



# **Larimer County Analysis – Technical Memorandum No. 12 Groundwater Modeling Report**

Prepared for:  
**Larimer County**

Prepared by:  
**Northern Integrated Supply Project  
Water Activity Enterprise**

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**To:** Larimer County Planning Department

**From:** Randy Parks and Derek Nelson - Dewberry Engineers Inc.

**Subject:** Northern Integrated Supply Project - Groundwater Modeling



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The Northern Integrated Supply Project has four (4) pipeline reaches that run through Larimer County. The reaches are known as the County Line, Poudre Intake, Glade/Poudre Release Pipeline, and Northern Tier Pipelines.

Detailed geotechnical exploration and site-specific groundwater issues will be addressed during final design. This report presents an overview of the anticipated groundwater levels, construction methodologies, and best management practices to mitigate impacts to groundwater.

## Overview of Groundwater Levels

The NISP conveyance facilities all fall within the South Platte River Basin, with the Cache la Poudre sub-basin the principal aquifer within Larimer County. Depth to groundwater levels vary along the conveyance corridors from near ground surface to over 25 feet. As would be expected, the higher groundwater levels are near surface water sources consisting of ditches, reservoirs, rivers, and streams.

Data was gathered from Colorado Division of Water Resources Well Permit Applications and was utilized to generate **Figures 1** through **3**. These figures depict approximate groundwater depth contours and serve as an approximation of anticipated groundwater levels at this preliminary stage, and are summarized below:

- **Glade/Poudre Release Pipeline (Figure 1)**
  - Groundwater at the Glade site is currently being monitored
  - Geotechnical investigation for these pipe routes will include data from groundwater monitoring wells
- **Northern Tier Pipeline (Figure 1)**
  - Westernmost 2 miles – Groundwater between 15 feet and 25 feet
  - Middle 5 miles - Groundwater between 5 feet and 15 feet
  - Easternmost 8 miles – Groundwater between 5 feet and 20 feet
- **Poudre Intake Pipeline (Figure 2)**
  - Westernmost 2 miles – Groundwater between 5 feet and 10 feet
  - Middle 3 miles - Groundwater between 5 feet and 15 feet
  - Easternmost 2 miles – Groundwater between 10 feet and 20 feet

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- County Line Pipeline (**Figure 3**)
  - Northernmost 10 miles – Groundwater between 10 feet and 30 feet
  - Middle 12 miles - Groundwater between 5 feet and 10 feet
  - Southernmost 8 miles – Groundwater between 10 feet and 20 feet

During final design, the groundwater depths will be determined and monitored in conjunction with the geotechnical investigations.

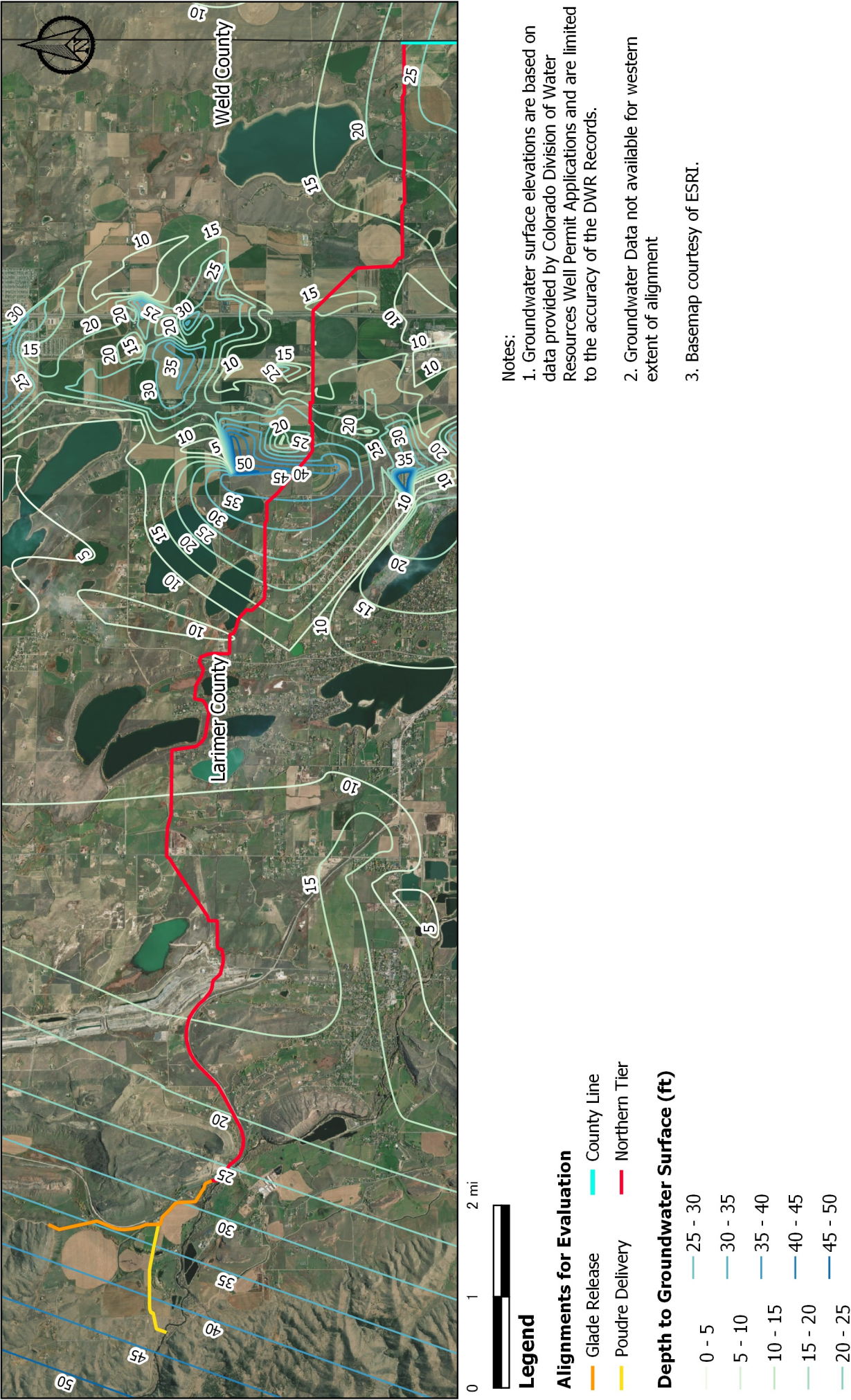
### Mitigation of Impacts

There are a range of mitigation practices anticipated to mitigate construction impacts and long-term effects of the pipeline construction including:

- Use of an imported granular pipe bedding around the pipe, to allow transverse transmission of groundwater around the linear pipeline feature
- Construction of low-permeability trench plugs along the pipeline to prevent longitudinal transmission of groundwater. These trench plugs are typically made of bentonite or flowfill and are designed to intercept longitudinal groundwater flows that can occur in the permeable bedding to avoid inadvertent draining or collection of groundwater in a manner that had not previously occurred.
- Utilizing best management practices (BMP's) in accordance with Larimer County and Colorado Department of Public Health and Environment (CDPHE) regulations in conjunction with:
  - Dewatering of trenches or tunnel shafts
  - Collection and sediment control, treatment (if required), and discharging

CDPHE construction dewatering permits will be acquired and contractors will be required to meet all requirements.

Figure 1 - Depth to Groundwater Analysis for Northern Tier, Glade Release, and Poudre Release Alignment

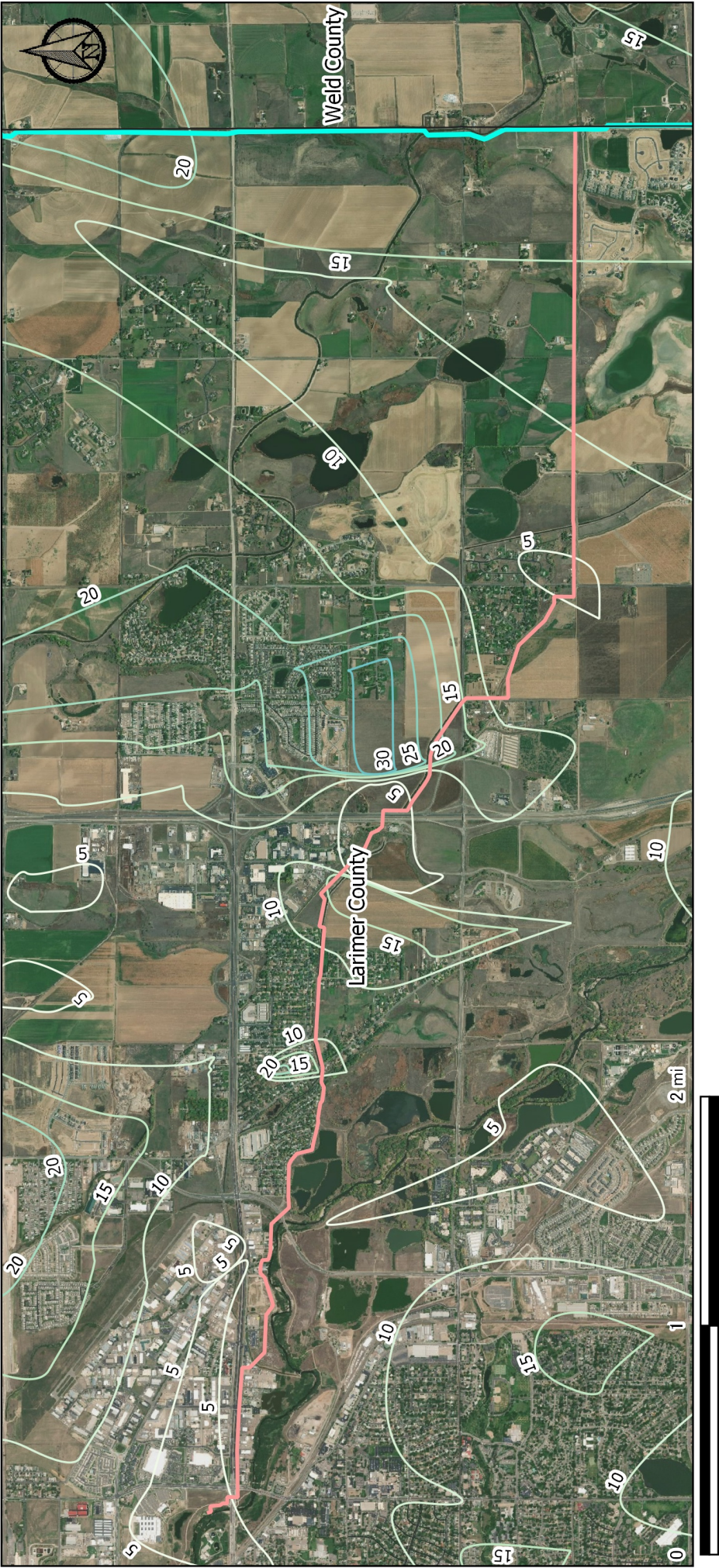


**Notes:**

1. Groundwater surface elevations are based on data provided by Colorado Division of Water Resources Well Permit Applications and are limited to the accuracy of the DWR Records.
2. Groundwater Data not available for western extent of alignment
3. Basemap courtesy of ESRI.



Figure 2 - Depth to Groundwater Analysis for Poudre Intake Alignment



**Legend**

**Alignments for Evaluation**

- County Line
- Poudre Intake

**Depth to Groundwater Surface (ft)**

- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50

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2. Basemap courtesy of ESRI.



Figure 3 - Depth to Groundwater Analysis for County Line Alignment

