Town of Erie Municipal Airport Connection

July 14, 2022

Prepared for:

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TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

1.0 PROJECT OVERVIEW

The Town of Erie Municipal Airport is located within the southern limits of the Town of Erie. It is bound by Baseline Road to the south, County Line Road to the west, Coal Creek to the north, and Bonanza Drive to the east, as shown in Figure 1.0A. The airport currently has one formalized entrance along Airport Drive which enters the airport from the south from Baseline Road. The Town of Erie tasked RockSol with exploring alternative locations for a second access to the airport. This second access is to provide an additional entrance for emergency vehicles and enhance connectivity to the communities north of the airport, with an emphasis on providing access off County Line Road.

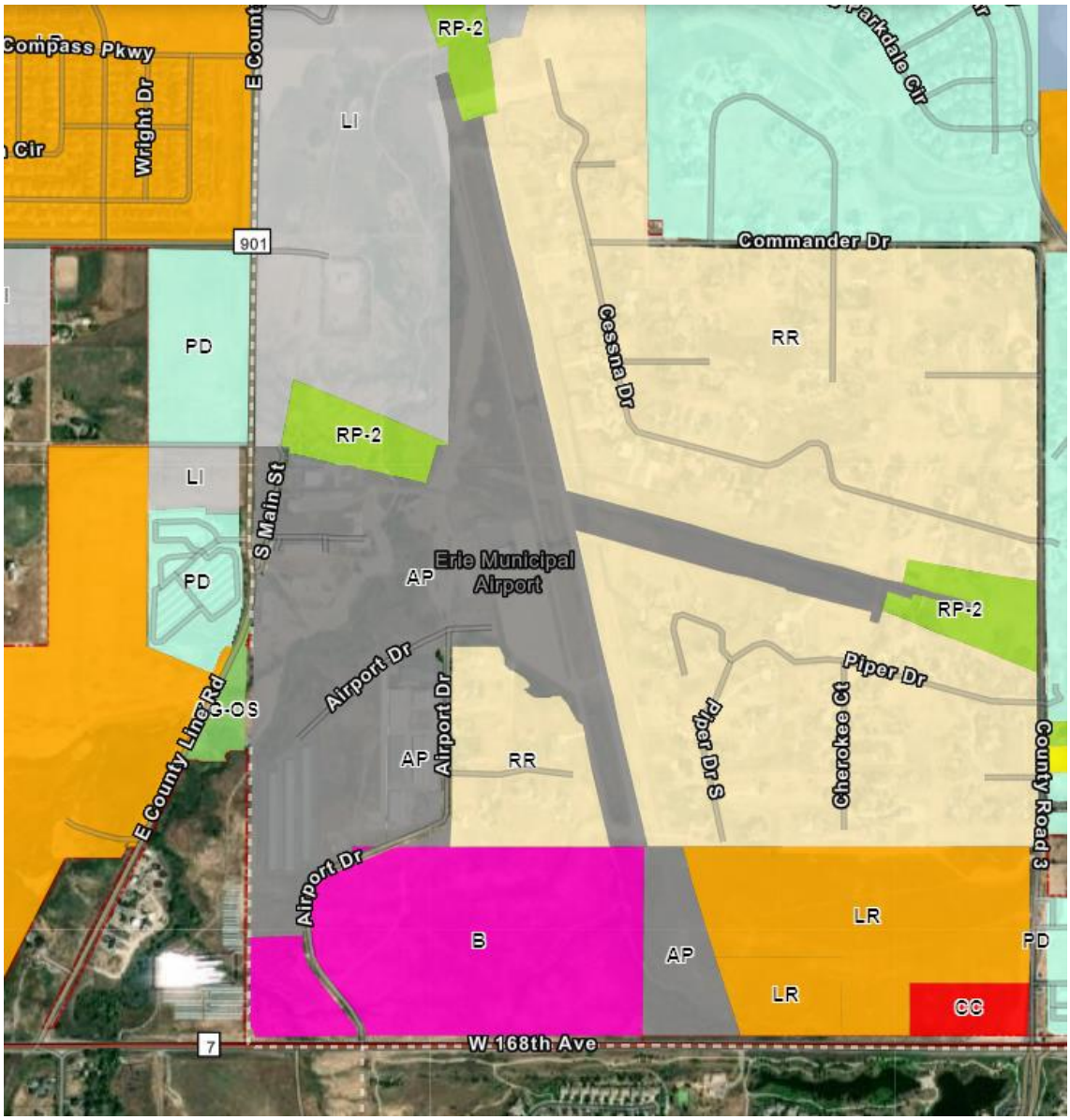


Figure 1.0A: Zoning Map from Town of Erie GIS

The Town of Erie and RockSol initially identified six alternative locations for the new airport access road. Three of these locations were eliminated based on discussions with the Town of Erie and fatal flaw analysis. The three remaining locations were evaluated based on the criteria show in Table 3.3A. This report outlines the data collection that preceded the alternatives analysis and provides the Town of Erie with recommendations for the preferred location of the airport access road.

2.0 DATA COLLECTION

2.1 GEOTECHNICAL SITE CONDITIONS

RockSol performed a review of available geological and geotechnical information for the Erie Airport and adjacent vicinity to characterize site soil conditions that may be anticipated for the various roadway alternatives.

Previous Geotechnical Investigation Documents Provided by the Town of Erie

1) Subsurface Exploration Program and Geotechnical Recommendations, Town of Erie South Coal Creek Sanitary Sewer, Erie, Colorado, February 26, 2013, by Ground Engineering Consultants, Inc., Job Number 13-3008
2) Geotechnical Engineering Report, Erie Airport Culvert, Erie, Colorado, April 13, 2010, by Yeh and Associates, Inc., Project No. 210-032
3) Geotechnical Investigation Proposed Concrete Flood Walls Pedestrian Underpass Repair at Taxiway over Coal Creek, Erie, Colorado, November 30, 2016, by CTL Thompson Inc., Project No. FC07144-125
4) Addendum to Geologic and Preliminary Geotechnical Investigation Erie Assemblage Northeast of Baseline Road and 119th Street, Erie, Colorado, August 19, 2016, by CTL Thompson Inc., Project No. DN48,284-115

Geological and Subsurface Discussion

Based on information presented in the *Geological Map of the Boulder-Fort Collins-Greeley Area, Colorado*, by Roger B. Colton, dated 1977 (See Figure 2.1A – Site Geology Map), each of the alternative configurations for the proposed roadway are underlain by the Piney Creek Alluvium (Qp), which generally consists of gravels, sand, silt and clay, deposited by modern stream flows (Coal Creek), Loess (Qel) deposits consisting of windblown clay, silt, and sand, and Broadway Alluvium (Qb), consisting of creek deposited sands and gravels with clayey silt and sand. Stream-channel and flood-plain areas of Coal Creek may be prone to flooding, erosion, and sediment deposition.

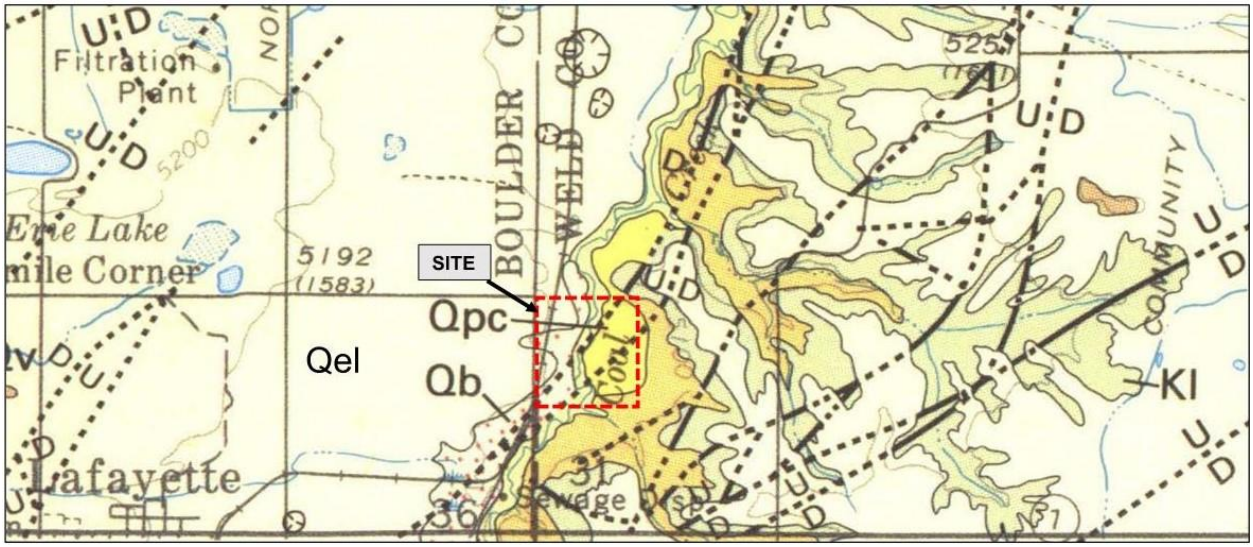


Figure 2.1A: Site Geology Map

Surficial sedimentary bedrock units are identified on the geologic map east of the project area. The Laramie Formation (Kl) is mapped at or near the surface approximately 1,000 feet to the east and 2,000 feet to the south of the project site. The Laramie Formation generally consists of sedimentary claystone, shale, sandy shale, coal and scattered lenticular beds of lignite.

Based on the *Maps Showing the Extent of Mining, Locations of Mine Shafts, Adits, Air Shafts, and Bedrock Faults, and Thickness of Overburden Above Abandoned Coal Mine in the Boulder-Weld Coal Field, Boulder, Weld, and Adams Counties, Colorado, compiled by S.B Roberts, J.L. Hynes, and C.L. Woodward, Geologic Investigations Series I-2735, dated 2001* by the United States Geological Survey (USGS) and Colorado Geological Survey, underground coal mining activities are described to have occurred approximately 2,000 feet south of the project site (See Figure 2.1B – Coal Mine Map). Based on maps and information prepared by the USGS and CGS, it is RockSol's opinion that the project site is outside of the mapped coal mine limits and has a low hazard for future mine subsidence.

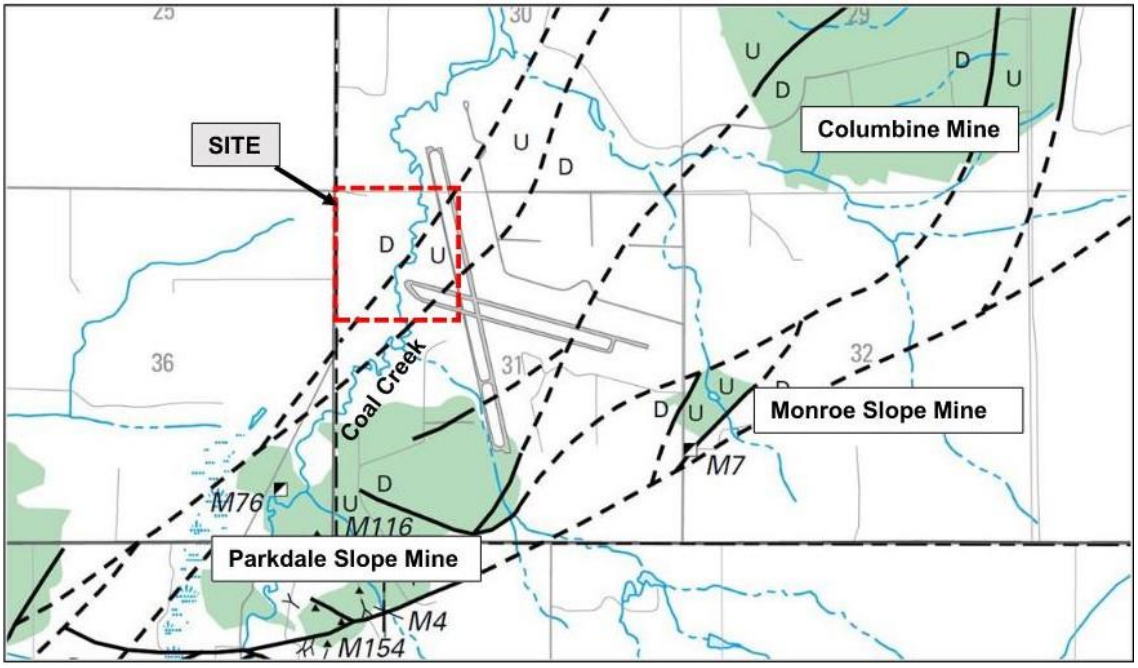


Figure 2.1B: Coal Mine Map

Based on previous geotechnical investigation reports provided by the Town of Erie and USGS geological maps, subsurface conditions are anticipated to consist of silty to clayey sand, sandy to silty clays, and gravelly sand overlying sedimentary bedrock. Bedrock was identified in the previous geotechnical studies as consisting of sandy claystone at elevations ranging from 5,052 feet to 5,054 feet near the banks of Coal Creek within the project limits.

Based on RockSol's review of the previous geotechnical investigation reports provided by the Town of Erie, groundwater is anticipated at approximate depths ranging from 12 feet to 20 feet below existing grades within the project limits. Groundwater levels are estimated to be near the water flow elevation of Coal Creek.

Settlement and Expansive Soil Discussion

Based on RockSol's review of the previous geotechnical investigation reports provided by the Town of Erie, the subgrade soils above bedrock are anticipated to possess no to low swell potential and low to moderate consolidation/settlement potential. It is RockSol's opinion that special earthwork requirements for swell mitigation will not be necessary for this project. Moisture conditioning and compaction will be required for all earthwork.

Pavement Subgrade and Design Discussion

Based on RockSol's review of the previous geotechnical investigation reports provided by the Town of Erie, the upper four to five feet of subgrade soil is anticipated to consist of sandy clay and clayey sand soils. R-Value strength testing is likely to produce results varying from 5 to 15, with correlating Resilient Modulus (M_R) values ranging from 5,356 pounds per square inch (psi) to 7,247 psi.

Foundation Design Discussion

Where a roadway alternative requires a crossing of Coal Creek, a bridge structure with deep foundations is feasible due to the presence of relatively shallow sedimentary bedrock, as identified in several of the previous geotechnical investigations in the site vicinity. A concrete box culvert (CBC) is also feasible from a geotechnical perspective. In both cases, a structure-specific geotechnical investigation will be required along with evaluation of scour.

Sulfate Resistance Discussion

Cementitious material requirements for concrete in contact with site soils or groundwater are based on the percentage of water-soluble sulfate in either soil or groundwater that will be in contact with concrete constructed for this project. Mix design requirements for concrete exposed to water soluble sulfates in soils or water is considered by CDOT as shown in Table 2.1A and in the Standard Specifications for Road and Bridge Construction, dated 2019 (CDOT Table 601-2).

Severity of sulfate exposure	Water-soluble sulfate (SO_4), in dry soil, percent	Sulfate (SO_4), in water, ppm	Water Cementitious Ratio, maximum	Cementitious Material Requirements
Class 0	0.00 to 0.10	0 to 150	0.45	Class 0
Class 1	0.11 to 0.20	151 to 1,500	0.45	Class 1
Class 2	0.21 to 2.0	1,500 to 10,000	0.45	Class 2
Class 3	2.01 or greater	10,001 or greater	0.40	Class 3

Table 2.1A: Sulfate Exposure

Based on the concentration of water-soluble sulfates documented in the previous geotechnical investigations performed near the project site, Exposure Class 2 is anticipated for concrete in contact with subgrade materials.

2.2 ENVIRONMENTAL SITE CONDITIONS

A field survey was conducted to analyze environmental resource impacts for all alternative roadway alignments. It is anticipated that state or federal funds will be acquired to bring the project to fruition, therefore documentation to support and comply with the National Environmental Policy Act (NEPA) will need to be completed. All resources that are protected under NEPA were considered.

The project area and surrounding buffer zone consists of agricultural lands, commercial properties, the airport, Coal Creek, and Coal Creek Trail. The project area provides potential habitat for wildlife, including the habitat adjacent to Coal Creek, as well as adjacent open fields. Coal Creek runs in a north-south orientation and the Coal Creek Trail follows the west side of Coal Creek through the project area. Oil and gas wells are present near the intersection of County Line Road and Arapahoe Road, which may be a potential hazardous material source.

Multiple resources were considered to determine the level of NEPA compliance that will be required for the project. Resources assessed include:

- Air Quality
- Noise
- Hazardous Materials
- State and Federally Listed Threatened and Endangered Species
- Section 4(f), Historic and Non-Historic
- Archeology
- History
- Paleontology
- Section 6(f)
- Water Quality
- Wetland Delineations

Figure 2.2A: Wetlands within Coal Creek

Based on the project scope and assuming state or federal funding, it is anticipated that an Environmental Assessment (EA) will be necessary for NEPA compliance. At a minimum, an air quality analysis, noise analysis, Initial Site Assessment (ISA) for hazardous materials, a Biological Resource Report, a Cultural Resource Assessment to cover archeology, historic 4(f), Stormwater Management Plans, and permanent water quality will be required to achieve NEPA compliance.

Additional clearances that may be considered depending on which alternative is chosen include paleontology, a 404 permit, a dewatering permit, and Senate Bill 40 (SB40) Certification.

Air Quality: Part 93 of Title 40 of the Code of Federal Regulations (CFR) (40 CFR 93) requires highway and public transit projects to conform with the State Implementation Plan to meet the Clean Air Act requirements. Since the Erie Municipal Airport falls within at least one nonattainment or maintenance area and the project scope does not meet any of the conformity requirement exemptions, an air quality analysis will be required.

Noise: The Colorado Department of Transportation (CDOT) Noise Analysis and Abatement Guidelines (NAAG) complies with the Federal Regulation 23 CFR 772, which requires states to determine if a project will cause noise impacts and if noise abatement will be built as part of the project. With the guidance of the NAAG, RockSol is anticipating that due to the scope of this project, it will classify as a Type I project; the project involves construction of a highway on a new location. In the NAAG, highway is defined as a broad term that not only includes what are commonly considered to be highways, but can also include roadways such as roads, streets and parkways. Due to this project classification, further noise analysis is required. However, a noise wall is not anticipated.

Hazardous Materials: While no hazardous materials are anticipated within the project area or adjacent area, NEPA compliance requires performing a document search to determine if there are any known hazardous materials present. An Initial Site Assessment will need to be conducted to analyze known hazardous materials within and adjacent to the project area.

Biological Resources: Minimal biological resource impacts are anticipated, but an analysis addressing known environmental resources will be incorporated. This includes consideration of state and federally protected threatened and endangered species, migratory birds, bald and golden eagles, wetlands, and noxious weed management. Although upstream sections of Coal Creek have suitable habitat for the Preble's Meadow Jumping Mouse (Zapus hudsonius preblei), a currently listed federally threatened species, no impacts are anticipated. The biological resources report will analyze each of these resources individually.

Non-historic Section 4(f): The U.S. Department of Transportation Act of 1966 prohibits the FTA and other USDOT agencies from using land from publicly owned parks, recreation areas (including recreational trails), wildlife, and waterfowl refuges, or public and private historic properties, unless there is no feasible and prudent alternative to that use and the action includes all possible planning to minimize harm to the property resulting from such a use. Coal Creek Trail falls under this protected status, and additional consideration will need to be taken during construction due to impacts to the trail and those recreating on the trail.

Cultural Resources: The cultural resource assessment will cover historic 4(f), Section 106, and archeological resources, as well as the impacts to these resources. Consultation with SHPO will be required as part of the clearance process, though no impacts are anticipated.

Paleontology: It is not anticipated that there will be paleontological impacts within the project area. However, any time there is bridge construction, paleontology must be considered due to the depth of excavation.

Water Quality: Alternatives that will be impacting Coal Creek will have additional permitting requirements. Based on the wetland delineation completed on 4/29/2022 and the proposed alternative elements, permitting for this project will include a 404 permit through the Army Corps of Engineers (USACE) and a Dewatering Permit through the Colorado Department of Public Health and Environment. Once impacts to Coal Creek are determined, a Senate Bill 40 Certification Letter from the Colorado Division of Wildlife will be required. It is anticipated that a General Stormwater Construction Permit will be needed for all alternatives.

To comply with the Town of Erie's Municipal Separate Storm Sewer System General Permit (MS4), permanent on-site treatment requirements will need to be considered for all alternatives as project plans develop to achieve compliance.

Land Acquisition: For all alternatives, land acquisition will be required. As part of the land acquisition process, procedural policies and other requirements informed by the Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970 will need to be adhered to.

Public Involvement: Since the project will require a high level of environmental clearance, the public must be given an opportunity to comment on the project and all the alternatives that were considered. A comment period will be required on the NEPA documentation, as well as public meetings to ensure that the public has been informed and their comments were taken into consideration during design.

Environmental resources that were ruled out for consideration as part of the final design include: Section 6(f). Additional details are discussed below.

Section 6(f): Section 6(f)(3) of the Land and Water Conservation Fund (LWCF) Act prohibits the conversion of property acquired or developed with grants from this fund to a non-recreational purpose without the approval of the National Park Service. No LWCF properties are present within the project area.

Should local funds, rather than state or federal funds, be acquired to move the project forward, impacts to the following environmental resources will need to be analyzed and documented: an Initial Site Assessment (ISA) for hazardous materials, a Biological Resources Report, Stormwater Management Plans, and permanent water quality analysis to ensure compliance with the Town of Erie's Municipal Separate Storm Sewer System General Permit (MS4). Depending on the chosen alternative and impacts to Coal Creek, a 404 Permit may also be required. The 404 Permit requires evaluation of impacts to threatened and endangered species (which would be covered under the Biological Resources Report) and a Cultural Resource Assessment for historic resources. It is recommended that if at all possible, local funds should be used to complete the

project to greatly reduce the amount of environmental clearance documentation that will be required to complete the project.

2.3 UTILITIES

There are several known utilities within the project limits including water, sanitary sewer, storm sewer, oil and gas, electric, and communications. The Town of Erie provided GIS data for existing water, storm sewer, and sanitary sewer in the project limits shown on Figure 2.3A. Also shown in Figure 2.3A is a sanitary sewer line that was recently installed adjacent to the east side of Coal Creek and west of the runway. A site visit revealed electric, communications, and oil and gas in the project vicinity. Figure 2.3B shows gas risers at 370 17th St (7N LLC property).

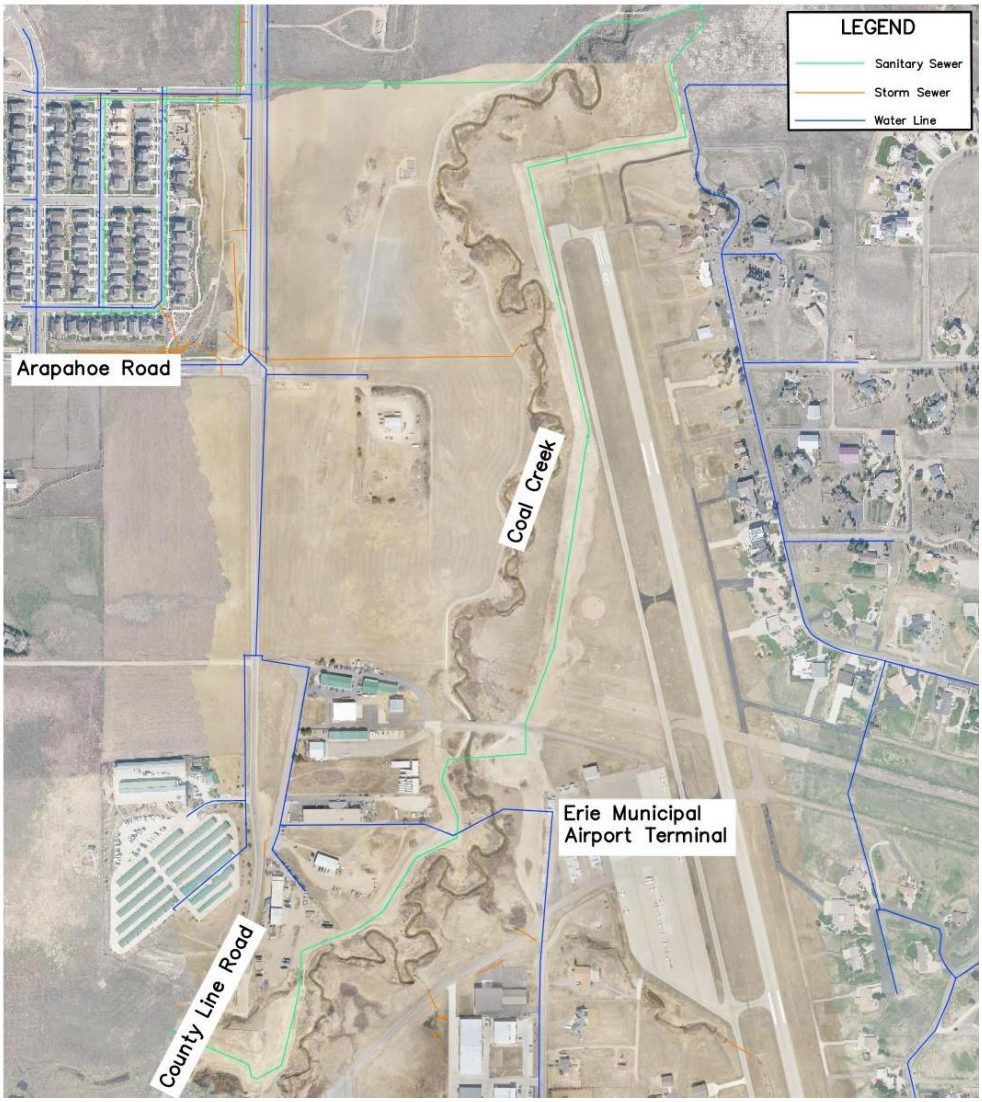


Figure 2.3A: Utilities Map from Town of Erie GIS

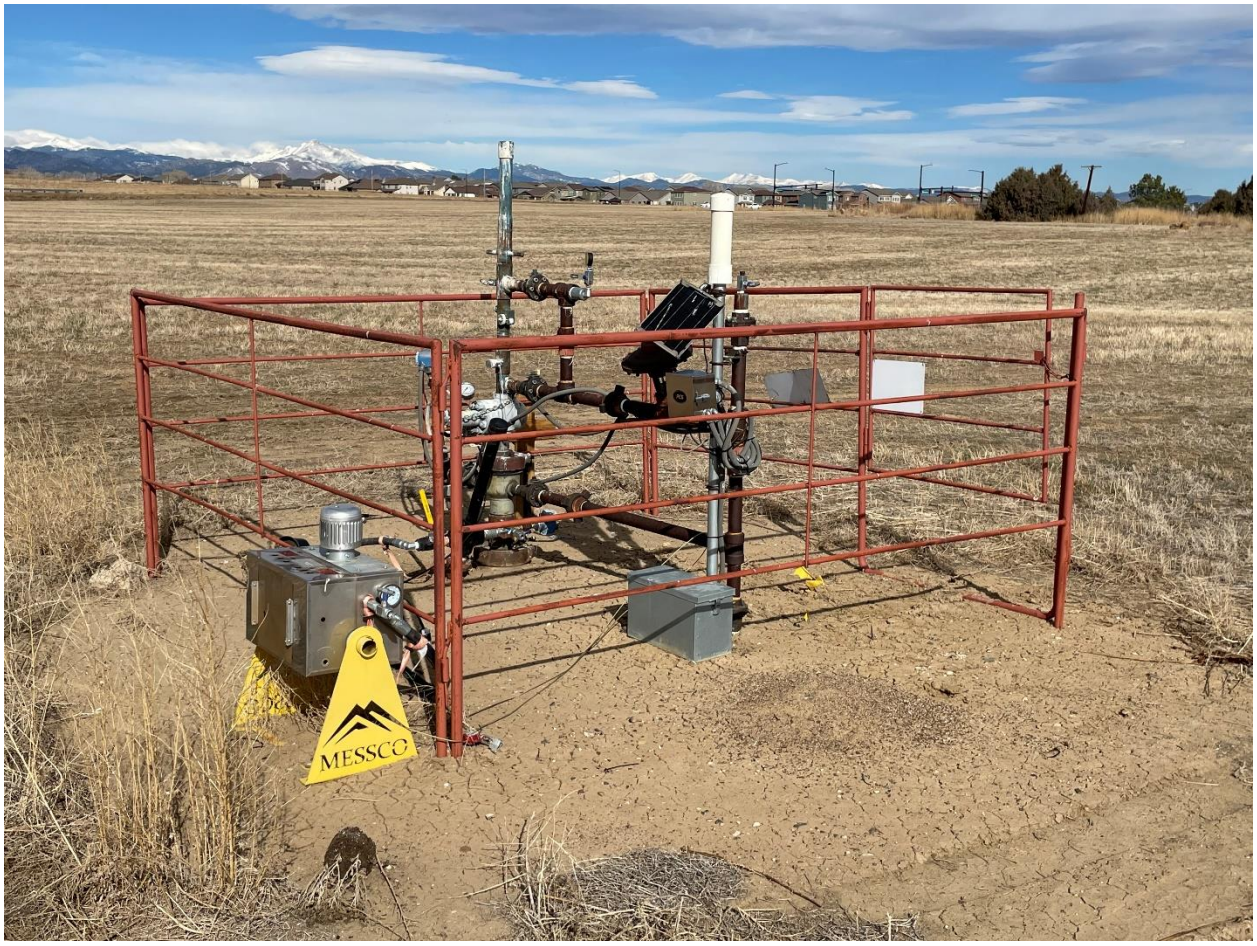


Figure 2.3B: Gas Risers

2.4 DRONE DATA COLLECTION

RockSol flew the extents of the airport with a drone to capture detailed aerial imagery as well as surface data. This imagery was useful in conveying a more recent view of the airport and providing sufficient information for location analysis for the airport access road. The surface elevation data was helpful to understand the topography with which the alternatives would traverse and inform on constructability and necessary earthwork for the roadway. The drone captured 1 million elevation points with accuracy levels acceptable for conceptual design efforts. Figure 2.4A shows the elevation points captured in the vicinity of the Coal Creek box culvert.

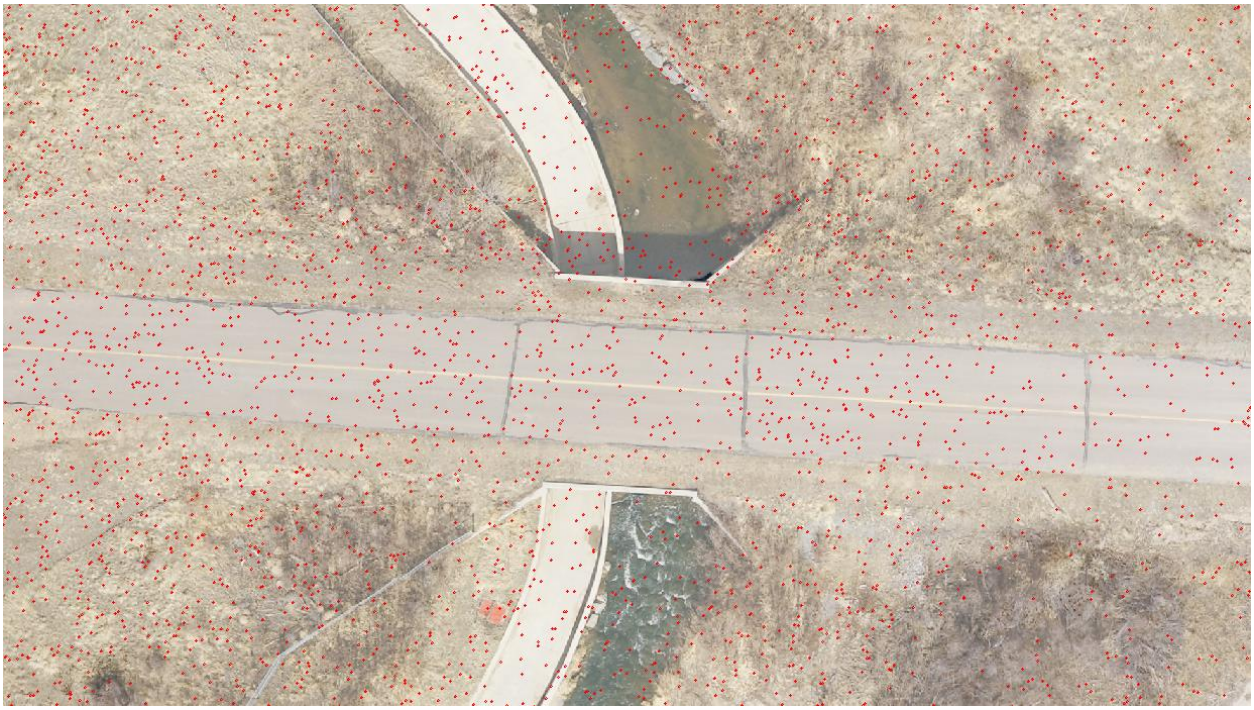


Figure 2.4A: Drone Elevation Points

2.5 BRIDGE AND HYDRAULICS CRITERIA

Bridges over waterways need to pass the flood event without causing a rise in the 100-year water surface. If a "no rise" is not possible, a Conditional Letter of Map Revision (CLOMR) is required prior to construction, plus a Letter of Map Revision (LOMR) after construction. Bridge layout and hydraulics considerations usually span most of the 100-year regulated flood plain and conduct hydraulics analysis to compare water surface in the existing condition with the water surface in the proposed condition. Deep foundations (driven steel piles or reinforced concrete drilled shafts) support bridges over waterways to provide stability against scour events. Riprap scour protection is located on the slopes in front of bridge abutments.

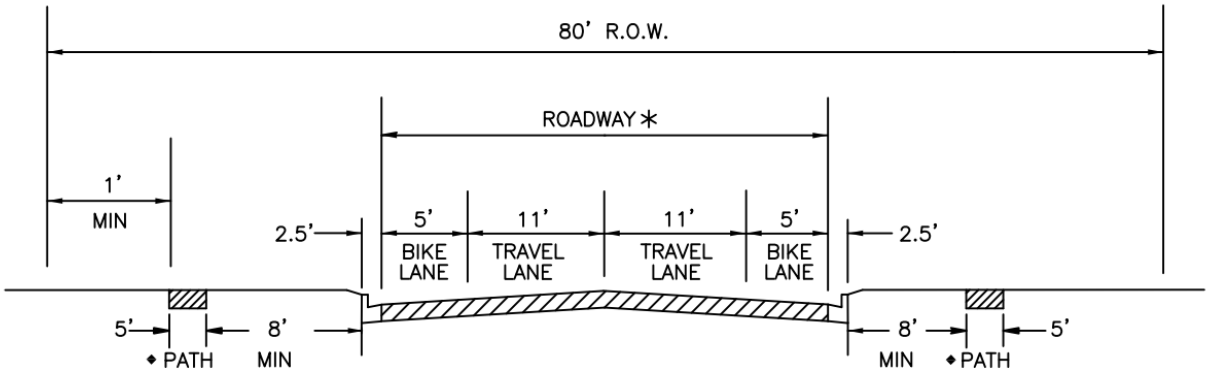
Bridge widths carry the vehicle lanes, bike lanes, 2 feet offset to bridge barriers, and sidewalks if needed. Bridge width to carry the roadway typical section shown in Figure 2.6A would be 39 feet without sidewalk, and 49 feet with one 10-foot sidewalk.

2.6 ROADWAY CRITERIA

The airport access road will be classified as a collector road. Table 2.6A shows key design criteria for the roadway. The Town of Erie Engineering Standards and Specifications Section 500 as well as the AASHTO Policy on Geometric Design of Highways and Streets 2018 7th Edition were used to develop the criteria. A design speed of 30 MPH and posted speed of 25 MPH were assumed when compiling the roadway design criteria. Figure 2.6A shows a typical section of the roadway from the Town of Erie's street details.

Design Criteria			
Design Parameters	**Town of Erie Engineering Standards & Specifications Section 500**	**AASHTO PGDHS (2018) 7th Edition**	**Proposed**
Horizontal			
Max for Super Elevation	Normal Crown	4%-6%	Normal Crown
Minimum Curve Radius at Normal Crown	300	333	300
Taper Rate	N/A	15:1	15:1
Vertical			
Crest (K)	20	19	20
Sag (K)	40	37	40
Stopping Sight Distance: Sag (ft)	200	200	200
Stopping Sight Distance: Crest (ft)	200	200	200
Grade			
Minimum	0.75%	0.50%	0.75%
Maximum	6%	9%	6%
Pavement Cross Slope	2-4%	1.5%-2%	2%
Cross Sectional Elements			
Right of Way Width (ft)	70' or 80'	N/A	80'
Number of Through Lanes	2	Depends on LOS	2
Lane Width (Ft)	11'	10-12	12
Bike Lane Width (ft)	4' or 5'	5' or more	5
Clear Zone Width (ft)	N/A	16-18	18
Sidewalk Width - Attached (ft)	5'	4-8'	5
Sidewalk Width - Detached (ft)	5'	4-8'	5
Sidewalk Cross Slope	2%	2%	1.5%
Note: Road is classified as a Residential Collector with a design spead of 30 MPH and posted speed of 25 MPH.			

Table 2.6A: Roadway Design Criteria



COLLECTOR WITHOUT PARKING OR MEDIAN

Figure 2.6A: Town of Erie Collector Standard Detail (ST3)

3.0 ALTERNATIVES ANALYSIS

3.1 AIRPORT CONNECTOR ALTERNATIVES

Six initial locations for the airport connection were considered at the beginning of project. These locations are shown on Figure 3.1A. Locations 4, 5, and 6 were determined to have fatal flaws that prevented them from further analysis. A fatal flaw for alternatives 4 and 5 is that they would require extensive rebuild at their connection to County Line Road. This results from the proximity of the floodplain in these two locations and the need for County Line Road to be raised to provide sufficient floodplain clearance. Alternative 6 would utilize the existing area where the old east/west runway is located, with access coming off Bonanza Drive. A fatal flaw with this alternative is that traffic would have to cross the active north/south runway to access the airport terminal. This alternative would also require ROW acquisition from five residential properties near Bonanza Drive. Alternatives 1 through 3 were further analyzed. Key elements of those alternatives include:

Alternative 1 – Arapahoe Road

- Connects to County Line Road at Arapahoe Road.
- Requires new structure at crossing of Coal Creek.
- Terminates at north side of existing airport terminal.

Alternative 2 – Coal Creek Existing Crossing

- Connects to County Line Road directly north of Main St. Cul-de-sac.
- Utilizes existing structure which is currently used as a taxi over Coal Creek.

Alternative 3 – North of Cul-de-sac

- Connects to County Line Road directly north of Main St. Cul-de-sac.
- Requires new structure at crossing of Coal Creek.
- Terminates at north side of existing airport terminal.

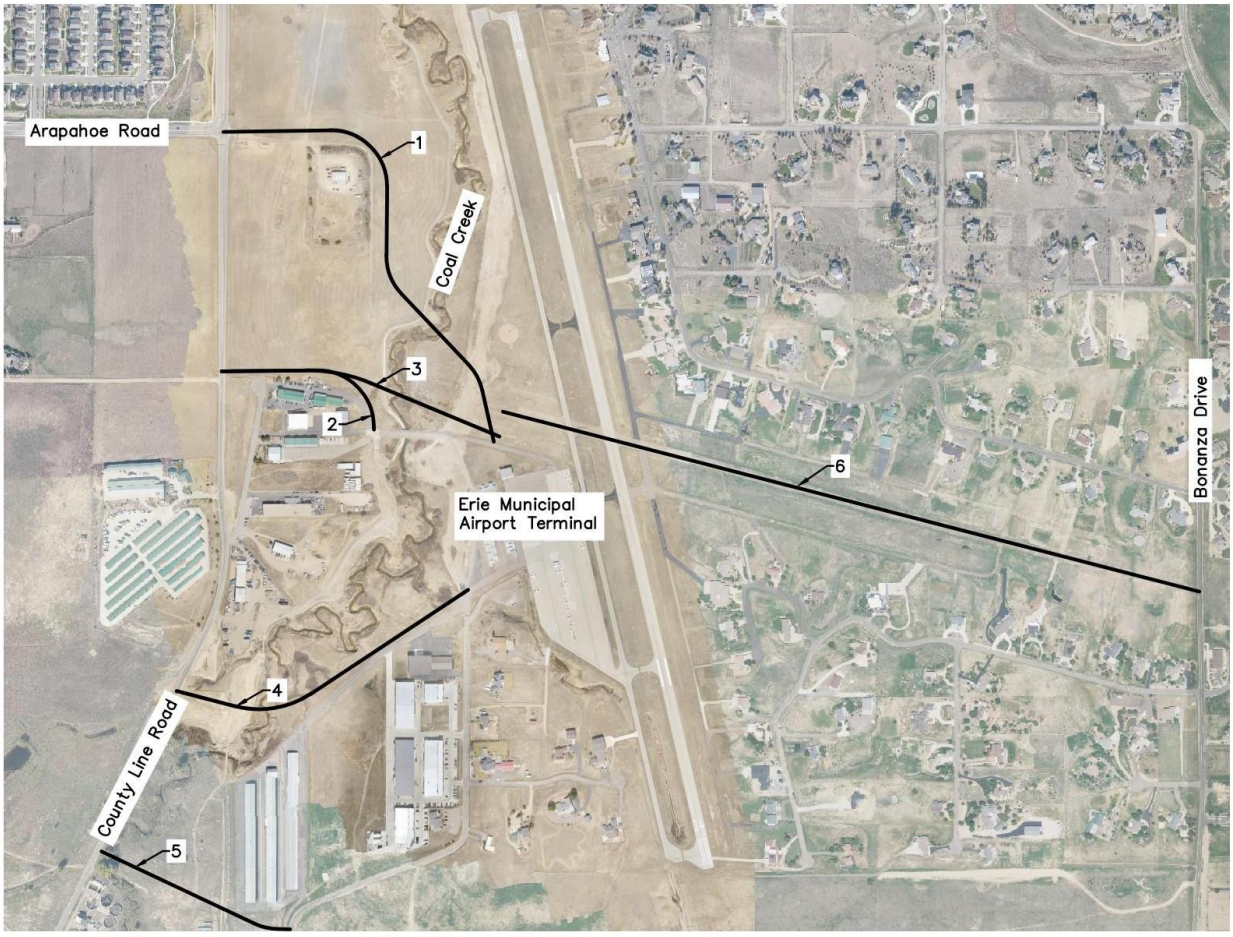


Figure 3.1A: Alternatives Location Map

3.2 ALTERNATIVES EVALUATION MEASURES

Alternatives 1 through 3 were evaluated on the following measures. Appendix A contains conceptual design layouts of the three alternatives.

Property Impacts
Each alternative requires ROW acquisition from multiple adjacent private properties. The ROW width assumed in these calculations for the roadway is 80 feet. This is the Town of Erie's standard ROW width for collector roads.

Coal Creek Impacts
Coal Creek flows south to north through the entirety of the project area, separating County Line Road from the airport terminal and runway. Elements pertinent to impacts at Coal Creek include width of the 100-year floodplain at the crossing, estimated structure length, bridge extent and structural impacts, hydraulic impacts, and environmental impacts.

Airport Operations
Current and future airport operations and their compatibility with each alternative were considered. The Town of Erie's Airport Master Plan was referenced. Coordination also occurred with BA Group, an airport consultant for the Town of Erie.

Traffic and Engineering Factors
Other engineering factors considered in the evaluation of the alternatives included ease of use and connectivity, intersection operations, and utility impacts.

Constructability and Cost
Conceptual cost estimates were prepared for each alternative. Constructability analysis included determining construction and schedule impacts.

3.3 ALTERNATIVES EVALUATION MATRIX

The following table presents the matrix used to evaluate the three alternatives. To serve as a guide to help identify key differentiators between the alternatives, the following color scheme was used in the table:

- **Red text – indicates greatest impact or poorest condition when compared to other alternatives.**
- **Yellow text – indicates moderate impacts compared to other alternatives.**
- **Green text – indicates lowest impact or best condition when compared to other alternatives.**

Town of Erie Municipal Airport Connection Evaluation				
Criteria	Measure	Alternative 1: Arapahoe Road	Alternative 2: Coal Creek Existing Crossing	Alternative 3: North of Culdesac
Property Impacts	Area Effected (SF)	101,000	70,000	65,000
	Number of Private Parcels Effected	2	3	2
Coal Creek Impacts	Width of 100 Year Floodplain at Crossing (Ft)	260	260	180
	Structure Estimated Length (Ft)	240	Existing	170
	Structural/Hydraulic Impacts	Moderate Impacts	100 Year Overtop	Moderate Impacts
	Environmental Impacts	Moderate Impacts	Minor Impacts	Moderate Impacts
Airport Operations	Compatability with Existing Operations	Good	Fair	Good
	Compatability with Future Operations	Good	Poor	Good
Traffic & Engineering Factors	Ease of Use and Connectivity	Good	Fair	Good
	Intersection Operations	Good	Fair	Good
	Utility Impacts	Moderate Impacts	Minor Impacts	Minor Impacts
Constructability & Cost	Schedule	Minor Impacts	Moderate Impacts	Minor Impacts
	Construction Impacts	Minor Impacts	Moderate Impacts	Minor Impacts
	Total Project Estimated Cost (Million)	8.01	1.17	5.19

Table 3.3A: Alternatives Evaluation Matrix

3.4 CONCLUSIONS

Alternative 1 – Arapahoe Road

Property Impacts

Of the three alternatives, this option has the largest ROW impact with an estimated 101,000 square feet of ROW acquisition. This alignment would require ROW takes from 2 private parcels, which have the same owner. There is an existing 60-foot width of right of way extending 650 feet to the east of the intersection at County Line Road that this alignment would utilize. A small acquisition would be necessary from the property to the north, which is owned by 7N LLC. Most of the acquisition would be from the 7N LLC property that the roadway would fall within to the

west of its crossing with Coal Creek. The area of the southern 7N LLC property that would fall to the east of the new roadway and west of Coal Creek would likely need to be acquired by the Town of Erie as well. This area would likely be too small and close to the floodplain to be developed. The large area remaining between County Line Road and the new airport connector road, however, could still be developed. Both these 7N LLC properties were identified in the 2016 Airport Master Plan as targets for future commercial TTF Aircraft Manufacturing.

Coal Creek Impacts

As outlined in the evaluation matrix, the width of the 100-year floodplain is 260 feet. The bridge and the roadway carried on the bridge would be located above the 100-year water surface, and would pass the flood flow with minimal or no rise in the 100-year water surface elevation. If the proposed bridge opening results in an increase of the 100-year water surface, a CLOMR prior to construction and a LOMR after construction would be required. The estimated structure length is 240 feet, and scour protection would armor the slopes in front of bridge abutments. The structure for Alternative 1 will be 70 feet longer than Alternative 3. Bridge width would be 39 feet without sidewalk, or 49 feet with one sidewalk. Environmental impacts to Coal Creek will require a 404 permit, dewatering permit, and SB 40 Certification.

Environmental Clearances

Should state or federal funds be acquired, all three alternatives would require an Environmental Assessment (EA) since a new road is being constructed. Alternative 1 would require an Initial Site Assessment (ISA) for hazardous materials, a Biological Resource Report, a Cultural Resource Assessment to cover archeology and historic resources, noise, air quality, paleontology, a 404 permit, dewatering permit, SB40 Certification, Stormwater Management Plans which include erosion control sequencing, and permanent water quality considerations. Public involvement will also be required as part of the EA process, since the public must be given the opportunity to comment on the alternatives and voice their concerns regarding the project.

Should local funds be acquired, Alternative 1 would require an Initial Site Assessment (ISA) for hazardous materials, a Biological Resource Report, a Cultural Resource Assessment to cover archeology and historic resources, a 404 permit, dewatering permit, Stormwater Management Plans which include erosion control sequencing, and permanent water quality considerations.

Airport Operations

Alternative 1 would provide an additional access to the north side of the terminal, greatly improving emergency access. The roadway would be constructed in a largely undeveloped area and should not have major impacts to existing functions of the airport. With the alignment coming into the northern portion of the existing airport terminal, a new vehicular parking lot would likely be necessary as part of this alternative. Most of the 370 17th Street (7N LLC) property could still be utilized for future commercial TTF Aircraft Manufacturing.

Traffic and Engineering Factors

The main benefit for this alternative from a traffic engineering standpoint is that the airport access road would connect to County Line Road at an existing intersection. Compared to the other alternatives, this alternative would not necessitate an additional intersection along County Line Road. Signal modifications and pedestrian improvements would likely be needed at the

intersection. A cross walk could be added to connect the sidewalk along the north side of the airport road to the community on the northwest corner of the intersection. This alternative would also create a direct connection for pedestrians from the Compass neighborhood to the Coal Creek Spine Trail.

As shown in Figure 2.3A, there is a water main that ends on the 370 17th Street (7N LLC) property. Implementation of this alternative would provide an opportunity to extend the water line further east towards the airport. There is a 96" storm sewer directly north of the alternative that could be protected in place during construction. The 7N LLC property also has oil and gas facilities present on site which would need to be coordinated with during construction of this alternative.

Constructability and Cost

Of the three alternatives, Alternative 1 is most costly, coming in at around 8.01 million dollars. The new bridge and near one half mile of roadway contribute to this cost. See Appendix B for the conceptual cost estimate. Constructability of the alternative would be greatly improved by the fact that the alignment is off system and traffic control would not be needed. The main constructability challenges would likely relate to the construction of the new structure and any intersection modifications that would be needed at the Arapahoe Road and County Line Road intersection.

Alternative 2 – Coal Creek Existing Crossing

Property Impacts

This alternative would impact three private parcels and require approximately 70,000 square feet of Right of Way acquisition. Property impacts would be minor on the 7N LLC property and 9377 East 147th Place. The access road for 2540 South Main Street Unit B would need to be reconstructed to connect to the new airport access road.

Per the Erie Gateway South Annexation No. 9 Exhibit A dated 4/16/2021 (Appendix C), future development west of County Line Road could change the connection of this alternative at County Line Road and increase the property impacts this alternative would require. The Exhibit also calls for a potential regional water quality pond near this alternative which could add challenges to acquiring adequate ROW.

Coal Creek Impacts

The existing crossing over Coal Creek is overtopped by 100-year flood flows, and therefore does not meet criteria for new transportation facilities. If the existing crossing were to be used as a temporary vehicle access to the airport, the non-conforming hydraulics aspects of the existing crossing would result in flooding risk to vehicles and multi-modal transportation users. In that scenario, a flood detection monitor should be implemented that would close the crossing to users if high water were detected. The current structure is overtopped in 100-year flood events and may need to be replaced in the future to ensure that the structure is resilient to flooding.

Environmental Clearances

Should state or federal funds be acquired, all three alternatives would require an Environmental Assessment (EA) since a new road is being constructed. Alternative 2 would require an Initial Site Assessment (ISA) for hazardous materials, a Biological Resource Report, a Cultural Resource Assessment to cover archeology and historic resources, noise, air quality, Stormwater Management Plans which include erosion control sequencing and permanent water quality considerations. Public involvement will also be required as part of the EA process, since the public must be given the opportunity to comment on the alternatives and voice their concerns regarding the project.

Should local funds be acquired, Alternative 2 would require an Initial Site Assessment (ISA) for hazardous materials, a Biological Resource Report, Stormwater Management Plans which include erosion control sequencing, and permanent water quality considerations.

Airport Operations

This alternative utilizes the existing access road across the box culvert at Coal Creek, which is currently being used as both an aircraft taxi and a passenger vehicle access to the terminal. This mixing of traffic creates a safety concern for users of the airport. Establishing Alternative 2 would create a second emergency access to County Line Road but would increase the potential conflicts of aircraft and vehicular traffic. If this alternative were to be used as a long-term solution for providing vehicular traffic access to the airport, the route would likely need to restrict aircraft. This would necessitate the property owners with aircraft storage to likely relocate.

Traffic and Engineering Factors

Alternative 2 would create a new intersection along County Line Road, directly north of the Main Street Cul-de-sac. Depending on traffic volumes accessing the airport from this location, a traffic signal may need to be considered. There are currently no existing sidewalks along County Line Road in this location, so the new sidewalk for this alternative would not be making any immediate connections. Additionally, per the Erie Gateway South Annexation No. 9 Exhibit A dated 4/16/2021, the proposed Coal Creek Blvd. would be connecting to County Line Road directly north of this connection, which could complicate traffic operations in the vicinity and create a less than ideal connection from the airport to the neighborhoods to the north.

Because this alternative utilizes the existing crossing of Coal Creek, a stop condition would be needed where the new airport road connects directly west of Coal Creek. The horizontal curves along the alignment would be less than standard in order to not heavily impact the Main Street Condos Unit Owners property, thus necessitating the stop condition.

Constructability and Cost

Of the three alternatives, number 2 is by far the least costly at an estimated 1.17 million dollars. The use of the existing crossing at Coal Creek is the major contributor to the low cost. This alternative would also only require approximately 1000 linear feet of new roadway. See Appendix B for a conceptual cost estimate. Alternative 2 would be less of a challenge from a constructability standpoint than the other alternatives. Main challenges would include

coordinating access with the 2540 South Main Street Unit B property and constructing the tie-in to the existing crossing at Coal Creek.

Alternative 3 – North of Cul-de-sac

Property Impacts
This alternative would have the smallest impact of the alternatives, impacting two private parcels and requiring approximately 65,000 square feet of Right of Way acquisition. Property impacts would be minor on the 7N LLC property and the 2540 South Main Street Unit B property. The same considerations would need to be made as Alternative 2 regarding the construction of the Erie Gateway South Annexation.

Coal Creek Impacts
As outlined in the evaluation matrix, the width of the 100-year floodplain is 180 feet. The bridge and the roadway carried on the bridge would be located above the 100-year water surface, and would pass the flood flow with minimal or no rise in the 100-year water surface elevation. If the proposed bridge opening results in an increase of the 100-year water surface, a CLOMR prior to construction and a LOMR after construction would be required. The estimated structure length is 170 feet, and scour protection would armor the slopes in front of bridge abutments. The structure for Alternative 3 will be 70 feet shorter than Alternative 1. Bridge width would be 39 feet without sidewalk, or 49 feet with one sidewalk. Environmental impacts to Coal Creek will require a 404 permit, dewatering permit, and SB 40 Certification.

Environmental Clearances
Should state or federal funds be acquired, all three alternatives would require an Environmental Assessment (EA) since a new road is being constructed. Alternative 3 would require an Initial Site Assessment (ISA) for hazardous materials, a Biological Resource Report, a Cultural Resource Assessment to cover archeology and historic resources, noise, air quality, paleontology, a 404 permit, dewatering permit, SB40 Certification, Stormwater Management Plans which include erosion control sequencing and permanent water quality considerations. Public involvement will also be required as part of the EA process, since the public must be given the opportunity to comment on the alternatives and voice their concerns regarding the project.

Should local funds be acquired, Alternative 3 would require an Initial Site Assessment (ISA) for hazardous materials, a Biological Resource Report, a Cultural Resource Assessment to cover archeology and historic resources, a 404 permit, dewatering permit, Stormwater Management Plans which include erosion control sequencing, and permanent water quality considerations.

Airport Operations
Similar to Alternative 1, this alternative would provide an additional access to the north side of the terminal which would greatly improve emergency access. The roadway would be constructed in an undeveloped area north of the Main St Cul-de-sac and should not have major impacts to existing functions of the airport. With the alignment coming into the northern portion of the existing airport terminal, a new vehicular parking lot would likely be necessary as part of this alternative as well. Compared to Alternative 1, this alternative would leave more

available area from the 370 17th Street (7N LLC) property to be utilized for future airport development.

Traffic and Engineering Factors
Similar to Alternative 2, this alternative would create a new intersection along County Line Road, directly north of the Main Street Cul-de-sac and may necessitate a traffic signal at this location. There are currently no existing sidewalks along County Line Road at this location, so the new sidewalk for this alternative would not be making any immediate connections. The same issues could arise with the development of the Erie Gateway project. Of the three alternatives, Alternative 3 would provide the most direct access from County Line Road to the airport terminal. It should also have only minor impacts to utilities.

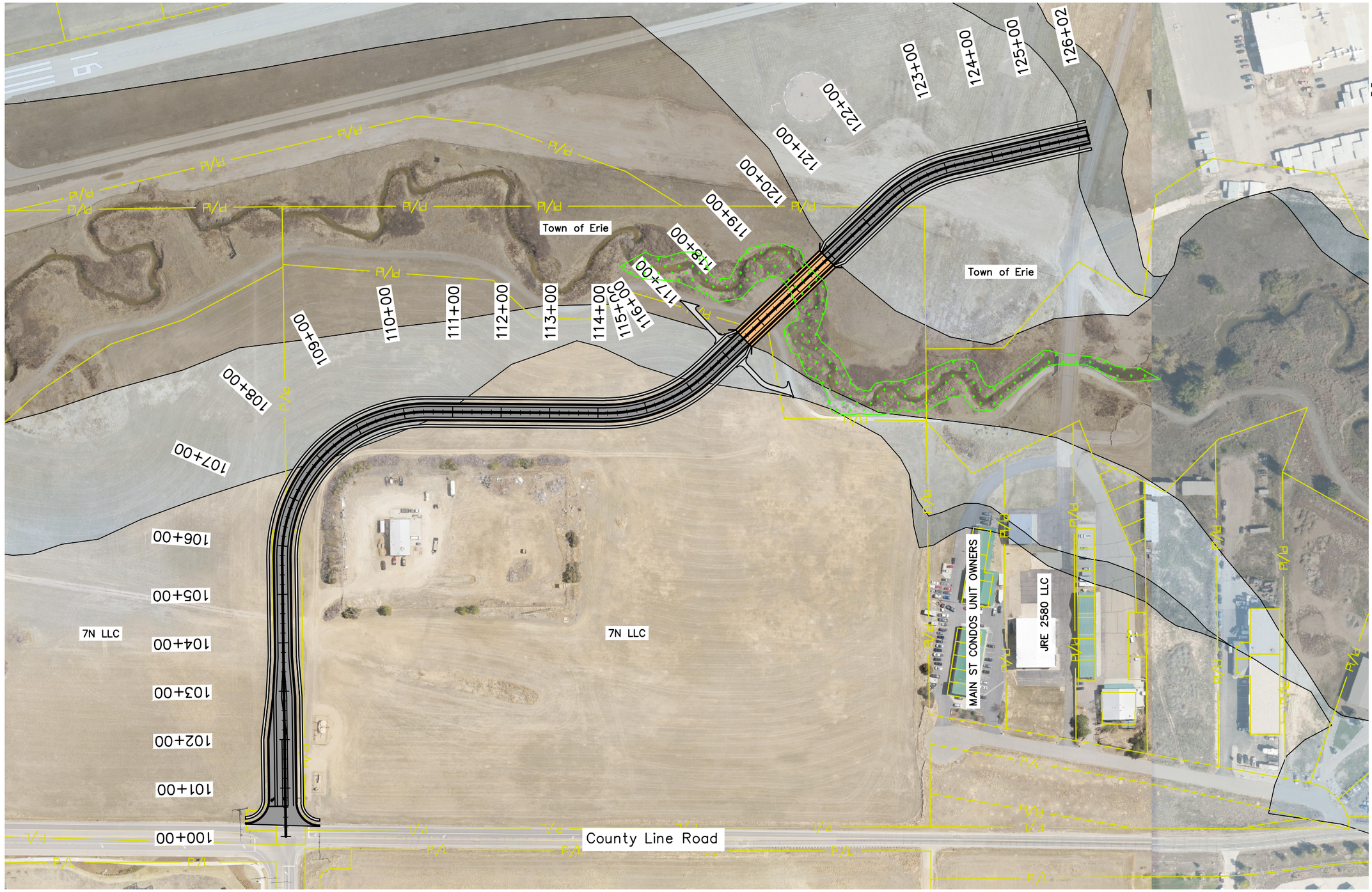
Constructability and Cost
Alternative 3 has a conceptual cost estimate of 5.19 million dollars. See Appendix B for a breakdown of conceptual costs. The new bridge would account for slightly less than half of the total cost of this alternative. Approximately 1,400 liner feet of new roadway would be needed. This alternative would also benefit from being off network and having traffic control at a minimum. Construction of the new structure would likely be the most significant challenge during construction.

4.0 RECOMMENDATIONS

Based on the analysis of the criteria presented in section 3 of this report, RockSol recommends Alternative 1, extending Arapahoe Road east. While the most expensive alternative, the Arapahoe Road option has several advantages to the other two alternatives. The location of the connection to County Line Road provides many benefits. These benefits include the use of an existing intersection, increased pedestrian connectivity to Coal Creek Trail, improved personal and emergency vehicular connectivity to the north, improved connectivity at the airport terminal, compatibility with future development plans and airport operations, and opportunities for utility improvements such as water line extensions.

The future Erie Gateway development adjacent to County Line Road would complicate the connections of Alternatives 2 and 3 to the County Line Road. These alternatives would also require an additional intersection with County Line Road. Another concern with Alternative 2 is the use of the existing crossing of Coal Creek which is prone to flooding. This alternative would also require the mixing of vehicular and airplane traffic or the closing of taxiway access to the properties west of the crossing.

APPENDIX A – CONCEPTUAL LAYOUTS



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Horiz. Scale: As Noted Vert. Scale: As Noted

RockSol Consulting Group, Inc.
12076 Grant Street
Thornton, CO 80241
Ph: (303) 962-9300
Fax: (303) 962-9350

Sheet Revisions

Date	Comments	Initials

TOWN OF ERIE 1874

As Constructed

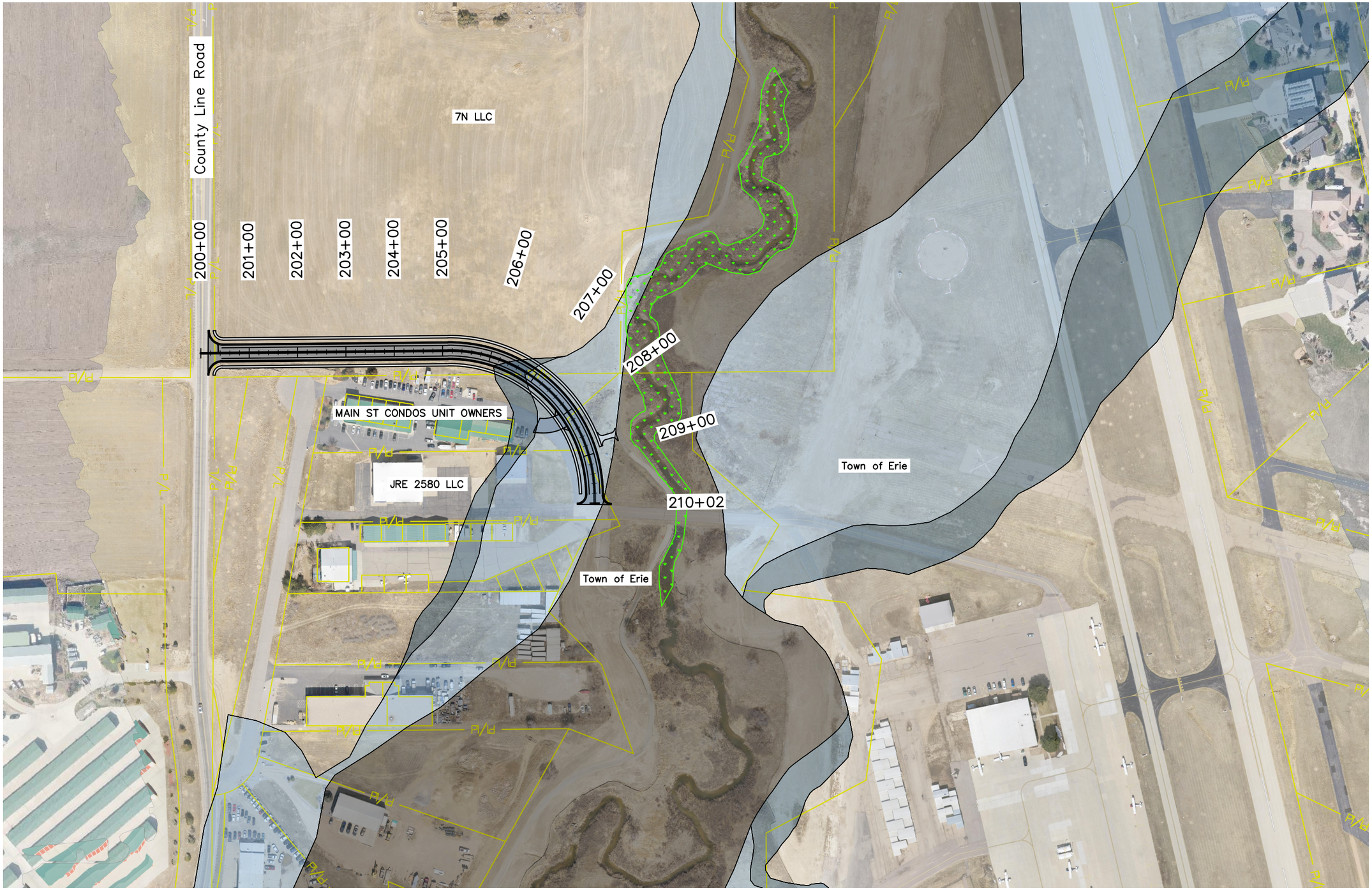
No Revisions:
Revised:
Void:

Erie Municipal Airport
Alternative 1
Arapahoe Road

Designer:
Detailer:
Sheet Subset:
Structure Numbers
Subset Sheets: 1 of 5

Project No.

Drawing Number
Sheet Number



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Thornton, CO 80241
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Fax: (303) 962-9350

Sheet Revisions

Date	Comments	Initials

TOWN OF ERIE 1874

As Constructed

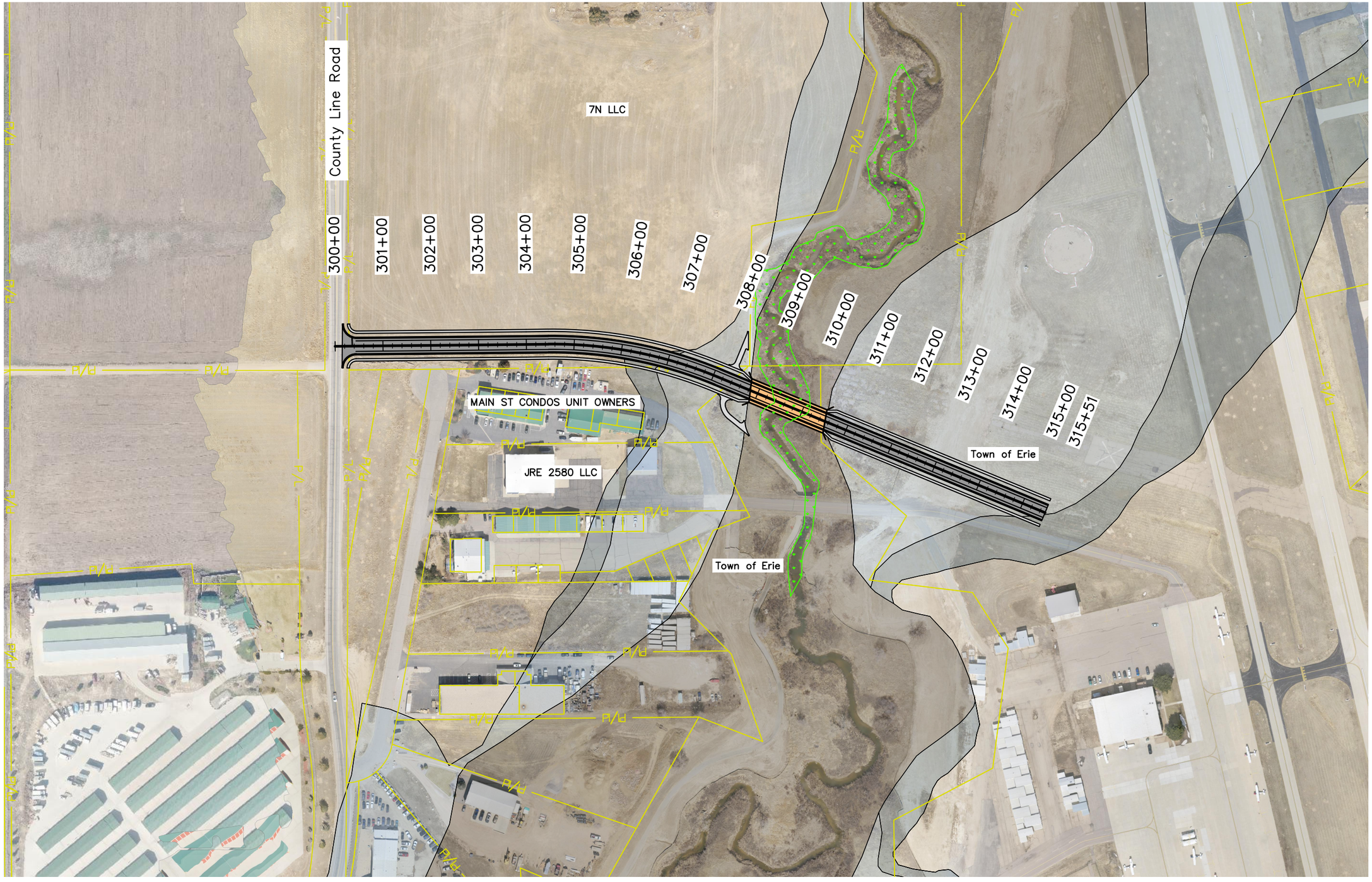
No Revisions:
Revised:
Void:

Erie Municipal Airport
Alternative 2
Coal Creek Existing Crossing

Designer:
Detailer:
Sheet Subset:
Structure Numbers
Subset Sheets: 2 of 5

Project No.

Drawing Number
Sheet Number



N

0 100 200

SCALE IN FEET

100 Year Regulatory Floodway

100 Year Floodway

500 Year Floodway

Wetlands

P/L Existing Property Line

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Print Date: 6/30/2022
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Thornton, CO 80241
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Fax: (303) 962-9350

Sheet Revisions

Date	Comments	Initials

TOWN OF ERIE 1874

As Constructed

No Revisions:

Revised:

Void:

Erie Municipal Airport
Alternative 3
North of Culdesac

Designer:
Detailer:
Sheet Subset:
Structure Numbers
Subset Sheets: 3 of 3

Project No.

Drawing Number

Sheet Number

APPENDIX B – CONCEPTUAL COST ESTIMATES

Town of Erie Municipal Airport Connection
Alternative 1 (Arapahoe Road)
Conceptual Estimate
July 14, 2022

ITEM	UNIT	QUANTITY	UNIT PRICE	COST
Roadway Items				
Clearing and Grubbing	LS	1	$20,000.00	$20,000
Aggregate Base Course (ABC)	CY	3,027	$65.00	$197,000
Curb & Gutter (Type 2-IIB)	LF	4,729	$48.00	$227,000
Hot Mix Asphalt (HMA)	TON	4,059	$115.00	$467,000
Concrete Sidewalk	SY	2,915	$80.00	$233,000
Structure Items				
New Bridge Structure	LS	1	$2,350,000.00	$2,350,000
Subtotal (Roadway & Structure):				**$3,494,000**
Major Items				
Embankment	LS	1	3.00%	$104,820
Erosion Control	LS	1	2.00%	$69,880
Removals, Resets, Adjustments	LS	1	2.00%	$69,880
Drainage Items	LS	1	5.00%	$174,700
Signing, Striping & Signals	LS	1	6.00%	$209,640
Construction Traffic Control	LS	1	4.00%	$139,760
Seeding & Channel Restoration	LS	1	5.00%	$174,700
Landscape & Bridge Aesthetics	LS	1	6.00%	$209,640
Mobilization	LS	1	7.00%	$244,580
Lighting	LS	1	2.00%	$69,880
Utilities	LS	1	5.00%	$174,700
Subtotal (Major Items):				**$1,642,180**
Subtotal Before Contingencies:				$5,136,180
Contingencies:			25%	$1,284,045
TOTAL COST OF CONSTRUCTION BID ITEMS				***$6,420,225***

OTHER COSTS

Design (10%)	***$642,023***
Construction Management (10%)	***$642,023***
Land Acquisition ($3 per SF)	***$303,000***

TOTAL PROJECT COST ***$8,007,270***

Escalation to 2023 (5%)	$8,407,633.50
Escalation to 2024 (5%)	$8,828,015.18
Escalation to 2025 (5%)	$9,269,415.93
Escalation to 2026 (5%)	$9,732,886.73

Note: Cost estimate does not include parking lot improvements near airport terminal. Alternatives 1 and 3 would likely necessitate some enhanced parking at the terminal since existing parking lot is located to the south of the terminal.

Town of Erie Municipal Airport Connection
Alternative 2 (Existing Crossing)
Conceptual Estimate
July 14, 2022

ITEM	UNIT	QUANTITY	UNIT PRICE	COST
Roadway Items				
Clearing and Grubbing	LS	1	$10,000.00	$10,000
Aggregate Base Course (ABC)	CY	1,257	$65.00	$82,000
Curb & Gutter (Type 2-IIB)	LF	2,020	$48.00	$97,000
Hot Mix Asphalt (HMA)	TON	1,686	$115.00	$194,000
Concrete Sidewalk	SY	1,071	$80.00	$86,000
Subtotal (Roadway):				**$469,000**
Major Items				
Embankment	LS	1	3.00%	$14,070
Erosion Control	LS	1	2.00%	$9,380
Removals, Resets, Adjustments	LS	1	2.00%	$9,380
Drainage Items	LS	1	5.00%	$23,450
Signing & Striping	LS	1	3.00%	$14,070
Construction Traffic Control	LS	1	4.00%	$18,760
Seeding	LS	1	2.00%	$9,380
Landscaping	LS	1	2.00%	$9,380
Mobilization	LS	1	7.00%	$32,830
Lighting	LS	1	2.00%	$9,380
Utilities	LS	1	5.00%	$23,450
Subtotal (Major Items):				**$173,530**
Subtotal Before Contingencies:				$642,530
Contingencies:			25%	$160,633
TOTAL COST OF CONSTRUCTION BID ITEMS				***$803,163***

OTHER COSTS

Design (10%)	***$80,316***
Construction Management (10%)	***$80,316***
Land Acquisition ($3 per SF)	***$210,000***

TOTAL PROJECT COST ***$1,173,795***

Escalation to 2023 (5%)	$1,232,484.75
Escalation to 2024 (5%)	$1,294,108.99
Escalation to 2025 (5%)	$1,358,814.44
Escalation to 2026 (5%)	$1,426,755.16

Note: Cost estimate does not include parking lot improvements near airport terminal. Alternatives 1 and 3 would likely necessitate some enhanced parking at the terminal since existing parking lot is located to the south of the terminal.

Town of Erie Municipal Airport Connection
Alternative 3 (North of Culdesac)
Conceptual Estimate
July 14, 2022

ITEM	UNIT	QUANTITY	UNIT PRICE	COST
Roadway Items				
Clearing and Grubbing	LS	1	$15,000.00	$15,000
Aggregate Base Course (ABC)	CY	1,633	$65.00	$106,000
Curb & Gutter (Type 2-IIB)	LF	2,760	$48.00	$132,000
Hot Mix Asphalt (HMA)	TON	2,190	$115.00	$252,000
Concrete Sidewalk	SY	1,734	$80.00	$139,000
Structure Items				
New Bridge Structure	LS	1	$1,670,000.00	$1,670,000
Subtotal (Roadway & Structure):				**$2,314,000**
Major Items				
Embankment	LS	1	3.00%	$69,420
Erosion Control	LS	1	2.00%	$46,280
Removals, Resets, Adjustments	LS	1	2.00%	$46,280
Drainage Items	LS	1	5.00%	$115,700
Signing & Striping	LS	1	3.00%	$69,420
Construction Traffic Control	LS	1	4.00%	$92,560
Seeding & Channel Restoration	LS	1	5.00%	$115,700
Landscape & Bridge Aesthetics	LS	1	6.00%	$138,840
Mobilization	LS	1	7.00%	$161,980
Lighting	LS	1	2.00%	$46,280
Utilities	LS	1	5.00%	$115,700
Subtotal (Major Items):				**$1,018,160**
Subtotal Before Contingencies:				$3,332,160
Contingencies:			25%	$833,040
TOTAL COST OF CONSTRUCTION BID ITEMS				***$4,165,200***

OTHER COSTS

Design (10%)	***$416,520***
Construction Management (10%)	***$416,520***
Land Acquisition ($3 per SF)	***$195,000***

TOTAL PROJECT COST ***$5,193,240***

Escalation to 2023 (5%)	$5,452,902.00
Escalation to 2024 (5%)	$5,725,547.10
Escalation to 2025 (5%)	$6,011,824.46
Escalation to 2026 (5%)	$6,312,415.68

Note: Cost estimate does not include parking lot improvements near airport terminal. Alternatives 1 and 3 would likely necessitate some enhanced parking at the terminal since existing parking lot is located to the south of the terminal.

APPENDIX C – ERIE GATEWAY SOUTH ANNEXATION NO. 9 EXHIBIT A

ERIE GATEWAY SOUTH ANNEXATION NO. 9
EXHIBIT A

LEGEND

- EXISTING DRAINAGEWAY
- PROPOSED DRAINAGEWAY
- EXISTING WATERLINE
- PROPOSED WATERLINE
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- ANNEXATION NO. 9 LIMITS
- TOWN OF ERIE LIMITS

N

250 0 125 250 500

SCALE: 1"= 250 ' HORIZ.

EXISTING 12" WATERLINE

COMPASS FILING NO. 1
RN: 0347760

POTENTIAL CONNECTION TO COMPASS. 12" WATERLINE

ARAPAHOE ROAD

COUNTY LINE ROAD

EXISTING 15" SEWER MAIN

EXISTING 12" SEWER MAIN

CONNECTION TO EXISTING 15" SEWER MAIN AT MH SSMH-7

7N LLC
NO LOCAL ADDRESS
ERIE, CO

7N LLC
2405 COUNTY ROAD 1 WELD
ERIE, CO

POTENTIAL 12" SEWER OUTFALL

POTENTIAL REGIONAL EURV POND

TOWN OF ERIE

POTENTIAL CONNECTION TO EXISTING 12" WATERLINE

DONLEY, JERRY D
12300 ARAPAHOE RD
ERIE, CO
146536000004

DONLEY, JERRY D
12420 ARAPAHOE ROAD
ERIE, CO
146536000003

LEIKER, DAVID M
12500 ARAPAHOE ROAD
BOULDER COUNTY, CO
146536000002

ZAHN, JOHN H TRUST ET AL
NO LOCAL ADDRESS
ERIE, CO
146536100002

FLOWLINE "ARAPAHOE ROAD" DRAINAGE BASIN

ARAPAHOE 119 OPEN SPACE
COUNTY OF BOULDER
NO LOCAL ADDRESS
146536000013

SPIERS, JOHN & ROSCI
12928 ARAPAHOE ROAD
BOULDER COUNTY, CO
146536000005

OED 2, LLC
12618 ARAPAHOE RD
BOULDER COUNTY, CO
146536000006

OED 2, LLC
12428 ARAPAHOE RD
BOULDER COUNTY, CO
146536000008

CONTINUATION OF "ARAPAHOE ROAD" DRAINAGE BASIN

PROPOSED COAL CREEK BLVD.

KANO, DIANA, JANET, & RICHARD
12400 ARAPAHOE RD
BOULDER COUNTY, CO
146536000012

POWELL, LAUREL & DANA
12512 ARAPAHOE RD
BOULDER COUNTY, CO
146536000011

JMJC ELEVEN, LLC
1401 E COUNTY LINE RD
ERIE, CO
146536002001

TRACT A, BLOCK 1
MUHA SUBDIVISION
RN: 0035194

JOSEPHINE ROCHE OPEN SPACE
COUNTY OF BOULDER

119TH STREET

OED 2 LLC
1080 N 119TH ST
BOULDER COUNTY, CO
146536000250

OED, LLC
NO LOCAL ADRESS
ERIE, CO
146536004002

UTILITY CONNECTION TO PARKDALE FILING 1, 8" WATERLINE AND 8" SANITARY SEWER

SCHICHTEL, BART
12514 ARAPAHOE RD
BOULDER COUNTY, CO
146536000010

OED, LLC
903 E COUNTY LINE ROAD
ERIE, CO
146536000009

JMJC ELEVEN, LLC
1401 E COUNTY LINE RD
ERIE, CO
146536002001

LOT 1, BLOCK 1
MUHA SUBDIVISION
RN: 0035194

CONTINUATION OF OSP "DRAINAGE 1" DRAINAGE BASIN

UTILITY CONNECTION TO PARKDALE FILING 1, 8" WATERLINE AND 8" SANITARY SEWER

UTILITY CONNECTION TO PARKDALE FILING 1, 12" WATERLINE

UTILITY CONNECTION TO PARKDALE FILING 1, 8" WATERLINE AND 8" SANITARY SEWER

OED, LLC
1100 N 119TH ST
ERIE, CO
146536000044

OED, LLC
1022 N 119TH ST
ERIE, CO
146536000257

COAL CREEK BLVD

OED, LLC
NO LOCAL ADDRESS
ERIE, CO
146536000258

OED, LLC
903 E COUNTY LINE ROAD
ERIE, CO
146536000259

TINA AND STEVE ZAKARAY
1130 N. 119TH ST.
BOULDER COUNTY

CITY OF LAFAYETTE
591 N. 119TH ST.
LAFAYETTE, CO

TERENCE R. BUSS
1010 N. 119TH ST.
BOULDER COUNTY
146536000017

NEIL S. BRESLER
1080 N. 119TH ST.
BOULDER COUNTY
146536000016

DATE: 04.16.2021

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

J:\2063.181#\SURVEY\ANNEXATION\ALL PROPERTIES\EXHIBIT A\181#-ANNEXATION-IMPACT-REPORT-EXHIBIT-A.DWG