

August 2020



Whitney Road Corridor Plan



AVI, PC
ENGINEERING, PLANNING, SURVEYING
1103 OLD TOWN LANE SUITE 101, CHEYENNE, WY 82009
WWW.AVIPC.COM



DISCLAIMER NOTICES:

AVI Professional Corporation (AVI) in conjunction with Metropolitan Planning Organization (MPO) have created these electronic report files for the Metropolitan Planning Organization (MPO). The files were developed by AVI and the MPO to support planning level efforts for the Whitney Road Corridor Study. Additional data, calibration, and validation may be required prior to use for design purposes.

AVI is providing, by agreement with certain parties, materials stored electronically. The parties recognize that data, plans, specifications, reports, documents, or other information recorded on or transmitted as electronic media (including but not necessarily limited to "CAD documents") are subject to undetectable alteration, either intentional or unintentional, due to, among other causes, transmission, conversion, media degradation, software error, or human alteration. Accordingly, all such documents are provided to the parties for informational purposes only and not as a final product or as a record document. Any reliance thereon is deemed to be unreasonable and unenforceable.

U.S. Department of Transportation

Federal Highway Administration

The preparation of this report has been financed in part through grant[s] from the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

This report was funded in part through grant[s] from the Federal Highway Administration [and Federal Transit Administration], U.S. Department of Transportation. The views and opinions of the authors [or agency] expressed herein do not necessarily state or reflect those of the U. S. Department of Transportation.

Remainder of Page Intentionally Left Blank



Whitney Road Corridor Plan

Table of Contents

August 2020

Acknowledgements.....	1
Lead Agencies.....	1
Consultant Team.....	2
Work Cited	3
1.0 Introduction	5
2.0 Glimpse	8
History and Platting.....	8
Existing Corridor and Boundary Conditions.....	14
Historical Review.....	16
Utilities	16
Drainage.....	21
Bicycle Transportation	21
Transit	22
Environmental.....	22
Current Traffic Conditions	22
Existing Land Use and Zoning	25
3.0 Collaboration	26
Steering Committee.....	26
Public Open House	28
One-on-one Meetings.....	33
Planning Commission	53
Cheyenne Metropolitan Planning Organization (Committee Meetings).....	53
Jurisdictional Meetings.....	53
Reference.....	53
4.0 Profile	54
Foundation 1: Future Land Use Plan.....	54
Foundation 2: Key-Planning Considerations.....	54
Foundation 3: Potential Funding Mechanisms.....	55



Whitney Road Corridor Plan

Table of Contents

August 2020

Foundation 4: Environmental Constraints.....	58
Resource Areas Requiring Potential Further Review	65
5.0 Design.....	66
Roadway Concept Alternatives.....	66
Design Guide Criteria	67
Future Traffic Volume Conditions	68
Cross Sectional Elements	68
North Alignment Alternatives.....	79
North Alignment Alternative Analysis	86
Selection of Recommended North Whitney Alignment Alternative	88
Conceptual Intersection Options and Recommended Alternatives	89
Conceptual Options and Recommended Alternative	92
Alternative Analysis.....	98
Intersection Capacity	99
Right-of-way Requirements	101
Costs.....	102
Safety.....	102
Driver Familiarity, Public Opinion, Involvement, and Impact.....	103
Environmental.....	104
Summary of Findings	104
Proposed Corridor Right-of-way Requirements.....	106
Post Development Drainage	110
Special Features.....	112
Engineer’s Opinion of Probable Costs and Funding Options.....	113
Implementation Program	114
Action Plan Summary.....	115



Figure's	page #'s
Figure 1.1 Corridor Study Area and Vicinity Map.....	6
Figure 2.1 Foster Tracts Subdivision 2nd Filing Plat with a 66' Right-of-way width	11
Figure 2.2 Greenmeadow Estates Subdivision 40' West Right-of-way	11
Figure 2.3 Final Plat Meadowlark Estates 40' Right-of-way East of West Section Line 24	12
Figure 2.4 Saddle Ridge Subdivision	12
Figure 2.5 Jolly Rogers Subdivision	13
Figure 2.6 US 30 Business Plaza	13
Figure 2.7 Whitney Road north of US 30.....	14
Figure 2.8 Whitney Road at US 30	14
Figure 2.9 Whitney Road (Dell Range Blvd. to Storey Blvd. / Beckle Road)	15
Figure 2.10 Water and Sewer Main Summary	18
Figure 2.11 Water Service Area and Existing Distribution Lines (BOPU)	19
Figure 2.12 Sewer Service Boundary, Existing Collection System (BOPU)	19
Figure 2.13 Planned Bike and Trail Network	21
Figure 2.14 Existing Transit Routes	22
Figure 2.15 Existing Traffic Conditions 2017	23
Figure 2.16 2015 Zoning Map.....	25
Figure 3.1 Who Attended Public Meetings?.....	28
Figure 3.2 What were Considered Important Transportation Design Elements?	30
Figure 3.3 What one Change would you make?	31
Figure 3.4 Existing and Proposed Profile Concept Whitney Road	35
Figure 3.5 Restway Travel Park Alternative 2	47
Figure 3.6 Restway RV Travel Park Concept 4	49
Figure 3.7 Restway Travel Park Concept 5	50
Figure 3.8 Whitney Road at U.S. 30 (Looking South)	51
Figure 4.1 Future Land Use Plan Detail	56
Figure 4.2 Future Land Use Plan Cheyenne Urban Area.....	57



Whitney Road Corridor Plan

Table of Contents

August 2020

Figure 4.3 Potential Wetlands Whitney Road	58
Figure 5.1 Recommended Typical Sections Whitney Road (Looking North)	75
Figure 5.2 Today and 2040 Projected Volumes (ADT)	76
Figure 5.3 2040 Projected Peak Hour and ADT Overall Volumes	77
Figure 5.4 Alternative 2: Existing Alignment with Maximum Allowable Profile	81
Figure 5.5 Alternative 3: Existing Alignment with Accessible Profile	82
Figure 5.6 Alternative 4a: Alignment placement east of Whitney Gysel Barn Structure	83
Figure 5.7 Alternative 4b: Alignment placement west of Whitney Gysel Barn Structure	83
Figure 5.8 Alternative 5: Three-lane Roadway, Revised Alignment, Accessible Profile, and Impact to Plains All American Pipeline (PAAPL)	84
Figure 5.9 Alternative 6: Three-lane Roadway, Revised Alignment, Accessible Profile, No Impact to Plains All American Pipeline (PAAPL) or Whitney Gysel Barn Structure	85
Figure 5.10 Alternative 7: Three-lane Roadway, Revised Alignment East, Accessible Profile, No Impact Whitney Gysel Barn Structure	86
Figure 5.11 Direct Comparison of Highest Rated Whitney North Alignment Alternatives	88
Figure 5.12 Significant Observations Intersection of Whitney Road at U.S. 30	91
Figure 5.13 Signalize and Widen Intersection without Removing Skew	93
Figure 5.14 Realign Intersection/ Remove Skew	93
Figure 5.15 Recommended Intersection Alternative Whitney Road at U.S. 30	95
Figure 5.16 Significant Observations Intersection of Whitney Road at Dell Range Blvd.	96
Figure 5.17 2040 Peak Hour AM/ (PM) Volumes Whitney Road at Dell Range Blvd.	100
Figure 5.18 Stakeholder Evaluation: Single Lane Roundabout	103
Figure 5.19 Single Lane RAB Alternative	105
Figure 5.20 Standard Intersection Alternative	105
Figure 5.21 Parcel 1 Exhibit	108
Figure 5.22 Parcel 2 and 3 Exhibit	108
Figure 5.23 Parcel 4 Exhibit	109
Figure 5.24 Parcel 5,6, and 7 Exhibit	109
Figure 5.25 Drainage Basin Overview	110
Figure 5.26 Conceptual Drainage Plan	111
Figure 5.27 Porous and Solid Snow Fence Drift Comparisons	112



Table's	page #' s
---------	-----------

Table 2.1 Platted Roadway Right of Widths	10
Table 2.2 2014 - 2017 Crash Summary for Key Intersections	24
Table 4.1 Environmental Review Corridor Checklist	59
Table 5.1 Jurisdictional Cross Section Elements Comparisons	69
Table 5.2 Jurisdictional Left and Right Turn Warrant Criteria	72
Table 5.3 Jurisdictional Requirements for Deceleration and Tapers for Auxiliary Lanes	73
Table 5.4 Intersection Storage Lengths	74
Table 5.5 Alignment Analysis Criteria and Questions	87
Table 5.6 North Alignment Alternatives Analysis	87
Table 5.7 Intersection Alternative Evaluation Criteria	90
Table 5.8 Alternative Analysis Whitney at U.S. 30	94
Table 5.9 Kimley-Horn 2040 Traffic Level of Service (LOS) and Delay	99
Table 5.10 STS 2040 Level of Service (LOS) and Delay	100
Table 5.11 Alternatives Analysis Whitney Road at Dell Range Blvd.	105
Table 5.12 Summary of Right-of-way Requirements	107
Table 5.13 Cost Estimates 2020	113
Table 5.14 Short Term Action Plan Summary	115
Table 5.15 Long Term Action Plan Summary	116

Appendices

- Appendix A Improvement Plans
- Appendix B Public Meetings
- Appendix C Presentations
- Appendix D Cost Estimates
- Appendix E Traffic Analysis
- Appendix F Environmental
- Appendix G Additional Information



Whitney Road Corridor Plan

Acknowledgements

August 2020

ACKNOWLEDGEMENTS

Lead Agencies



**Cheyenne Metropolitan
Planning Organization**

615 West 20th Street
Cheyenne, WY 82001



**Laramie County Planning & Development Office
Laramie County**

3966 Archer Parkway
Cheyenne, WY 82009



City of Cheyenne

2101 O'Neil Avenue
Cheyenne, WY 82001



Wyoming Department of Transportation

District Number One
Project Development
Resident Engineers Office



Whitney Road Corridor Plan

Acknowledgements

August 2020

Consultant Team



AVI Professional Corporation (AVI)

1103 Old Town Lane, Suite 101, Cheyenne, WY
Thomas D. Cobb, PE, Project Manager
Scott Cowley, PE, Principal
Sherry Prieskorn, Office Administrator



Sustainable Traffic Solutions, Inc (STS)

823 West 124th Drive, Westminster, CO
Joe Henderson, PE

Numerous agencies, local associations and individuals devoted their time to the development of this document, including but not limited to:

Cheyenne Metropolitan Planning Organization

Policy Committee
Technical Advisory Committee
Citizens Advisory Committee
Whitney Road Steering Committee

Laramie County

County Commissioners
Planning Commission
Laramie County Planning and Development Office
Public Works

City of Cheyenne

City Council
Planning Commission

Community

Interested Stakeholders
Property Owners
Area Residents





Work Cited

- Transportation Research Board/Assoicates C. (2014). *Plan Cheyenne Transportation Plan: Laramie County Version*. Cheyenne, Wyoming: Cheyenne Metropolitan Planning Organization and Laramie County.
- Board, T. R. (2010). *Highway Capacity Manual*. National Research Council.
- Board, T. R. (2014). *NCHRP Report 780 Design Guidance for Intersection Auxiliary Lanes*. Washington, D.C.: National Academy of Sciences.
- CH2M Hill. (November 1988). *Drainage Master Plan Allison Creek*. Cheyenne, WY: City of Cheyenne.
- City of Cheyenne, C. o. (2013). *City of Cheyenne Unified Development Code*. Cheyenne: City of Cheyenne.
- Laramie County, L. (2011). *Laramie County Land Use Regulations*. Cheyenne, WY: Laramie County, Wyoming.
- Greenwood Mapping, I. (2015, June 15th). *Cheyenne/Laramie County GIS Cooperative (CLCGISC)*. Retrieved June 15th, 2015, from Laramie County Cooperative GIS Database Search / Interactive Mapping Site: <http://arcims.laramiecounty.com/mapserver/map>
- Group, A. P. (2012). *Cheyenne On-Street Bicycle Plan and Greenway Plan Update*. Cheyenne: City of Cheyenne, WY and Cheyenne Metropolitan Planning Organization.
- NACTO. (2013). *Urban Street Design Guide*. New York, NY: National Association of City Transportation Officials.
- AASHTO Office, W. S. (2016, April). *National Register of Historic Places Database*. Retrieved April 16th, 2016, from State Historic Preservation Office: <http://wyoshpo.state.wy.us/NationalRegister/Search.aspx>
- AASHTO Officials, A. A. (2011). *A Policy on Geometric Design of Highways and Streets*. Washington, DC: American Association of State Highway and Transportation Officials.
- AASHTO Officials, A. A. (2011). *Roadside Design Guide*. Washington, DC: American Association of State Highway and Transportation Officials.
- AASHTO Officials, N. A. (2014). *Urban Bikeway Design Guide, Second Edition*. New York NY : National Association of City Transportation Officials.
- Program, W. T. (2012). *Pavement Marking Manual*. Cheyenne, WY: State of Wyoming Department of Transportation.



Whitney Road Corridor Plan

Acknowledgements

August 2020

Summit Engineering, L. (2014). *South Cheyenne Water and Sewer District 2014 Water and Sewer Master Plan Update*. Cheyenne, Wyoming: South Cheyenne Water and Sewer District.

Tabler, R. (1994). *SHRP-H-391 Design Guidelines for the Control of Blowing and Drifting Snow*. Washington, D.C.: National Research Council Strategic Highway Research Program .

Kimberly-Horn-Whitney Ranch Traffic Study

US30 Corridor Study -Kimley Horn

Remainder of Page Intentionally Left Blank



1.0 INTRODUCTION

Various areas in East Cheyenne and Laramie County have begun to develop and redevelop in the last several years. Until the previous decline in energy related oil, gas, and mineral extraction, the area has seen a steady growth in the job market as a result of a number of new industrial companies, age related baby boomer market businesses including health care providers, long-term care, and health care support businesses. This growth has increased the demand for additional housing in area. Consequently, fringe City and County residential developments like Saddle Ridge Subdivision have begun to advance in un-platted and open parcels available within and surrounding the City of Cheyenne. Saddle Ridge Subdivision entailed a 209 acre residential housing development and has steadily reached build-out. The subdivision has recently been expanded to a twelfth filing to the east and other housing and mixed use developments have now been prompted to develop within Laramie County including Whitney Ranch.

The estimated population for the City of Cheyenne in 2020, 2030, and 2040 is projected to increase from 65,891 to 71,848 to 75,621 residents according to the Department of Administration and Information Economic Analysis Division. This corresponds to approximately +9.0% over the next 10 years and +14.8% over a 20 year period. As the community continues to experience growth, the existing transportation system will not be sufficient to accommodate all the expansion.

A number of important transportation connections in the eastern Cheyenne roadway network, north of I-80 and south of Iron Mountain Road, have not been completed or planned. The need for an east west connector other than Dell Range Blvd. and Pershing between Whitney Road and College Drive has been evident for quite some time as potential rural residential developments adjacent to the area have begun to emerge.

The boundaries of the Whitney Road Corridor Study are U.S. 30 to the south and Beckle Road/ Storey Blvd. to the north. The boundary is illustrated in Figure 1.1 Corridor Study Area and Vicinity Map.

Remainder of Page Intentionally Left Blank



Whitney Road Corridor Plan

Introduction

August 2020

The project was reviewed with oversight by a steering committee comprised of the following agencies or representative organizations:

- The Cheyenne Metropolitan Planning Organization.
- Laramie County Public Works.
- Cheyenne Urban Planning.
- City Engineering.
- Black Hills Energy.
- High West Energy.
- City of Cheyenne Board of Public Utilities.
- WYDOT District #1.
- WYDOT Traffic.

The primary objective of the plan is to create a comprehensive plan which strives to optimize safety, growth, and fiscal responsibility. After discussion with the members of the Steering Committee, the goal of the project was to create a 10% design corridor plan for the future development of Whitney Road that met the following criteria:

- Understand the community and neighborhood vision for the roadway.
- Improve roadway and intersection safety and function.
- Address drainage and snow drifting.

Remainder of Page Intentionally Left Blank



2.0 GLIMPSE

The Glimpse section of the plan provides a summary of the review of the known existing information related to the roadway, right-of-way, and planning area.

History and Platting

Prior to platting, the roadway was likely used by local ranchers, property owners, and businesses as a shared access road. Based on the Cheyenne – Laramie County Cooperative GIS Database Search/ Interactive Mapping Site [1], the first recorded plat of Whitney Road was the Foster Tracts Subdivision recorded on September 29, 1952.

U.S. 30 to Dell Range (Middle Section)

The Foster Tracts, 2nd Filing dedicated 33' of Whitney Road right-of-way on the east side of Section 24 from U.S. 30 to the north approximately 1,348.2' or what is now Dell Range Blvd. A total of 66' of right-of-way was illustrated on the plat (Figure 2.1 Foster Tracts Subdivision 2nd Filing Plat with a 66' Right-of-way width).

It appears that an additional 7' of right-of-way was dedicated for a total of 40' based on survey monuments located in the field. Other platting continued to the west of the corridor with the Final Plat of Greenmeadow Estates recorded in June 2019 (Figure 2.2 Greenmeadow Estates Subdivision 40' West Right-of-way). This plat dedicated a right-of-way width of 40' west of the east line of Section 26, Township 14 N, Range 66 West from Dell Range Blvd. to the south for 949.30'. The remainder of the west right-of-way line of Whitney Road from U.S. 30 to Greenmeadow Estates is defined by un-platted 5.0 acre mobile home park boundary and the Jolly Roger Subdivision. The Jolly Ranch Subdivision dedicated approximately 40' of right-of-way and an additional 10' Road Reservation from the east line of Section 26, T 14 N, R 66 W. The plat was recorded on May 10, 1994 (Figure 2.5 Jolly Rogers Subdivision).

Dell Range to Beckle Road/ Storey Blvd. (North Section)

The north portion of the corridor (i.e. north of Dell Range Blvd.) was first platted with the Meadowlark Estates plat recorded on November 19, 1997 (Figure 2.3 Final Plat Meadowlark Estates 40' Right-of-way East of West Section Line 24). The plat dedicated 40' of right-of-way from the west line of Section 24 to the east. The west right-of-way is defined by deed on an un-platted parcel owned by Gysel Whitney, LLC. Development based on a boundary survey conducted by AVI. This area is under development planning and future right-of-way needs should be addressed during the development agreement process.

Remainder of Page Intentionally Left Blank



U.S. 30 to Country Side Avenue (South Section)

The south right-of-way for the section of Whitney Road was dedicated by two plats. The first was the Saddle Ridge Subdivision recorded June 27, 2007 (Figure 2.4 Saddle Ridge Subdivision). The Saddle Ridge Subdivision dedicated a total of 50' of right-of-way from the west line of Section 25 to the east. The east right of right-of-way was confirmed by the US 30 Business Plaza recorded February 9, 2016 to be 40' east of the West Section 25 (Figure 2.6 US 30 Business Plaza).

Dell Range Blvd.

The Dell Range Blvd. right-of-way northeast of Whitney Road is defined on the north by the Meadowlark Estates Subdivision plat which dedicated 60' to the north of the south line of Section 24, T 14 N, R 66 W. The right-of-way southeast of Whitney Road is defined by the Foster Tracts, 2nd Filing where 33' south of the north line of Section 25 was dedicated for right-of-way. The southwest right-of-way at Dell Range Blvd. at Whitney Road is Greenmeadow Estates plat which dedicated 50' of right-of-way south of the north line of Section 26, T 14 N, R 66 W while the northwest right-of-way was established by legal/ deed on an un-platted parcel owned by Gysel Whitney, LLC. Based on the boundary work completed by AVI, it appears that 40' of right-of-way exists north of south line of Section 23.

Table 2.1 Platted Roadway Right of Widths summarizes the information known at this time related to the right-of-way widths of the corridor and intersecting cross streets. Please see Appendix G for recorded plats and road reservation documentation.

Remainder of Page Intentionally Left Blank



Whitney Road Corridor Plan

Glimpse

August 2020

Table 2.1 Platted Roadway Right of Widths

Roadway Section	Platted Width [1]	Notes
Whitney Road:		
Beckel Road/ Storey to Dell Range Blvd.	80'	40' East, 40' West (AVI Boundary of Whitney-Gysel Property)
Dell Range Blvd. to U.S. 30	73'	40' West, 33' East (Property corner indicates 80' by monument evidence)
U.S. 30 to Country Side Avenue	90'	50' East, 40' West
Dell Range Blvd.		
East of Whitney Road	93'	60' North, 33' South
West of Whitney Road	90'	50' South, 40' North (AVI Boundary of Whitney-Gysel Property)
Whitney Road Intersecting Roadways		
Beckle Road (East)	90'	40' North, 50' South
Storey Blvd (Beckle Road) (West)	50'	
Buttercup Drive	80'	
Chickadee Drive	80'	
Foxglove	80'	
Greenmeadow Drive	60'	
Hinsley Road	80'	
U.S. 30	300'	

Remainder of Page Intentionally Left Blank



Whitney Road Corridor Plan

Glimpse

August 2020

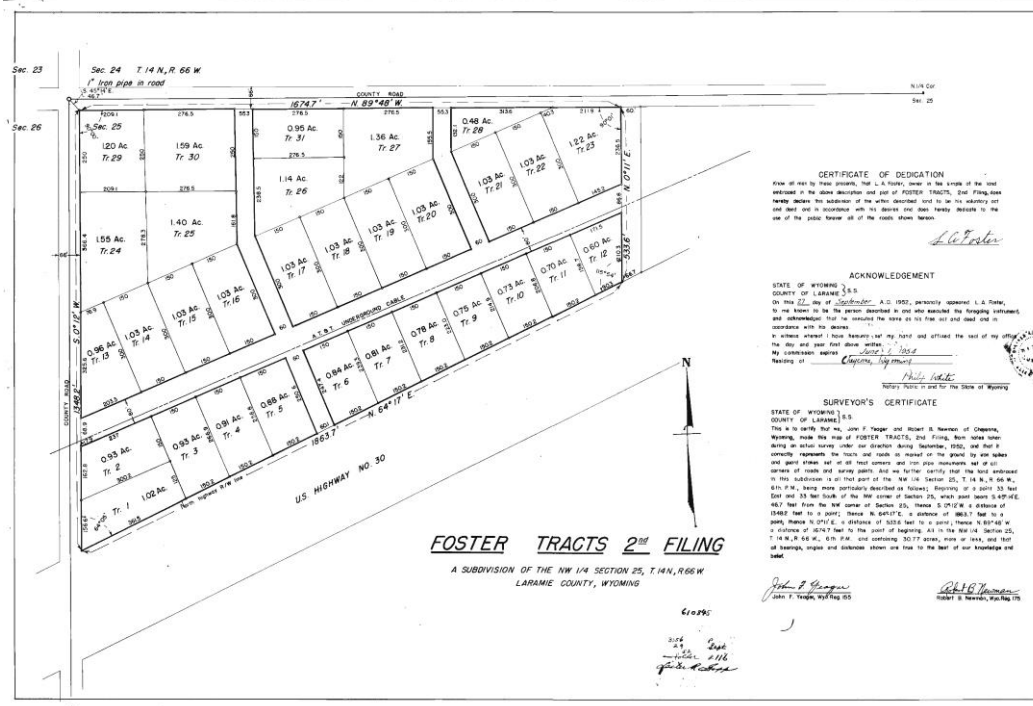


Figure 2.1 Foster Tracts Subdivision 2nd Filing Plat with a 66' Right-of-way width

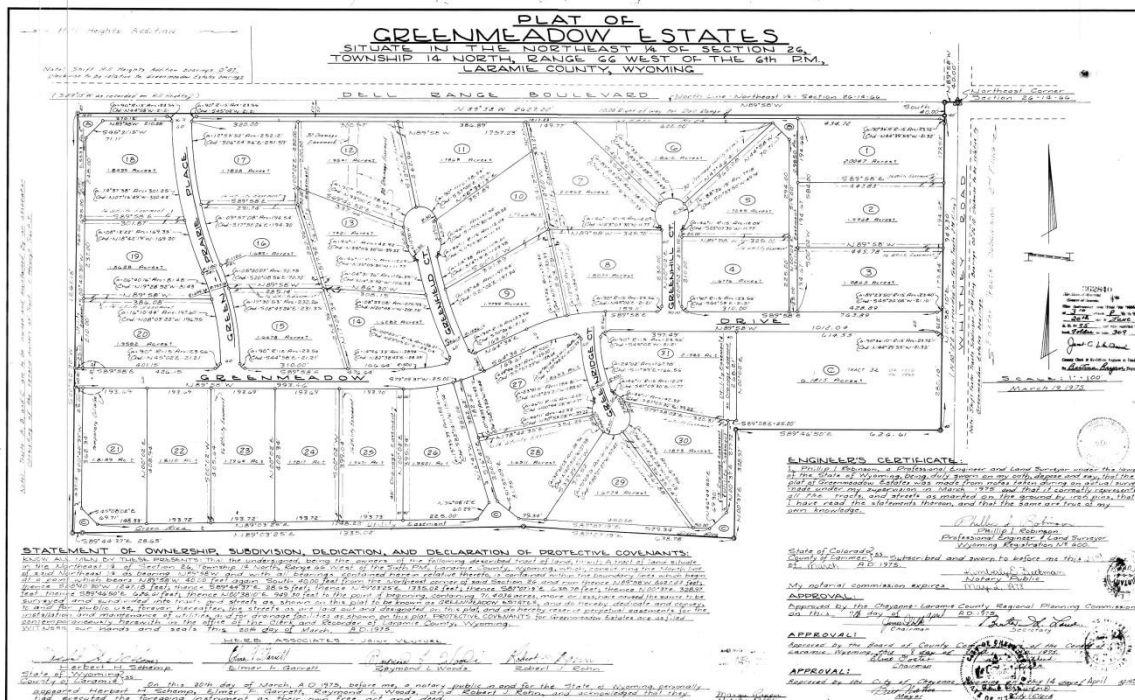


Figure 2.2 Greenmeadow Estates Subdivision 40' West Right-of-way



Whitney Road Corridor Plan

Glimpse

August 2020

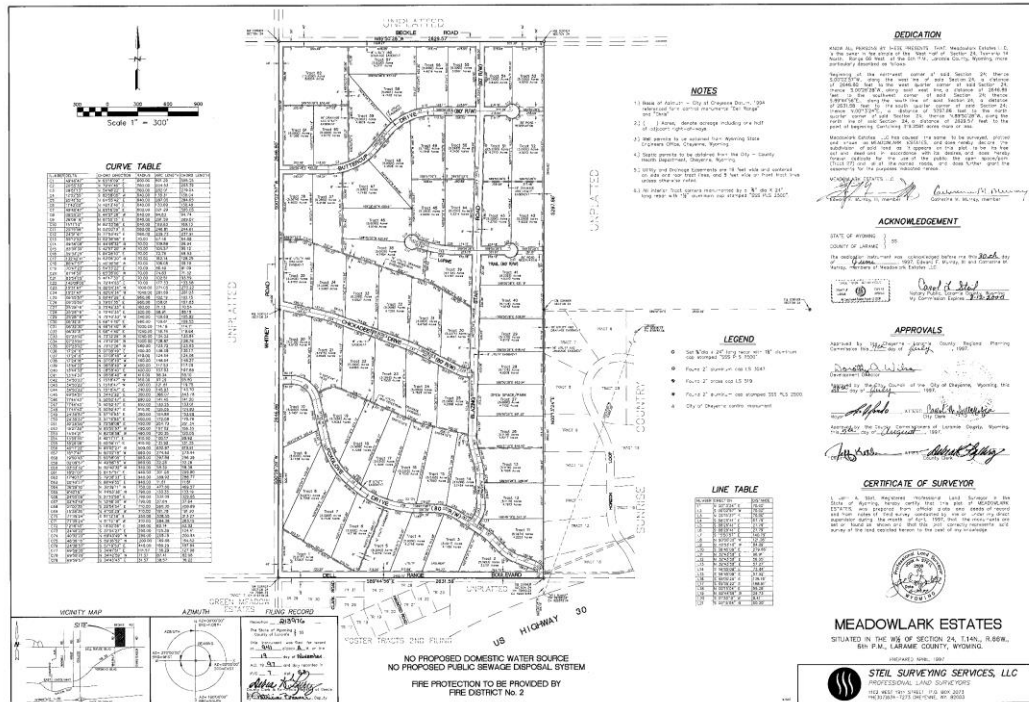


Figure 2.3 Final Plat Meadowlark Estates 40' Right-of-way East of West Section Line 24

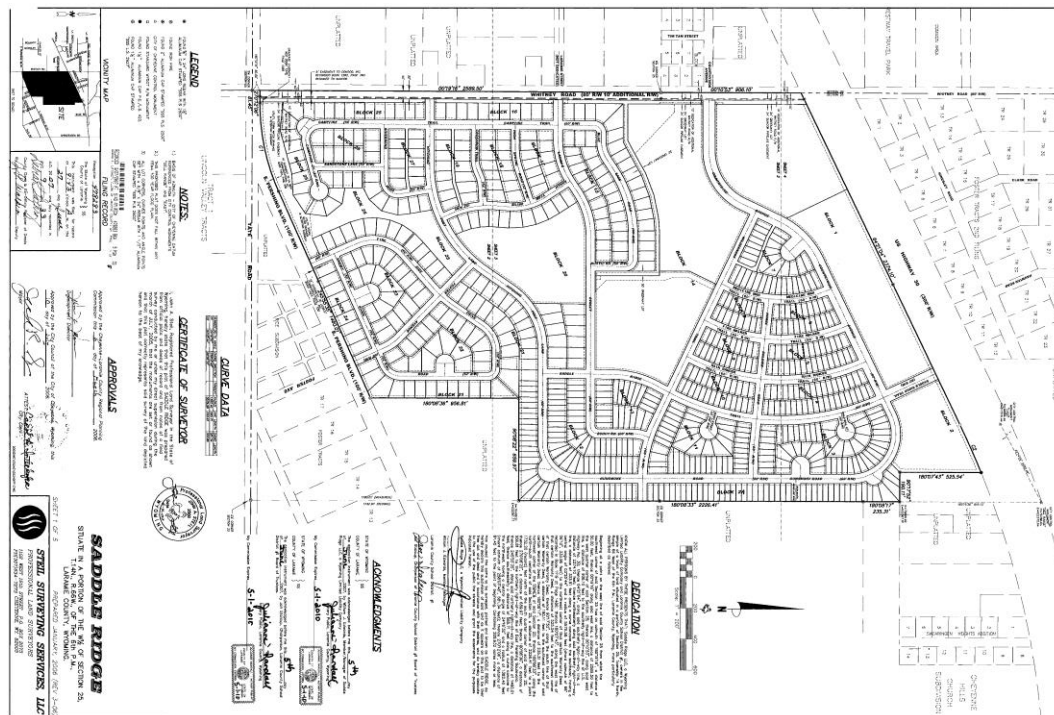


Figure 2.4 Saddle Ridge Subdivision



Whitney Road Corridor Plan

Glimpse

August 2020

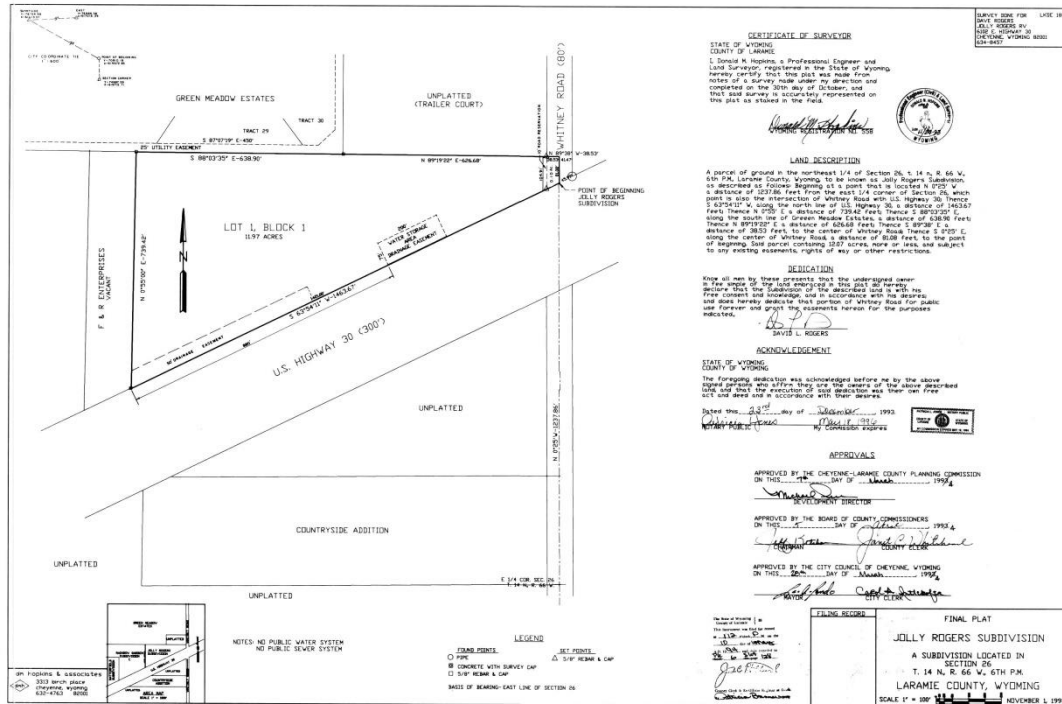


Figure 2.5 Jolly Rogers Subdivision



Figure 2.6 US 30 Business Plaza



Existing Corridor and Boundary Conditions

Whitney Road runs north/south and connects large lot developments in the northeast area of Cheyenne with east/west arterials in the eastern side of the community. It is classified as a minor arterial from US 30 to Dell Range and a major collector from Dell Range northward. Whitney extends four miles north to Iron Mountain Road which then connects to Interstate 25 (I-25) approximately five point five (5.5) miles to the west. The major cross streets on the corridor are Dell Range Blvd. and U.S. Highway 30. Dell Range Blvd. is a principal arterial and contains the principal big box and strip mall, and mall shopping areas in Cheyenne. State highway U.S. 30 is also a principal arterial and connects to the downtown of Cheyenne where much of the state and city government offices, as well as, the regional hospital are located.

Traffic on the narrow, rural Whitney Road has been increasing due to the growth in eastern Cheyenne including the Saddle Ridge subdivision and the other county subdivisions north of Dell Range. In particular, the varying conditions are summarized below.

Whitney Road between US 30 and Dell Range Boulevard

As shown in Figure 2.7 and 2.8 this section of Whitney Road is a narrow county road with an approximate width of 20' to 22' without shoulders. The posted speed limit in this section of roadway is 30 mph. The boundary conditions contain rural residential, a mobile home park, travel park, undeveloped parcels, industrial, and commercial. The properties along this stretch are close to the road. The intersection with US 30 and Whitney is stop controlled and skewed with Whitney Road at an angle of sixty point three seven (60.37) degrees.



Figure 2.7 Whitney Road north of US 30
(Looking north)



Figure 2.8 Whitney Road at US 30
(Looking southwest)



Whitney Road between Dell Range Boulevard and Beckle Road/ Storey Blvd.

As shown in Figure 2.9 Whitney Road (Dell Range Blvd. to Storey Blvd. / Beckle Road) this section of Whitney Road is also a narrow county road with an approximate width of 20' to 22' without shoulders. The posted speed limit in this section of roadway is 40 mph from Dell Range Blvd to Foxglove Road and 45 mph north of Foxglove Road. The boundary conditions are rural residential to the east and north, and an undeveloped parcel to the west containing an old ranch house and supporting buildings. The intersection of Whitney at Dell Range is stop controlled. Additionally, this section of Whitney has recently been impacted by heavy semi-truck traffic due to oil and gas well drilling and production in area which prompted regulatory signage "No Truck Traffic" to be placed north of Dell Range Blvd. on Whitney. This section of Whitney Road contains, and elevation change of approximately 95 feet from Dell range with grades in excess ten (10) percent. This grade and elevation change creates unsafe sightlines as you near the top of the hill heading north and coming over the crest heading south. This grade becomes dangerous in inclement weather and icy conditions.



Whitney Road north of Chickadee Drive
(Looking north)



Whitney Road at Dell Range
(Looking north)

Figure 2.9 Whitney Road (Dell Range Blvd. to Storey Blvd. / Beckle Road)

Remainder of Page Intentionally Left Blank



Historical Review

The Whitney Road corridor plan area is not known to be a part of any historic districts at the present time. Additionally, the Wyoming State Historic Preservation Office (SHPO) website was reviewed for all the National Register listings in the area of the study and none were found.

Please note that if federal funds are used on any future projects or if a federal agency is part of the planning and implementation, a Section 106 Study will be required to determine potential impacts to any historic properties. Properties in the area of any construction impacts will be identified and evaluated based on the Secretary of Interior's Standards and Guidelines for identification. Several determinations can be made in the evaluation including the following:

- No historic properties affected.
- Historic property adversely affected.
- Historic property not adversely affected.

Utilities

Based on observed surface locates and desktop research the following utilities have been identified within the corridor area:

- Black Hills Energy: Overhead Electric, Underground Natural Gas Line.
- High West Energy: Overhead Electric.
- Century Link: Underground telephone; fiber optic.
- Suncor Energy: 12.75" Petroleum Pipeline (2' to 5' deep; east side of Whitney Road), Easement Bk #1282, page 780-783 South of U.S. 30.
- Plains All American Pipeline System, LLC: 16" Petroleum Pipeline (4'-3" to 14'-5" deep; west side of Whitney Road), Easement Bk #1976, p. 1815.
- City of Cheyenne Board of Public Utilities (BOPU).
 - Water Main
 - Sanitary Sewer Main

Whitney Utility Infrastructure

Further development of the corridor will require wet and dry utility infrastructure to be expanded and coordinated with the individual entities to support future development. Water and sewer utilities are not immediately available within the corridor area with the exception of a small section on the southwest corner of the corridor beginning at Whitney Road at U.S. Highway 30 and Saddle Ridge. Future water and sewer development of this area would likely be served by the BOPU as the SCWSD is not allowed to serve or expand outside their current boundary without City of Cheyenne and BOPU approval.

As with any new roadway project, prudent engineering and planning for underground utility infrastructure should be evaluated and incorporated into the roadway construction plans. This approach results in the least expensive method to get the utility infrastructure installed as the road



construction project will have the all of the soft project costs such as mobilization, traffic control, testing, surveying, bonds & insurance already included as well as the more expensive hard cost associated with roadway resurfacing. In additions, the inconvenience to the traveling motorist is considerable reduced as all work is completed under and during a single construction project.

There is an existing 12" water main located at the south end of Whitney road and a 15" existing sewer main available for extension. As these mains extend up Whitney to Del range intersection, the water line would connect to a proposed 12" water main planned to be extended east down Del range to Whitney Road. Both water and sewer mains need to extend past the Roundabout splitter island limits currently under design. This will minimize have new improvements removed to connect into these mains. Utility main stub outs should also be made into each County road side street for ease for future main extension. BOPU should be consulted to determine what the optimum main size should be based on their system modeling efforts and assumed development density for the contributing areas.

An area of contribution exhibit has been prepared see Figure 2.10 Water and Sewer Main Summary that indicates those county properties that would potentially connect to the Whitney water and sewer infrastructure over the next 20 years. Initial estimates are approximately 260 acres would benefit from the water main being extended and approximately 390 acres would contribute to the sanitary sewer main. At urban densities, this would serve around 1000 residential units. County parcel along Whitney road are prime for redevelopment as traffic counts are projected to increase. This combined with the installation and availability of utility infrastructure will allow the adjacent properties to transition into higher and better uses.

A cross section of Whitney road in Figure 2.10 Water and Sewer Main Summary depicts potential infrastructure location and spacing with the road section.

Remainder of Page Intentionally Left Blank



Whitney Road Corridor Plan

Glimpse

August 2020

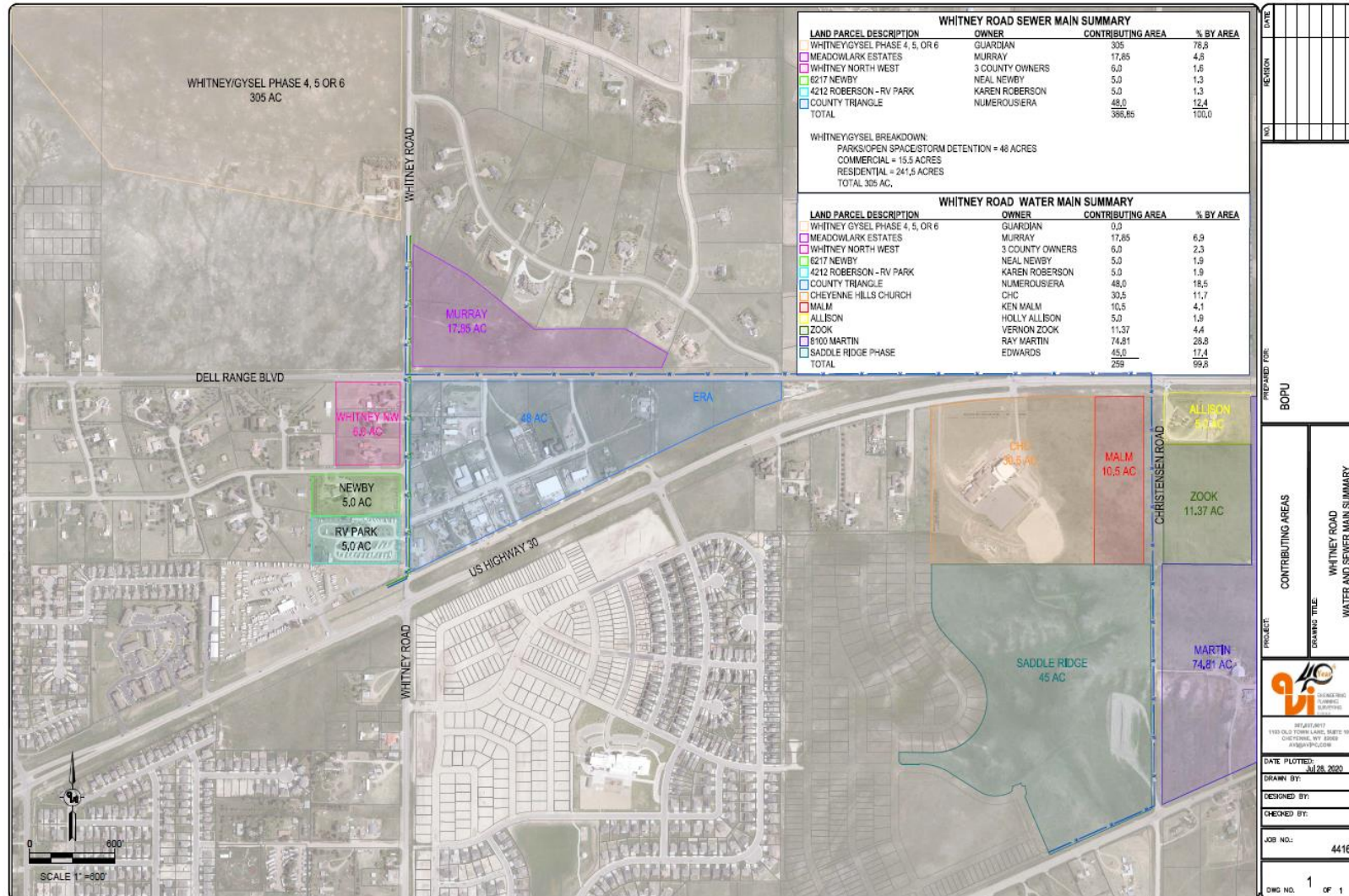


Figure 2.10 Water and Sewer Main Summary



Whitney Road Corridor Plan

Glimpse

August 2020

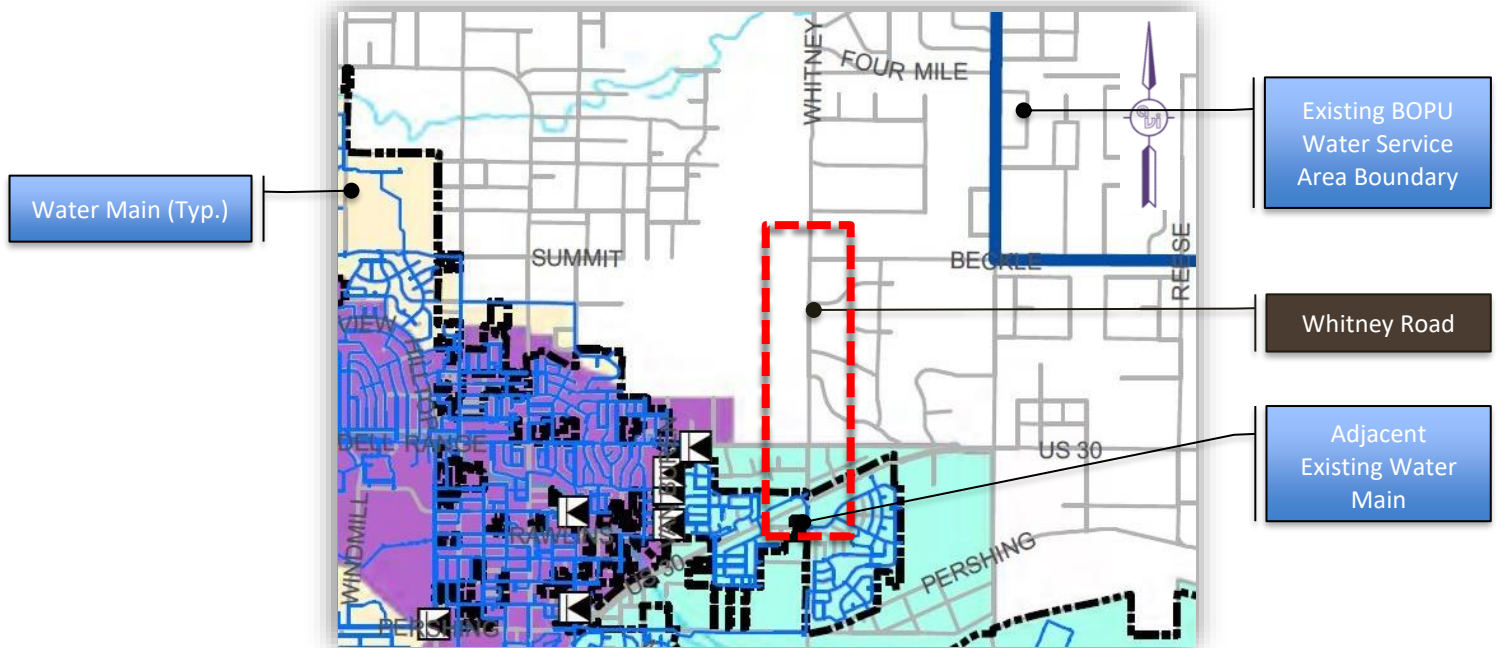


Figure 2.11 Water Service Area and Existing Distribution Lines (BOPU)

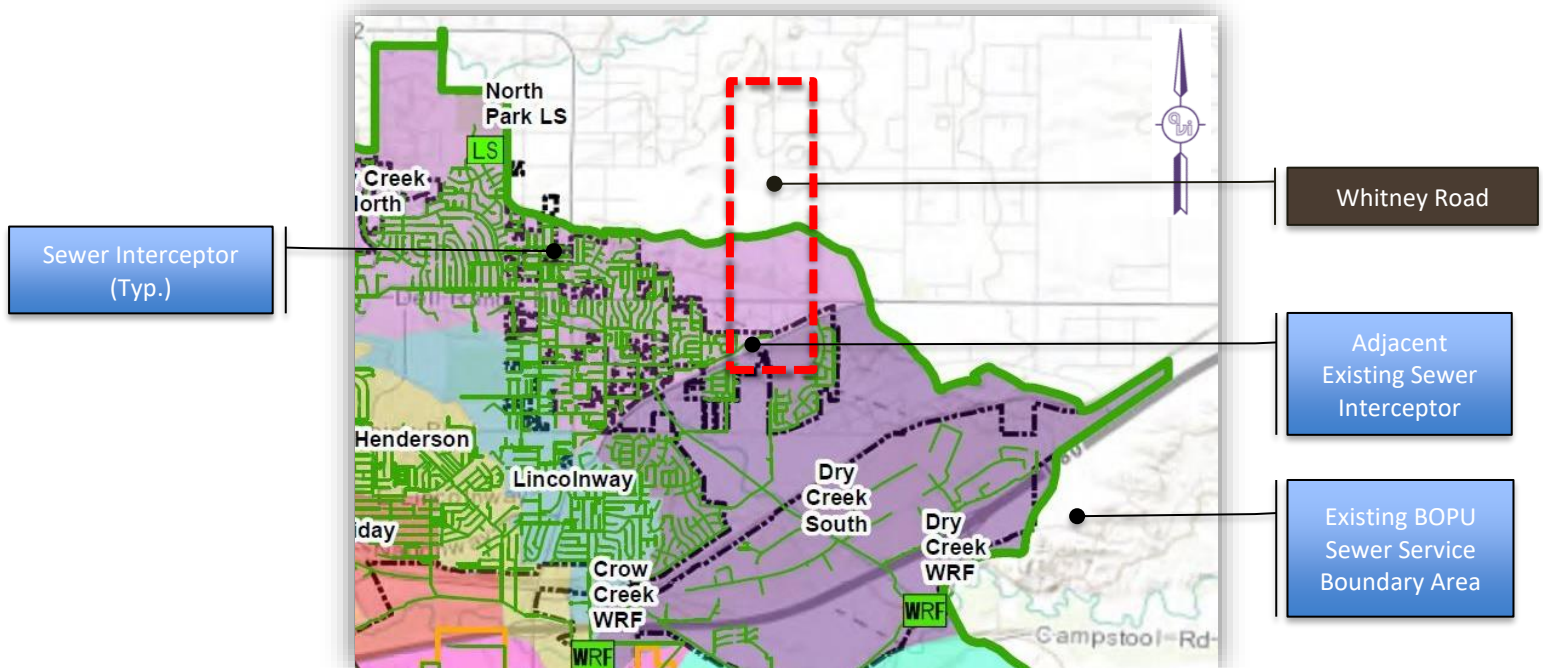


Figure 2.12 Sewer Service Boundary, Existing Collection System (BOPU)



Adjacent water and wastewater distribution and collection lines, as well as, service area boundaries are illustrated in the excerpt figures from the 2013 Cheyenne Water and Wastewater Master Plans by HDR for the City of Cheyenne Board of Public Utilities [2] and shown in Figure 2.11 Water Service Area and Existing Distribution Lines (BOPU) and Figure 2.12 Sewer Service Boundary, Existing Collection System (BOPU). The primary developments in the area appear to be served by onsite septic and groundwater well systems. This is based on a review of the e-permit Application and Water Rights Database by the Wyoming State Engineer's Office [3] which indicates four hundred twenty-one (421) water rights existing within T 14 N, R 66 W, Section 23, 24, 25, and 26 adjacent to the corridor area. As the corridor and area develops, property owners will have the ability to connect to future water and sewer mains within the area.

The utility companies that posed potential conflicts or crossings were notified of the planning project. Those were the Suncor Pipeline and Plains All American Pipeline which are on the east and west side of the existing roadway, respectively. These petroleum pipeline companies were specifically were asked about any special requirements required for possible crossings or boundary conditions of a future roadway in the area. Please see Collaboration Section 3.0 for additional information. Desktop and courthouse research at this level of corridor study did not reveal the easements for Suncor Pipeline North of U.S. 30 on Whitney Road. The Plains All American Pipeline has a standard Laramie County Easement within the right-way. See Appendix F for additional information. The contacts for these two specialized coordination efforts for the adjacent petroleum lines will be required of a future project and as noted below:

Contacts: Dillon R. Ohrt, SR/WA,
Right-of-way and Public Awareness Coordinator
Suncor Energy (U.S.A.) Pipeline Company
Cheyenne, WY 82001
307-549-8008
dorhrt@suncor.com

Steve Sullivan, ROW
307-472-9900
sdsullivan@paalp.com

Plains All American Pipeline
2500 E 5th St
Cheyenne, WY 82001
Corporate Headquarters
333 Clay Street, Suite 1600,
Houston, TX 77002
713-646-4100.



Drainage

None of the Whitney Road Corridor study area is within the Federal Emergency Management Agency (FEMA) regulated Dry Creek or Childs Draw Basin floodplains as shown on Flood Insurance Rate Map (FIRM), Panel 1111 of 1650, Map Number 56021C1111F, Effective January 17, 2007 (<https://msc.fema.gov/portal>).

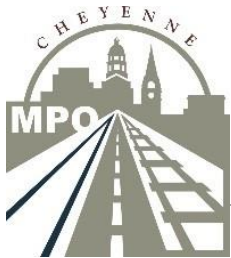
The corridor appears to be within Unshaded Zone X. The Unshaded Zone X is classified to be outside the 0.2% annual chance floodplain. Detailed hydraulic and hydrologic modeling efforts along with sound engineering judgment will be critical to overall success of the future final plan development.

Bicycle Transportation

Currently there are no bike lanes, multiuse paths, or formal trails within the corridor boundary. However, it should be noted that Whitney Road was designated for a "Shoulder Bikeway" and "Greenway" connection with Dell Range Blvd designated for a "Buffered Bike Lane" and US 30 for a "Greenway" in the *September 2012 Cheyenne On-street Bicycle Plan and Greenway Plan Update* [4]. See the existing and future proposed plan excerpt shown in Figure 2.13 Planned Bike and Trail Network.



Figure 2.13 Planned Bike and Trail Network



Transit

Based on existing corridor use and conditions no transit has been utilized to date. Based on a review of the long range direction of the transit system illustrated in the Cheyenne Transit Program Five-Year Transit Development Plan, it appears that no additional routes have been planned in this area. The nearest Cheyenne Transit Program (CTP) stop is at the intersection of Dell Range Blvd. at Ocean Loop approximately one point two (1.2) miles west of the corridor location. Future need for transit will depend on the development of the corridor, land use densities, and surrounding boundary conditions.

Environmental

Environmental considerations were reviewed for possible impact to future improvements within the corridor based on a desktop analysis without field confirmation or independent investigation. AVI reviewed publicly available databases and submitted inquiries to public agencies in an attempt to accurately identify resources that may be present. No significant impacts were identified but, will need to be investigated with future planning projects to confirm or identify. Refer to Profile Chapter and Appendix F for additional information and reference.

Current Traffic Conditions

Traffic Volume

Traffic volume data was collected for this project on average weekdays at various times during April 4 thru April 10, 2017. Peak hour counts were collected at the key intersections along Whitney Road during the morning and evening peak hours. Noon peak hour counts were evaluated when they were available. Peak hour and daily traffic volumes, laneage, and traffic control are contained in Figure 2.15 Existing Traffic Conditions 2017.

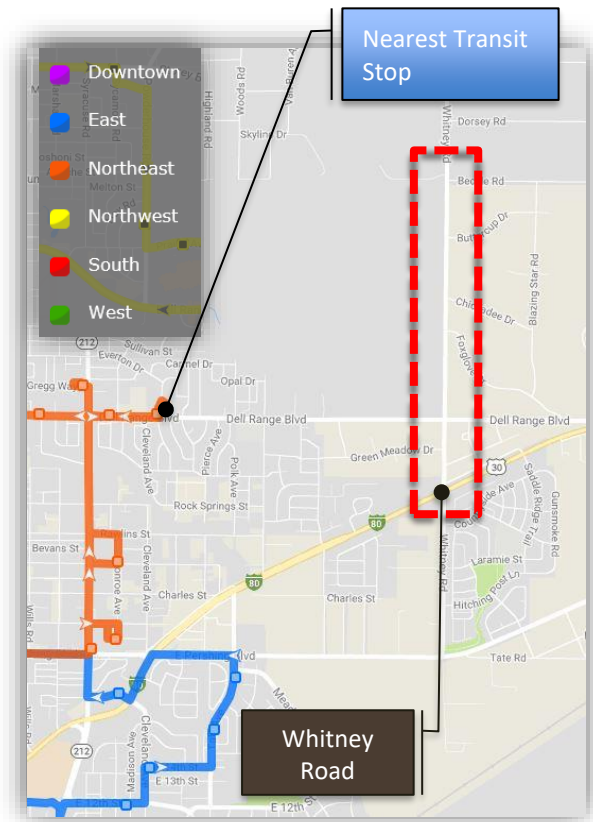


Figure 2.14 Existing Transit Routes

Remainder of Page Intentionally Left Blank

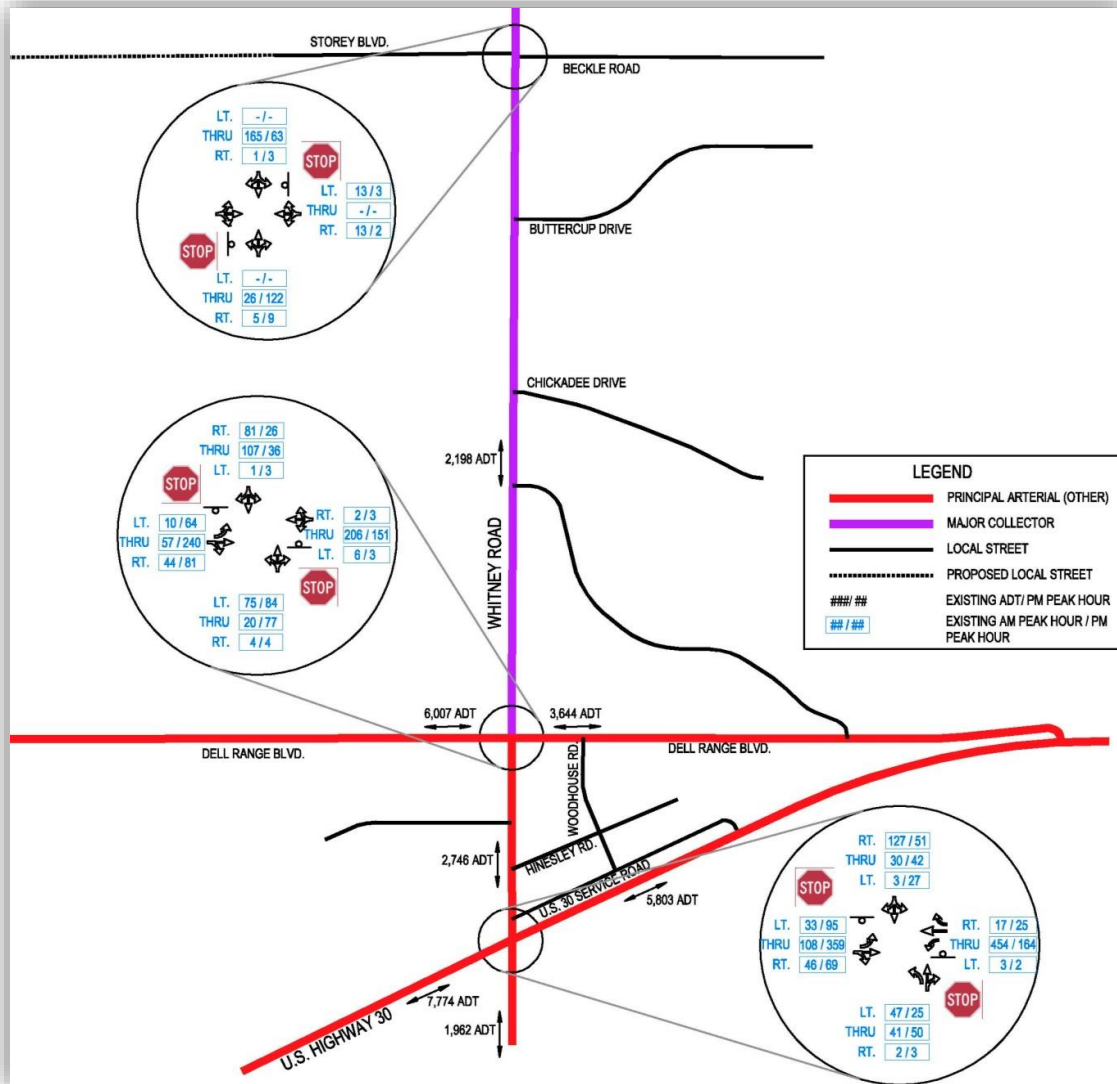
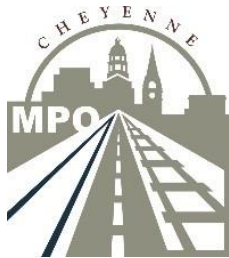


Figure 2.15 Existing Traffic Conditions 2017

Traffic Safety

Crash data was provided by WYDOT and the City of Cheyenne for each of the key intersections along the corridor for the time period beginning on January 2014 and ending on September 2017. The number of crashes ranged from a total of eleven (11) at Whitney Road at U.S. 30 and one (1) at the intersection of Whitney Road at Beckle Road. Given the low calculated crash rates, it would appear that no crash problems are present on the corridor at this time. However, given crash rate at intersections is based on accidents per million entering vehicles, volumes are not that high, and one fatality occurred our analysis is skewed.



Whitney Road Corridor Plan

Glimpse

August 2020

Intersection Crash Rate (R) is calculated as follows:

$$R = (1,000,000 \times C) / 365 \times N \times V \text{ where,}$$

R = Crash rate for the intersection expressed as accidents per million entering vehicles (MEV).

C = Total number of intersection crashes in the study period.

N = Number of years of data.

V = Traffic volumes entering the intersection daily.

Based on observation, failure to yield is the primary cause of the crashes for both Whitney Road at Dell Range Blvd and Whitney Road at U.S. 30. Both intersections pose the highest risk for potential safety concerns for the corridor due to speeds, geometry, and vertical alignment. The crash data is detailed in Appendix E and summarized in Table 2.2 2014 - 2018 Crash Summary for Key Intersections.

Table 2.2 2014 - 2018 Crash Summary for Key Intersections

Type	Whitney Road		
	Beckle Road	Dell Range Blvd.	US 30
	Number of Crashes		
Angle	-	7	10
Rear End	1	-	3
Fixed Objects	-	1	4
Head-on	-	-	-
Total	1	8	17
Rate	0.33	0.53	0.89
PDO	1	4	11
Injury	-	3	4
Fatality	-	1	2
Total	1	8	17
Failure to Yield ROW	-	7	9
Following too Closely	1	-	2
Speeding	-	-	2
Driving too Fast for Conditions	-	1	3
Mechanical Failure	-	-	1
Total	1	8	17

Remainder of Page Intentionally Left Blank



Existing Land Use and Zoning

Land Use in the corridor study area varies but, is mainly comprised of agricultural in combination with agricultural residential, medium density residential, mixed use (Laramie County), Public, and Community Business. The current Zoning Map is illustrated in Figure 2.16 2015 Zoning Map.

The following zoning uses are currently within the corridor area:

City Zoning: Description:

- CB Community Business
- MR Medium Density Residential
- MU Mixed Use (Laramie County)
- P Public
- AR Agricultural Residential
- A-2 Agricultural

The Laramie County Land Use Regulations [5] and City of Cheyenne UDC [6] does not correlate to Mixed Use in the City of Cheyenne. This is due to the fact that Laramie County unlike Cheyenne does not distinguish mixed-use residential and mixed-use business for land use types. Laramie County only has a single Mixed Use Zone which can be residential or commercial.

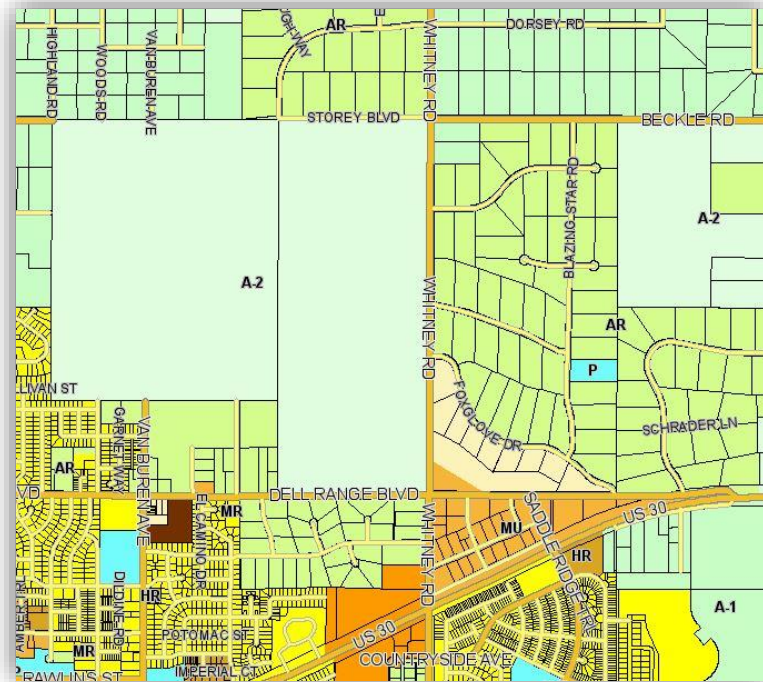


Figure 2.16 2015 Zoning Map



3.0 COLLABORATION

The collaboration is the process and planning context phase of the project. It provided an avenue for a cooperative design effort which defined the opportunities and constraints of the corridor, as well as framework for key planning considerations, that shaped the plan.

The Whitney Road Corridor Study relied heavily upon extensive public and stakeholder participation. The process involved stakeholder one-on-one meetings, open house format meetings with residents, business owners, developers, landowners, project steering committee meetings, Cheyenne MPO committees, Laramie County and City of Cheyenne Planning Commissions, and City and County Jurisdictional approvals or acknowledgements.

Steering Committee

The first collaboration component of the project involved enlisting the assistance of a Steering Committee during the plan development. The committee was comprised of the following staff and key stakeholders from the City, County, WYDOT and other agencies:

- Bruce Hattig, BOPU
- Nathan Beauheim, City of Cheyenne,
- Susana Montana, City of Cheyenne,
- Amy Allen, City of Cheyenne
- Anissa Gerrard, City of Cheyenne
- Randy Greisbach, WYDOT,
- Timothy Morton, WYDOT
- Mark Wingate, WYDOT,
- Jeffery Mellor, WYDOT,
- Rob Geringer, Laramie County,
- Dave Bumann, Laramie County,
- Jef McMann, Black Hills Energy,
- Lloyd Sisson, High West Energy,
- Tom Mason, MPO,
- Nancy Olson, MPO,
- Sreyoshi Chakraborty, MPO,
- Tom Cobb, AVI/MPO,
- Cassie Pickett, AVI
- Daryl Johnson, AVI
- Joe Henderson, STS, Inc.,
- Curtis Rowe, Kimley-Horn,
- Troy Russ, Kimley-Horn.

The Steering Committee formally met three (3) times during the project to guide the consultant team, review project information, provide insight, discuss public and stakeholder involvement, and collaborate to make decisions about the plan direction and recommendations. Agenda, meeting minutes, and presentations can be found in Appendix C.

Remainder of Page Intentionally Left Blank



Table 3.1 Public Outreach Matrix

Activity	Date(s)
Steering Committee (2)	5.09.2017 10.19.2017 2.13.2019
Public Open House (2)	11.08.2017 6.28.2018
Individual One-on-one Meetings (12)	5.07.2018 8.08.2018 & 8.09.2018 10.30.2018 & 10.31.2018 11.13.2018 & 11.16.2018 1.15.2019 3.11.2019 & 3.12.2019 4.23.2019 5.02.2019
Utility Meetings: Suncor Energy USA Pipeline Plains All American Pipeline	5.09.2017 6.23.2018
MPO Technical Advisory Committee (TAC) (5)	9.12.2018 11.14.2018 3.13.2019 5.15.2019 8.15.2019
MPO Citizen's Advisory Committee (CAC) (3)	9.12.2018 5.15.2019 8.15.2019
Planning Commissions City of Cheyenne Laramie County	12.12.2018 7.15.2019 12.19.2018 7.11.2019
Governing Bodies (2) City Council County Commissioners	9.9.2019 8.20.2019



Public Open House

The second collaboration component involved a combination presentation and open house style forum for stakeholder and public comments. AVI led the public involvement process with assistance and contributions from all the team members. The meetings were advertised through various media including newspaper, website, Facebook®, and electronic message boards. Planning and Engineering consultants from AVI, representatives of the Cheyenne

Metropolitan Office, and Laramie County Public Works were present at both meetings to receive public comment. Information and input were collected using three different avenues; direct communication with a team member (i.e. consultant, MPO staff members, and Laramie County), having the public write comments on Post-it® notes and place them on large planning area maps, and filling out a written survey. The primary purpose of the three (3) different communication avenues was to create the most comfortable environment for individuals to convey information to the team. A total of two (2) Open Houses were conducted in November 2017 and June 2018. The meetings were very well attended, and comment card respondents identified themselves by the following demographic information shown in Figure 3.1 Who Attended Public Meetings?

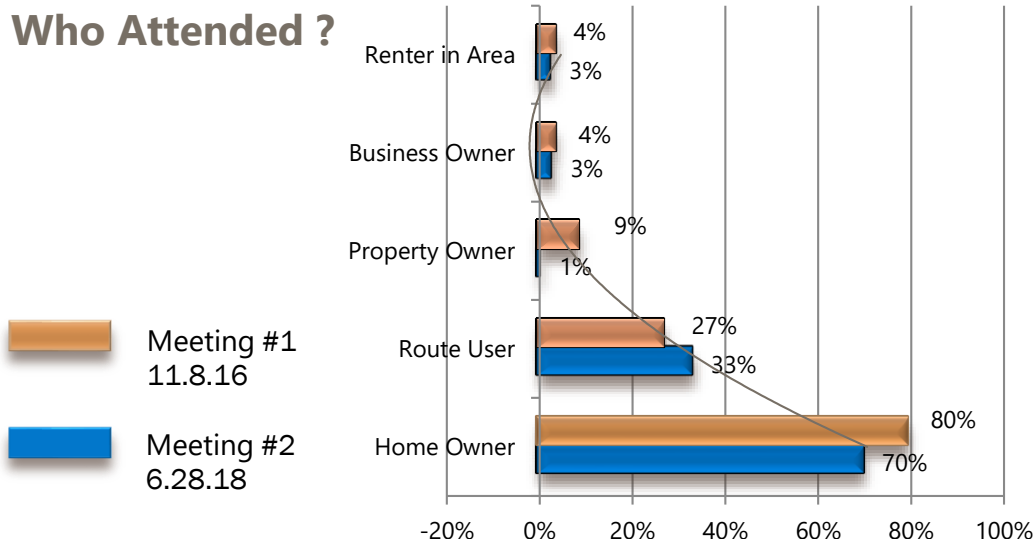


Figure 3.1 Who Attended Public Meetings?



Public Open House #1

A brief presentation, combined with an Open House, was conducted on November 8th, 2017 at Dildine Elementary School. One hundred twenty people were listed on the Sign-In-Sheet as attending the meeting. It was estimated that approximately 150 people attended. A twenty (20) minute presentation focused on the following: Introduction of Team, Project Overview and Limits, Purpose and Goals, Overall Study Process, What to expect (i.e. Schedule), Identifying the Issues, and Possible Conceptual Ideas for addressing future traffic. After the presentation attendees were asked to adjourn to two duplicate workshop station areas to ask specific questions, review exhibits, and complete comment cards. Each station was comprised with the following elements:

- Existing Conditions
(Aerial photo map and site location photos along the corridor),
- Traffic Conditions
(Aerial photo map with existing lane configurations, speed limits, known crash data)
- Opportunities and Constraints
(Aerial photo map outlining physical constraints and safety concerns at U.S. 30 and Dell Range Blvd.)
- Conceptual Roadway Cross Sections
(Existing Roadway, Conceptual Rural 2 Lane Roadway, Conceptual Rural 3 Lane Roadway, Conceptual Urban 3 Lane Roadway)

Overview

Results from the written survey were entered into the web-based program by the consultants after the open houses and the public had the option of directly providing comments electronically to the survey through the Survey Monkey® web link. The link was provided on the www.plancheyenne.org & www.avipc.com websites. A complete summary of comments, exhibits, sign in sheets, and individual comment cards are enclosed in Appendix C.

Of the one hundred thirty (130) persons attending the public open house two-hundred thirty-seven (237) written comments were returned at the rate of one-hundred eighty-two-point three percent (182.3%).

We asked the public two specific questions for comments related to the corridor summarized as follows.

Remainder of Page Intentionally Left Blank



Q1. Please rate the importance of the following transportation users and issues based on what you consider to be the most important design considerations for Whitney Road?

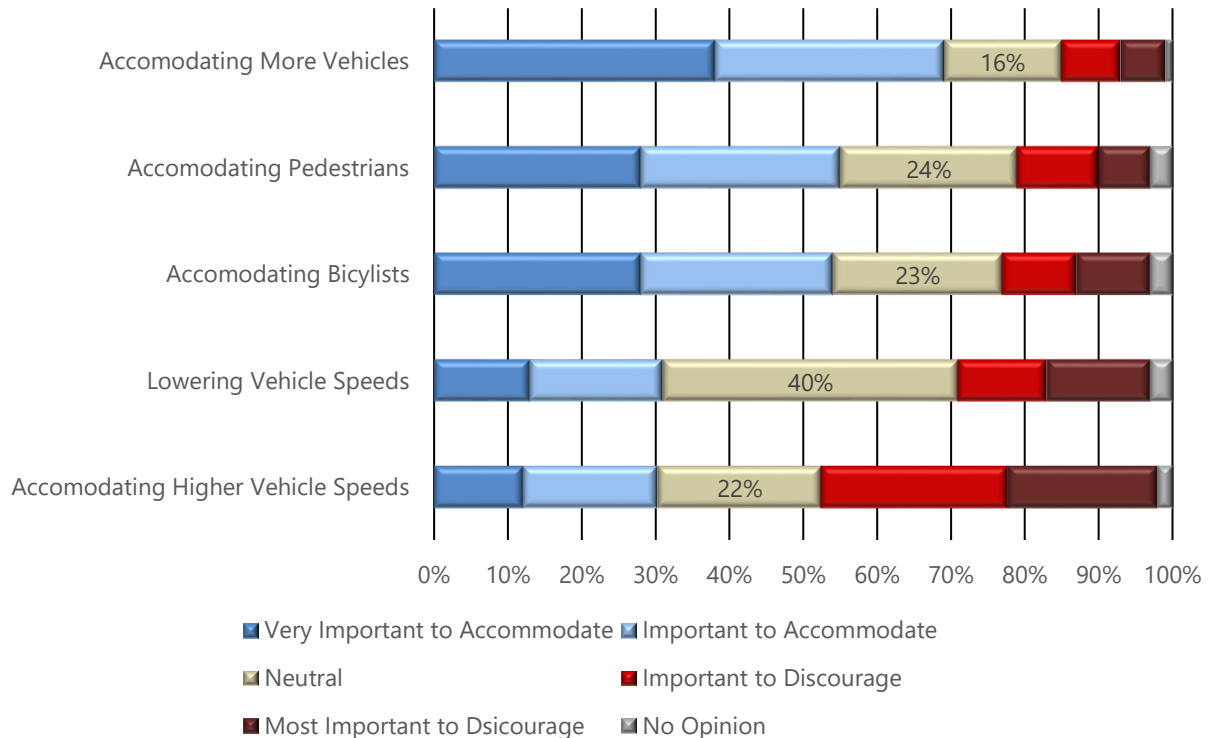


Figure 3.2 What were Considered Important Transportation Design Elements?

The rating for each category as illustrated graphically above: Very Important to Accommodate, Important to Accommodate, Neutral, Important to Discourage, Most Important to Discourage, No Opinion. It is easy to graphically view what most people consider the important design elements for the corridor in Figure 3.2 What were Considered Important Transportation Design Elements? Very Important to Accommodate and Important to Accommodate are shown in varying shades of blue while Most Important to Discourage and Important to Discourage are shown in shades of red. Neutral is shown in gold and label as a percentage of the total responses.

Most respondents believed that it is important to Accommodate More Vehicles on the roadway, Accommodate Pedestrians, and Bicyclists. Additionally, respondents believed that the speed of vehicles along the roadway corridor meets their needs after combining the two design elements of Lowering Vehicle Speeds and Accommodating Higher Vehicle Speeds.



Q2. If you could make one change to the existing Whitney Road Corridor what change would you make?

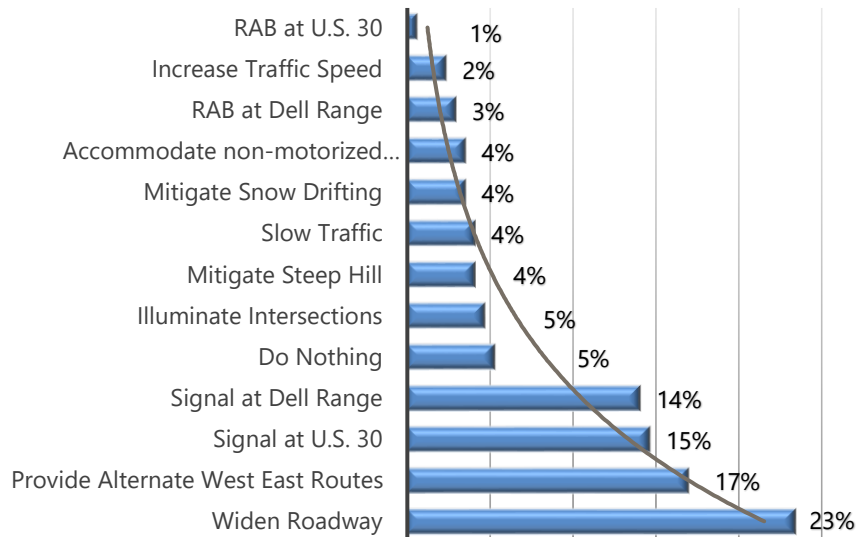


Figure 3.3 What one Change would you make?

After evaluating the raw data from the question, the most common categories were developed and tabulated. The results of the tabulation are illustrated graphically in Figure 3.3 What one Change would you make? The top four (4) most important changes requested were as follows:

- Widen the Roadway
- Provide Alternative East West Traffic Routes
- Provide Traffic Signals at U.S. 30 and Dell Range Blvd.
- Provide Intersection Illumination.

Remainder of Page Intentionally Left Blank



Public Open House #2

A brief presentation combined, with an Open House, was conducted on June 28th, 2018 at Dildine Elementary School. A total of 68 people was listed on the Sign-In-Sheet as attending the meeting. It was estimated that approximately 75 people attended this meeting. A twenty (20) minute presentation focused on the following: Study Area and Primary Goals, Where we have been and what to expect, What we heard (Public Meeting No. 1), Details of the Identified Issues, and Overview of recommended Improvements. After the presentation attendees were asked to adjourn to two duplicate workshop station areas to ask specific questions, review exhibits, and complete comment cards. The station comprised the following elements:

- Proposed Conceptual Improvements
(Aerial photo map overlaid with proposed improvements for the corridor),
- Conceptual Roadway Cross Sections
(Beckle Road/ Storey Blvd. Intersection (Looking North), Dell Range Blvd to Beckle Road/Storey Blvd. (Looking North), U.S. 30 to Dell Range Blvd. (Looking North)).

Overview

Results from the written survey were entered in the web-based program by the consultants after the open houses and the public had the option of directly providing comments electronically through the Survey Monkey® web link. The link was provided on the www.plancheyenne.org & www.avipc.com websites. A complete summary of comments, exhibits, sign in sheets, and individual comment cards can be found in Appendix C.

Of the sixty-eight (68) persons attending the public open house four-hundred thirteen (413) written comments were returned at rate of six-hundred and seven-point four percent (607.4%).

Recommendations for Conceptual Typical Cross-Sections for all segments identified received strong public consensus from 83.4% to 77.8% combining "Definitely Like" and "Like" for the section of Whitney Road from Beckle Road/Storey to Dell Range Blvd. and Dell Range Blvd. to U.S. 30, respectfully. Additionally, conceptual intersection options at U.S. 30 (Realignment to remove skew/signalized) and Dell Range Blvd (Single Lane Roundabout) received support at 56.4% and 49.4% combining "Definitely Like" and "Like", respectfully. It should be noted that adding "No Opinion" to "Definitely Like" and "Like" for the alternatives yielded 55.5% for the Single Lane Roundabout at Dell Range Blvd. and 74.8% for the realignment of U.S. 30 Intersection.

Additional ideas, information, or other comments received at this meeting included the following:

- "Traffic in this area would be significantly reduced with a connection of Storey Blvd and Four Mile Rd through Whitney all the way to Christensen RD. As well as further reductions when Christensen exit/overpass project is completed from



Interstate 80. Funds would be better spent with more effective results with the development of these alternative routes.”

- “Something needs to be done for both Highway 30/Whitney and Dell Range/Whitney intersections before serious injuries start occurring from the growing traffic and pedestrian traffic Intersection Down Lighting on Existing Power Poles or Independent Poles.”
- “Get the project out to bid and started before the costs go up”

One-on-one Meetings

The third type of collaboration component involved a series of one-on-one meetings with local business owners who had either expressed concerns about the design team proposals or where right-of-way was thought to be needed to accommodate the proposed improvements. The following are a list of the stakeholder groups and individuals who provided input outside of the public open house process:

- Utility Meetings
 - Suncor Energy USA Pipeline
 - Plains All American Pipeline
- Whitney Ranch Development
 - Connie and Bill Holgerson,
 - Carol and Dave Anderson
 - Joe Patterson
- U.S. 30 Service Road Business Group
 - Jeannie Spraker, Big Al's Auto & Exhaust
 - Andy Vehar, Big Al's Auto & Exhaust
 - Dave Rose, Big Al's Towing
 - Jim Hanrahan, Pinnacle Cabinet
 - Gary Everett, Pinnacle Cabinet
 - Shane Pickel, Unique Wood Design
- Restway Travel Park
 - Karen Sherman
 - Scott Sherman
 - Kelly Bartlett
- Jolley Rogers RV
 - Steve Hamlin
- Private Property Owner (6405 Hinesley Road)
 - Betty Beckle
 - Don Beckle
 - Zack Middelstadt
 - Stan Middelstadt



One-on-one Meetings (Utility Meetings)

Meeting No. 1: May 9, 2017: 2:00 p.m. to 3:30 p.m. : Suncor Energy USA Pipeline

Meeting attended by Dillon Ohrt, Barry McCann, Regan Marsh, Cameron Nuss, Suncor; Tom Cobb, AVI. The meeting was conducted at Suncor Energy USA Pipeline office on 1715 Fleischli Parkway, Cheyenne, Wyoming.

Meeting No. 2: May 9, 2017: 2:00 p.m. to 3:30 p.m. : Suncor Energy USA Pipeline

Meeting attended by Steve Sullivan, ROW, Jason Norris, Op. Supervisor, Tyler Keller, District Manager, and Eric Heap, Technical Manager; Plains All American Pipeline (PAAPL); Tom Cobb, AVI, Nancy Olson, MPO. The meeting was conducted via phone conference at the AVI office located on 1103 Old Town Lane, Cheyenne, Wyoming

Overview of Meetings

The following notes are based on the MPO's understanding of the meeting. The agenda of the meetings included: Introductions, Introduce Whitney Project, Additional available pipeline data and details, Ability to complete isolated relocation or realign a portion of the pipeline, Potential Benefits, Primary Options, and Alternatives to Consider.

After introductions and introducing the project to both groups, the discussion focused on the future development of the property west of Whitney Road, called Whitney Ranch, that is moving forward with the planning and construction of a large residential development. The purpose of the Whitney Road plan is to create a comprehensive plan that will optimize safety, growth and fiscal responsibility which meets the following goals:

- Understand the community and neighborhood vision for the roadway,
- Improve roadway and intersection safety and function and
- Address drainage and snow drifting.

The interrelationship of the petroleum pipelines and the roadway corridor planning project is the result of the horizontal and vertical location of the lines within the right-of-way and the ability of the planning project to meet the established criteria; i.e., removal or mitigation of the steep roadway grade to improve safety for users and establish a non-motorized sidewalk/path that meets the Americans with Disability Act (i.e. ADA) accessibility requirements. The current terrain of the roadway north of Dell Range Blvd. contains up to a 13% roadway profile, located south of the existing ranch house. If the roadway were lowered to accommodate a 5% profile, approximately a 26' cut would be created and require relocation of the petroleum lines. For reference and additional information refer to Figure 3.4 Existing and Proposed Profile Concept Whitney Road. It was conveyed by both petroleum groups the size, type, and location of their respective mains. Suncor's pipeline is a 12.75" steel crude line at 1,440 psi of pressure and a depth of approximately 2' to 5' deep on the east side of the corridor while the PAAPL is a 16" steel crude pipeline at a depth from 4' to 15' located on west side of the corridor. Both pipeline groups emphasized the importance of potholing the lines when the final design begins to



ensure the most accurate information on the depth and location of lines. Horizontal and vertical information was furnished by both companies to assist in the preliminary design of the roadway concept. It was confirmed that the location of the pipelines roughly follows the marker locations in the field. Both companies indicated that the procedures and logistics for isolated relocation or realignment of a portion of the line would need to be accomplished approximately two years in advance of proposed roadway construction. Typical costs for relocation were given by each company at approximately \$1.0 million and did not seem to depend on length of the relocation or whether the line was moved horizontally or vertically.

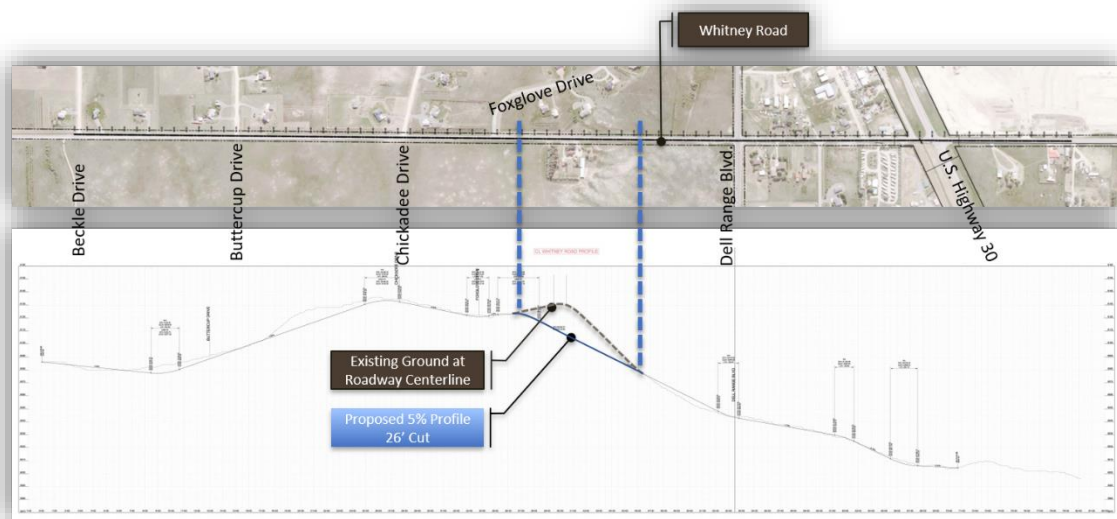


Figure 3.4 Existing and Proposed Profile Concept Whitney Road

Further discussion continued as to whether either line was scheduled for a maintenance shut-down which could provide an opportunity for relocation. No shut-downs were indicated. It was discussed whether retaining walls could be used to accommodate the roadway and pipeline. PAAPL indicated a retaining wall no closer than 10' from a footer could be utilized while Suncor did not desire retaining walls near their line.

The pipe lines companies were asked if they could furnish easement documentation and if they understood who had the responsibility of relocation under this circumstance. PAAPL forwarded easement documentation via email immediately following the meeting and furnished the recorded book and page (i.e. BK#1976, pg. 1815) while Suncor did not have the information readily available. Suncor did indicate their easement has been in place since 1950 and believed all costs to relocate the line would be the responsibility of the entity which initiated the relocation. The PAAPL document is a "Board Approval" for location within Laramie County and not an easement. It was unclear as the meaning of the "Board Approval" document, further investigation will be necessary.



One-on-one Meetings (Whitney Ranch)

Meeting No. 1: May 7, 2018: 4:00 p.m. to 5:00 p.m.

Meeting attended by Brad Emmons – AVI (Whitney Ranch), Tom Mason, MPO, Tom Cobb, AVI. The agenda of the meeting included: Why Modification to Roadway Alignment, Potential Benefits, Primary Options, and Alternatives to Consider. The meeting was conducted at AVI at 1103 Old Town Lane, Suite 100, Old Town Lane, Cheyenne, Wyoming.

Meeting No. 2: August 8, 2018: 11:00 a.m. to 12:30 p.m.

Meeting attended by Joe Patterson, Guardian Development, Connie, and Bill Holgerson, Gysel Whitney, LLC, and Tom Cobb, AVI. The meeting was conducted at 1103 Old Town Lane, Suite 100, Old Town Lane, Cheyenne, Wyoming.

Meeting No. 1 and 2 centered upon discussion of the primary reason for an alignment modification which is due to the existing roadway profile or longitudinal grade of up to 13% exceeds. The City of Cheyenne Unified Development Code (UDC) and Laramie County Land Use Regulations (LCLU) of 8% for a Collector and Minor Collector, respectfully. This steep grade creates safety concerns due to the fact it reduces sight distance and creates hazardous conditions during ice and snow events. Two options were presented which shifted the steepest portion of the existing alignment of Whitney Road west though and/or around the existing farm house and barn structures. Potential options were discussed with these alternatives including creating a northbound and southbound lane using a combination of the shifted alignment with the existing alignment and a three-lane section in the proposed alignments with a greenway component within the unused portion of the existing right-of-way.

The second meeting further explored the original alternatives but was expanded to extend north completely within the Whitney Ranch property. A third alternative was developed which required removal of the west side of the existing barn structure. Those alternatives were developed to document the amount of impact to the property where the petroleum transmission mains were completed avoided. The right-of-way required to shift the road, ranged from 9.8 acres to 16.8 acres. The development group and current owners of the property indicated these options adversely impacted the future development of property. They believed the shifted alignments either bifurcated the property or impacted the existing barn which they wish to protect.

Meeting No. 3: October 30, 2018: 1:30 p.m. to 3:00 p.m.

Meeting attended by Joe Patterson, Guardian Development, Connie, and Bill Holgerson, Gysel Whitney, LLC, Tom Mason, MPO, Nancy Olson, MPO, and Tom Cobb, AVI. The meeting was conducted at the MPO office at 615 West 20th Street.

The meeting was scheduled to present a three-dimensional exhibit which explored the possibility of shifting the roadway centerline to the west without impacting either the petroleum



lines or the barn structure using a 5% vertical profile grade. Using those parameters, it was not possible to create an alignment which satisfied both conditions. The alternative created a 35 ft. deep cut at the highest portion of the existing ground. This coincides with the location of the barn structures. Potentially, retaining walls could be placed that would mitigate the width of the impacted area, however this would not be cost effective and create additional maintenance cost with snow drifting. The primary goals of a viable alternative solution were discussed and summarized below:

- Minimize impact to adjacent property owners.
- Fiscally responsible to the taxpayer, the petroleum pipeline companies, and the Whitney Ranch stakeholders.
- Meet or exceed the minimum criteria established by the UDC and LCLU documents for the City of Cheyenne and Laramie County.
- Establish a non-motorized sidewalk/path that meets the ADA accessibility requirements.

The following notes are based on the MPO's understanding of the meeting, questions, and concerns. No comments or questions are specifically attributed to allow stakeholders to speak freely and in confidence.

Comments/Questions:

- *I understand that public comments did not mention the steepness of the road as a concern with the existing road. Why is this a concern of the design?*

Leaving the steep vertical grade is dangerous in inclement weather, especially ice. Additionally, it does not meet the current UDC, LCLU, or ADA accessibility criteria. It is possible to meet the UDC and LCLU regulations using 8% maximum, but this is not desirable. First, there is a need to get the roadway slope to an acceptable percent that meets the UDC standards and addresses safety. Second, an 8% grade does not meet the ADA accessibility requirements and really is the absolute maximum grade for snow or ice.

- *What is the maintenance and replacement schedule for the petroleum pipeline?*

The MPO has made several attempts to inquire with Plains All American Pipelines to discuss future maintenance or replacement plans. Based on our understanding of the easement documentation, costs for lower or relocating the pipelines would fall upon the roadway construction or jurisdictional entity for the Suncor Pipeline and on the pipeline company itself for the Plains All American Pipeline. Please keep in mind this is based on conversations with Suncor and not easement documentation.

- *Could an alternate alignment be considered which abandons north Whitney to Dell Range where the roadway would head west from Foxglove into the development and then down to Dell Range? Additionally, Van Buren is the only North/South road within the development at this point.*



The MPO has some concern with this option which potentially could force unnecessary additional traffic on Dell Range Blvd. corridor west of the proposed location.

- *The Barn is the main obstacle in shifting the alignment and will create an isolated large parcel of land from the rest of the subdivision that would become virtually worthless.*

The MPO noted the concern by the developer but believe some connection could be maintained.

- *Could an option be developed to move southbound and keep northbound in the right of way as mentioned in the previous meeting?*

The City, County and WYDOT are under pressure to have the MPO get the plan complete and move forward with solutions, due to the recent accidents. The MPO will develop this option further to investigate the feasibility.

- *The pipeline should be moved to accommodate the needs of the roadway. Can an option be looked at that impacts the west pipeline only and not the barn structures?*

The MPO will investigate the possibility of an option which moves the roadway as close to the Barn as possible without impact and assuming the pipeline will be moved.

If a consensus cannot be reached, the Plan may need to present up to three alternative alignments with pros and cons of each including estimated construction costs. The Planning Commission and governing bodies would be required to make a final decision on the selected alternative.

Meeting No. 4: November 16, 2018: 10:00 a.m. to 11:30 a.m.

Meeting attended by Joe Patterson, Guardian Development, Connie, and Bill Holgerson, Gysel Whitney, LLC, Tom Mason, MPO, Nancy Olson, MPO, and Tom Cobb, AVI. The meeting was conducted at the MPO office at 615 West 20th Street.

The meeting was scheduled to present, review, and gather feedback on the six (6) alternatives. Detailed three-dimensional exhibits of all alternatives were presented with the brief pros and cons summarized.

- Alternative 1: Do Nothing Alternative
- Alternative 2: Existing Alignment with Maximum Profile (3 Lane Section) and Pedestrian Path
- Alternative 3: Existing Alignment with Accessible Profile (3 Lane Section)
- Alternative 4: NBL/SBL Independent Roadways w/Maximum NBL and Accessible SBL Profiles
 - Alternative 4a: SBL Alignment placed east of Whitney-Gysel Barn Structure
 - Alternative 4b: SBL Alignment placed West of Whitney-Gysel Barn Structure



- Alternative 5: Three-lane Roadway, Revised Alignment, Accessible Profile, and Impact to Plains All American Pipeline (PAAPL)
- Alternative 6: Three-lane Roadway, Revised Alignment, Accessible Profile, No Impact to Plains All American Pipeline (PAAPL) or Whitney-Gysel Barn Structure.

The MPO presented the north alignment options to the City of Cheyenne and Laramie County staff. Based solely on the information and exhibits as shown, the jurisdictional or public perspective the preferred alternatives in order were Alternative #6, Alternative #3, and Alternative #2. This was based on construction cost, maintenance cost, objectives and goals, multi-modal corridor, accessibility, potential snow and ice accumulation and safety.

The following notes are based on the MPO's understanding of the meeting, questions, and concerns.

Comments/Questions:

The developer understood the perspective and order of preference of the alternatives and added the following comments for record.

Alternative #2 was the favorable option with the developer. They believed that it would go together with their concept of a trail system. Asked if the alignment for the path could be changed to fit in with their ideas?

The alignment was a concept only. It could easily be modified but would need to stay at or under a 5% vertical profile.

Alternative #4a was the developers preferred option prior to reviewing the three-dimensional plan and profile. Based on the available information, it appears that it is not possible to avoid both the barn structures or petroleum pipeline (PAAPL) using a 5% grade on the SBL. This option requires either the pipeline or barn to be relocated. A pedestrian underpass connects the "proposed park area" to the rest of the development. Alternative #4b divides the property and is not preferred.

The developer expressed that they would like to receive a legal opinion from Mark Voss, County Attorney, on the easement documents for the pipelines and not get locked in to the design for the old ranch buildings until more information is available. They contend that the best option is to have the pipeline relocated.

The MPO will continue to investigate and inquire about the easement documentation and opinion of the County Attorney. As we previously discussed, we have not been able to acquire the documentation of all the pipeline easements through investigation at the Courthouse. We will again request the documentation through the pipe line companies. It is the intent that the documentation will provide some insight into financial responsibility for relocation of the petroleum transmission mains.



Alternative #6 is the least desirable option for the landowner and developer. They acknowledged the need for the detention and amenities like a playing field, gazebo, playground, and use of the existing buildings within the development plan. However, it was noted that Guardian (developer) CEO, Ross Malinski's "vision was to preserve the history of the Barn and have nice overlooks of the city". The developer is looking into the feasibility of creating a venue for weddings or to add a recreation center in the historic area.

They also noted that within the 588 acres of land available that there will be some undevelopable portions. These areas have already been identified as open space or parkland. They see this separated section as over and above the dedicated undevelopable land. They believed that this area as shown in Alternative #6 is a double hit where the developer must pay for the road relocate and lose the developable land used as right-of-way.

It was reiterated that fiscal responsibility is an important criterion for both the jurisdictional entities, tax payers, petroleum companies, and the Whitney Ranch stakeholders. Alternative #6 fulfills all but one of the primary goals of a viable alternative solution previously discussed:

- Minimize impact to adjacent property owners
- Fiscally responsible to the taxpayer, the petroleum pipeline companies, and the Whitney Ranch stakeholders ✓
- Meet or exceed the minimum criteria established by the UDC and LCLU documents for the City of Cheyenne and Laramie County ✓
- Establish a non-motorized sidewalk/path that meets the ADA accessibility requirements. ✓

The developer presented another version of Alternative 4a, where the southbound alignment would be forced to the west near Chickadee or Foxglove and then commence south onto Dell Range Blvd., half-way between Gysel Place and Whitney Road. Additionally, this alignment could work well with approximately 35 acres in the southeast corner they have "reserved" for commercial purposes and multi-family in the southern portion of the development.

The MPO indicated that this realignment option would require a reassessment by the developers traffic engineer, Kimley-Horn to determine traffic impacts and feasibility. Concerns to the impact on Dell Range Blvd. were discussed.

Additionally, east – west connections or alternate routes like Storey Blvd. were discussed which will directly improve congestion and impacts to Dell Range Blvd.



Guardian does not have an immediate plan to construct Storey Blvd. at this point due to constraints with water distribution pressure and serviceable gravity sewer boundaries. Guardian will be meeting with BOPU on December 14th to get answers for the water issue to the north along Storey Blvd. and Summit Drive. Depending on the meetings and information, this might allow Storey to be built sooner than anticipated for the development.

The MPO will require AutoCAD or detailed sketches indicating the approximate boundary limits of the proposed commercial area to review an Alternative #4c. Additionally, Kimley-Horn will need to update the traffic impact assessment report.

Has an alternative been investigated shifting the alignment to the east of the existing centerline?

The MPO will investigate the feasibility of shifting the roadway alignment to the east. It is our understanding this would impact the Suncor pipeline which we understand the cost would fall onto the developer or jurisdictional agency reconstructing the road which would impact the pipeline.

Meeting No. 5: March 11, 2019: 1:00 p.m. to 2:30 p.m.

Meeting attended by Joe Patterson, Guardian Development, Connie, and Bill Holgerson, Gysel Whitney, LLC, Tom Mason, MPO, Nancy Olson, MPO, and Tom Cobb, AVI. The meeting was conducted at the Municipal Complex at 2101 O'Neil Avenue, Room 208.

The meeting was scheduled to review additional details and gather feedback on the top two (2) feasible alternatives for a north alignment of Whitney Road along with a new third alternative (Alternative #7). This alternative was discussed as a possibility in our last meeting. It shifts the existing alignment east to avoid impacting Whitney Ranch and the Guardian development. Detailed three-dimensional exhibits of all alternatives were presented with additional electronic information on the PAAPL and Suncor petroleum pipelines vertical profile projected onto the conceptual design exhibits.

- Alternative 2: Existing Alignment with Maximum Profile (3 Lane Section) and Pedestrian Path
- Alternative 6: Three-lane Roadway, Revised Alignment, Accessible Profile, No Impact to Plains All American Pipeline (PAAPL) or Whitney Gysel Barn Structure.
- Alternative 7: Three-lane Roadway, Revised Alignment East, Accessible Profile.

Alternative #7 was investigated at the request of the developer at the last meeting. The option appeared to be viable in theory however, after close examination, the option could not be shifted far enough east to prevent impacting one of the petroleum lines (i.e. PAAPL and Suncor). The only way to avoid impact to a petroleum line (PAAPL) was to install a 15'



retaining wall on the west side. Furthermore, residential properties are burden with major impacts to small lots on the east side of the alignment due to the large movement of earthwork required to realign the roadway.

After the initial alignments were reviewed by the group, they discussed the latest information on the petroleum pipeline easements and County Attorney opinion. First, the group was reminded by the MPO that the PAAPL is located on the west side of the right-of-way of Whitney Road while the Suncor pipeline is located on east side of the right-of-way. Second, Mark Voss, Laramie County Attorney reviewed the PAAPL Board Approval documentation on Whitney Road (Book#1976. PG#1815, REC# 460462). Mr. Voss' basic answer to the question about who would bear the cost for relocation of the lines was stated to be "complicated". He reviewed a copy of the resolution issued by the Board of Commissioners allowing for the installation of the PAAPL line in 2006. That resolution references to sections of the 1988 zoning ordinances which have been supplanted by a revision done in 2011. In any case, the resolution does not contain any language regarding the cost of relocation. He further indicated that given the cost of relocation of pipelines, there will be a "fight" over the payment with the entities owning or using the pipelines. He referenced case law and state statutes that require utilities pay the cost of removing and relocating their facilities placed upon public highways when necessitated by highway improvements. At the time of the correspondence with the County Attorney, Suncor pipeline apparently had no easement documentation whatsoever. Mr. Voss believed there may be somewhat stronger grounds to have the company relocate the utility at their cost. However, whether documentation exists or not, he believed that we should anticipate a strong and forceful objection to paying the cost of moving the line. After corresponding with Mr. Voss, Suncor furnished some documentation of the easements on Whitney Road north of Beckle Road. No documentation can be located for Suncor pipeline easements from Beckle Road to U.S. 30 at this time.

Consequently, based the fact that relocation was not specifically addressed in the resolution by the County in 2006, the MPO agrees it is unclear who would bear the cost of improvements. Therefore, the MPO believes that the plan or alternatives considered should assume that the cost of relocation of the PAAPL would be assumed to be on the developer or jurisdiction making the roadway improvements.

The following notes are based on the MPO's understanding of the meeting, questions, and concerns.

Comments/Questions:

The developer understood the easement issues and constraints, the preference of the alternative #2 or #6 and elimination of Alternative #7 for further consideration. They added the following comments for record.

Indicated that a Land Planner had been hired to complete a Master Plan for the development. Would like to have MPO meet with the land planner.



The MPO would be happy to coordinate and meet with new Land Planner. However, we are trying to complete the plan as soon as practically possible.

One-on-one Meetings (U.S. 30 Service Road Business Group Foster Tracts Subdivision)

Meeting No. 1: August 9, 2018: 8:00 a.m. to 10:30 a.m.

Meeting attended by Jeannie Spraker, Big Al's Auto, Jim Hanrahan, Pinnacle Cabinet, Gary Everett, Pinnacle Cabinet, Shane Pickel, Unique Wood Designs, Dave Rose, Big Al's Towing, and Tom Cobb, MPO. The meeting was conducted at Big Al's Auto 6526 U.S. 30 Service Rd Cheyenne, WY.

Local business owners had previously attended the first public meeting and expressed concerns about an original proposal by the design team which eliminated the U.S. 30 Service Road and Whitney Road connection using a cul-de-sac on the west end of the service road. The proposed improvements were developed to address existing and potential safety concerns. Those safety concerns were as follows:

- Proximity of the service road intersection to the U.S. 30/Whitney Road Intersection (171.6' CL to CL spacing).
- Cut-through traffic observed to and from Saddle Ridge Subdivision via Saddle Ridge Trail to the U.S. 30 Service Road to Whitney Road and back;
- Projected increase in ADT on Whitney Road anticipated to increase from 2,746 (2017) to 9,400 (2040) or 10.54% per year.

The business owners within the Foster Tracts Subdivision understood the safety concerns and the need to control access to and from the U.S. 30 Service Road onto Whitney Road. However, they indicated that elimination of the connection and the creation of a cul-de-sac would drastically impact their businesses. Additionally, not allowing proper ingress/egress for large semi-truck deliveries and business-owned tow truck haulers (37') hauling tractor-trailer combinations up to 80' long is a problem. They stated that most of the business deliveries and tow trucks access the businesses from the interstates to U.S. 30 then to Whitney Road and finally onto the U.S. 30 Service Road. If the cul-de-sac was constructed, they would be forced to use the U.S. 30 Service Road access onto U.S. 30 at the Saddle Ridge Trail intersection (i.e. east of Whitney Road) for both ingress and egress. Delivery vehicles would not be able to turn around to egress at the same location due to the size of vehicles used and limitation on the cul-de-sac radius (i.e. maximum cul-de-sac 50' radius to accommodate future 12' travel lane, 12' deceleration/auxiliary lane, 8' shoulder, and a 22' clear-zone for 55 mph ADT > 6,000). Consequently, to address safety concerns, the business owners and design team developed a compromise solution where an access control median would be installed on Whitney Road north of U.S. 30 to prevent left turns in and out of the U.S. 30 Service Road. The business owners requested that if an access control median is installed, could a full access be constructed at Woodhouse Road onto U.S. 30 to improve business access and visibility into the Foster Tracts



area. They indicated that other access points into the area on Hinesley Road and Woodhouse Road do not allow easy access for large trucks due to the lack of roadway maintenance and poor surfacing, as well as, snow drifting issues. It was conveyed that any new access proposed on U.S. 30 would need to be approved by WYDOT. WYDOT has the jurisdictional control over access onto U.S. 30 and the U.S. 30 Service Road.

Meeting No. 2: October 31, 2018: 10:30 a.m. – 11:00 a.m.

Meeting attended by Jeannie Spraker, Big Al's Auto, Andy Vehar, Big Al's Auto, Nancy Olson, MPO, and Tom Cobb, MPO. The meeting was conducted at Big Al's Auto 6526 U.S. 30 Service Rd Cheyenne, WY.

This meeting was a follow-up to the previous meeting to update the group on the progress of developing an option for the extension of Woodhouse Road and future anticipated public meetings.

One-on-one Meetings (Jolley Rogers RV)

Meeting No. 1: October 31, 2018: 9:00 a.m. to 10:30 a.m.

Meeting attended by Steve Hamlin, Jolly Rogers, Nancy Olson, MPO, and Tom Cobb, MPO. The meeting was conducted at Jolly Rogers RV, 6102 U.S. 30.

An exhibit was presented of the latest proposed re-alignment of the intersection of Whitney at U.S. 30 which removes the skew angle and installs an access control median for improved safety. U.S. 30 would have a full movement access as it is currently. The Whitney access would be right in right out. The proposed improvements were developed to address existing and potential safety concerns. Those safety concerns were as follows:

- Proximity of the service road intersection to the U.S. 30/Whitney Road Intersection (171.6' CL to CL spacing).
- Cut-through traffic observed to and from Saddle Ridge Subdivision via Saddle Ridge Trail to the U.S. 30 Service Road to Whitney Road and back.
- Projected increase in ADT on Whitney Road anticipated to increase from 2,746 (2017) to 9,400 (2040) or 10.54% per year.

The discussions focused on the current design proposal which requires approximately 4,727 sq. ft. of land and removal/replace trees within a portion of Jolley Roger's RV property. This included approximately 10' of reserved right-of-way on the east side of the Jolley Roger RV property. It was explained that the negotiations for right-of-way would be done through the Wyoming Department of Transportation (WYDOT) and that land owners are compensated at fair market value and that trees are normally replaced at least 2 to 1 to sometimes a 3 to 1 ratio depending on the project and type of impact. Further discussion centered on the timeframe of the reconstruction project(s). Currently, Whitney Road is programed to be redesigned and built in 2022 and WYDOT has U.S. 30 reconstruction programed for 2024.



Mr. Hamlin expressed his support for the project and realignment proposal if they are fairly compensated for the value of the property required. Some concern was expressed that an estimated 50% of his customers and employees turn left onto Whitney to avoid the U.S. 30 intersection. Mr. Hamlin stated that he would need to discuss the proposed improvements with his partner and let us know the final answer. Mr. Hamlin contacted the MPO the following day and expressed his support of the proposed improvements and reiterated his stipulations to fair compensation for the property and would like the access approach location relocated farther south to better accommodating the turning movement of employee and recreational vehicles using the right-in-right-out on Whitney Road.

One-on-one Meetings (Restway Travel Park)

Meeting No. 1: October 31, 2018: 1:00 p.m. to 3:00 p.m.

Meeting attended by Karen Sherman, Restway Travel Park, Scott Sherman, Restway Travel Park, Nancy Olson, MPO, and Tom Cobb, MPO. The meeting was conducted at Restway Travel Park, 4212 Whitney Road.

The purpose of the meeting was to introduce them to the project, design team, and set up a future meeting to discuss details of the conceptual improvements and to understand their business operation and needs. A brief overview of the current plan was presented which included an access control median on Whitney Road preventing left turns at their existing approach. They were concerned over the realignment as it impacts a RV dump station, an existing mobile home/trailer they are renting, a picnic shelter, and their sign as well as trees and some landscaping.

Meeting No. 2: November 13, 2018: 9:00 a.m. to 10:30 a.m.

Meeting attended by Karen Sherman, Restway Travel Park, Scott Sherman, Restway Travel Park, Kelly Bartlett, Restway Travel Park, and Tom Cobb, MPO. The meeting was conducted at Restway Travel Park, 4212 Whitney Road.

An exhibit was presented of the latest proposed re-alignment of the intersection of Whitney at U.S. 30 which removes the skew angle and installs an access control median for improved safety. The Whitney access into their existing business would be right-in right-out. The proposed improvements were developed to address existing and potential safety concerns. Those safety concerns were as follows:

- Proximity of the service road intersection to the U.S. 30/Whitney Road Intersection (171.6' CL to CL spacing);
- Cut-through traffic observed to and from Saddle Ridge Subdivision via Saddle Ridge Trail to the U.S. 30 Service Road to Whitney Road and back;
- Projected increase in ADT on Whitney Road anticipated to increase from 2,746 (2017) to 9,400 (2040) or 10.54% per year.



The discussions were related to the approximate 5,238 sq. ft. of land and remove/replace trees within a portion of Restway Travel Park property. It was explained that the negotiations for right-of-way would be done through the Wyoming Department of Transportation (WYDOT) and that land owners are compensated at fair market value and that trees are normally replaced at least 2 to 1 to sometimes a 3 to 1 ratio depending on the project and type of impact. Further discussion centered on the timeframe of the reconstruction project(s). Currently, Whitney Road was explained to be programmed to be redesigned and built in 2022 and WYDOT has U.S. 30 programmed for 2024.

The owners expressed concern over the proposed improvements' direct impact to their business due to access being removed from U.S. 30 by a median. They indicated that all current patrons access their business from U.S. 30. The MPO indicated that the storage and deceleration length of southbound right and left turn lanes dictate the length of the access control median. It was further explained that the project goals are to improve safety and not destroy or hinder business. Alternatives will be developed to improve access and a follow-up meeting will be scheduled.

Meeting No. 3: January 15, 2019: 2:00 p.m. to 4:30 p.m.

Meeting attended by Karen Sherman, Restway Travel Park, Scott Sherman, Restway Travel Park, Kelly Bartlett, Restway Travel Park, and Tom Cobb, MPO. The meeting was conducted at Restway Travel Park, 4212 Whitney Road.

The purpose of the meeting was to follow-up the previous November 13, 2018 meeting after developing an alternative to allow full access into the current business. This proposed option added an ingress access north to align with Hinesley Road in conjunction with keeping the current access as a restricted right-in-right-out. The alternative required some reconfiguration of the RV sites in the northwest portion of the property. The RV sites were placed at 40' long x 16' wide at a 60° angle to optimize placement. The current sites in that location are approximately 40' long x 16' wide at varying angles. See Figure 3.5 Restway Travel Park Alternative 2.

Remainder of Page Intentionally Left Blank

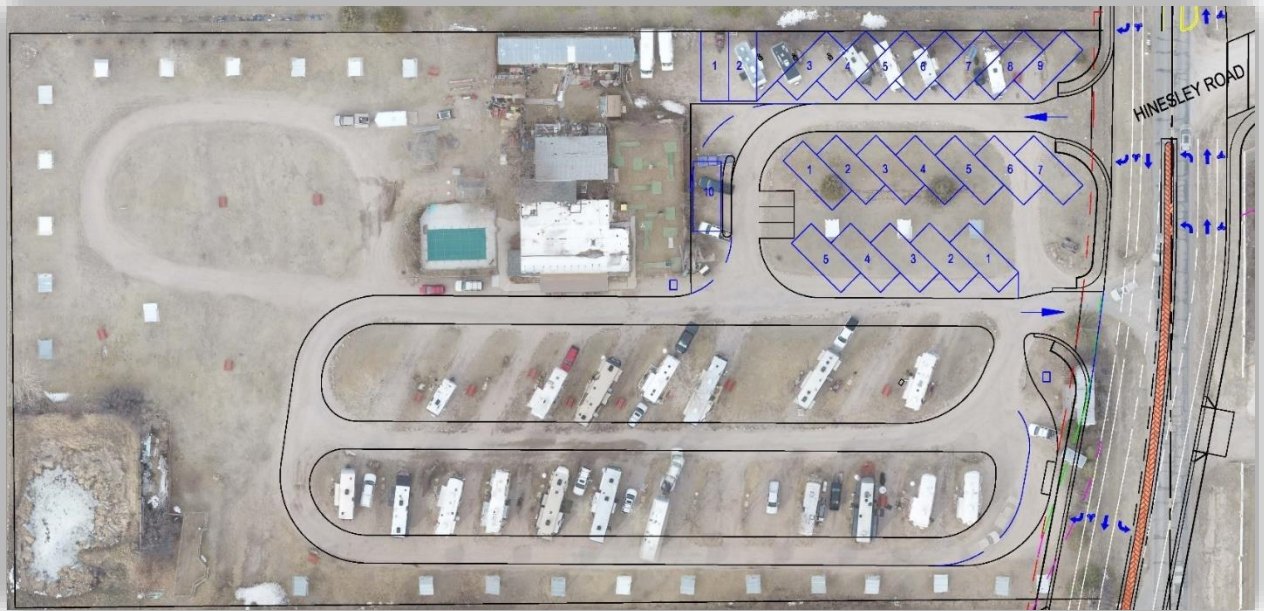


Figure 3.5 Restway Travel Park Alternative 2

The following notes are based on the MPO's understanding of the meeting, questions, and concerns.

Comments/Questions:

The owners expressed concern over the cost to reconfigure the RV sites and asked if they would they be compensated for the reconfiguration?

The MPO indicated that the design is only in the planning stages and a final design will need to be completed. Right-of-way negotiations for this project will be conducted by the WYDOT Right-of-way Section and they would be contacted during the final design phase of the project. It is our understanding that compensation is based on right-of-way area and damages (i.e. number and type of sites impacted) by the roadway modifications. The owners indicated that the impacts occur to different types of sites. Water, electric; water, sewer, and electric; tent sites. The MPO stated that each site would likely be valued at different levels depending on the type of site.

They also indicated that a one-way in and one-way out configuration is not the most desirable and could an alternative be developed for a two-way entry at each approach location?

The MPO will investigate the feasibility of developing a two-way entry/exist at each approach.



Could we review an option with increased RV site size and reconfiguration of the non-discharging sewer lagoon area and west portion of the site?

The MPO will investigate the feasibility of developing an alternative for re-imagined site for the lagoon area and the west portion of the site that could potentially add large RV sites.

Additional discussions:

Existing RV site sizes on the property are approximately 16' wide: south sites 50' depth, middle sites are 60' depth, and the northwest sites are 40' in depth. The angles and total length vary depending on angle of the site.

The minimum width of any reconfiguration of site shall be 25' to account for width of RV, extensions, and vehicle (16' + 9' = 25').

What are the costs to connect to the City of Cheyenne Board of Public Utilities sanitary sewer main south of the property?

The MPO will investigate the costs and the sizes of the RV sites are noted for future reference and information.

Meeting No. 4: March 12, 2019: 2:00 p.m. to 4:30 p.m.

Meeting attended by Karen Sherman, Restway Travel Park, Scott Sherman, Restway Travel Park, Kelly Bartlett, Restway Travel Park, and Tom Cobb, MPO. The meeting was conducted at Restway Travel Park, 4212 Whitney Road.

The purpose of the meeting was to present two additional conceptual plans for the owners to review and comment. The third conceived concept plan reconfigured the west and northwest portion of the RV park site utilizing a two-way entry/exit at each of the approaches previously shown. The north approach is a full movement access aligning with Hinesley Road while the south approach is widened in its current location with restricted right-in-right-out access. The RV campsites were placed at 60' long x 25' wide and were placed at 60° angle to optimize placement. The fourth concept similarly reconfigured the northwest and west portions of the RV Park as outlined in the third option except for a new two-lane drive realigned into the site office. The concept was also different in that it eliminated the south approach and shifted the north approach south. See Figure 3.6 Restway RV Travel Park Concept 4.

Remainder of Page Intentionally Left Blank

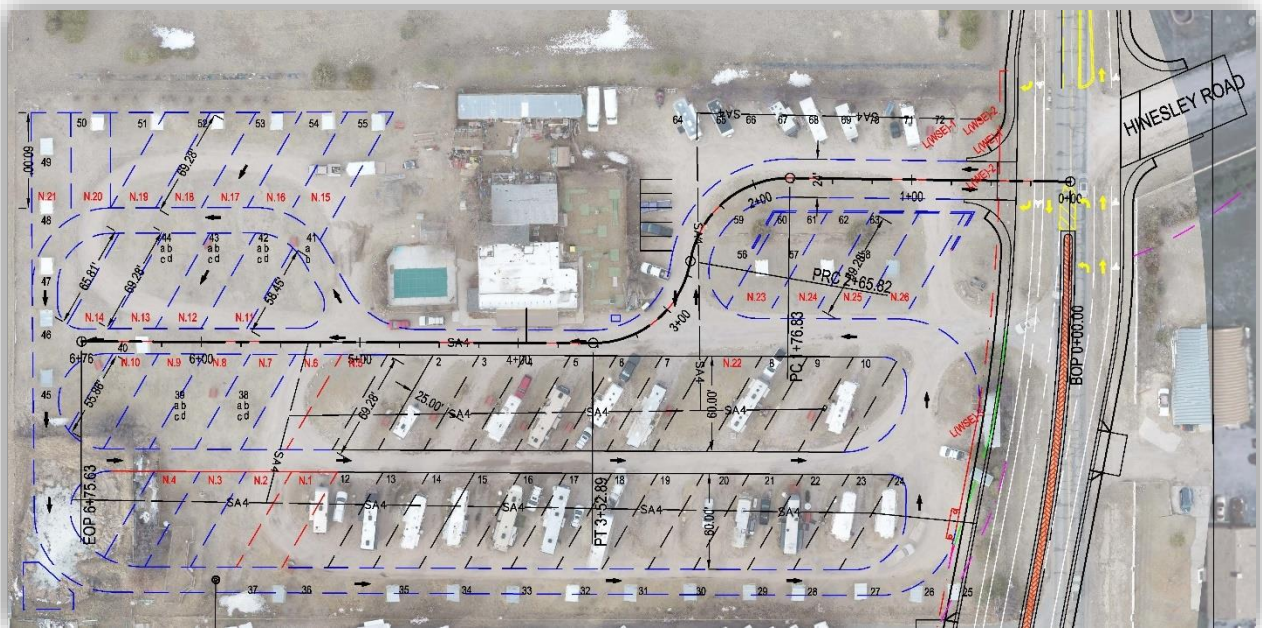


Figure 3.6 Restway RV Travel Park Concept 4

The following notes are based on the MPO's understanding of the meeting, questions, and concerns.

Comments/Questions:

The owners expressed deep concern over the cost to reconfigure of the RV sites and remove the evaporative lagoon on the southwest corner of the site.

They are concerned over the removal of the permanent mobile home on the west side of the site. They indicated it is a constant revenue source.

The MPO reiterated that this a planning study and a final design will need to be completed. The only modification required at this point of the Whitney Road Construction would be the northwest and west portion of the site. Additionally, the intent of the concept was to show the owners another way to look at the site. In this case, how many large RV sites could fit within your existing property.

Could the MPO look at the feasibility of realigning Hinesley Road to line up the Restway RV Travel Park approach rather than moving the approach to align with Hinesley?

The MPO will investigate the feasibility of developing an option to realign Hinesley Road to the south and coordinate with the adjacent property owners. Realigning Hinesley Road will require additional right-of-way acquisition.



Meeting No. 5: May 2, 2019: 2:00 p.m. to 3:30 p.m.

Meeting attended by Karen Sherman, Restway Travel Park, Scott Sherman, Restway Travel Park, Gay Woodhouse, Roden, Nethercott, LLC, Dave Bumann, Laramie County Public Works, Tom Mason, MPO, Tom Cobb, MPO. The meeting was conducted at the MPO office at 615 West 20th Street. The purpose of the meeting was to introduce the legal team hired by the owners to the MPO and briefly discuss the history and answer any questions.

The meeting began with an MPO overview and graphical presentation of the four concept plans developed along with the Concept Plan #5. Concept #5 realigned Hinesley Road to the south and relocated the approach for Restway RV Travel Park to the north Figure 3.7.

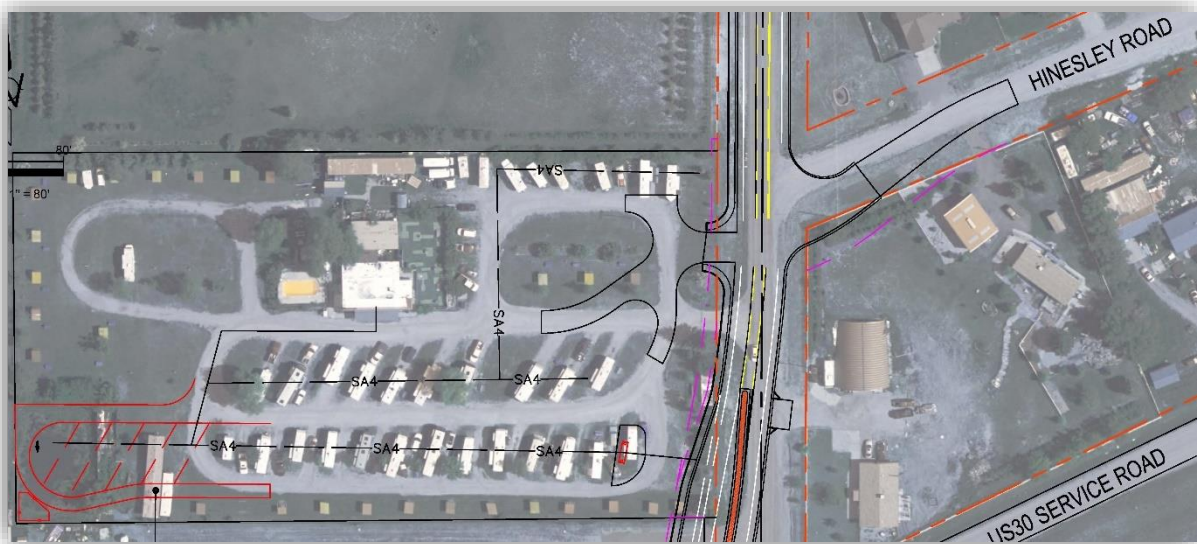


Figure 3.7 Restway Travel Park Concept 5

The following notes are based on the MPO's understanding of the meeting, questions, and concerns.

Comments/Questions:

The legal team had a question as why the U.S. 30 and Whitney Road Intersection was shifted to the west instead of the east which would have less burden on their client?

The MPO explained the reason to shift the intersection alignment to the west and not to the east was to remove the skew angle from Whitney to U.S. 30. This was based on two factors: first, the Saddle Ridge developers had just completed the new single-family homes and duplexes on the southeast corner of the intersection of U.S. 30 and Whitney Road; second, two underground petroleum transmission mains run parallel and follow the existing ground grade on each side of Whitney Road. The Suncor line is on the east side while the Plains All American Pipeline is on the west. We



understand from the pipe line companies that the transmission lines generally follow the existing ground grade and as a result begins to rise due to the topography on the east side of the right-of-way. Consequently, a significant intersection shift to the east will likely require relocating or lowering of the Suncor pipeline. Any adjustments to the Suncor pipeline on the east side of Whitney Road within the area of Saddle Ridge would require the jurisdiction (i.e. Laramie County/WYDOT) to pay for that relocation. This is based on the original and revised easement agreements (BK#1937, PG# 484). See Appendix G for additional information. To better illustrate the difference in the existing ground or depth of the petroleum lines see Figure 3.8 Whitney Road at U.S. 30 (Looking South) east is to the left in the photo.



Figure 3.8 Whitney Road at U.S. 30 (Looking South)

The owners expressed concerns over the negative impacts to the property and potential impact to the business because of the property change and construction period that would limit access.

The MPO explained that the construction activity would obviously disrupt normal business but, access would need to be maintained. This would be coordinated with WYDOT during final design and construction.

Additionally, the Restway Travel Park Concept incorporated more than just the realignment of Hinesley Road. The traffic engineering consultant (Kimley-Horn and Associates) for the Whitney Ranch developed the original traffic volume projections previously used to calculate the storage queue lengths for this project (Sustainable Traffic Solutions). Those volume projections and turn lane storage queue lengths were examined and recalculated by Kimley-Horn on the U.S. 30/Dell Range Corridor Study. Concept #5 utilized the revised storage queue lengths for the Whitney southbound left and right-turn lanes which were significantly reduced. The MPO would like to develop a Concept #6 which shifts the alignment by minimizing the design speed, incorporate new storage queue lengths, and independent parallel left turns for



southbound Whitney Road and the northbound Restway RV Park access. The MPO optimistically believes this option could provide significant reduction to the impact to the Restway RV Travel Park and meet the goals of the Whitney Road project.

The MPO will develop the Restway Travel Park Concept #6 and send to group for review.

One-on-one Meetings (Private Property: 6405 Hinesley Road)

Meeting No. 1: April 23, 2019: 2:00 p.m. to 4:00 p.m.

Meeting attended by Betty Beckle, Don Beckle, Zack Middelstadt, Stan Middlestadt, and Tom Cobb, MPO. The meeting was conducted at 6405 Hinesley Blvd. The purpose of the meeting was to present the Restway Travel Park Concept #5 conceptual plan for review by the impact owner and residences for review and comment.

The following notes are based on the MPO's understanding of the meeting, questions, and concerns. No comments or questions are specifically attributed.

Comments/Questions:

Placing a median on Whitney restricts access into their property and prevents them from backing in a tractor trailer combination headed southbound. What is the purpose of the median?

The proposed improvements addressed existing and potential safety concerns. Those safety concerns were as follows:

- Proximity of the service road intersection to the U.S. 30/Whitney Road Intersection (171.6' CL to CL spacing);
- Cut-through traffic observed to and from Saddle Ridge Subdivision via Saddle Ridge Trail to the U.S. 30 Service Road to Whitney Road and back;
- Projected increase in ADT on Whitney Road anticipated to increase from 2,746 (2017) to 9,400 (2040) or 10.54% per year.
- Conflicting northbound and southbound left turn movements overlap at the Restway RV Travel Park and Whitney Road.

The MPO discussed an option with the owners to have an access off the U.S. 30 Service Road in conjunction with the approach on Whitney Road. An access permit would need to be submitted to WYDOT.

The owner indicated that they were in favor of the combination of approaches to allow access and provide an opportunity for future commercial development. They indicated that a previous access permit was denied several years ago.

The MPO will introduce the concept to WYDOT for initial comment. The MPO cannot speak on behalf of WYDOT but, believes that based on the proposed future restricted access to the service road the new approach would likely not be denied at this time.



The owner and residence had no issue with realigning Hinesley Road and the impact to the northwest corner of the property. They indicated that portion of the property is not really being utilizing but, they would like to be compensated fairly if the right-of-way is required.

They indicated that two households occupy the single property at this time and the structures to the north and steel Quonset building are both garages. A single underground water well supplies water to the two homes and a single septic and leach field are located north of the west house on Whitney Road.

Storm runoff from Whitney Road and Hinesley Road significantly impacts the house on the southeast corner of the property due to existing grading and ditches. Additionally, a single pipe install by others conveys runoff from the property onto the U.S. 30 Service Road north ditch. The lowest elevation or invert elevation of pipe is close to the finished floor elevation of the west house. Could the pipe be modified to improve drainage on this project?

The MPO indicated that it would illustrate an "WYDOT M-1" inlet and relayed pipe be placed on the plan to alleviate the effect of storm water from the site. Additionally, the plan already shows curb and gutter, inlets, and a storm water conveyance system which will reduce the impact of small storms to the residence.

Planning Commission

The fourth structure component of the project involved updates and a final presentation to the Laramie County and City of Cheyenne Planning Commissions. The primary purpose of the meetings was to convey the comments received from the public input, present recommended solutions for the corridor, and have a forum for any additional comments from the public or the commissioners.

Cheyenne Metropolitan Planning Organization (Committee Meetings)

The fifth type of structure component involved presenting design development updates, soliciting input, and final approvals from the established Cheyenne Metropolitan Planning Organizations Technical Committee and Citizens' Advisory Committee, and Policy Committee.

Jurisdictional Meetings

The fifth type of structure component involved presenting design development updates and final adoption or reception of the plan by the Cheyenne Governing Body and Laramie County Commissioners.

Reference

The Collaboration or public involvement phase of the project provided one of the components utilized for development of the Design portion of the plan. Please see the "Glimpse" section of the plan, which encompasses the culmination of the collaboration components and rationale behind the recommendations set forth in the plan.



4.0 PROFILE

The Profile section contains a set of foundations which help frame the boundary of the plan. The four (4) foundations are listed and detailed in the following chapter:

- Foundation 1: Cheyenne's Future Land Use Plan
- Foundation 2: Key Planning Considerations
- Foundation 3: Potential Funding Mechanisms
- Foundation 4: Environmental Constraints

Foundation 1: Future Land Use Plan

The Future Land Use Plan is a long-range growth-focused map that provides the basis to guide future development in the City of Cheyenne and Laramie County areas of the Whitney Road Corridor. The map focuses on areas where new development will likely occur in the future and redevelopment areas. The Land Use for this area was not revised and was used as the basis for future traffic volumes. Please see Figure 4.1 Future Land Use Plan Detail and Figure 4.2 Future Land Use Plan Cheyenne Urban Area.

Foundation 2: Key-Planning Considerations

The Glimpse, Collaboration, and Profile phase of the project provide a framework for the future land development and corridor vision of the various stakeholders. The Whitney Road Corridor area has the potential to grow and develop as additional utility and roadway infrastructure become available and are appropriately sized for future capacity needs. The following structure considerations shape the corridor:

- Transit and Non-motorized Transportation
- Provide a safe, accessible and continuous pedestrian connection along the entire corridor
- Provide street lighting at intersections and non-motorized crossings where appropriate
- Provide shoulder bike lanes per the Cheyenne On-Street Bicycle Plan and Greenway Plan Update, Volume 1 by Update by Alta Planning + Design in 2012.
- Review options to expand the Greenway north of Dell Range Blvd. within the future developments for connectivity to schools and existing greenway components.
- Minimize impacts to nearby residential properties and businesses.

Traffic Safety and Operation

- Build a roadway cross section that enhances travel efficiency and accommodates all modes of transportation.
- Provide peak hour intersection operations with a minimum Level of Service (LOS) C through horizon year 2040.
- Attempt to maintain commercial and residential access approaches.
- Where appropriate, provide for proper turning radius at intersection to accommodate a conventional single unit truck, bus, or semi-trailer combination with a minimum wheelbase



of forty (40) feet (i.e. 3 to 4 axle), and maximum of sixty-five (65) feet (i.e. 5 to 6 axles).

Roadway Connectivity

- Review options to promote development in undeveloped open space.
- Review existing roadways and provide additional or enhanced street connectivity.

Utility Companies

- Consult with wet and dry utility companies to provide enhanced or improved facilities to that will facilitate redevelopment.
- Attempt to provide a dry utility corridor within the current or proposed road right-of-way corridor.

Cooperation

- Multiple public agencies or wet utilities that have areas of jurisdiction in the area: Laramie County Government, City of Cheyenne, WYDOT, Board of Public Utilities.

Foundation 3: Potential Funding Mechanisms

Keys to successful development and revitalization in the corridor will be predicated on the following:

- A clear vision, considering the market and economic reality.
- A proactive strategy for reinvestment (public and private).
- Educated citizenry and policy makers.
- Calculated strategy to attract investment and remove barriers.
- Quantifiable leveraged public investment.
- Fiscally and economically responsible phasing plan.
- Equalization of economic risk vs. reward.
- On-going project support (political).

The public sector (City of Cheyenne, Laramie County, Cheyenne MPO, and WYDOT) will play an important role in “readying the area for private investment” through infrastructure improvements, public planning and policy initiatives. From these initiatives and/or investments, private sector development and redevelopment can be leveraged.

Funding mechanisms for public infrastructure could include loans and grants (e.g., Wyoming Business Council’s Business Ready Community Program and Community Facilities Grant and Loan Program); Community Development Block Grant (CDBG) funds; 5th and 6th Penny Sales Tax projects revenue bonds; general obligation bonds; and Surface Transportation Program – Urban Systems (federal funds).

One of the “truths” in corridor development and revitalization is that private investment will typically follow public investment. The types of public infrastructure recommended in the Corridor Plan will not only encourage new development on vacant and/or underutilized parcels, but redevelopment of existing sites and buildings. This new private investment represents the “leveraged” return to the public sector from their initial investments.



Whitney Road Corridor Plan

Profile

August 2020

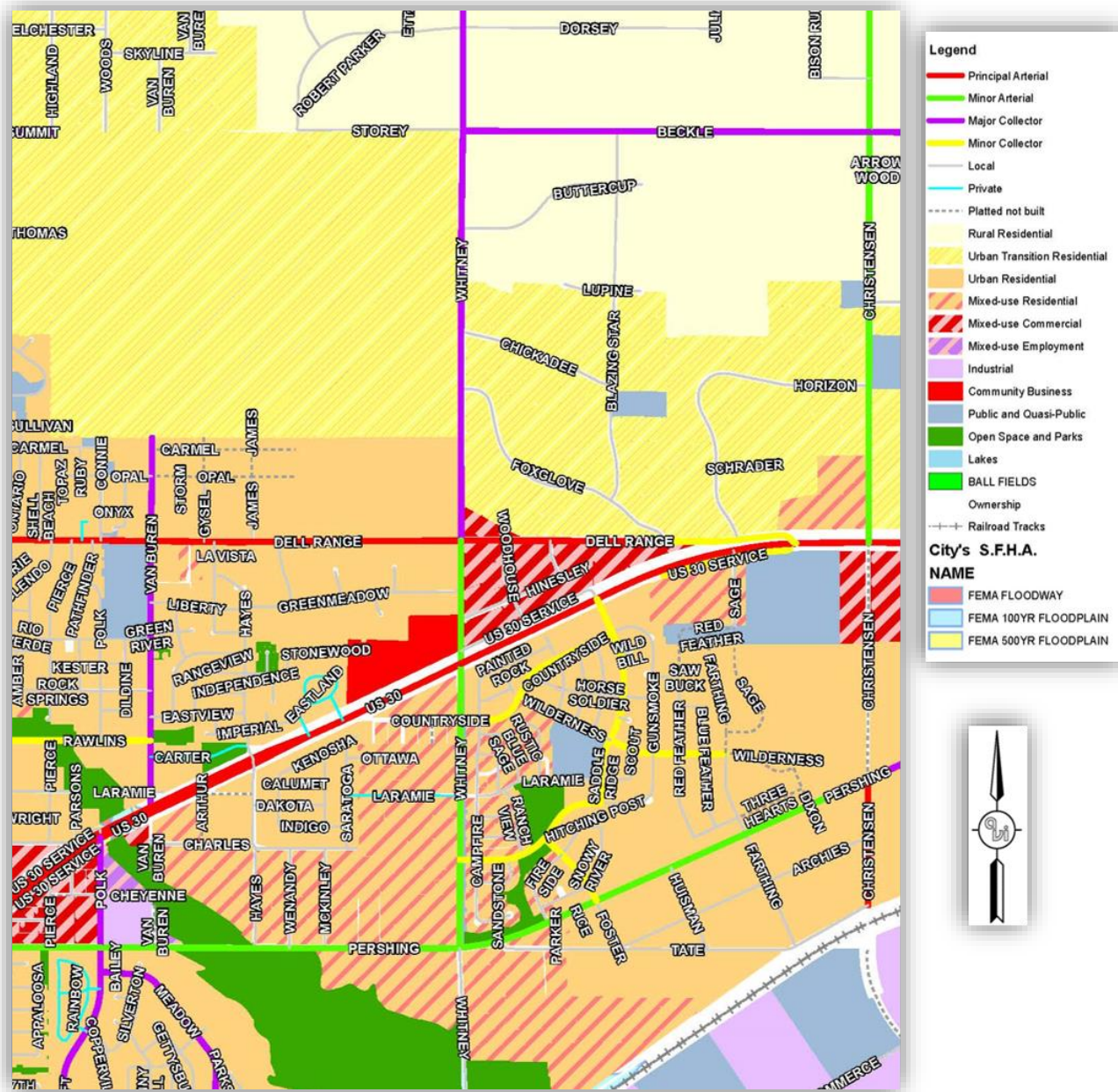


Figure 4.1 Future Land Use Plan Detail



Whitney Road Corridor Plan

Profile

August 2020

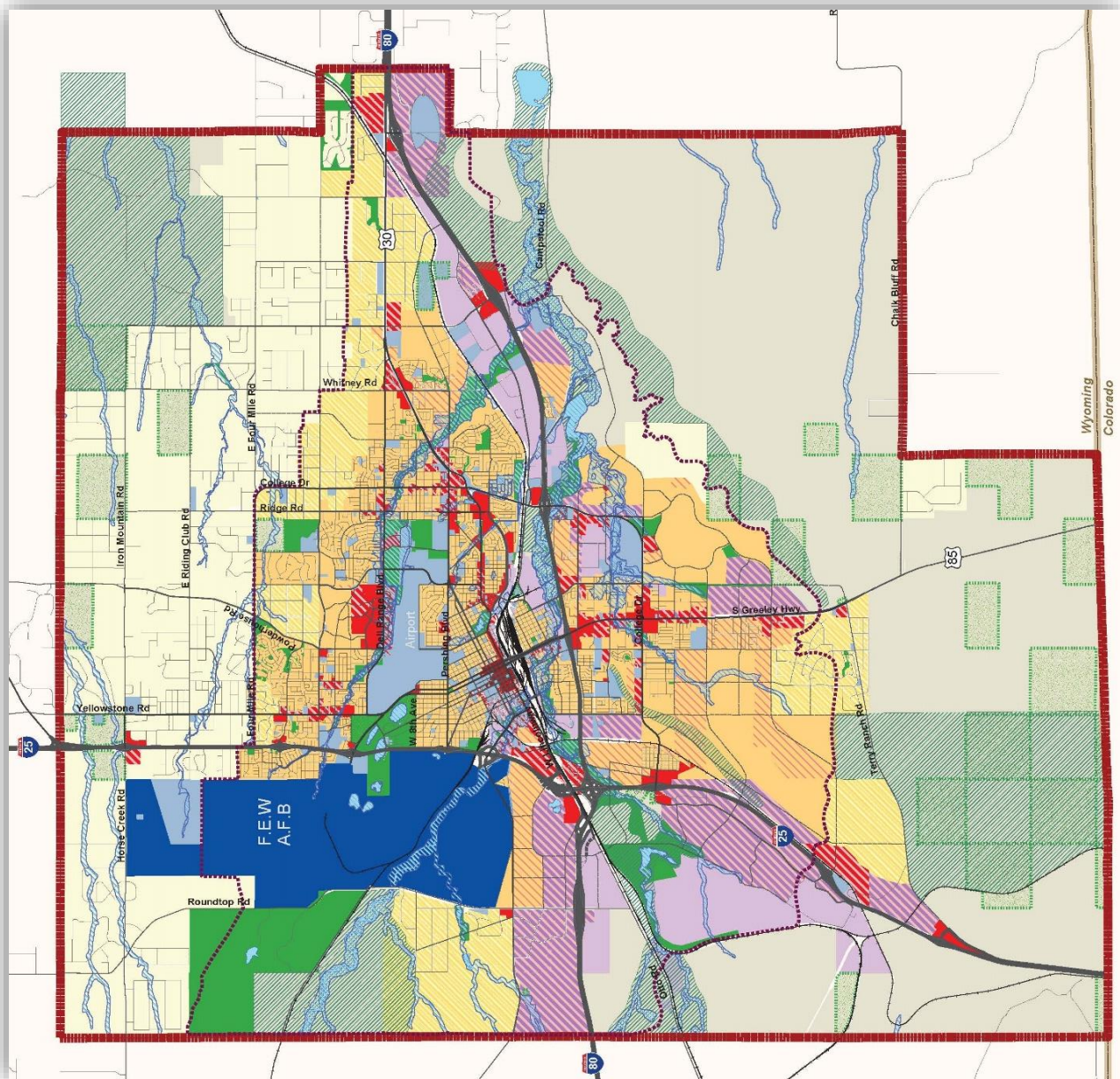
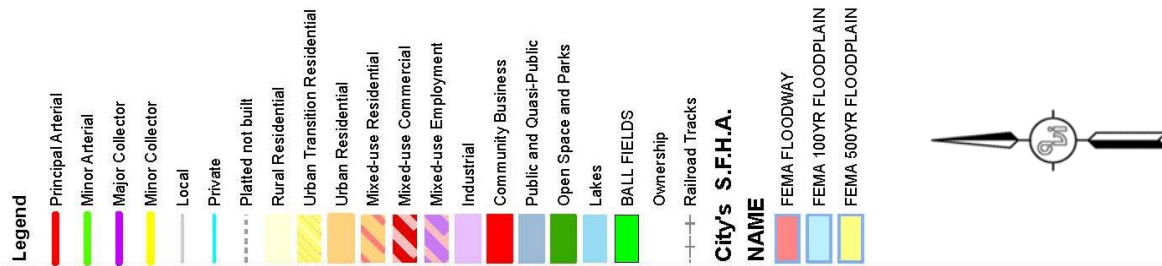


Figure 4.2 Future Land Use Plan Cheyenne Urban Area



Foundation 4: Environmental Constraints

The following environmental checklist Table 4.1 Environmental Review Corridor Checklist was reviewed for the corridor to identify any areas of environmental concern that may need to be addressed in future development of the corridor plan, roadway design, and construction.

A formal environmental report will likely be required to secure funding before and/or during the final design phases of the project.

The MPO conducted a desktop survey for the existing and potential alternatives and identified potential wetlands that are regulated by the Army Corps of Engineers (ACOE). No waters of the U.S. were identified. Please see Figure 4.3 Potential Wetlands Whitney Road and desktop environmental report contained in Appendix F for additional information and reference.



Figure 4.3 Potential Wetlands Whitney Road



Whitney Road Corridor Plan

Profile

August 2020

Table 4.1 Environmental Review Corridor Checklist

Resource or issue	Is the resource or issue present in the area?	Are impacts to the resource or issue involvement possible?	Are the impacts mitigable?	Discuss the level of review and method of review for this resource or issue and provide the name and location of any study or other information cited in the planning document where it is described in detail. Describe how the planning data may need to be supplemented during NEPA.
Natural Environment				
Threatened or Endangered Species	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<p>Further investigation will be required during final design but not anticipated to be a factor. Review of area and U.S. Fish & Wildlife website. Unofficial US fish and Wildlife Service online database suggests the following:</p> <p>Mammals : Preble's meadow jumping mouse, Least Tern, Piping Plover, Whooping Crane, and Pallid Sturgeon. Flowering Plants: Colorado Butterfly Plant, Ute Ladies'-tresses, Western Prairie Fringed Orchid.</p> <p>While these species have some potential, it is unlikely they are present. However, specific species/habitat surveys may be required once an alignment is selected. We are still waiting on response from the FWS from our letter request.</p>
Wildlife Corridors	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Not applicable	<p>Further investigation will be required during final design but not anticipated to be a factor. Based on WGFD GIS data, no wildlife corridors cross or are in the area.</p>
Invasive Species	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<p>Further investigation will be required during final design but not anticipated to be a factor.</p>



Whitney Road Corridor Plan

Profile

August 2020

Resource or issue	Is the resource or issue present in the area?	Are impacts to the resource or issue involvement possible?	Are the impacts mitigable?	Discuss the level of review and method of review for this resource or issue and provide the name and location of any study or other information cited in the planning document where it is described in detail. Describe how the planning data may need to be supplemented during NEPA.
Natural Environment (Continued)				
Wetland Areas	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Further investigation will be required during final design but not anticipated to be a factor. Please see Appendix F and Figure 4.3 for additional information and reference.
Riparian Areas	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Not applicable	Observation
100-Year Floodplain	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Not applicable	FEMA website and County GIS review. (see Glimpse: Drainage; Figure 2.7)
Clean Water Act Sections 404/401 Waters Of The United States	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Not applicable	WYDEQ identified no Class I waters, but further detailed design/layouts will be needed to determine what if any permits will be required from the Army Corps of Engineers and WYDEQ-WQD.
Prime Or Unique Farmland	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	The USDA National Resources Conversation Service of Laramie County Custom Soil Survey identified Sections of Prime or Unique Farmlands in the area (i.e. Map Unit Symbol: 100) and areas of Prime Farmland, if irrigated (Map Unit Symbol 102, 104, 158). See Appendix F Soil Survey.



Whitney Road Corridor Plan

Profile

August 2020

Resource or issue	Is the resource or issue present in the area?	Are impacts to the resource or issue involvement possible?	Are the impacts mitigable?	Discuss the level of review and method of review for this resource or issue and provide the name and location of any study or other information cited in the planning document where it is described in detail. Describe how the planning data may need to be supplemented during NEPA.
Natural Environment (Continued)				
Wild and Scenic Rivers	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Observation and public process. Visual leisure in the case is "open space/aerial". Although this is subjective it may have impacts throughout the corridor.
Designated Scenic Road/Byway	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Formal survey was not completed; however, the Disturbed nature of the area would suggest that it is unlikely to find surface deposits. Buried artifacts may be possible. Formal surveys are likely once an alternative is selected. We are still waiting on a response from SPHO from our letter request.
Cultural Resources				
Archaeological Resources	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Formal survey was not completed; however, the Disturbed nature of the area would suggest that it is unlikely to find surface deposits. Buried artifacts may be possible. Formal surveys are likely once an alternative is selected. We are still waiting on a response from SPHO from our letter request.
Historical Resources	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Observation



Whitney Road Corridor Plan

Profile

August 2020

Resource or issue	Is the resource or issue present in the area?	Are impacts to the resource or issue involvement possible?	Are the impacts mitigable?	Discuss the level of review and method of review for this resource or issue and provide the name and location of any study or other information cited in the planning document where it is described in detail. Describe how the planning data may need to be supplemented during NEPA.
Section 4(f) and Section 6(f) Resources				
Section 4(f)1 Wildlife and / or Waterfowl Refuge	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	No impacts are anticipated based on observation.
Section 4(f) Historic Site	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	A section 106 Study will be required to determine potential impacts however, the area was not listed on the SHPO website.
Wild and Scenic Rivers	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Observation
Section 4(f) Park	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Observation
Section 6(f)2 Resource	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	

¹ Section 4(f) of the U.S. Department of Transportation Act of 1966 (49 U.S. Code § 303, as amended); see <Section 4(f)>.

² Section 6(f) of the Land and Water Conservation Fund Act



Whitney Road Corridor Plan

Profile

August 2020

Resource or issue	Is the resource or issue present in the area?	Are impacts to the resource or issue involvement possible?	Are the impacts mitigable?	Discuss the level of review and method of review for this resource or issue and provide the name and location of any study or other information cited in the planning document where it is described in detail. Describe how the planning data may need to be supplemented during NEPA.
Human Environment				
Existing Development	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Existing approaches, fences and right-of-way will be necessary to complete the project based on the preliminary plan.
Planned Development	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Potential development is anticipated on underdeveloped properties based on discussions with adjacent boundaries.
Displacements	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Possible impacts to adjacent business adjacent to the existing Whitney because of realignment of south Whitney.
Access Restriction	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Observation
Neighborhood Continuity	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Observation



Whitney Road Corridor Plan

Profile

August 2020

Resource or issue	Is the resource or issue present in the area?	Are impacts to the resource or issue involvement possible?	Are the impacts mitigable?	Discuss the level of review and method of review for this resource or issue and provide the name and location of any study or other information cited in the planning document where it is described in detail. Describe how the planning data may need to be supplemented during NEPA.
Human Environment (Continued)				
Community Cohesion	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Public Involvement process.
Physical Environment				
Title VI/Environmental Justice Populations ³	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Not applicable	
Utilities	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Observation See Section Glimpse; Utilities.
Hazardous Materials	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Observation

³ refers to Title VI of the 1964 Civil Rights Act and 1994 Executive Order 12898 on environmental justice



Whitney Road Corridor Plan

Profile

August 2020

Resource or issue	Is the resource or issue present in the area?	Are impacts to the resource or issue involvement possible?	Are the impacts mitigable?	Discuss the level of review and method of review for this resource or issue and provide the name and location of any study or other information cited in the planning document where it is described in detail. Describe how the planning data may need to be supplemented during NEPA.
Physical Environment (Continued)				
Sensitive Noise Receivers ⁴	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	Adjacent Neighborhoods
Air Quality	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	
Energy	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Not applicable	

Resource Areas Requiring Potential Further Review

Based on a desktop review and observation, the following resource areas may require additional review and are summarized below:

- Threatened or Endangered Species
- Visual Resources
- Wetland Areas
- Prime or Unique Farmland
- Archaeological Resources
- Displacements
- Existing Development
- Planned Development
- Utilities
- Energy.

⁴ under FHWA's Noise Abatement Criterion B: picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals



5.0 DESIGN

The Glimpse, Collaboration, and Profile phase of the project provided a solid basis for development of the Design portion of the plan. The design section of the plan encompasses the culmination of the groundwork components and rationale behind the recommendations set forth in the plan.

The overall recommendations are specifically designed to address the modes of transportation and safety needs of the present and future users of the Whitney Road. All recommendations have been examined carefully to ensure the requests of the stakeholders have been considered as well as their practicality, functionality, aesthetic appeal, sustainability, and successful implementation. The physical layout of the improvements are detailed in the following pages and can be found on the corridor plan and profile sheets contained in Appendix A. Detailed cost estimates are shown in Appendix D.

Roadway Concept Alternatives

The conceptual roadway “typical” alternatives were developed and evaluated using a multi-modal framework as a base. At intersections and other locations with unique design challenges (e.g. driveways, areas with limited sightline, skew, etc.), special designs and modifications may be needed to address issues of road geometry, adjacent land uses, traffic volumes and other characteristics. The Whitney Road Corridor Study evaluated conceptual improvement alternatives for the roadway segments and streetscape with the following framework components:

- What are the existing and future adjacent conditions and uses?
- What variations can be made to create a more user-friendly corridor?
- What movements and interactions will take place on the corridor?
- What is the corridor vision of the stakeholders?
- What can we do to add low maintenance streetscape to “soften” the corridor for non-motorized modes of transportation?
- Current City of Cheyenne Unified Development Code (UDC) and Laramie County Land Use Regulations (LCLU) typical sections based on roadway classifications.

Remainder Of Page Intentionally Left Blank



Design Guide Criteria

The roadway corridor is comprised of two different roadway classifications with corresponding criteria developed from industry standards and a merging of two independent jurisdictional criteria (i.e. Laramie County and City of Cheyenne).^{1 2 3}

(Minor Arterial: South of Dell Range Blvd.)

- Roadway Classification: Minor Arterial
- Minimum Design Speed: 30 mph (Intersection of U.S. 30); 40 mph (Corridor)
- Clear Zone Width: 16 feet (ADT > 6,000), 1V:5H to 1V:4H
14 feet (ADT > 6,000), 1V:6H
- Stopping Sight Distance: 30 mph: 200 feet; 40 mph: 305 feet
- Passing Sight Distance: 30 mph: 500 feet; 40 mph: 600 feet
- Crest Vertical Curve: K = 89 (30 mph); K= 129 (40 mph): Passing Sight Distance
K = 19 (30 mph); K=44 (40 mph): Stopping Sight Distance
- Sag Vertical Curve: K = 37 (30 mph); K=64 (40 mph)
- Grade (Max./ Min.): 6%/ 0.5%
- Design Vehicle: WB-67
- Horizontal Curve CL: R = 333' (30 mph); R = 762' (40 mph): Adverse Crown: -2.0%
- Transitions: $L = WS^2/60 = W(30 \text{ or } 40)^2 / 60$

(Major Collector: North of Dell Range Blvd.)

- Roadway Classification: Major Collector
- Minimum Design Speed: 35 mph
- Clear Zone Width: 12 feet (ADT 1,500-6,000), 1V:5H to 1V:4H
10 feet (ADT 1,500-6,000), 1V:6H
- Stopping Sight Distance: 35 mph: 250 feet
- Passing Sight Distance: 35 mph: 550 feet
- Crest Vertical Curve: K = 108 (Passing Sight Distance)
K = 29 (Stopping Sight Distance)
- Sag Vertical Curve: K = 49 (Stopping Sight Distance)
- Grade (Max./ Min.): 8%/ 0.5%
- Design Vehicle: WB-40
- Horizontal Curve CL: R = 510' (Adverse Crown: -2.0%)
- Transitions: $L = WS^2/60 = W(35)^2 / 60$

¹ A Policy on Geometric Design of Highways and Streets (Officials, A Policy on Geometric Design of Highways and Streets, 2018)

² City of Cheyenne Unified Development Code (Last Amended Cheyenne, 2017), (Cheyenne, 2017)

³ The Laramie County Land Use Regulations (2019 Edition Laramie County, Effective January 1, 2019)



Future Traffic Volume Conditions

Traffic volume projections were developed for Year 2040 by Kimley-Horn to estimate the impacts of the traffic growth on the corridor. Projected peak hour volumes were developed for the key intersections along the corridor as well as daily volumes for the links along the corridor using the following process.

- **Background Traffic**, the existing peak hour and daily volumes were inflated by 1.25% annually to estimate the growth in background traffic along the corridor. This rate is used by the MPO and WYDOT to estimate traffic growth in the Cheyenne metropolitan area which was developed in the City of Cheyenne Transportation Plan.
- **Development Traffic**, the year 2040 estimated trips that are expected to be generated by the new development/ redevelopment areas adjacent to the corridor were distributed and assigned to the intersections utilizing Figure 4.1 Future Land Use Plan Detail and Figure 4.2 Future Land Use Plan Cheyenne Urban Area in addition to the Whitney Ranch Traffic Impact Study.
- **Total Traffic**, the background traffic was combined with the development traffic to estimate year 2040 total traffic. The year 2040 volumes peak hour and daily volumes are summarized in *Figure 5.2 Today and 2040 Projected Volumes (ADT)* and *Figure 5.3 2040 Projected Peak Hour and ADT Overall Volumes*.

Cross Sectional Elements

Lane Widths

As shown in Table 5.1 Ultimate Typical Section Jurisdictional Comparison, lane width requirements vary between the jurisdictional entities from ten to twelve (10-to-12) feet. According to AASHTO (*Officials A. A., A Policy on Geometric Design of Highways and Streets, 2018*) and our experience, smaller lane widths may be used in more constrained areas where truck and bus volumes are relatively low and where speeds are less than 45 mph. Lane widths of eleven (11) feet wide are frequently used in urban street designs while twelve (12) foot wide lanes are desirable on high speed, free flowing corridors.

After extensive discussion between the design team and Steering Committee, we recommend the use of eleven (11) foot wide travel lanes on Whitney Road. This width still accommodates larger design vehicles and allows increases the available tree lawn width, which can be used for snow storage, pedestrian separation, and drainage.

Remainder Of Page Intentionally Left Blank



Table 5.1 Jurisdictional Cross Section Elements Comparisons

Description	Minor Arterial			Major Collector		
	City of Cheyenne (1)	Laramie County (2)	2018 AASHTO (3)	City of Cheyenne (1)	Laramie County (2)	2018 AASHTO (3)
Travel Lane width	12'	12'	10' – 12'	12'	11'	11'
Turn Lane width	12'	12'	Context	12'	12'	Context
Parking	none	none	Context	none	None	7' to 10'
Roadway Width	48'	48'	Volume	48'	44'	Volume
Sidewalk/ Pedestrian Area	6'	6'	Context	6'	6'	Context
Parkway/ Tree Lawn	8'	8'	-	8'	5'	-
Bike Lane/ Shoulder	6'	6'	8'	6'	6'	6'
Volume Capacity (ADT)	7,500 – 18,000	7,500 – 15,000	>2,000	6,000 – 10,000	3,500 – 7,500	>2,000

Curbs

The type and location of curbs affect driver behavior and safety. Curbs serve many purposes including drainage control, roadway edge delineation, delineation of pedestrian walkways, and access control. Although curbs are not considered fixed objects in the context of a clear zone obviously, they will affect impacting or overriding car movements, after discussion within the public, design team and Steering Committee, we recommend the use of curb and gutter on Whitney Road. Curb and gutter will provide better access control and pedestrian delineation for use by pedestrians, young school children, and control drainage.

Bicycle Facilities

Bicycling is becoming increasingly popular as a means of transportation and recreation in Cheyenne. To promote and support multi-modal transportation both the Unified Development Code of the Cheyenne, Wyoming (UDC) and the Laramie County Land Use Regulations make provisions for bike lanes on both the major collector and minor arterial street sections (See Table 5.1 Jurisdictional Cross Section Elements Comparisons).

This ensures a comprehensive, continuous, safe, and efficient bicycle system network within the urban boundary of Cheyenne and Laramie County. Multi-modal corridor design emphasis provides safe, efficient, and convenient movement of all modes of transportation including vehicles, bicycles, and pedestrians. A Bike Lane is defined as a designated area of the roadway favored or exclusive to bicyclists while a separated multi-use pathway provides the broadest opportunity for a variety of non-motorized transportation modes. Advanced commuter cyclists seem to prefer riding within the roadway.

Whitney Road was designated for a "Shoulder Bikeway" while Dell Range Blvd has been designated for a "Buffered Bike Lane," and US 30 for a "Greenway" in the *September 2012 Cheyenne On-street Bicycle Plan and Greenway Plan Update* [4].



The Urban Bikeway Design Guide by the *National Association of City Transportation Officials* (Officials N. A., 2014) recommends the following conventional bike lane standard.

- **Conventional Bike Lanes.** A 6-inch to 8-inch stripped area with a minimum width of four (4) feet when no curb and gutter is present, five (5) feet when adjacent to curb and gutter, and six (6) feet where right-of-way allows.
- **Buffered Bike Lanes.** The buffer shall be no less than 18 inches wide and marked with two 6 to 8-inch-wide solid white lines. If the width is three (3) feet or wider, the buffer area shall have interior diagonal cross hatching or chevron markings. The chevron markings shall be 4 inch white angled at 30 to 45 degrees at intervals of 10 to 40 feet.

After discussion with the public, design team and Steering Committee, we recommend the use of additional on-street shoulder / bike lane on the Whitney Road Corridor.

Pedestrian Facilities

The need for continuous and updated pedestrian facilities and accessible facilities are fundamental to encourage redevelopment, development, and promote an efficient and fair transportation system. All people benefit from pedestrian facilities, however youth, seniors, physically, economically, and socially disadvantaged people require non-automobile options which provide convenient and safe multi-modal connectivity.

The need for pedestrian facilities received moderate support during the public process for Whitney Road. This is likely due to the rural nature of the area which naturally promotes the use of motorized vehicle transportation. As this area begins to develop and redevelop the need for pedestrian facilities will become a paramount necessity on the corridor. Discussions during the planning process centered on utilizing two types of facilities:

- Shared Use Path. A multi-use path designed primarily for use by bicyclists and pedestrians, including pedestrians with disabilities for transportation and recreation purposes. Shared use paths are physically separated from motor vehicle traffic by an open space or barrier. They are either within the right-of-way or within an independent right-of-way or easement.
- Sidewalks. A well-maintained sidewalk provides a safe and accessible conduit for pedestrian movement and access which enhances connectivity and promotes walking. The Urban Street Design Guide by the National Association of City Transportation Officials (Officials N. A., 2014) recommends that sidewalk have a desired minimum through zone of 6 feet and absolute minimum of 5 feet. Where sidewalk is directly adjacent to moving traffic, the desired minimum is 8 feet, providing a two-foot buffer for street furnishings and utilities.

After discussion with the public, design team and Steering Committee, we recommend the use of 6' sidewalks on each side of the roadway south of Dell Range Blvd. and a 7' multi-use path on the east side of the corridor north of the Dell Range Blvd. on the Whitney Road Corridor.



Safety Medians

The primary function of medians is safety. They separate traffic streams, guide turning movements at intersections, and provide access control to/from minor access drives and intersections. It is very important that medians be delineated in a way that makes them visible and distinguishes them from the adjacent driving lanes. Curbed medians and traffic islands provide an added benefit by “softening” the urban roadway edge and subjectively enhance the aesthetic quality when utilizing a combination of the material types.

Three (3) types of medians are most common in the urban roadway environment: raised, flush, and two-way left-turn lanes.

- **Raised Medians.** A raised median is used in urban streets where it is desirable to control or restrict mid-block left turns and cross maneuvers. Installing a raised median can result in the following benefits:
 - Improve traffic safety
 - Restrict left-turn and crossing maneuvers to specific locations or certain movements
 - Increase capacity and reduce delays
 - Provide a pedestrian refuge area (minimum of six (6) feet wide).
 - AASHTO (Officials A. A., A Policy on Geometric Design of Highways and Streets, 2018) recommends that intersection median turn lanes have a minimum medial separator of four (4) feet between turning lane and opposing traffic. Additionally, they recommend that with wider medians, consideration should be given to offsetting the left-turn lanes to provide maximum visibility between opposing traffic volumes.
- **Flush Medians.** Flush medians are surface painted medians that can be traversed. (Although they discourage left-turn and crossing maneuvers by their striping configuration, they do not prevent left turns because the median can be easily crossed).
- **Two-way Left-turn Lane.** Two-way left-turn lanes (TWLTL) are flush medians that may be used for left turns by traffic from opposing directions on the street. AASHTO (Officials A. A., A Policy on Geometric Design of Highways and Streets, 2018) recommends the use of a TWLTL on arterials with numerous cross streets, commercial, residential drives, or where it is impractical to limit left turn movements.

After discussion and evaluation by the public, design team, and Steering Committee, we recommend the use of all three types of medians at appropriate locations along the corridor. Please see Appendix A for additional detail. The medians will only be used at locations near major intersections at Dell Range Blvd. and U.S. Highway 30 for safety and access control.

Remainder of Page Intentionally Left Blank



Auxiliary Lanes (Speed-Change Lanes)

The existing corridor would be governed under the jurisdiction of WYDOT, Laramie County, and the City of Cheyenne. Their criteria along with AASHTO, and the National Cooperative Highway Research Program (Kay Fitzpatrick, 2014) Report 780, Design Guidance for Intersection Auxiliary Lanes was utilized for reference and information. A summary of the individual criteria is summarized in Table 5.2 Jurisdictional Left and Right Turn Warrant Criteria and careful consideration was given to the proposed conceptual alternatives to use the safest and most practical deceleration length on the corridor. Therefore, due to the proximity of access approaches, and expected relatively lower speeds approaching intersections, a one-hundred (100) foot deceleration length is recommended to be applied to the auxiliary lane development on Whitney Road and four hundred fifteen (415) foot on U.S. 30 with corresponding tapers 100' and 150' minimum tapers, respectively. If specific site conditions did not allow development of a full deceleration lane, it was so noted. Consequently, for a twelve (12) foot auxiliary lane, this equates to approximately an 8.3:1 on Whitney Road and 12.5:1 on U.S. 30.

Left Turn Lane, AVI recommends that a left-turn deceleration lane and taper are required for any access with a projected peak-hour ingress turning volume greater than 10 vehicles per hour (vph). The taper length shall be included with the required deceleration length

Right Turn Lane, A right-turn deceleration lane and taper is required for any access with a projected peak hour ingress turning volume greater than 25. The taper length should be included within the deceleration length.

Table 5.2 Jurisdictional Left and Right Turn Warrant Criteria

Criteria	Through	Left-turn	Right-turn	Notes
	Turning Volume [Vehicles per hour (vph)]			
City of Cheyenne	NA	> 10 vph	> 25 vph	12' (no less than 10')
Laramie County	> 10 vph	> 10 vph	> 25 (Program, 2014) vph	12' (no less than 10')
NCHRP 780	250	15	-	-

Remainder Of Page Intentionally Left Blank



Table 5.3 Jurisdictional Requirements for Deceleration and Tapers for Auxiliary Lanes

Design Speed	Stop Condition	15 MPH Turns	Minimum Taper Ratio
	Deceleration Length (feet)		
AASHTO 2018			
30	150'	-	8:1
35	205'	-	8:1 to 15:1
40	265'	-	8:1 to 15:1
50	415'	-	15:1
55	505'	-	15:1
60	600'	-	15:1
City of Cheyenne			
35	275'	235'	10:1
40	315'	295'	11.5:1
50	435'	350'	13:1
Laramie County			
30	235'	185"	8:1
35	275'	235'	10:1
40	315'	295'	11.5:1
50	435'	405'	15:1
WYDOT			
40	275'	-	150' (12.5:1)
50	410'	-	150' (12.5:1)
55	485'	-	150' (12.5:1)
NCHRP 788			
30	170'	80'	180' (15:1)
35	230'	120'	245' (20.4:1)
40	290'	170'	320' (26.7:1)
50	460'	290'	600' (50:1)
60	650'	460'	720' (60:1)

Intersection Storage Lengths

All intersection storage lengths in the study were calculated by Kimley Horn using Synhro® 10 Signal Timing and Analysis Software based on future signalization, 2040 traffic volumes, signal cycle length, and signal phasing assumptions. Assumption details can be found in Appendix E. The lengths shown were used to develop the recommended intersection layouts shown in Appendix A and the document.



Table 5.4 Intersection Storage Lengths

Intersection/ Movement	Minimum Turn Bay Length (ft) ⁴		Thru Movement Storage		Recommended Auxiliary Turn Lane Lengths (ft)			
	AM	PM	AM	PM	Storage	Decel.	Taper	Total
Whitney Road (DS = 30 mph) at Dell Range Blvd. (DS = 40 mph)								
Eastbound Left (EBL)	28'	m 23'	82'	#599'	125'	265'	100'	290'
Westbound Left (WBL)	M 21'	m10'	#506'	355'	100'	265'	100'	265'
Northbound Left (NBL)	168	m#134	134'	#451	100'	150'	100'	250'
Southbound Left (SBL)	56	#107	#452'	318'	100'	150'	100'	250'
Whitney Road (DS = 30 mph) at U.S. 30 (DS = 50 mph)								
Eastbound Left (EBL)	53'	m 227'	28'	m 126'	375'	415'	150'	790'
Eastbound Right (EBR)	0'	m 15'			100'	415'	150'	365'
Westbound Left (WBL)	m 4'	55'	204'	98'	100'	415'	150'	365'
Westbound Right (WBR)	13'	50'			100'	415'	150'	365'
Northbound Left (NBL)	192'	112'	96'	95'	100'	150'	100'	250'
Southbound Left (SBL)	m 4'	m 19'	m 34'	m 70'	150'	150'	100'	300'
Southbound Right (SBR)	m 193'	m 130'			200'	150'	100'	350'

Provision for Dry Utilities

As previously described in the study, utilities are interlaced in the corridor area and are both underground and overhead. Obviously, utilities should desirably be located underground or at the edge of the right-of-way, when practical. Based on the constrained right-of-way width of 80 feet, we would recommend that new developments have dry utility facilities relocate underground and within easements outside of the existing corridor.

Remainder Of Page Intentionally Left Blank

⁴ m - Volume for 95 percentile queue is metered by upstream signal

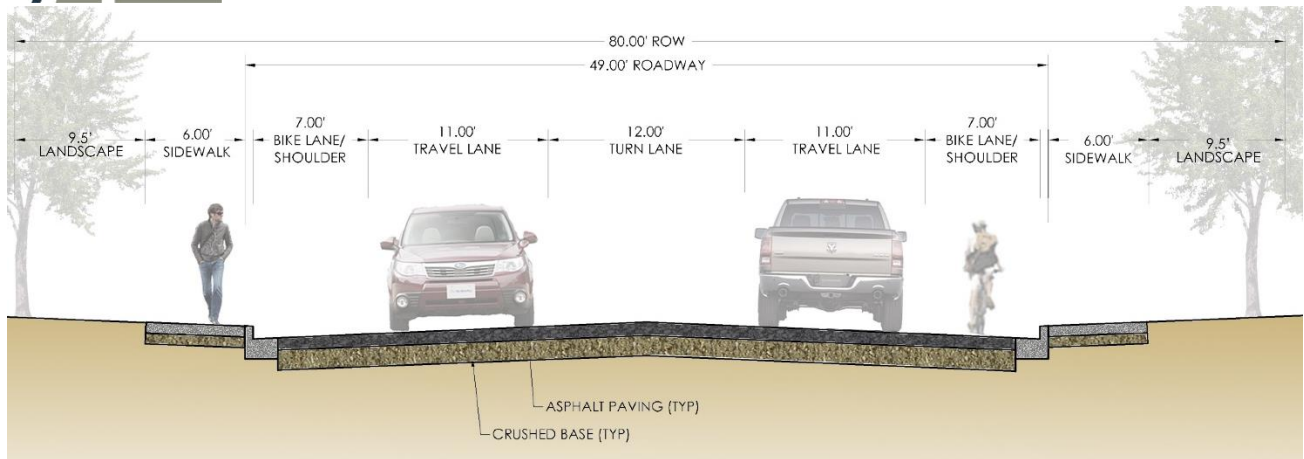
- 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles



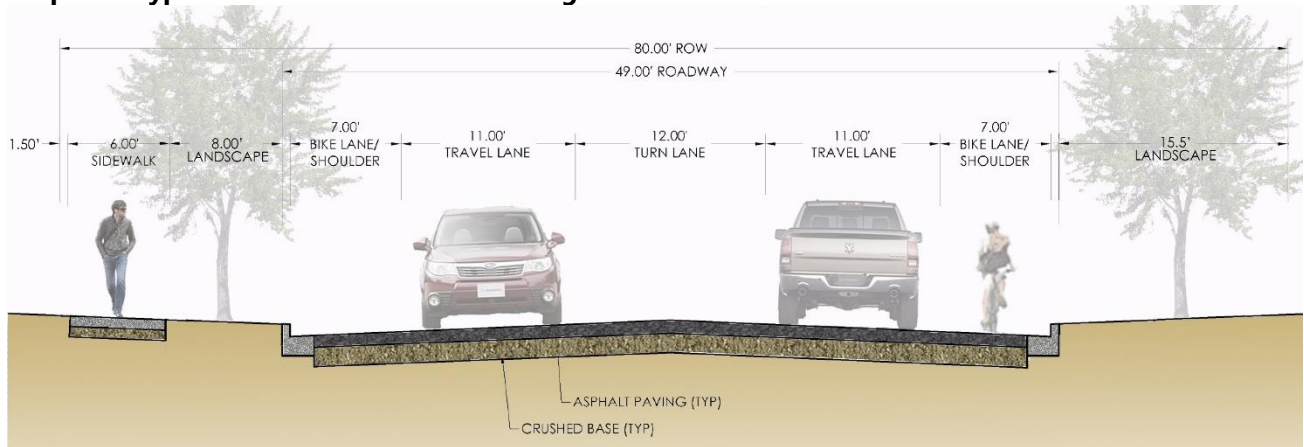
Whitney Road Corridor Plan

Design

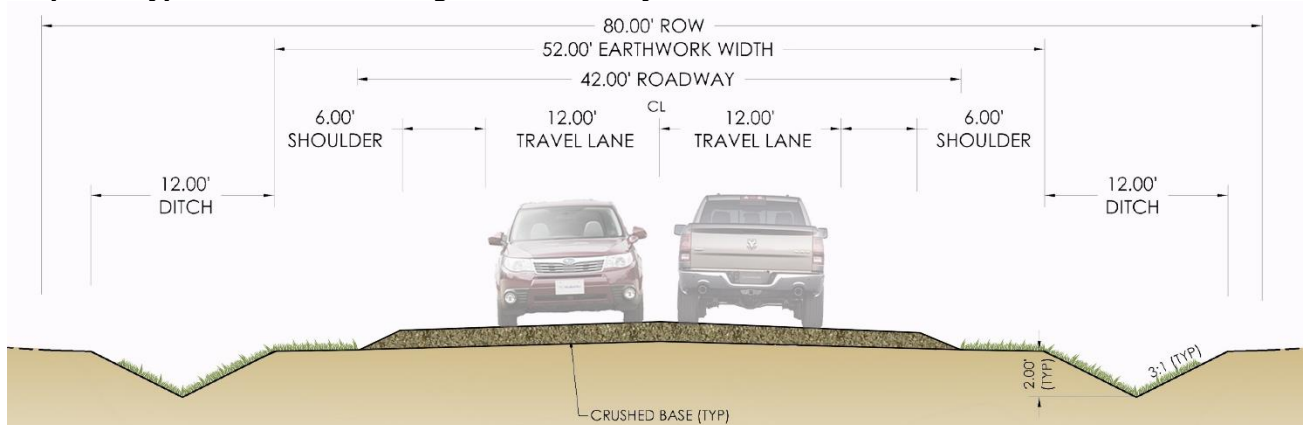
August 2020



Proposed Typical Section U.S. 30 to Dell Range Blvd.



Proposed Typical Section Dell Range Blvd. to Storey Blvd./ Beckle Road



Proposed Typical Section Beckle Road North

Figure 5.1 Recommended Typical Sections Whitney Road (Looking North)

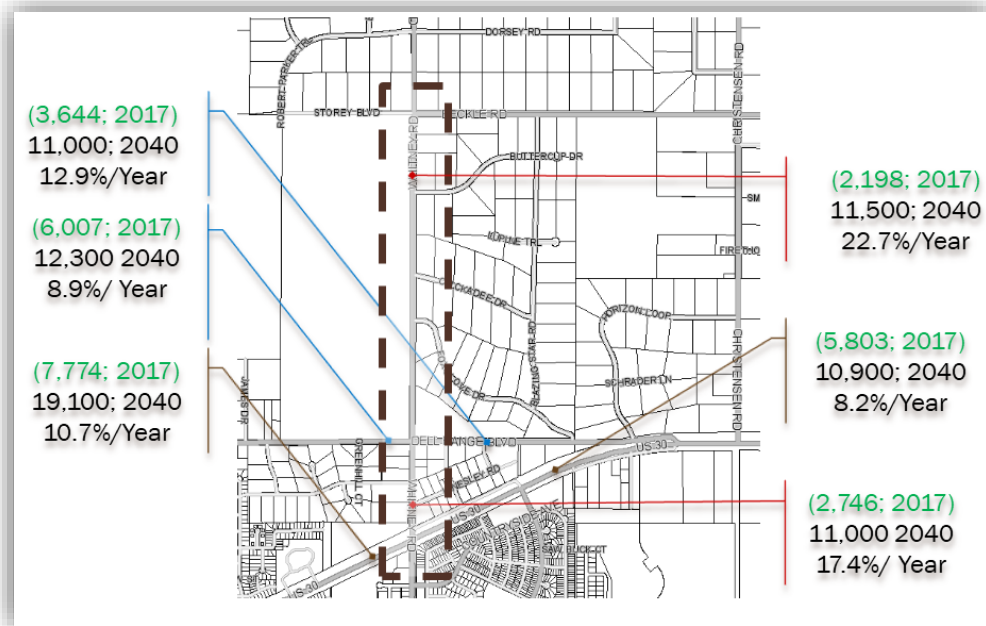


Figure 5.2 Today and 2040 Projected Volumes (ADT)

Remainder of Page Intentionally Left Blank



Whitney Road Corridor Plan

Design

August 2020

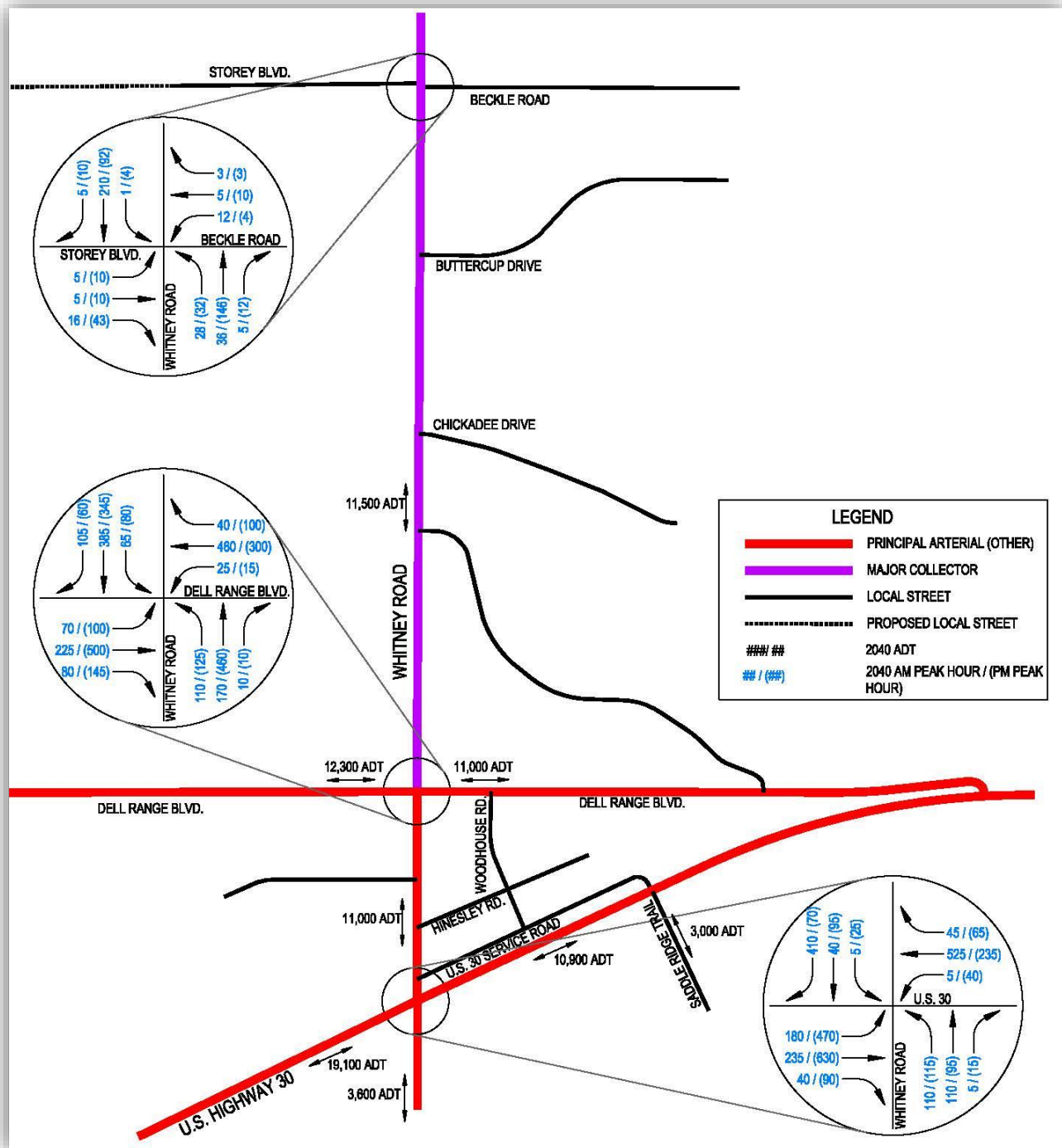


Figure 5.3 2040 Projected Peak Hour and ADT Overall Volumes



Drainage and Detention

The requirements for drainage and detention for the City of Cheyenne and Laramie County differ in policy. We understand that the roadway at this time is in Laramie County however, it is within the City of Cheyenne Planning Area Boundary.

The primary requirements for each jurisdiction are briefly outlined below:

Laramie County

- **Detention.** Stormwater detention is based on the one hundred (100) year design frequency.
 - Post development design requirements shall be for a system to maintain total contributory site discharge at no greater than a pre-development (i.e. historic) fifty (50) year release rate for a 100-year storm event.
 - Drainage planning shall include a design to maintain post-development runoff rates to historic rates for all return periods.
 - Emergency spillways shall be included in the design planning facilities.
- **Drainage Conveyance.** Drainage conveyance system elements shall be based on the following minimum criteria for a minor arterial street to accommodate both sections of Whitney Road:
 - **Minor Storm**
 - No curb overtopping and one interior drive lane clear of spread
 - **Major Storm (100-year)**
 - Maximum depth in gutter flowline 12 inches, 6 inches flow across street intersections.
 - Drainage Swales (Major Storm within easement)

City of Cheyenne

- **Detention.** Detention of stormwater shall be based on the more restrictive of the following:
 - No increase in peak discharge rates.
 - 100-year post-project peak rate no greater than the pre-project fifty (50) year release rate.
 - The downstream conveyance capacity of a project.
 - As provided for in Section 3.2.3.a.3(a). Drainage facilities shall be designed to, at a minimum, not adversely impact downstream properties. Proposals to increase downstream conveyance capacity of an area may be considered in-lieu of over-detention on a project, with justification.
 - Drainage planning and design shall provide for stormwater detention based on a design storm up to a 100-year frequency. The design shall maintain post-development runoff rates to predevelopment rates for return periods up to a 50-year frequency.
 - Emergency spillways shall be sized to convey the 100-year inflow peak. Spillway design velocities exceeding 5 fps shall require buried soil riprap.



- Embankments shall be no steeper than 4:1 below the 100-year water surface elevation and no steeper than 3:1 above the 100-year water surface elevation. The top width shall be 40 percent of the maximum dam height plus 4 feet.
- A 15-foot maintenance access with an 8 foot all weather surface shall be provided to assure access to all pond components.
- Post-construction Stormwater Best Management Practices (BMPs) are required to treat a minimum of the Water Quality Capture Volume (WQCV) as defined in the Urban Storm Drainage Criteria Manual (UDFCD) published by the Mile High Flood District (District, 2010, 2019). The WQCV shall be added to the detention volumes up to the 50-year and may be incorporated within the 100-year detention volume.
- *Drainage Conveyance.* Drainage conveyance system elements shall be based on the following minimum criteria for a minor arterial street:
 - *Minor Storm*
 - No curb overtopping and one 10 foot interior drive lane clear of spread
 - Maximum depth of 6 inches in cross pans, where allowed.
 - *Major Storm (100-year)*
 - Maximum depth of 12 inches in gutter flowline and cross street intersections.
 - Channels (100 cfs or greater). Design for the 100-Year frequency with one foot of freeboard. Maximum velocities 5 fps for erosive soils and 7 fps for non-erosive soils. Bank slopes 4:1 desirable; steeper slopes require review and approval.
- *Storm Sewers.* Storm sewers shall not be designed to surcharge in the minor storm (surcharge is a depth of flow greater than 80 percent of the height). The maximum hydraulic head shall be 0.5 feet below the lip of drop inlets for the minor storm. The minor storm varies depending on zoning and land use from 2-Year to 10-Year.

The design team developed a conceptual drainage plan for the corridor. Due to the minimum size of the right-of-way at approximately 80 feet and level of design, planning level opportunities exist for improving the post development drainage adjacent to the corridor. After careful review, we recommend a combination of detention methods and storm sewer be implemented at the final design phase:

- Roadside drainage that capture and treat water via longitudinal gravel beds, and the use of roadside ditches as linear detention/water quality facilities
- Conventional offsite detention as available from adjacent landowners.

Redirect flows along Whitney and Dell Range east down Whitney south via storm sewer system.

North Alignment Alternatives

The north alignment or namely Whitney Road from Dell Range Blvd. to Storey Blvd./Beckle Road was the only section of the corridor considered for realignment during the study process. This is due to the fact this section of Whitney Road contains an elevation change of approximately 95 feet from Dell Range with grades in excess ten (10) percent. This grade and elevation change create unsafe sightlines as you near the top of the hill heading north and coming over the crest heading south.



Additionally, the grade becomes dangerous in inclement weather with icy and hydro-plane conditions. However, just mitigating the steep grades in this area of the corridor potentially has significant impacts to both adjacent landowners and the petroleum lines located within the right-of-way of the corridor as previously mentioned in other sections of this report. The interrelationship of the petroleum pipelines and the roadway corridor planning project is the ability of the planning project to meet the established criteria; i.e., removal or mitigation of the steep roadway grade to improve safety for users and establish a non-motorized sidewalk/path that meets the Americans with Disability Act (i.e. ADA) accessibility requirements while minimizing impacts. Many different concepts were suggested, reviewed, and evaluated for consideration for the Whitney Road north alignment from Dell Range Blvd. to Storey Blvd./Beckle Road during the study process. Those considered included the following:

- Do Nothing
- Existing Alignment with Maximum Allowable Profile (3 Lane Section)
- Existing Alignment with Accessible Profile (3 Lane Section)
- NBL/ SBL Independent Roadways and Maximum Allowable NBL and Accessible Profile SBL
 - Alignment placement east of Whitney Gysel Barn Structure
 - Alignment placement west of Whitney Gysel Barn Structure
- Three-lane Roadway, Revised Alignment, Accessible Profile, and Impact to Plains All American Pipeline (PAAPL)
- Three-lane Roadway, Revised Alignment, Accessible Profile, No Impact to Plains All American Pipeline (PAAPL) or Whitney Gysel Barn Structure.
- Three-lane Roadway, Revised Alignment East, Accessible Profile.

A detailed description of each Alternative, its advantages and disadvantages, are detailed in the following portion of the study.

Alternative 1: Do Nothing. This alternative utilizes the existing Whitney Road right-of-way north of Dell Range Blvd without any improvements.

Advantages:

- No construction cost.
- No impact to adjacent property.
- No impact to existing utilities within the right-of-way.

Disadvantages:

- Future development would be limited due to the limited vehicle capacity of a rural two-lane roadway.
- Safety concerns.
 - The longitudinal profile of the roadway is steep with limited visibility for stopping site distance. The posted speed limit exceeds the stopping site distance on the crest hills, as well as, the sags of the roadway.
 - Snow and ice issues related to the steep incline would remain a potential threat.



- Shoulders to do not provide the width to accommodate emergency parking.
- Roadway does not provide for non-motorized transportation modes (i.e. pedestrians and bicycles).

Alternative 2: Existing Alignment with Maximum Allowable Profile (3 Lane Section) with Independent Accessible Non-motorized Route. This alternative utilizes the existing alignment and available right-of-way. Improvements would be required to the roadway including widening for shoulders and center turn lane to accommodate future anticipated traffic volumes. Potential independent detached sidewalk alignment to accommodate a maximum of a 5% grade for pedestrian and/ or non-motorized modes of travel on the west side. See Figure 5.4 Alternative 2: Existing Alignment with Maximum Allowable Profile.



Figure 5.4 Alternative 2: Existing Alignment with Maximum Allowable Profile

Advantages:

- Lower impact to adjacent property owner property.
- No impact to existing barn structure.
- Minimal impact to existing utilities within the right-of-way.
- Provides independent accessible route for pedestrians and non-motorized transportation.
- Adjacent property is not bifurcated by roadway development.
- No additional right-of-way required.

Disadvantages:

- Snow and ice issues related to the steep incline would remain a potential threat.
- Although roadway provides width for non-motorized transportation modes, the steep incline limits the type of bicyclist using the facility.
- Potential impact to underground petroleum transmission lines exist. Further underground investigation would be required to determine impact(s).

Remainder of Page Intentionally Left Blank



Alternative 3: Existing Alignment with Accessible Profile (3 Lane Section).

This alternative utilizes the existing alignment and available right-of-way. Improvements would be required to the roadway including widening for shoulders and center turn lane to accommodate future anticipated traffic volumes.

Additionally, the longitudinal slope of the roadway would be lowered to accommodate a maximum of a 5% grade for pedestrian and/ or non-motorized modes of travel on the roadway, as well as, a sidewalk on the west side.



Figure 5.5 Alternative 3: Existing Alignment with Accessible Profile

Advantages:

- Provides accessible route for pedestrians and non-motorized transportation.
- Adjacent property is not bifurcated by roadway development.
- Roadway provides full accessibility for non-motorized transportation modes and pedestrians.
- No additional right-of-way required.

Disadvantages:

- Significant impact to adjacent property and barn structure.
- Significant impact to underground petroleum transmission lines and existing utilities.
- Significant snow drifting and maintenance due to prevailing wind and depth of roadway below adjacent ground.

Alternative 4: NBL/ SBL Independent Roadways and Maximum Allowable NBL and Accessible Profile SBL.

This alternative creates two independent travel lane roadways for a Northbound lane (i.e. NBL) and a Southbound lane (SBL), respectfully. The roadways are comprised of 3.5' inside and 7' outside shoulders and an 11' travel lane. The NBL longitudinal profile was developed with a maximum of an 8% vertical grade without sidewalk and the SBL was developed with an accessible profile of 5.0%. As a part of the alternative, backslopes were reviewed at both 4:1 and 3:1 with a retaining wall option to minimize adjacent impacts.

Remainder of Page Intentionally Left Blank



Alternative 4a: Alignment placement east of Whitney Gysel Barn Structure

Advantages:

- Adjacent Whitney Gysel property not bifurcated by roadway development.
- Provides accessibility for non-motorized transportation modes and pedestrians on SBL.

Disadvantages:

- Significant impact to adjacent property and barn structure.
- Significant impact to one of the two (2) underground petroleum transmission lines and existing utilities (West or Plains All American Pipeline).
- Although roadway provides the width for non-motorized transportation modes, the steep incline limits the type of bicyclist using the NBL facility.
- Snow and ice issues related to the steep incline would remain a potential threat on NBL.
- Significant snow drifting and maintenance due to prevailing wind and depth of roadway below adjacent ground for SBL.
- Additional right-of-way required.



Figure 5.6 Alternative 4a: Alignment placement east of Whitney Gysel Barn Structure

Alternative 4b: Alignment placement West of Whitney Gysel Barn Structure

Advantages:

- No impact to existing barn structure or existing petroleum transmission lines.
- Provides accessibility for non-motorized transportation modes and pedestrians on SBL.
- Mitigates snow drifting and ice on SBL facility.

Disadvantages:

- Adjacent property somewhat bifurcated by roadway development.
- Although roadway provides the width for non-motorized transportation modes, the steep incline limits the type of bicyclist using the NBL facility.
- Snow and ice issues related to the steep incline would remain a potential threat on NBL.
- Additional right-of-way required.



Figure 5.7 Alternative 4b: Alignment placement west of Whitney Gysel Barn Structure



Alternative 5: Three-lane Roadway, Revised Alignment, Accessible Profile, and Impact to Plains All American Pipeline (PAAPL). This intent of this alignment alternative was to only impact one of the two parallel petroleum pipelines within the Whitney Road right-of-way. This alternative utilized a three-lane roadway section, snow storage ditches, 4:1 backslopes, and an accessible profile of 5%. The roadway itself consisted of a two (2) 11' travel lanes, 12' center turn lane, and 7' shoulder/ bike lanes. As a part of the alternative, backslopes were reviewed at both 4:1 and 3:1 with a retaining wall option to minimize adjacent impact to the existing barn structure on the Whitney Gysel property.



Figure 5.8 Alternative 5: Three-lane Roadway, Revised Alignment, Accessible Profile, and Impact to Plains All American Pipeline (PAAPL)

Advantages:

- Adjacent Whitney Gysel property not bifurcated by roadway development.
- Roadway provides limited accessibility for non-motorized transportation modes and pedestrians on SBL.
- No impact to existing PAAPL petroleum transmission line with use of retaining walls.
- Provides accessibility for non-motorized transportation modes and pedestrians

Disadvantages:

- Significant impact to adjacent property.
- Impact to existing barn structure.
- Retaining walls required to mitigate the impact to the PAAPL petroleum pipeline.
- Additional right-of-way required.
- Significant snow drifting and maintenance due to prevailing wind and depth of roadway below adjacent ground.

Remainder of Page Intentionally Left Blank



Alternative 6: Three-lane Roadway, Revised Alignment, Accessible Profile, No Impact to Plains All American Pipeline (PAAPL) or Whitney Gysel Barn Structure.

This intent of this alignment alternative was to have no impact to either of the two parallel petroleum pipelines within the Whitney Road right-of-way and the Whitney Gysel Barn Structure. The alternate utilized a three-lane roadway section, snow storage ditches, and 4:1 backslopes. The roadway itself consisted of a two (2) 11' travel lanes, 12' center turn lane, and 7' shoulder/ bike lanes. As a part of the alternative, backslopes were reviewed at both 4:1 and 3:1 with a retaining wall option to eliminate adjacent impact to the existing barn structure on the Whitney Gysel property.

Advantages:

- Provides accessibility for non-motorized transportation modes and pedestrians on SBL.
- No impact to existing barn structure.
- No impact to existing petroleum transmission lines.
- Provides accessibility for non-motorized transportation modes and pedestrians.
- Mitigates snow drifting and ice.

Disadvantages:

- Whitney Gysel development property bifurcated by roadway development.



Figure 5.9 Alternative 6: Three-lane Roadway, Revised Alignment, Accessible Profile, No Impact to Plains All American Pipeline (PAAPL) or Whitney Gysel Barn Structure

Remainder of Page Intentionally Left Blank



Alternative 7: Three-lane Roadway, Revised Alignment East, Accessible Profile, No Impact to Whitney Gysel Barn Structure. This intent of this alignment alternative was to have no impact to the Whitney Gysel Barn Structure and Petroleum lines. The alternate utilized a three-lane roadway section, snow storage ditches, and 4:1 backslopes. The roadway itself consisted of a two (2) 11' travel lanes, 12' center turn lane, and 7' shoulder/ bike lanes, 6' attached walk west side of roadway. The option appeared to be viable in theory however, after close examination, the option could not be shifted far enough east to prevent impacting one of the petroleum lines (i.e. PAAPL and Suncor). The only way to avoid impact to a petroleum line (PAAPL) was to install a 15' retaining wall on the west side. Furthermore, residential properties are burdened with major impacts to small lots on the east side of the alignment due to the large movement of earthwork required to realign the roadway.



Figure 5.10 Alternative 7: Three-lane Roadway, Revised Alignment East, Accessible Profile, No Impact Whitney Gysel Barn Structure

Advantages:

- No impact to existing barn structure.
- Provides accessibility for non-motorized transportation modes and pedestrians.

Disadvantages:

- Significant impact to both existing petroleum transmission lines.
- Significant snow drifting and maintenance due to prevailing wind and depth of roadway below adjacent ground.
- Significant impact to adjacent property east of roadway.

North Alignment Alternative Analysis

The north alignment alternatives summarized above were qualitatively evaluated and compared based on select four (4) criteria group, questions, and sub-weight outlined as follows. Please note the sub-weight criteria was based on engineering judgement but is subjective and therefore depends on the perspective of the person assessing measures. The evaluation categories and questions are listed in Table 5.5 Alignment Analysis Criteria and Questions. The performance of each alternative was evaluated according to these criteria and results of the evaluation are compiled in Table 5.6 North Alignment Alternatives Analysis. The performance of each criteria was based (1) – Excellent, (2) – Fair, (3) – Poor, and (4) – Unacceptable.



Table 5.5 Alignment Analysis Criteria and Questions

Criteria	Questions?	Sub-weight
Traffic Safety	<ol style="list-style-type: none"> Does the alternative worsen traffic safety conditions? Does the alternative meet the minimum criteria established by the UDC and LCLU documents for the City of Cheyenne and Laramie County? Does the alternative provide for the projected future volumes anticipated for the area? 	50%
Developable and Compatible	<ol style="list-style-type: none"> Is the alternative sensitive to the needs and impacts of stakeholders? 	20%
Fiscally Responsible	<ol style="list-style-type: none"> Is the alternative too costly to construct? Could the alternative construction be phased to minimize future expense? Does the alternative minimize long term maintenance cost? 	25%
Accessible	<ol style="list-style-type: none"> Does the alternative serve all transportation users? 	5%

Table 5.6 North Alignment Alternatives Analysis ⁵

Criteria	Alternative							
	1 Do Nothing	2 Sep. Trail 8% Road	3 5% Road	4a 5% SBL East of Barn 8%	4b 5% SBL West of Barn 8%	5 5% Road East of Barn	6 5% Road West of Barn	7 5% Road East of ROW
Traffic Safety	3	2	2	2	2	2	1	2
Developable and Compatible	4	1	3	4	3	4	3	4
Fiscally Responsible	3	1	3	3	2	3	2	3
Accessible	4	2	1	2	2	1	1	1
Weighted Average	3.25	1.55	2.4	2.65	2.2	2.6	1.65	2.6

⁵ Performance Criteria: (1) – Excellent, (2) – Fair, (3) – Poor, and (4) – Unacceptable.



Selection of Recommended North Whitney Alignment Alternative

The results of the alternatives analysis were vetted through the design team, steering committee, and various stakeholders. Based on the criteria, the most viable alternatives are Alternative 2: Existing Alignment with Maximum Allowable Profile (3 Lane Section) and Alternative 6: Three-lane Roadway, Revised Alignment, Accessible Profile, No Impact to Plains All American Pipeline (PAAPL) or Whitney Gysel Barn Structure. Both alternatives meet the primary objectives of the alignment to mitigate the steep roadway grade, improve safety for users, and establish a non-motorized sidewalk/path that meets the Americans with Disability Act (i.e. ADA) accessibility requirements while minimizing impacts. However, these alternatives distinctively counter each other. For example, Alternative 2 requires no additional right-of-way and minimizes the impact to adjacent property while Alternative 6 bifurcates the private property and impacts the adjacent property. Conversely, potential for ice and snow issues related to steep grades remains a disadvantage with Alternative 2 and is removed in Alternative 6. Both alternatives do not necessitate relocation of the petroleum lines but, further subsurface utility investigations will be needed prior to final design. A summary of the advantages and disadvantages of the top two alternatives is shown in Figure 5.11 Direct Comparison of Highest Rated Whitney North Alignment Alternatives.

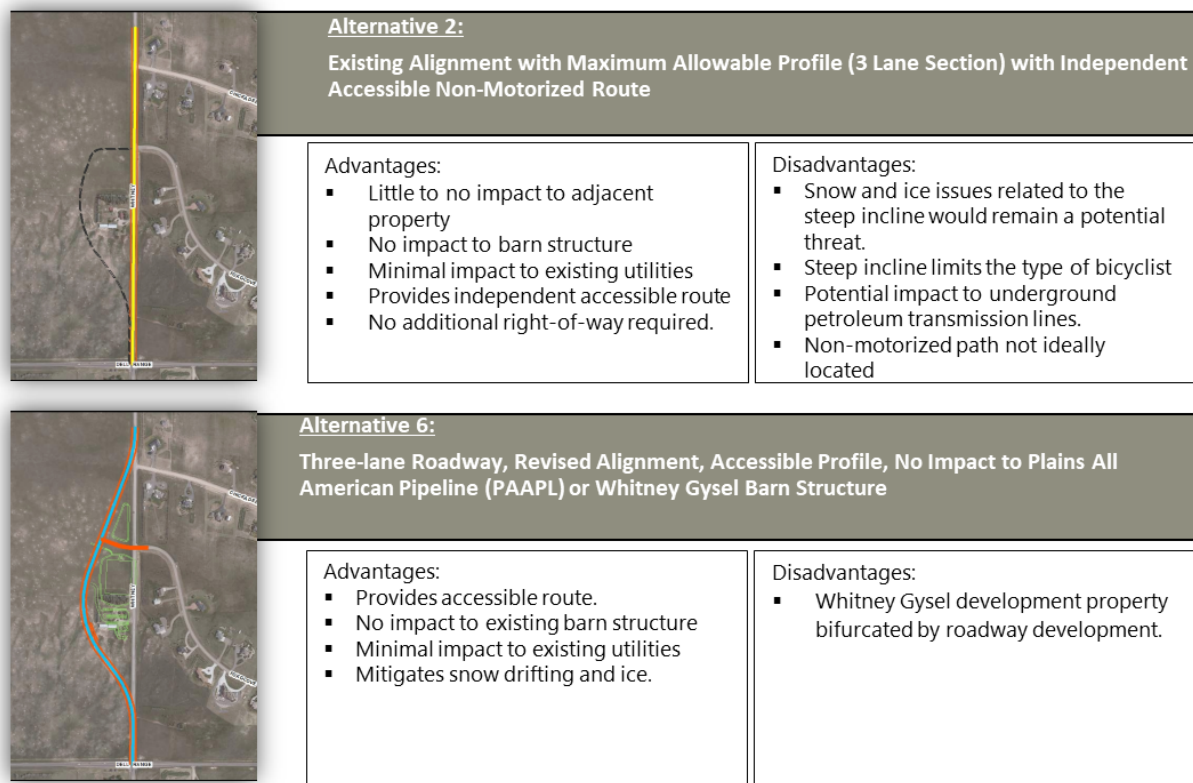


Figure 5.11 Direct Comparison of Highest Rated Whitney North Alignment Alternatives



Consequently, after careful consideration AVI recommends Alternative 2: Existing Alignment with Maximum Allowable Profile (3 Lane Section) with accessible non-motorized route as the recommended alternative for the north alignment with the following stipulation: Alternative 6: Three-lane Roadway, Revised Alignment, Accessible Profile, No Impact to Plains All American Pipeline (PAAPL) or Whitney Gysel Barn Structure should remain as a possible solution for the roadway development. This will allow flexibility to both the developer and the jurisdictional entity as development agreements and land use plans are formalized.

Conceptual Intersection Options and Recommended Alternatives

The goal of the intersection improvements is to create practical solutions that result in a multi-model corridor which fulfills the following objectives:

- Is sensitive to the needs of the property owners,
- Promotes safety,
- Minimizes long term maintenance,
- Fiscally responsible,
- Efficiently serves all transportation users.

Intersection alternatives were developed and vetted through a collaborative planning process which included known stakeholders. These included the design team, roadway users, land owners, business owners, interested stakeholders, jurisdictional planning commissions, governing bodies, and the project steering committee. The recommended alternatives summarized in the following sections of the report considered every stakeholder's unique opinions and prospective and attempted to achieve consensus. However, in order to properly evaluate and ultimately make an objective recommendation, a systematic data-driven and performance-based approach was utilized to evaluate and identify an optimal recommended alternative. Consequently, a majority and not complete consensus was achieved due to the unique prospective and diverse opinions of all the stakeholders. The following primary intersections required an alternative analysis:

- Whitney Road at U.S. 30
- Whitney Road at Dell Range Blvd.

The following Table 5.6 Intersection Alternative Evaluation Criteria summarizes the evaluation criteria and context developed and used to determine the recommended intersection improvements. Please note the sub-weight for each criteria component was based on engineering judgement and is somewhat subjective and therefore depends on the perspective of the person assessing measures.

Remainder Of Page Intentionally Left Blank



Table 5.7 Intersection Alternative Evaluation Criteria

Criteria	Context	Sub-weight
Construction Cost	Preliminary level construction costs are summarized in Table 5.7 Cost Estimates and detailed in Appendix D.	20%
Right-of-way	The alternative minimizes the amount and cost of required right-of-way area requirements.	10%
Constructability	The constructability parameter is based the ease of construction and the ability to minimize impacts to adjacent landowners, businesses, and the traveling public.	2.5%
Ability to Phase Construction	The relative ease of constructing an alternative in sequential phases or layered components.	5%
Maintenance Cost	This consists of operating costs and indirect costs for maintenance. Maintenance includes routine upkeep, replacements. Indirect costs are unforeseen expenditures that may occur as a result of implementation of an alternative (e.g. impact cost to other roadways, etc.).	10%
Stakeholder Consensus	Input from the public involvement process based on the written and verbal comments received and summarized in the Collaboration section of the study. Is the alternative acceptable by the public, local jurisdictions, and other stakeholders?	15%
Environmental Impact	The alternative has potential to affect environmental constraints such as wetlands, waterbodies, floodplains, etc. Please see the Environmental Review, Appendix F.	2.5%
Qualitative Traffic Analysis	The alternative that best provides the highest operation level or service at the horizon year 2040. See Appendix D Traffic Analysis for additional information.	10%
Traffic Safety	Does the intersection alternative address the safety need by enhancing safety performance? Does the alternative meet the minimum criteria established by the UDC and LCLU documents for the City of Cheyenne and Laramie County?	25%



Intersection of Whitney Road at U.S. Highway 30

This intersection is currently under jurisdictional control of the State of Wyoming Department of Transportation. Large vehicles use the intersection regularly including semi-truck and trailer combinations, recreational vehicles, mobile homes, and tow trucks for local business access on Whitney Road and the U.S. 30 North Service Road.

The current post speed limits are as follows:

U.S. 30, 55 mph; Whitney Road, 30 mph. Upon review of the existing intersection the following observations were noted as significant and are illustrated in Figure 5.12 Significant Observations Intersection of Whitney Road at U.S. 30.

Cut-thru traffic from and to Saddle Ridge Subdivision using the U.S. 30 Service Road and Saddle Ridge Trail during peak hour demands.

- The intersection is skewed at an angle $> 10^\circ$ at 25.8°
- The proximity of adjacent driveway accesses creates unsafe turning movements
- Unsafe opposing cross maneuver from U.S. 30 North Service Road southbound onto Whitney Road
- Inadequate storage que length as a result of the installation of pedestrian refuge island
- "Ghosted" thru and auxiliary turn lane related to the skew angle of the intersection for vehicles traveling northbound on Whitney Road.
- Lack of pedestrian facilities exception on the south leg of intersection.

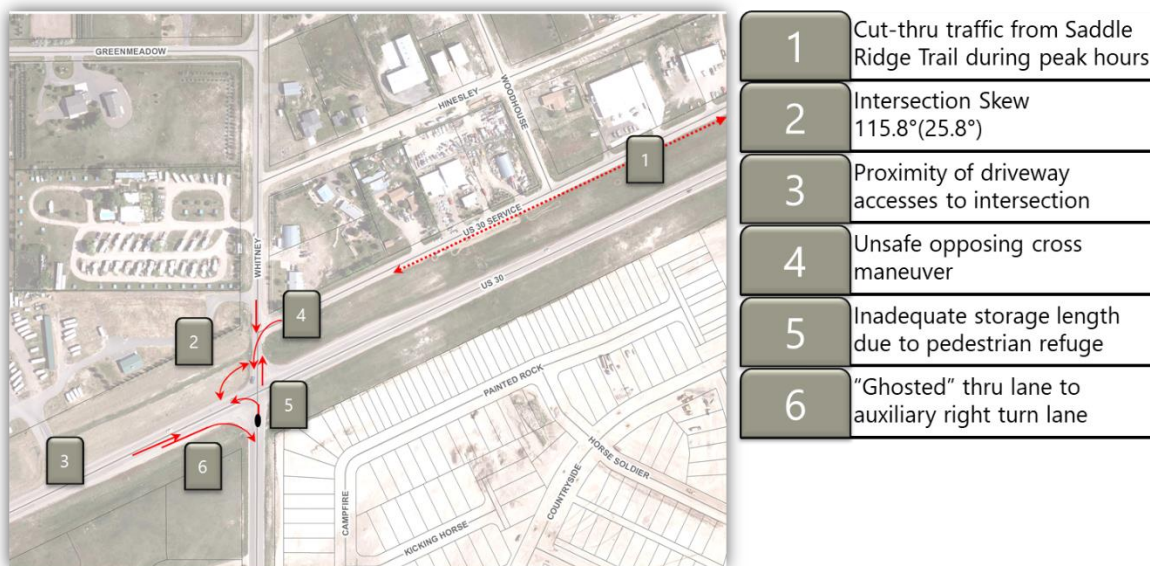


Figure 5.12 Significant Observations Intersection of Whitney Road at U.S. 30



Three primary alternatives appeared to be the most viable to consider during the design and collaboration process. Those alternatives were No build, Signalization, and Realign Intersection to Remove skew angle. The latter alternatives are illustrated in Figure 5.14 Realign Intersection/ Remove Skew and Figure 5.13 Signalize and Widen Intersection.

Conceptual Options and Recommended Alternative

No Build Alternative. Based on the anticipated increased traffic volumes the No Build alternative from the onset was virtually eliminated during the evaluation process. It was not a consensus option from the stakeholders, does not provide any traffic safety improvements, and will continue to see an increase in maintenance cost. Given the crash history, severity of crashes, and traffic operation based on increased volumes, a No build option does not appear to be the best alternative option.

Signalize and Widen without Removing Skew. See Figure 5.13 Signalize and Widen Intersection without Removing Skew for reference. Widening and signalizing the intersection provides a viable option for this intersection that has a lower construction cost and does not require any right-of-way. However, from the traffic safety criterion, the intersection signalization provides a better intersection than the No Build option. What remains is the visibility issues caused by the substantially-different from 90-degree angle of the intersection. Even with signalization, drivers making right-turn-on-red (RTOR) maneuvers will still have difficulty seeing on-coming traffic at the intersection with a severe skew. This is due in part to the geometry of roadway, vehicle structural frames or other parts blocking a driver's field of vision, and the added difficulty of a driver turning their head at an obtuse angle. A Policy on Geometric Design of Highways and Streets, 2018 indicates that in new or redesigns of existing facilities where right-of-way is restricted the intersection design, should meet at an angle of not less than 75 degrees. Additionally, the policy indicates that at skewed intersections where the approach leg to the left intersects the driver's approach leg an angle less than 75 degrees, the prohibition of RTOR is desirable. The current intersection intersects at an angle of 65.2 degrees which is also the opposing leg to left which intersects the driver's approach leg (i.e. southbound Whitney Road to eastbound U.S. 30).

Realign Intersection to Remove Skew. See Figure 5.14 Realign Intersection/ Remove Skew for reference. Realigning, widening, and signalizing when warranted provides a very viable option from the traffic safety and stakeholder consensus criterion. The challenges of the alternative are the required right-of-way acquisition to remove the skew from the intersecting roadways and the increased cost. Improving the intersecting angle while increasing the width and corner radii will improve the operational use of the facility for large tractor trailer combinations and dramatically improve the safety of intersection as noted above in the discussion of the Signalize and Widen without Remove Skew alternative.



Figure 5.13 Signalize and Widen Intersection without Removing Skew



Figure 5.14 Realign Intersection/ Remove Skew



The following Table 5.8 Alternative Analysis Whitney at U.S. 30 summarizes the alternative analysis and identifies the preferred alternative based on the evaluation criteria. The performance of each criteria was based (1) – Excellent, (2) – Fair, (3) – Poor, and (4) – Unacceptable in conjunction with the context and weight established illustrated in Table 5.7 Intersection Alternative Evaluation Criteria. Based upon the scoring criteria, the option with the lowest average is the highest-ranking option and is the Realign Intersection to Remove Skew.

Table 5.8 Alternative Analysis Whitney at U.S. 30

Criteria	Whitney at U.S. 30		
	No Build Option	Signalization without Removing Skew	Realign Intersection to Remove Skew
Construction Cost	1	1	2
Right-of-way	1	1	3
Constructability	1	1	2
Ability to Phase Construction	1	1	2
Maintenance Cost	4	2	2
Stakeholder Consensus	4	2	1
Environmental Impact	1	1	1
Qualitative Traffic Analysis	4	1	1
Traffic Safety	4	3	1
Weighted Average	2.8	1.75	1.575

AVI recommends the alternative, Realign Intersection to Remove Skew based on the following:

- Provides the most improved traffic safety
- Improved traffic flow and efficiency
- Accommodates multi-modal transportation
- Signalization can be phased to be constructed or installed as warranted
- Adjacent property owners amicable to right-of-way acquisition purchase based on fair market value.

Remainder Of Page Intentionally Left Blank



The final recommended alternative is illustrated in Figure 5.15 Recommended Intersection Alternative Whitney Road at U.S. 30.

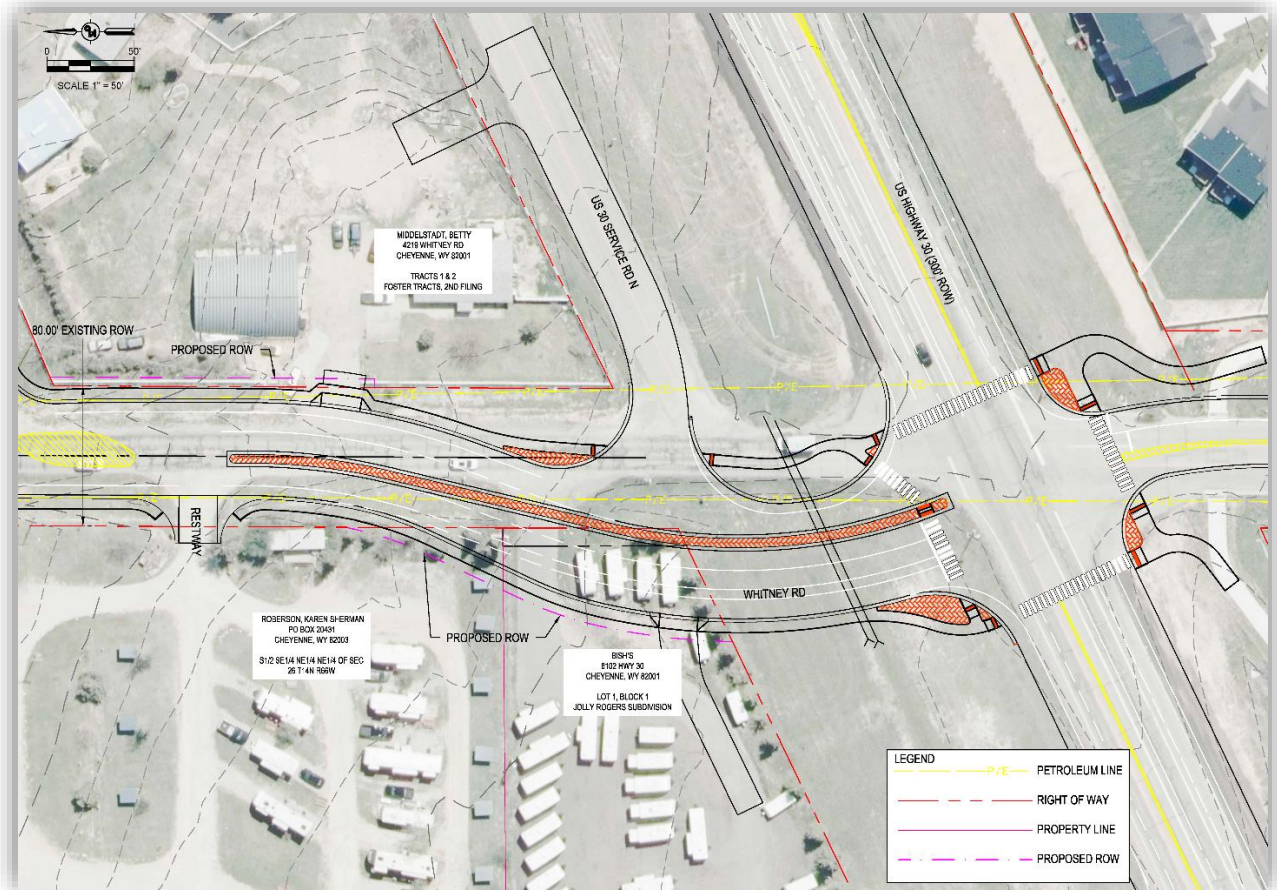


Figure 5.15 Recommended Intersection Alternative Whitney Road at U.S. 30

Remainder Of Page Intentionally Left Blank



Intersection of Whitney Road at Dell Range Blvd.

This intersection is currently under jurisdictional control of Laramie County. Large vehicles use the intersection regularly including semi-truck and trailer combinations, recreational vehicles, mobile homes, and truck and horse trailer combinations accessing the rural residential areas and oil production pads north of Dell Range Blvd. The current posted speed limits are as follows: Dell Range Blvd., 45 mph; Whitney Road, 30 mph (South of Dell Range Blvd.), 40 mph (North of Dell Range Blvd.), and 45 mph (North of Foxglove Road). Upon review of the existing intersection the following observations were noted as significant and are illustrated in Figure 5.16 Significant Observations Intersection of Whitney Road at Dell Range Blvd.

- Snow and ice issues related to wind direction, surroundings, and steep grades.
- Steep vertical profile of Whitney Road up to 13%.
- The proximity of adjacent driveway accesses creates unsafe turning movements
- The intersection of Whitney Road at Dell Range Blvd. has limited visibility at early morning, dusk, night, and significant weather which creates potentially unsafe driving conditions.



Figure 5.16 Significant Observations Intersection of Whitney Road at Dell Range Blvd.

Remainder of Page Intentionally Left Blank



Conceptual Options and Recommended Alternative

The Whitney Road and Dell Range Blvd. intersection is situated within Cheyenne's and Laramie County's high growth corridors. While currently rural in character, the land uses surrounding the intersection are transitioning into a more suburban development pattern. The Whitney Ranch and Saddle Ridge developments are the two largest influencing land use and traffic changes occurring in the area. This intersection is a very important component in the Cheyenne and Laramie County roadway network. Intersections control the amount of traffic able to use the intersecting roadways and together with the capacity of the connecting roadways determines network capacity. The appropriate intersection design and control solution at this intersection will provide improved safety, increase operational performance, and encourage the development and redevelopment of the surrounding area and corridor. The primary objective of the recommended alternative should be a fiscally responsible control that balances the safety, operational efficiency, road environment, roadway users, and physical constraints of the site.

Three primary alternatives were evaluated at the Dell Range and Whitney Road intersection: No Build, Standard Intersection, and Roundabout. These options are summarized below followed by an overview and summary of the alternative's analysis.

No Build Alternative. The No Build alternative was not a consensus option from the stakeholders, does not provide any traffic safety improvements, and will continue to see increases in maintenance cost. Given the current traffic use, anticipated future volumes, and crash history, the no build alternative was eliminated from consideration.

Standard Intersection Alternative. See Figure 5.20 Standard Intersection Alternative for reference. A standard four-way intersection alternative would include widening, signaling, and providing auxiliary lanes where appropriate and provides a viable option for this intersection that has a lower construction cost and does not require any right-of-way. Signalization would be determined by warrants and is predicated on development occurring within and adjacent to the corridor. With new developments like Whitney Ranch, Woods Landing, ERA, and redevelopment projects like Mission Village, and surrounding property redevelopment potential surrounding the corridor, this does not seem unrealistic.

One of the major objectives of any traffic signal design is to maintain the free flow of traffic. This design requires that important decisions be made about assigning green time to vehicle movements (e.g. signal phasing). Exclusive phasing such as left-turn arrows generally increase the cycle length and add delay. In this case, the recommended future roadway has dedicated left turn lanes on all intersection legs. Design factors such as progression efficiency (i.e. signal coordination with signals in series), pedestrian times, protected and clearance intervals need to be incorporated into final signal design. All these design features can lead to increased delays at an intersection. The proposed signalized intersection configuration is summarized on the following page:



- **Whitney Road southbound approach:** One (1) right-turn (RT) lane, one (1) thru lane, one (1) left-turn (LT) lane.
- **Whitney Road northbound approach:** One (1) combined right-turn (RT) and thru lane, one (1) left-turn (LT) lane.
- **Dell Range Blvd. east and west approach:** One (1) right-turn (RT) lane, one (1) thru lane, one (1) left-turn (LT) lane.

Roundabout Alternative. See Figure 5.19 Single Lane RAB Alternative for reference. A rural roundabout alternative was conceptualized for this alternative. The roundabout is proposed with a one-hundred thirty (130) foot inscribed circle diameter with a design speed of 25 mph. The roundabout would include one lane approaches for all legs with channelized islands, pedestrian, and bicycle accommodations. Due to higher anticipated vehicle speeds on Dell Range Blvd., horizontal chicanes were included in the conceptual design elements of the channelized islands. During the Collaboration portion of the planning stakeholders believed trucks, emergency vehicles, RV campers, and horse trailers would have a difficult time negotiating the roundabout. The major concern is related to the larger vehicles negotiating too small of inscribed interior circle radius and too high of curb height on the apron of the central interior island. Most of the surrounding area roundabouts have such high drive over apron curbs that trailer tires are dragged and rub around the apron curb as the truck is turning within the roundabout. Through proper design, roundabouts can easily accommodate emergency and larger size vehicles.

Alternative Analysis

During the early stages of the planning and design process this intersection received consensus from the Steering Committee, design team, and public stakeholders for a single lane roundabout as a long-term solution. The recommendation was based on a safety assessment and the 2016 traffic projections and analysis documented in the approved City of Cheyenne Whitney Ranch Traffic Impact Assessment. However, it was later discovered that the original study did not estimate the redistribution of projected future traffic utilizing the Christensen Road Extension to Interstate 80. This project which is currently under construction will significantly change driver patterns which allows another network connection to cross over the Union Pacific Railroad tracks into the City of Cheyenne. The additional traffic routed to the intersection negatively impacted the level of service (LOS) and a third alternative was evaluated. This alternative is a One lane Roundabout Alternative w/ EB and SB Right Turn Lanes. The analysis within this report documents both the most recent and historic operational assessment for context and record.

Remainder Of Page Intentionally Left Blank



Intersection Capacity

Year 2040 traffic operational assessment was conducted by Kimley-Horn for the Whitney Road and Dell Range Blvd. intersection. The alternatives evaluated included the no build; a single lane roundabout; a single lane roundabout with eastbound and southbound additional right-turn slip ramps; and, a signalized intersection with left-turn and a shared through and right-turn travel lane on each approach. The level of service (LOS) and delay analysis is shown below Table 5.9 Kimley-Horn 2040 Traffic Level of Service (LOS) and Delay.

The revised or updated analysis by Kimley-Horn shows the signalized intersection and the roundabout with additional right turn lanes meet the minimum traffic operation expectation in both the AM and PM peak hours. The roundabout operates at a LOS D with an overall delay of 31.8 seconds in the PM peak hour while the signalized intersection operates slightly better with a LOS C with an overall delay of 27.5 seconds in the PM peak hour. The software used to analyze the signalized intersection was Synchro 10®. Sidra Intersection 8.0® was used for the roundabout.

Table 5.9 Kimley-Horn 2040 Traffic Level of Service (LOS) and Delay

Movement	Delay [Second] (HCM:LOS, RAB: LOS)							
	No Build Two-Way Stop Control		One Lane Roundabout		One Lane Roundabout w/ EB & SB Right Turn		Signalized Intersection	
	AM	PM	AM	PM	AM	PM	AM	PM
Overall	-	-	19.9 (C)	45.5 (E)	11.9 (B)	31.8(D)	33.7(C)	27.5(C)
NB Approach	>300	>300	-	-	-	-		
EB Approach	8.8 (A)	8.5 (A)	-	-	-	-		
WB Approach	8.0 (A)	9.1 (A)	-	-	-	-		
SB Approach	>300	>300	-	-	-	-		

The original analysis conducted by Sustainable Traffic Solutions (STS) included a single lane roundabout; and a signalized intersection with one (1) right-turn (RT) lane, one (1) thru lane, one (1) left-turn lane on the south, east, and west approaches and a combined right-turn and thru lane and one (1) left-turn lane on the north approach. The level of service (LOS) and delay analysis is shown in Table 5.10 STS 2040 Level of Service (LOS) and Delay.

STS showed the signalized intersection and single lane roundabout meet the minimum traffic operation expectation in both the AM and PM peak hours. The roundabout operated the best with a LOS A in the AM peak hour with a delay of 9.7 seconds and a LOS C with an overall delay of 16.9 seconds in the PM peak hour. The signalized intersection operates slightly worse with a LOS D in the AM peak hour with an overall delay of 38.5 seconds and a LOS C in the PM peak hour with a delay of 29.1 seconds. STS utilized PTV Vistro 6® to analyze the intersection.

Remainder Of Page Intentionally Left Blank



Table 5.10 STS 2040 Level of Service (LOS) and Delay

Movement	Delay [Seconds] (LOS)			
	One Lane Roundabout		Signalized Intersection	
	AM	PM	AM	PM
Overall	9.7 (A)	16.9 (C)	38.5 (D)	29.1 (C)
NB Approach	5.9 (A)	23.3 (A)	-	-
SB Approach	14.2 (B)	11.6 (B)	-	-
EB Approach	7.0 (A)	16.4 (C)	-	-
WB Approach	7.4 (A)	14.6 (B)	-	-
NB LT	-	-	42.1 (D)	34.5 (C)
NB Thru + RT	-	-	31.6 (C)	46.0 (D)
SB LT	-	-	31.0 (C)	39.8 (D)
SB Thru	-	-	87.8 (F)	33.3 (C)
SB RT	-	-	30.0 (C)	22.5 (C)
EB LT	-	-	15.8 (B)	23.3 (C)
EB Thru	-	-	10.6 (B)	19.5 (B)
EB RT	-	-	9.8 (A)	15.3 (B)
WB LT	-	-	12.2 (B)	24.3 (C)
WB Thru	-	-	12.6 (B)	17.3 (B)
WB RT	-	-	9.6 (A)	14.5 (B)

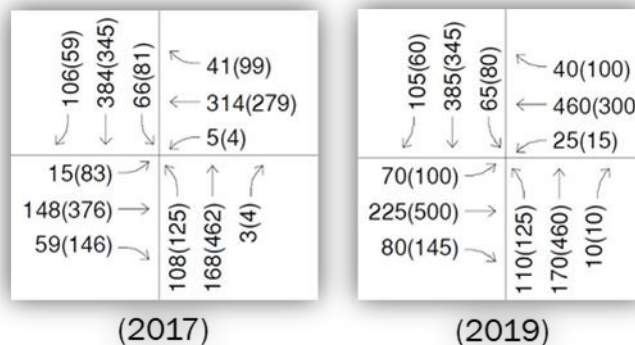


Figure 5.17 2040 Peak Hour AM/ (PM) Volumes Whitney Road at Dell Range Blvd.

Remainder of Page Intentionally Left Blank



Looking closer at the Peak Hour volumes between the original and revised distribution of Christensen Road, it appears the most significant increase in traffic volumes were on the EB PM Peak Hour and WB AM Peak Hour of Dell Range Blvd. The volumes increased by 33% and 46.5%, respectively.

Ultimately, operational efficiency is only one of many important components for evaluating this intersection. Different methods/ software used to calculate delays and LOS produce different results as illustrated in Table 5.9 and Table 5.10. Two independent Professional Traffic Engineers using the same Peak Hour volume data yielded different level of service grades and total delay values. This does not indicate whether one method or another is correct, incorrect, or more accurate. All the methods used to calculate the operational assessment are considered state of the practice and a model of an intersection. The model uses data that has been projected to emulate driver behavior (i.e. peak hour volumes) and development that has not been observed. The results and different methods should be relatively compared to each other and not be interpreted as exact.

Additionally, the delay thresholds set for LOS grades for signalized intersection and roundabouts by the Highway Capacity Manual, Sixth Edition (HCM) merit careful evaluation. The HCM Level of Service (LOS) delay thresholds for roundabouts are set to the same standard as stop sign-controlled intersections. Meaning that the same delay experienced by drivers at a signalized intersection considered acceptable can be unacceptable at standard stop control intersection or roundabout. For example, A level of Service E for an unsignalized intersection is set >35-50 seconds while a signalized intersection is set at >55-80 seconds. We believe this creates a LOS bias against roundabouts when compared with signalized intersection treatments when showing a LOS grade equal to or lower than a B. The actual computed delay was used to compare alternatives not just the Level of Service letter grade.

Consequently, the analysis generally indicates that the roundabout alternatives operate at a high level of service in the 2040 Peak AM while the signalized intersection operates more efficiently in the 2040 Peak PM.

Right-of-way Requirements

The signalized intersection alternative configuration can be accommodated within the existing 80' south of the Whitney Road right-of-way limits. The roundabout option requires additional right-of-way in northwest and southeast portions of the intersection to accommodate the required improvements. However, the Dell Range Blvd. portion of the intersection will require additional seventeen (17) feet of right-of-way on the north regardless of the alternative selected. This is to allow for additional lanes required as a result of future anticipated development.

Remainder of Page Intentionally Left Blank



Costs

Cost estimates for the alternatives were developed using the following information and assumptions:

- Engineering estimated at 10% of Estimated Construction cost excluding contingency or right-of-way costs.
- Cost estimates were development using data from the Weighted Bid Prices compiled by the Wyoming Department of Transportation (WYDOT); Colorado Department of Transportation (CDOT); and from historical AVI project data and experience.
- Quantities were based on conceptual layouts and are not intended to be used as final quantities.
- Please note that the costs and unit prices were calculated in Present Worth or Present Value dollars. Adjustments should be made for years beyond the present to better estimate the needed dollars for any future improvement plan(s).

Alternative	Estimated Costs					
	Construction	Right-of-way	Engineering	Contingency	Total	For Estimate
No Build Option	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Single Lane Roundabout	\$1,010,035.50	\$ 6,413.40	\$101,004.00	\$151,505.00	\$1,268,957.90	\$1,270,000.00
Single Lane Roundabout w/ Slip Lanes	\$1,142,608.50	\$ 119,700.00	\$114,261.00	\$171,391.00	\$1,547,960.50	\$1,550,000.00
Signalized Intersection	\$1,058,671.00	\$ -	\$105,867.00	\$158,671.00	\$1,323,209.00	\$1,330,000.00

The cost difference between roundabout and a traffic signal is comparable. Where long-term costs are considered, roundabouts eliminate hardware, maintenance and electrical costs associated with traffic signals, which have been estimated at \$3,500 to \$10,000 per year.

Safety

Studies have shown that roundabouts are safer than traditional stop sign or signal controlled intersections. Washington State Department of Transportation have found a 37% percent reduction in overall collisions, a 75 percent reduction in injury collisions, and a 90% reduction in fatality collisions (Transporation, 2020). It is generally accepted by the engineering design community that roundabouts provide proven benefits to vehicle traffic in terms of safety. They dramatically reduce the incidence of fatal and severe-injury crashes compared to traditional signalized intersections. However, roundabouts have generated a significant number of subjective complaints from pedestrians and bicyclists both nationally and locally suggesting difficulties and safety concerns. In addition, recent observational and safety data at the nearby roundabout at Converse Avenue and Pershing Blvd. confirm that local drivers misunderstand the rules of the roundabout, resulting in improper use and avoidable collisions (Mark T. Johnson, 2019). The majority or 75% of all crashes in this local roundabout where a result of entering vehicles failure-to-yield.



Driver Familiarity, Public Opinion, Involvement, and Impact

Researchers have conducted studies on public opinion of roundabouts in the US. Public opinion polls of drivers in Hutchinson, Kansas; Harford County, Maryland; and Reno, Nevada (communities where roundabout construction was planned) show that more than half of surveyed drivers (55%) were opposed to roundabout construction and were not aware of their operational characteristics (Dr. Aemal Khattak, 2009). Drivers surveyed stated safety, confusion, or that they would rather have a traffic signal as the main reasons for opposing roundabouts both before and after construction. The reasons given for opposing roundabouts were the same before and after roundabout construction, but the overall proportion of drivers opposed to roundabouts reduced by 27 percent after roundabout construction.

In our public involvement efforts, we specifically asked stakeholders to evaluate the a "Recommended Alternative Whitney Road at Dell Range Blvd.: Single Lane Roundabout". Respondents were given the option of Definitely Like, Like, No Opinion, Do Not Like, and Definitely Do Not Like as options. The results indicated that 49.4% of the stakeholders were in favor of the single lane roundabout with 45.3% opposing the recommendation. 6.2% of the respondents had "No Opinion". Concerns varied by some of the primary concerns were related to the following:

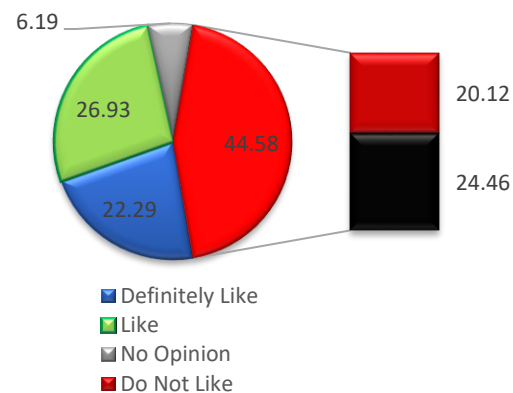


Figure 5.18 Stakeholder Evaluation: Single Lane Roundabout

- The ability of the roundabout to accommodate larger vehicles including trailers, recreational vehicles, and emergency services
- Snow, ice, and weather concerns
- Incompatible with the current and future use of Dell Range. Specifically, placing a roundabout within a corridor of signalized intersections
- More crashes than a standard intersection
- Perceived high speeds witnessed on the corridor
- Adjacent longitudinal steep grades north of the intersection
- Drivers misunderstanding of the rules of a roundabout.

Remainder of Page Intentionally Left Blank



Environmental

The Whitney Road and East Dell Range intersection is situated within Cheyenne's and Laramie County's high growth corridors. While currently rural in character, the land uses surrounding the intersection are transitioning into a more suburban development pattern. Whitney Ranch and Saddle Ridge are the two largest developments influencing land use and traffic changes occurring in the area.

A zoning and infrastructure assessment of the area shows Whitney Road will function as the City of Cheyenne's eastern boundary for many years. Sewer service expansion in the area is limited east of Whitney Road. Furthermore, most of the properties east of Whitney Road are large lot residential parcels and likely not to redevelop. The Whitney Road and East Dell Range intersection will function as a gateway between the urban and suburban patterns of development within Whitney Ranch, the City of Cheyenne with the more rural development pattern of Laramie County.

Between the two alternatives a roundabout presents a stronger gateway and urban design opportunity for transitioning land uses than a signalized intersection. The roundabout creates a physical transition between the higher travel speeds anticipated in rural areas east Whitney Road and the lower traffic speeds in the more suburban pattern west of Whitney Road. The roundabout balances mobility demands while providing a distinctive place-making opportunity.

Summary of Findings

The following Table 5.11 Alternatives Analysis Whitney Road at Dell Range Blvd. summarizes the alternative analysis and identifies the preferred alternative based on the evaluation criteria. The performance of each criteria was based (1) – Excellent, (2) – Fair, (3) – Poor, and (4) – Unacceptable in conjunction with the context and weight established illustrated in Table 5.7 Intersection Alternative Evaluation Criteria.

Based upon the scoring criteria, the option with the lowest average is the highest-ranking option is the Single Lane Roundabout by a small margin over the Signalized Intersection.

Remainder of Page Intentionally Left Blank



Table 5.11 Alternatives Analysis Whitney Road at Dell Range Blvd.

Criteria	Whitney at Dell Range Blvd.				Sub-weight
	No Build Option	Single Lane Roundabout	Single Lane Roundabout w/ Slip Lanes	Signalized Intersection	
Construction Cost	1	2	3	2	15.00%
Right-of-way	1	2	3	1	10.00%
Constructability	1	2	2	1	2.50%
Ability to Phase Construction	1	1	1	1	5.00%
Maintenance Cost	4	2	2	3	10.00%
Stakeholder Consensus	4	3	3	1	15.00%
Environmental Impact	1	1	1	1	2.50%
Qualitative Traffic Analysis					
Kimley-Horn Analysis	4	3	3	2	7.50%
STS Analysis	4	2	2	2	7.50%
Traffic Safety	4	1	2	3	25.00%
Weighted Average	2.95	1.90	2.40	2.00	100.00%



Figure 5.20 Standard Intersection Alternative



Figure 5.19 Single Lane RAB Alternative

Remainder of Page Intentionally Left Blank



After careful review and consideration of the alternatives and the alternative analysis of the Whitney Road at Dell Range Intersection, AVI concludes that either a Single Lane Roundabout or Signalized Intersection could feasibly be integrated in the future design of Whitney Road. We recommend that a careful and prudent design approach be incorporated with either approach as WYDOT and Laramie County move forward with the final design. Those additional design elements include further evaluation and incorporation of the following, when available:

- Final TransCAD model data from the Metropolitan Planning Organization's Connect 2045 Project when complete
- Review of continuity and compatibility with intersection plans on adjacent corridor intersection on Dell Range Blvd. at Van Buren Avenue and U.S. 30.
- Incorporation of more accurate traffic impacts and generation from future Whitney Ranch Commercial and Residential components for scale and impact
- Compatibility with the needs and vision of the rural residential users and commercial traffic surrounding the intersection (i.e. larger trucks, recreational vehicle movements, and stock and horse trailers.

We understand that Laramie County and WYDOT were moving forward with the Single Lane Roundabout design. Therefore, we have illustrated that alternative into the final recommendation and implementation portion of the report.

Proposed Corridor Right-of-way Requirements

During this preliminary design phase of the project, the team researched the Laramie County GIS website (GreenwoodMap.com, 2020) and recorded documents in the Laramie County Clerk's office in order to identify potential needs for future right-of-way. The purpose was two-fold; first, to identify the preliminary physical property needs and ownerships and second, to commence open communication with the present landowners.

The planning and design team have made recommendations for right-of-way acquisition that we believe were necessary to fulfill the goals of the project and minimize the impact to existing landowners. Please note that a Wyoming Professional Land Surveyor will be required to establish the existing right-of-way along the corridor and determine the acreages required for the project. The following table and figures summarize the parcels and ownerships which have been identified at the ten (10) percent design level for proposed right-of-way acquisition. These are outlined in the following Table 5.12 Summary of Right-of-way requirements and illustrations.

Remainder of Page Intentionally Left Blank



Whitney Road Corridor Plan

Design

August 2020

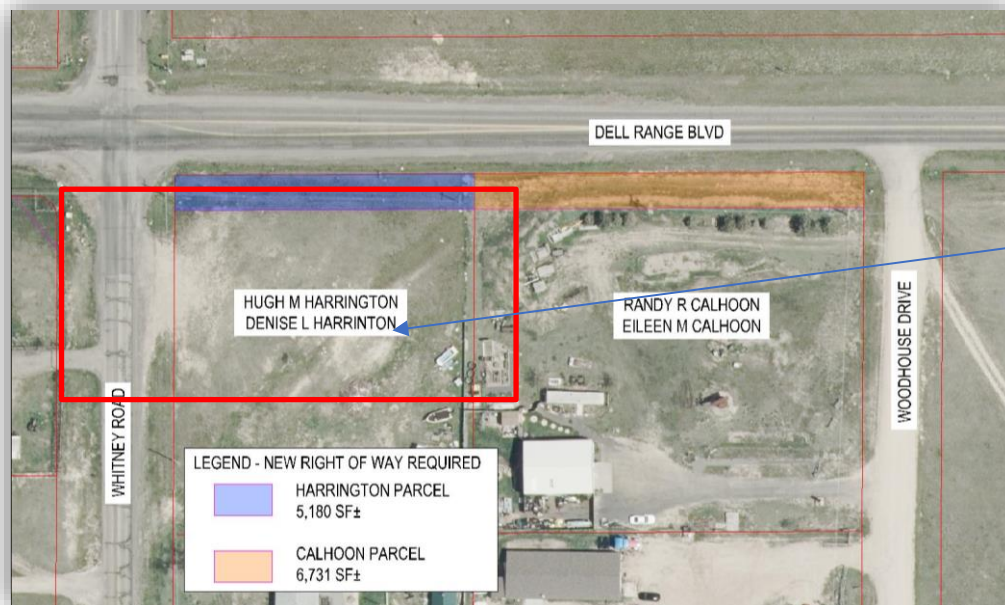
Table 5.12 Summary of Right-of-way Requirements

Parcel	Parcel No.	Property Address	Area (Acres)	Anticipated Right-of-way	Owner	Address	Reference
1	14662310000100	DELL RANGE BLVD	1.04	Platting	GYSEL WHITNEY LLC	PO BOX 72, ALBIN, WY 82050	FIGURE 5.21
2	14662520300200	DELL RANGE BLVD	0.12	Vacant	HARRINGTON, HUGH M ET UX	4501 WHITNEY RD	FIGURE 5.22
3	14662520300100	DELL RANGE BLVD	0.15	Level 1 Commercial	CALHOON, RANDY R ET UX	4506 WOODHOUSE DR	FIGURE 5.22
4	14662610100800	4512 WHITNEY RD	0.01 (509 SF)	Residential	MUELLER, MARTIN REV TR ET AL	4512 WHITNEY RD	FIGURE 5.23
5	14662610000100	4212 WHITNEY RD	0.03 (1,407 SF)	Level 2 Commercial	ROBERSON, KAREN SHERMAN	PO BOX 20431	FIGURE 5.24
6	14662611600100	6102 HWY 30	0.14	Level 2 Commercial	JOLLY ROGER LLC	6102 HWY 30	FIGURE 5.24
7	14662520400400	4219 WHITNEY RD	0.02 (921 SF)	Residential	MIDDELSTADT, BETTY	4219 WHITNEY RD	FIGURE 5.24
Total			1.51				

Remainder of Page Intentionally Left



Figure 5.21 Parcel 1 Exhibit



Spelling error

Figure 5.22 Parcel 2 and 3 Exhibit



Figure 5.23 Parcel 4 Exhibit

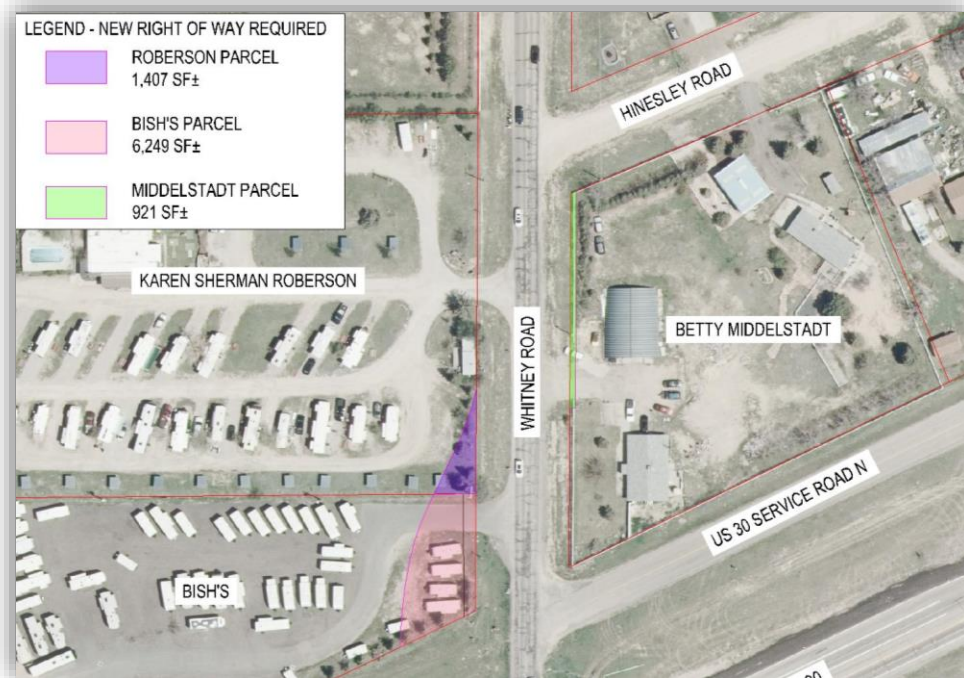


Figure 5.24 Parcel 5,6, and 7 Exhibit



Post Development Drainage

The corridor, as previously described, is located within the Child's Draw and Dry Creek Drainage Basins. The entire contributory drainage area encompasses about 18 square miles (CH2M Hill, November 1988). Child's Draw is predominantly a rural basin but, is in the process of urbanization. The topography in and around the study area generally slopes to the northeast within Childs Draw basin (brown) and Southwest within the Dry Creek basin (purple) in Figure 5.25 Drainage Basin Overview.

Initially we recommend that the roadway drainage criteria utilize the requirements of the *Laramie County Land Use Regulations 2019*. (County, The Laramie County Land Use Regulations 2019 Edition, 2019) Drainage planning and design shall provide for stormwater detention based on a design storm up to a one-hundred (100) year frequency. Post development design requirements shall be for a system to maintain total contributory site discharge at no greater than a pre-development (i.e. historic) fifty (50) year release rate for a 100-year storm event.

Additionally, at a minimum, drainage conveyance system elements shall be based on the following criteria for an arterial street:

- Minor Storm (5-year) – No curb overtopping and one interior drive lane clear
- Major Storm (100-year) – Maximum depth 12" above gutter flow line, 6" flow across street intersections.
- Downstream conveyance paths shall be reviewed to ensure no adverse impacts to downstream property or property owners.

The design team developed conceptual drainage plan opportunities for the Whitney Road Corridor. The layout outlined planning level opportunities for improving the post development drainage along the corridor. A brief summary of the systems and critical constraints are outlined below and in Figure 5.26 Conceptual Drainage Plan.

Conceptual Storm Sewer Trunk Line N-1. This sub-basin roughly encompasses Whitney Road from the high point north of Chickadee Drive proceeding north to Storey Blvd./ Beckle Road. The proposed profile mimics the existing topography which creates a low point for the basin on South of Storey Blvd./ Beckle Road. The conveyance system would require a series of inlets at locations along the roadway necessary to capture runoff to meet the minor and major conveyance criteria outlined above.

Conceptual Storm Sewer Trunk Line S-1. This basin roughly encompasses Whitney Road from a natural high point north of Chickadee Drive to south U.S. 30 right-of-way. This basin eventually runs west to the Dry Creek drainage. The proposed profile mimics the existing topography which

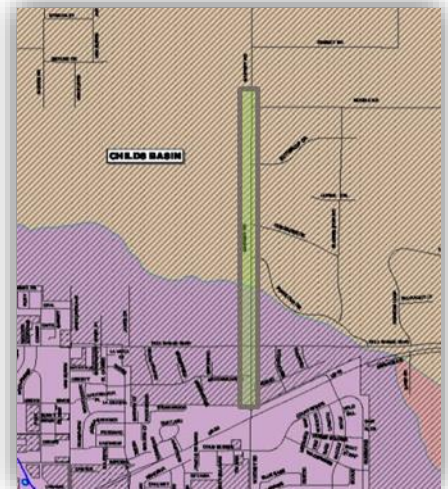


Figure 5.25 Drainage Basin Overview



creates a couple of low points within the profile. The conveyance system would require a series of inlets at the low point locations and along the roadway necessary to capture runoff to meet the minor and major conveyance criteria outlined above. The runoff would then be conveyed to stormwater detention ponds either north of Dell Range Blvd. on the east or west side of the roadway or combination of both. A local offsite inlet near the northeast side of U.S. 30 Service road should be installed to mitigate localized flooding occurring on adjacent properties.

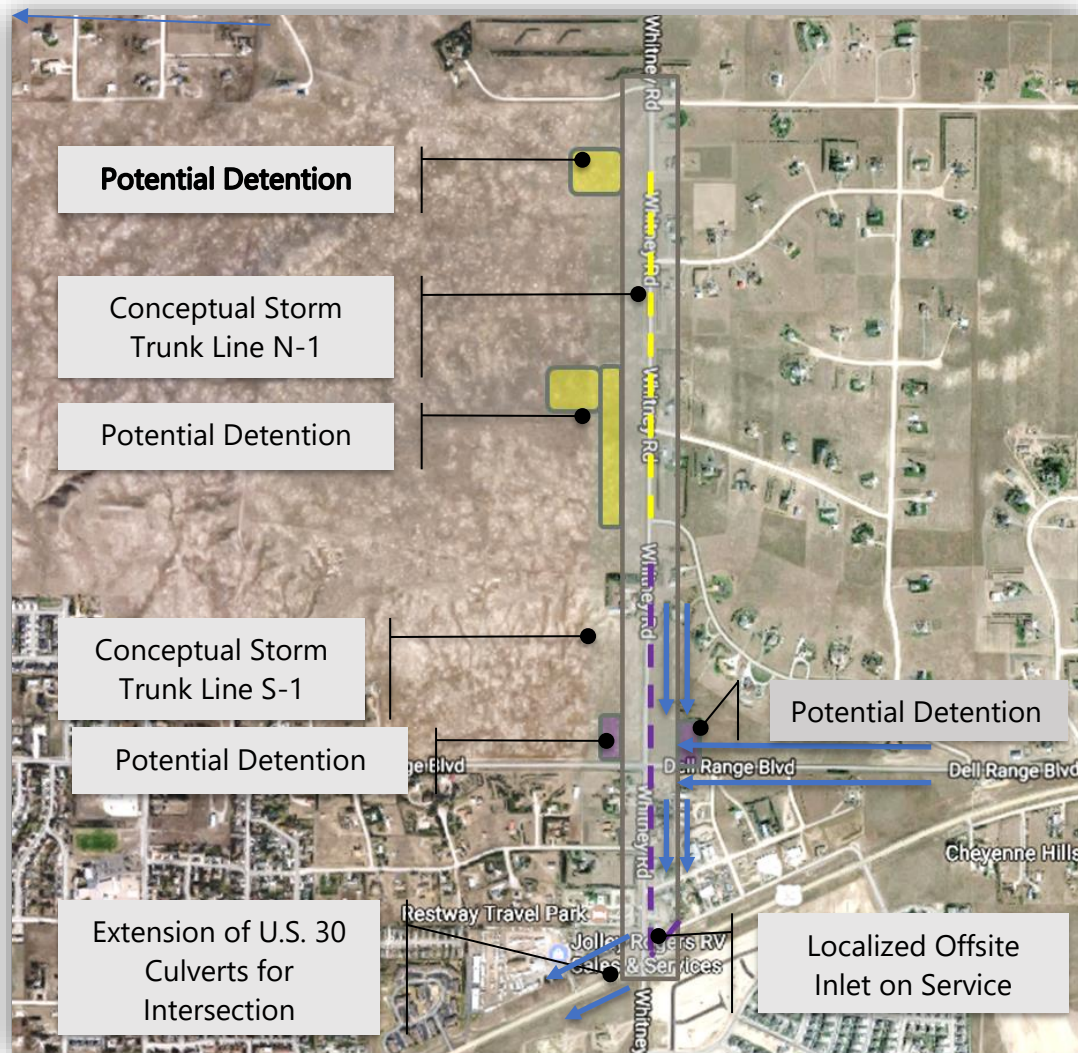


Figure 5.26 Conceptual Drainage Plan



Special Features

Snow Fence. Another concern expressed about the future construction of the Whitney Road corridor was snow drifting due to the natural topography and predominant wind direction. Every effort was made in this design to incorporate design features within the roadway cross section, alignment, and vertical profile to mitigate snow drifting, improving visibility, and reducing slush and ice. However, in most areas, it was impractical to include such design features to mitigate snow movement.

Consequently, we recommend that those areas utilize snow fence as a mitigation method until housing and structures to the northeast mitigate drifting. Unfortunately, the fence will need to be installed on private property due to right-of-way constraints. The basic design benefits and constraints are illustrated in Figure 5.27 Porous and Solid Snow Fence Drift from the *Design Guidelines for the Control of Blowing and Drifting Snow* by Ron Tabler of Tabler & Associates (Ronald D. Tabler, 2003). Benefits include reductions in Snow removal costs, Accidents, Property damage, Road closures, and Pavement maintenance.

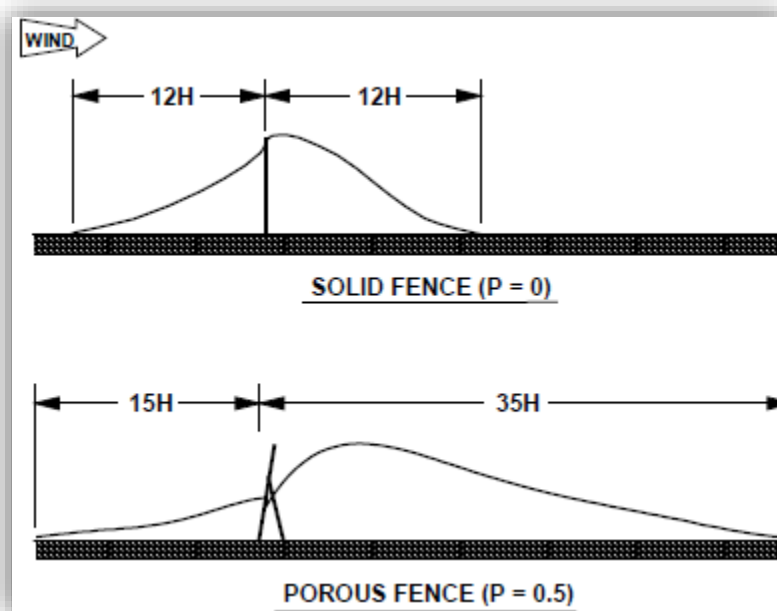


Figure 5.27 Porous and Solid Snow Fence Drift Comparisons



Engineer's Opinion of Probable Costs and Funding Options

Cost estimates for the preferred alternative were developed using the following information and assumptions. Please note that the total costs and unit prices are calculated in Present Worth or Present Value dollars. Adjustments should be made for years beyond the present to better estimate the needed dollars for any future improvement plan(s).

Table 5.13 Cost Estimates 2020

Description of Area	Estimated Costs					
	Construction	Right-of-way	Engineering	Contingency	Total	For Estimate
Whitney Road at Dell Range Blvd. Intersection (RAB W\Slip Lane)	\$ 1,142,609	\$ 19,700	\$ 114,261	\$ 171,391	\$1,547,961	\$ 1,550,000
Dell Range Blvd. to U.S. 30	\$ 1,245,878	\$108,070	\$ 124,588	\$ 249,176	\$1,727,712	\$ 1,730,000
Sub-total Phase I	\$ 2,388,487	\$ 227,770	\$ 238,849	\$ 420,567	\$ 3,275,673	\$ 3,280,000
Storey Blvd. to Dell Range Blvd.	\$ 2,446,254	\$ -	\$ 244,625	\$ 489,251	\$ 3,180,130	\$ 3,190,000
Whitney Road Totals						\$ 6,470,000

Assumptions:

1. Engineering estimated at 10% of Total Construction costs.
2. Cost Estimates were developed using data from the 2019 Weighted Average Bid Prices, complied by WYDOT; Colorado Department of Transportation (CDOT) 2019 Cost Data Book, compiled by the Engineering Estimates and Marketing Analysis Unit; Typical Costs from historical AVI project experience.
3. Quantities are based on the Conceptual Improvement Plan layouts. Please see Appendix A for additional information.
4. Right-of-way costs are based on listed values of adjacent similar properties gathered by the City of Cheyenne and historical AVI project experience in the region and projects of similar characteristics.

AVI recommends that future costs from the present 2020 dollars and should be updated using the United States Department of Labor and Bureau of Labor Statistics. Quantities are based on the Conceptual Improvement Plan layouts. Please see Appendix A and Appendix D for additional information.



Funding Opportunities

Based on AVI's experience in securing funding for other municipalities, we identified the following potential funding sources for improvements to the City of Cheyenne and Laramie County.

- The public sector: City of Cheyenne, Laramie County, and WYDOT, etc. will play important roles in "readying the area for private investment" through infrastructure improvements, public planning, and policy initiatives. From these initiatives and/or investments, private sector development can be leveraged.
- Funding mechanisms for public infrastructure could include loans and grants (e.g., Wyoming Business Council's Business Ready Community Program and Community Facilities Grant and Loan Program); Community Development Block Grant (CDBG) funds; Federal Surface Transportation Program (STP) revenue bonds; and general obligation bonds; and Sixth Penny Special Use Tax.
- A public-private partnership for development will likely take many forms and have many partners, responsibilities, and funding alternatives. In the end, a successful partnership will ensure that both the public and private sectors will realize reasonable returns on their investments and the community will realize their long-term vision for this portion of Laramie County and the City of Cheyenne.

Implementation Program

Key Planning Considerations. The decisions and directions made in the Whitney Corridor Plan were developed as a collaborative effort and were shaped by several influences. Those decisions and directions that are documented in this plan were shared with the community during the public outreach and engagement process. Every effort was made for complete transparency through open communication with participants of the team, stakeholders, and community participants.

There is a natural tendency to believe that a Corridor Plan will be applied in its entirety with minimal changes. However, that would not appropriately respond to natural and unforeseen opportunities that arise in a community. Decisions within the plan need to be periodically updated to reflect new or emerging circumstances. Each succeeding jurisdictional entity also has the discretion to reconsider long-range policy and plan decisions and may choose to modify this Plan.

Summary of Corridor Recommendation. The overall recommendations are specifically designed to address all modes of transportation, and safety needs of the Whitney Road Corridor. All recommendations have been examined carefully to ensure practicality, functionality, sustainability, and successful implementation. The physical layout of the improvements are detailed on the following in Plan of Appendix A. Detailed cost estimates are shown in Appendix D.



Action Plan Summary

Table 5.14 Short Term Action Plan Summary

Short Term Plan Implementation

Action / Goal		Specific Tasks	Roles & Responsibilities	Time Frame
Interim Safety Improvements Whitney Road at Dell Range Blvd.	1	Install larger Stop Signs (30" x 30" to 36 x 36 or 48 x 48)	Laramie County	Now
	2	Install Stop Bars on Whitney Road at Dell Range Blvd.	Laramie County	Now
	3	Install Stop Bars on Dell Range Blvd.	Laramie County	Now
	4	Install solar powered Flashing Beacon on Stop Signs at Dell Range Blvd.	Laramie County	Near
	5	Install Intersection Down Lighting on Existing Power Poles at Dell Range Blvd.	Laramie County/ City of Cheyenne	Near
Interim Safety Improvements Whitney Road at U.S. 30	1	Install larger Stop Signs (30" x 30" to 36 x 36 or 48 x 48)	WYDOT	Complete
	2	Install Stop Bar pavement markings on Whitney Road	WYDOT/ City of Cheyenne	Complete
	3	Install Flashing Beacon for Stop Control and Warning	WYDOT	Complete
	4	Remove pedestrian refuge median for improved stacking	City of Cheyenne	Complete
	5	Widen EB to SB auxiliary turn to improve visibility and remove "ghosting" effect	WYDOT	Complete
	6	Extend center pavement markings on the north leg of the intersection at U.S. 30	Laramie County WYDOT	Now
	7	Relocate pedestrian greenway crossing until intersection is reconstructed	City of Cheyenne	Mid



Table 5.15 Long Term Action Plan Summary

Long Term Plan Implementation

Action / Goal	Specific Tasks	Roles & Responsibilities	Time Frame
1	Implement Construction Phased Strategies along the Corridor	Laramie County City of Cheyenne	Mid to Long
2	Install Uniform Roadway and Pedestrian Lighting	Laramie County City of Cheyenne	Long
3	Investigate Possible Posted Speed Reduction a. U.S. 30 East West of Whitney (Pershing to Christensen Road) from 55 mph to 45 mph b. Whitney Road from Storey Blvd. from 45 mph to 30 mph	Laramie County WYDOT	Mid
4	Implement wet and dry utility priority projects as funding resources become available or development becomes the catalyst.	City of Cheyenne BOPU	Mid
5	Develop/ Create additional egress/ access routes north of Dell Range (i.e. Storey Blvd. West, Four Mile, Riding Club)	Laramie County/ City of Cheyenne	Mid to Long
6	Reserve and/ or purchase right-of-way as development occurs along the undeveloped corridor.	Laramie County/ City of Cheyenne	Near, Mid, Long
7	Explore opportunities, as area develops, to provide roadway storm water detention / retention features / facilities.	Laramie County/ City of Cheyenne	Near, Mid, and Long
8	Explore public/ private partnerships to implement	Laramie County/ City of Cheyenne	Near, Mid, and Long

Submitted By:



www.avipc.com avi@avipc.com

AVI CHEYENNE:

1103 Old Town Lane; Suite 101

Cheyenne, Wyoming 82009

P: 307.637.6017 F: 307.632.9326

AVI FORT COLLINS:

2290 E Prospect Road, Suite 5

Fort Collins, Colorado 80524

P: 970.420.0086 F: 307.632.9326