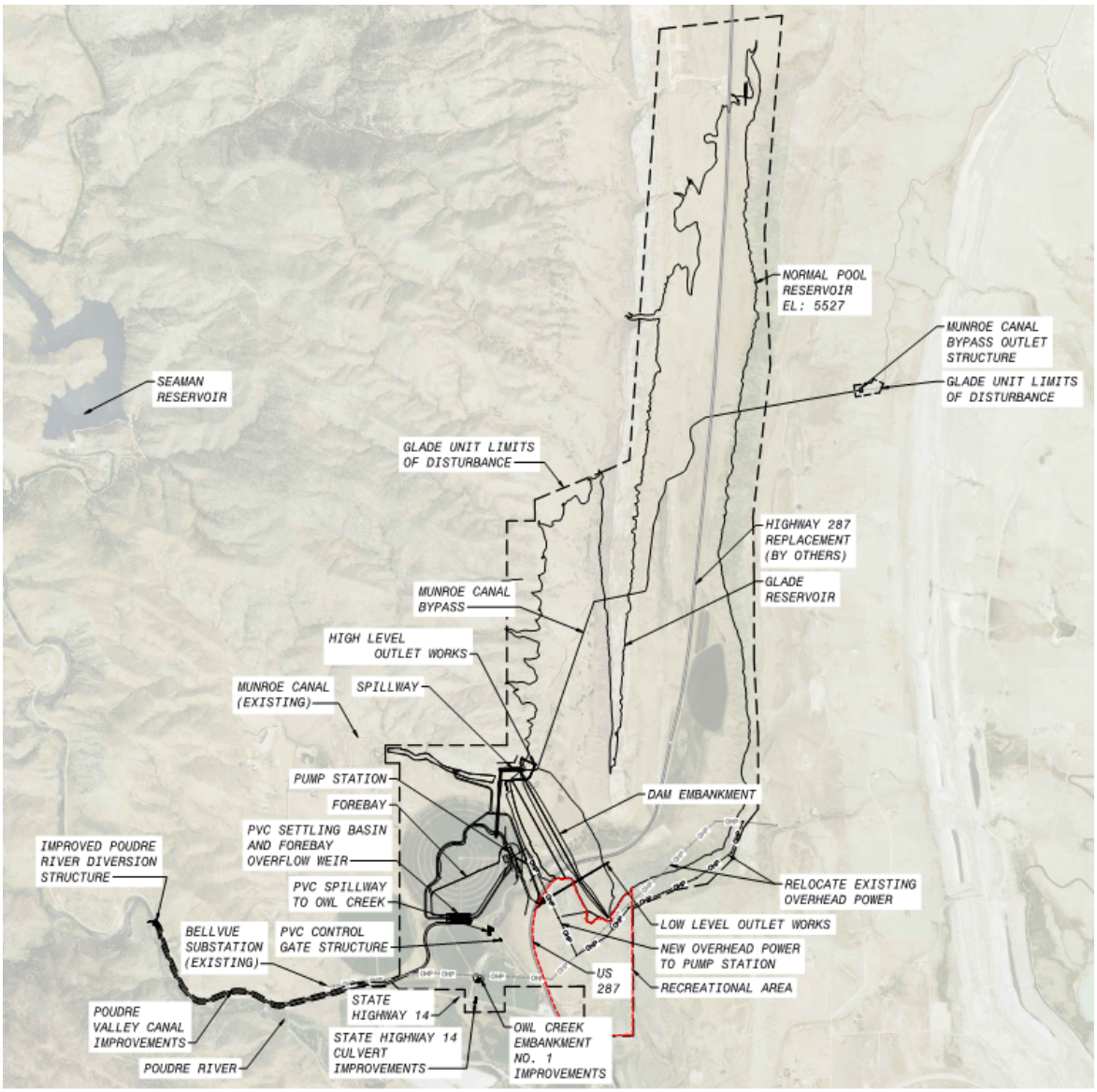

Figure 1 - Glade Unit Overview

Work associated with the PVC and Owl Creek improvements will necessitate both temporary and permanent impacts to Hwy. 14 just west of US 287 near Ted's Place in Larimer County.

PVC UPGRADES

The first disturbance to Hwy. 14 (just west of Owl Creek) will be for the upgrades to the PVC.

Proposed PVC Improvements – The existing PVC is used to convey flow for irrigation deliveries. As part of the Glade Unit, the PVC's capacity will be expanded from the new diversion structure to the forebay. The proposed improvements to the PVC include clay or concrete lining to prevent seepage losses and maximize capacity. The existing PVC alignment will remain unchanged, but the enlarged canal will have a wider cross-section and these improvements will impact Hwy. 14. To identify the improvements, we have stationed the PVC along the full length of the canal being improved beginning at the new diversion structure, which is PVC Sta 0+00. The alignment runs south of Hwy. 14 from PVC Sta 0+00 to 31+00 where it crosses to the north side of Highway 14. The existing culverts under Hwy. 14 will not be modified as part of these improvements. The improved section of the PVC then continues east along the north side of Hwy. 14 from PVC Sta 31+00 to approximately Sta 50+00 where it exits the mouth of the Poudre Canyon. After PVC Sta 50+00, the canal alignment begins to diverge from the Hwy. 14 alignment and enters an area where construction and maintenance access can be managed from the canal access road with much less potential impact to Hwy. 14. Figure 2 depicts the approximate limits of construction for the PVC, which will impact Hwy. 14.

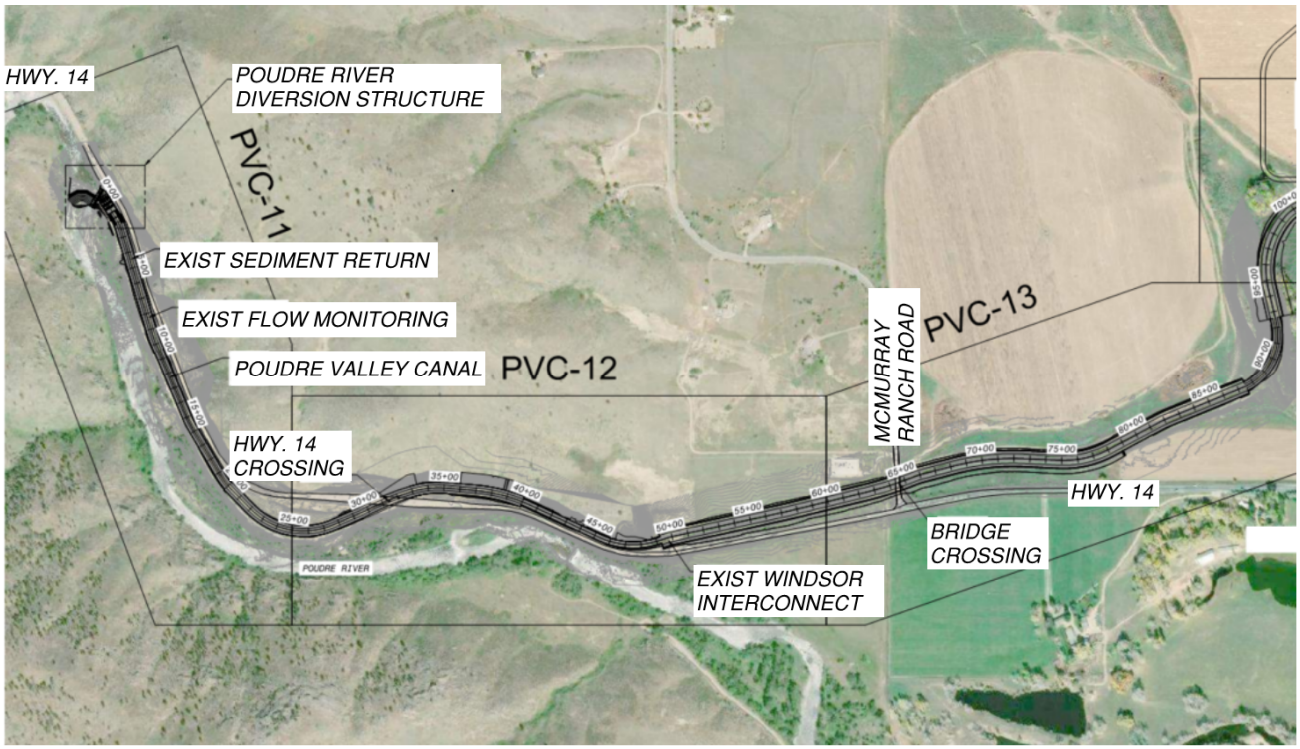

Figure 2 - PVC Improvements

Temporary Construction Impacts – Due to the proximity of the PVC and the highway, the construction of the PVC upgrades will likely result in traffic temporarily being reduced to a single lane from the mouth of the canyon to the PVC Diversion Structure. In places, the edge of the road is approximately 10 feet from the closest PVC water surface, so the lane nearest the PVC will likely need to be closed to safely complete the construction activities. Sheeting and shoring may be required at select locations to protect the stability of the highway during construction. Various traffic control devices will be required including signs, barricades, and potentially the addition of traffic signals to allow for timed one-way traffic. East of PVC Sta 50+00, the PVC diverges away from the highway and construction impacts to the highway should be greatly reduced. The existing Windsor Extension Interconnect Radial Gate (shown near PVC Sta 50+00 on Figure 2) and the existing conduit that crosses Hwy. 14 will remain in place. Prior to construction, notifications will be sent to local residents to alert them of the construction efforts.

Permanent Impacts – After the PVC improvements have been constructed, the construction contractor will return the highway to its existing condition. Due to the widening of the PVC, the grading and slopes from the edge of the road to the PVC may change, but the road alignment is not expected to change. Any damage to the highway caused by construction activities, such as heavy equipment tracking over the pavement, will be repaired.

PVC CROSSING UNDER STATE HIGHWAY 14

There is an existing elevated crossing of the PVC near Station 31+00 on Figure 2 (where the PVC transitions from the south side of the highway to the north). This elevated crossing is not anticipated to be affected during the construction activities. The work on the PVC will exclude the existing box culvert at this location as it will remain in place, and the PVC improvements will be upstream and downstream of this crossing.

MCMURRAY RANCH ROAD

There will be a bridge replacement on McMurray Ranch Road north of Hwy. 14 (near Sta 65+00 on Figure 2) which will have impacts to local residents and CDOT as road detours will be required in the area. The detailed traffic control plans will be shared with CDOT and Larimer County when they are further developed in detailed design. During construction, access will be maintained for property owners and emergency responders along the road.

OWL CREEK CROSSING

A single 36-inch corrugated metal pipe (CMP) culvert currently crosses under Hwy. 14 at Owl Creek to pass the low flows normally experienced in the creek (which discharges to the Poudre River). With the construction of the reservoir, forebay, and spillway, Owl Creek will need to be capable of passing a significant volume of water which will exceed the capacity of the existing culvert. The design peak flow at this crossing is being finalized and is dependent on several analyses including the Forebay Hazard Classification Analysis.

Proposed Improvements – The proposed plan would require significant upgrades to the existing culvert under the highway including the installation of larger capacity culverts to pass a higher flow volume. New concrete wing walls would likely be installed as well. Figure 3 shows the crossing location at Owl Creek.

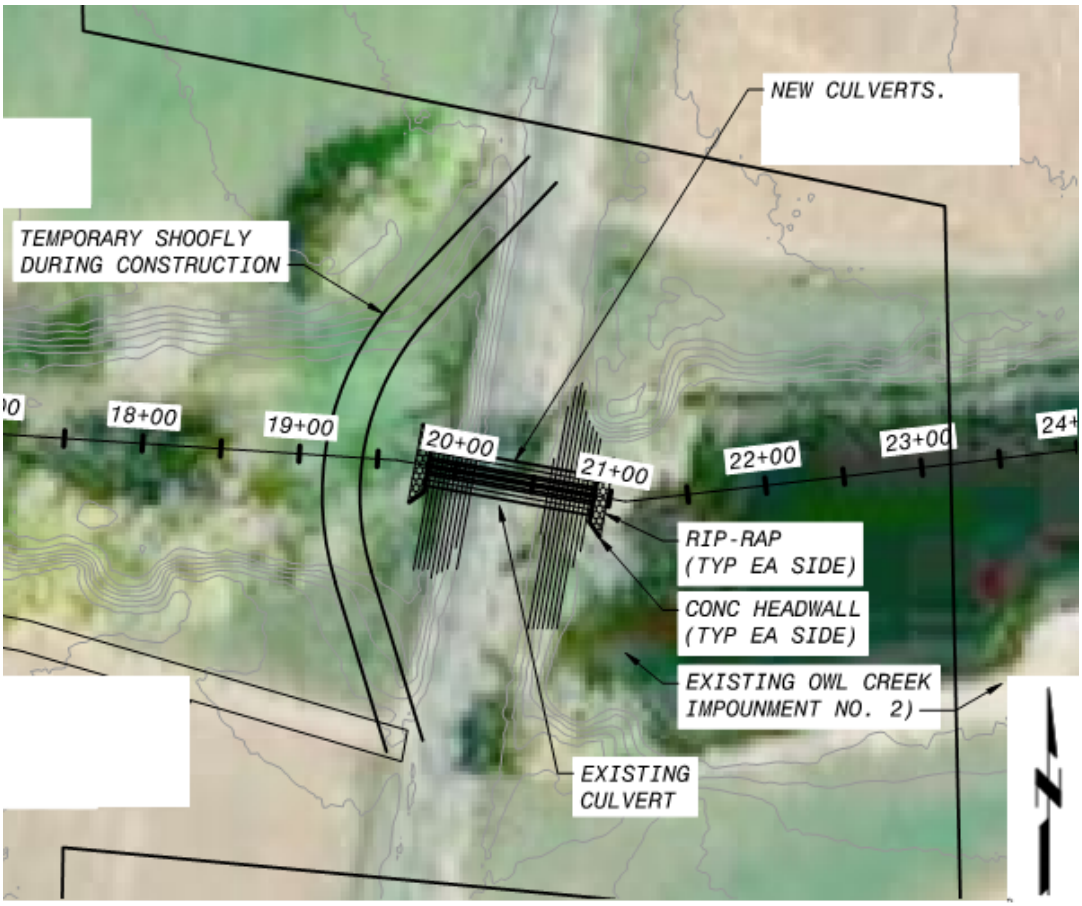

Figure 3 - State Highway 14 at Owl Creek

Temporary Construction Impacts – Traffic along the highway will be temporarily affected during the construction of these improvements to Owl Creek. As shown in Figure 3, there is a proposed temporary shoofly (bypass road) on the north side of the highway to pass traffic when the creek improvements are being constructed. The shoofly may be constructed of asphalt pavement or compacted road base and will be suitable to accommodate anticipated traffic loading. Some traffic control devices will be required (signs, barricades, flagger, etc.) to alert drivers to the new traffic pattern, and reduced speeds will be required through the construction zone. In addition, prior to construction, notifications will be sent to local residents to alert them of the construction.

Permanent Impacts – After the Owl Creek improvements have been completed, it is anticipated that the traffic pattern will return, and the roadway will be fully reconstructed. The temporary shoofly will be removed, and the area will be restored to its existing condition with some new grading required from the edge of roadway to the culvert headwalls.