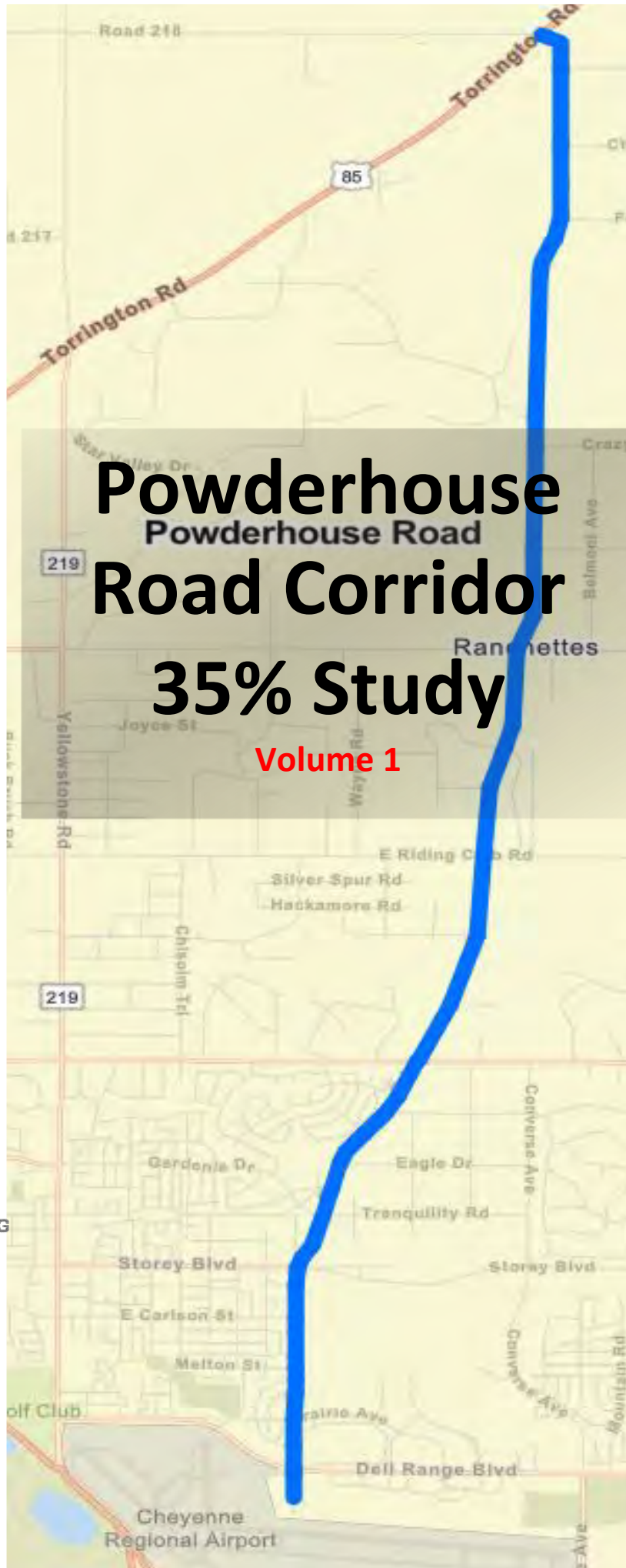


2023



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August 2023



Powderhouse Road Corridor 35% Study

Volume 1



POWDERHOUSE ROAD CORRIDOR 35% STUDY

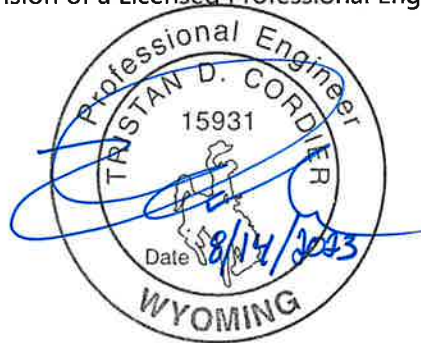
Professional Licensed Statement

Aug-23

Professional Licensed Statement

Powderhouse Road Corridor 35% Study

All engineering work performed during the course of this study was under the supervision of a Licensed Professional Engineer



Tristan Cordier, PE
AVI Professional Corporation
Wyoming PE No. 15931

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POWDERHOUSE ROAD CORRIDOR 35% STUDY ACKNOWLEDGEMENTS

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Acknowledgements

Lead Agencies



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POWDERHOUSE ROAD CORRIDOR 35% STUDY

ACKNOWLEDGEMENTS

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

City of Cheyenne Metropolitan Planning Organization

Technical Advisory Committee
Citizens Advisory Committee
Powderhouse Road Steering Committee

Laramie County County Commissioners

Planning Commission
Laramie County Public Works

City of Cheyenne

Engineering Services
Planning Commission
Public Works Department
Planning and Development Department

Community

Residents and Neighbors of Powderhouse Road

U.S. Department of Transportation

Federal Highway Administration

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SECTION 1. INTRODUCTION

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1.0 INTRODUCTION

In 2022, AVI Engineering, along with Stantec Consulting Services (Traffic) and Front Range Stormwater & Floodplain Consulting (Drainage), was tasked with completing analysis on the Powderhouse Road Corridor from Dell Range Blvd. north to US HWY 85. Scope of work included developing current and projected traffic volumes and drainage culvert crossing analysis and sizing. Also included with the study was 35% planning level construction drawings and estimated construction costs.

Powderhouse Road in north-central Cheyenne, Wyoming serves as a major north-south connector between the commercial areas of Dell Range Boulevard and the residential areas of northern Cheyenne and Laramie County. It stretches 7.2 miles long and passes through a wide range of land uses and jurisdictions.

New residential development in recent years and the addition of a new 5th & 6th grade school at the intersection of Powderhouse Road and Carlson Street have and will continue to increase traffic and impact existing drainage infrastructure along the corridor. Vacant parcels at the south end of the corridor will also change the way the corridor is used as more residential and commercial developments arrive.

Inconsistencies in the type and quality of roadway, sidewalk, and drainage infrastructure along the corridor limit the ability for pedestrians, bicyclists, and others to travel safely along the corridor. This is further complicated by the fact that some portions of Powderhouse Road fall within the jurisdiction of the City of Cheyenne, while other areas fall within the jurisdiction of Laramie County.

The Cheyenne Area has grown steadily and consistently over the last several decades at a rate of about 1% per year. The United States Census Bureau estimates that the population of Laramie County was 100,863 in 2021, with 65,051 of those individuals residing in the City of Cheyenne. A 35% planning and design framework for the Powderhouse Road Corridor is necessary in order to ensure that the corridor is scaled appropriately as the Cheyenne community continues to grow, and that it can safely accommodate users of various modes of transportation as they travel between neighborhoods, rural areas, and the many activity generators that are nearby.

Study Area

The Powderhouse Road Corridor stretches 7.2 miles and begins at Dell Range Boulevard as a minor arterial. It then continues north, crossing Storey Boulevard, East Four Mile Road (Road 212), and Iron Mountain Road where it becomes more rural in nature with a gravel roadway and no accommodations for modes of travel beyond motorized vehicles. The developed portion of the road currently terminates at Rising Star Road and then picks back up at Ford Road, where it continues approximately one mile to connect to US Highway 85. (See Figure 1-1)

Key Intersections:

1. Dell Range Boulevard and Powderhouse Road
2. Carlson Street and Powderhouse Road
3. Storey Boulevard and Powderhouse Road
4. East Four Mile Road (Road 212) and Powderhouse Road
5. East Riding Club Road and Powderhouse Road

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 1. INTRODUCTION

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6. Iron Mountain Road and Powderhouse Road
7. US 85 and Powderhouse Road

Initially, the corridor was broken into three phases. However, during the course of the Project, Section 3 was broken into two separate phases. These phases are summarized below:

Section 1: Dell Range Blvd. to Storey Blvd.

Section 2: Storey Blvd. to Four Mile Rd.

Section 3a: Four Mile Rd. to Iron Mountain Rd.

Section 3b: Iron Mountain Rd. to US HWY 85.

How To Read And Use This Report

The documents and data following will generally follow these phases as outlined above. This report has been prepared with separate appendices that cover in completeness the Traffic Study (**Appendix MA-A**) and Drainage Analyses (**Appendix MA-B**) with standalone summaries and appendices for each. Appendices referenced in other sections of this report are considered "Master Appendices, (MA)" and are also incorporated into the end of this report.

POWDERHOUSE ROAD CORRIDOR 35% STUDY SECTION 1. INTRODUCTION

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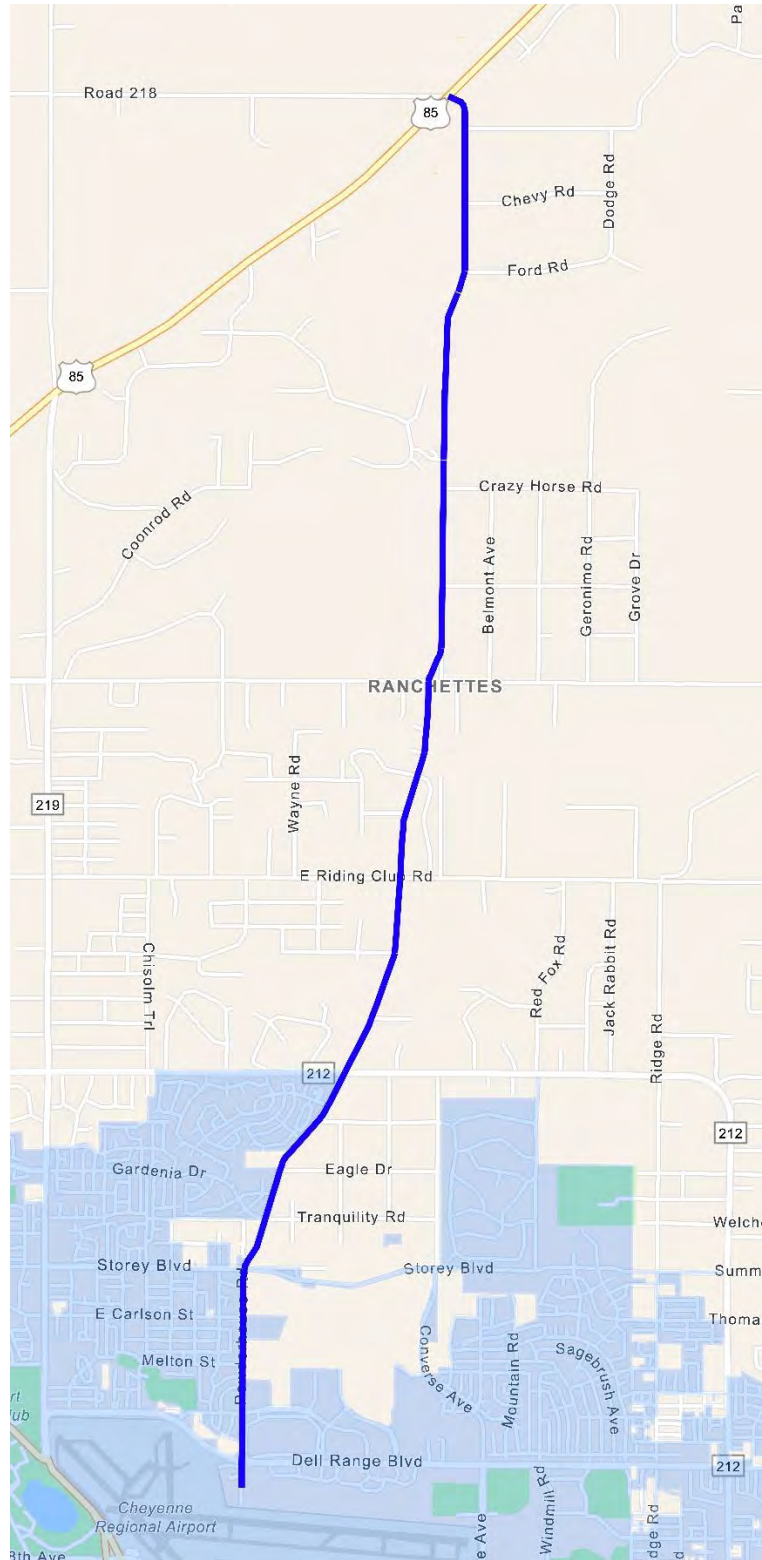


Figure 1-1: Powderhouse Road Corridor Study Area

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 2. REVIEW OF EXISTING INFORMATION

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2.0 REVIEW OF EXISTING INFORMATION

This section of the plan provides a summary of existing roadway and planning area.

History and Platting

North Cheyenne began developing more rapidly in the second half of the 20th century when F.E. Warren Air Force Base was chosen to be the headquarters for the Atlas intercontinental ballistic missiles. Prior to this time, Powderhouse Road was known as County Road #6 and served mostly local ranching traffic.

Thirty three (33) Plats are filed in the Clerks office of Laramie County at the time of this report, these Plats are summarized below, with copies of each being included in **Appendix MA-C**.

Dell Range Boulevard to Storey Boulevard

This section of Powderhouse Road includes some of the earliest denser residential developments on the north side of Cheyenne, as well as most of the commercial areas found throughout the corridor. Nimmo Addition, on the west side of Powderhouse Road, was platted in 1958 and shows an 80-foot right-of-way. Multiple filings of Indian Hills platted between 1958 and 1973 also show a right-of-way of 80 feet. Frontier Mall was first platted in 1979 and helped bring commercial development to this part of Cheyenne.

In 1985, a plat of this portion of Powderhouse Road was filed and shows the right-of-way to be 80 feet wide and lying 40 feet on either side of the east section line. Also in this section of the road lies The Village, which was filed in 2006 and created commercial and high density residential development through a Planned Unit Development zoning designation. In 2021, a plat of Coyote Ridge was filed to create a new elementary school on the east side of Powderhouse Road. This plat dedicated an additional 20 feet of right-of-way in front of the school, bringing this section of Powderhouse to 100 feet wide. Much of the remaining land on the east side of the road remains unplatted County land.

Storey Boulevard to E Four Mile Road

This section of Powderhouse Road contains some small sections of unplatted County land, as well as some low density agricultural and rural residential lots in the Montclair Subdivision on the east side of Powderhouse Road, which was platted in 1953. In 2002, the first filing of The Pointe subdivision brought a significant amount of low and medium density residential lots to the area, along with public water and sewer as it was annexed into the City of Cheyenne. Subsequent filings of the Pointe and the Pointe Plaza have allowed the area to develop further with some higher density and mixed-use zoning designations. Throughout this entire stretch of roadway, Powderhouse Road has an 80-foot right-of-way.

E Four Mile Road to Iron Mountain Road

This section of Powderhouse Road is bordered by Golden Prairie Ranch and Summerhill Ranch to the west, while Gun Hill and Bestview Subdivision lie to the east. Powderhouse Road remains at an 80-foot right-of-way throughout.

Iron Mountain Road to US Highway 85

This stretch of Powderhouse Road is the most rural in nature, with most lots ranging between 7 and 12 acres. Subdivisions in this area include Wyoming Ranchettes; North Star Ranch, 3rd Filing; Lone Star Estates; and North Country; all of which show Powderhouse as an 80-foot right-of-way.

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 2. REVIEW OF EXISTING INFORMATION

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There are also two sections of land belonging to the State of Wyoming in this section. As filed in Book 1722, Page 1181, and Book 1706, Page 1, a Right of Way easement was granted to Laramie County for Powderhouse Road to extend through the State Land. Refer to **Appendix MA-C**.

Existing Land Use & Zoning

The properties within the Powderhouse road corridor have many different uses, form, and function. The northern part of the corridor falls within the Laramie County boundary and is primarily rural residential, while the southern portion is mostly in the City of Cheyenne and has a variety of low and medium density residential uses, mixed uses, and commercial uses. Figures 2-A through 2-F illustrate the existing zone districts along the corridor.

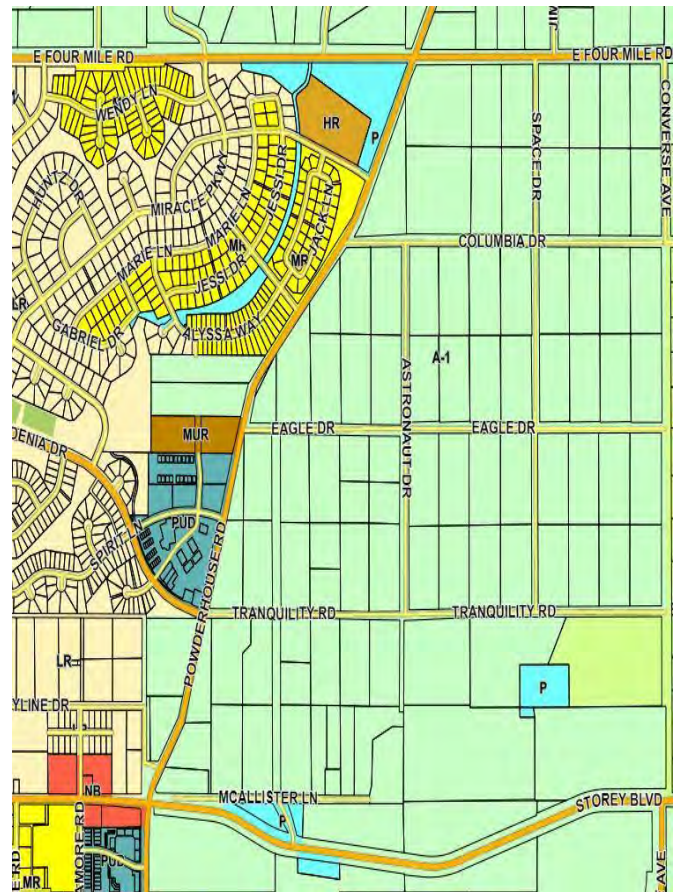
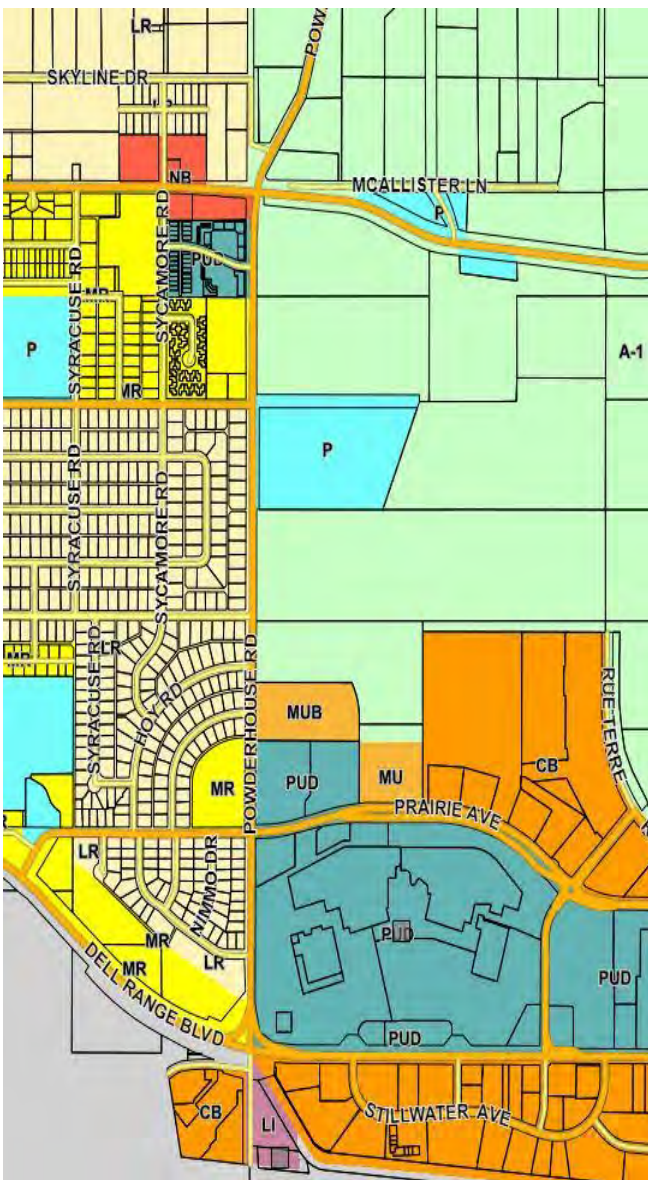


Figure 2-A

Figure 2-B

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Figure 2-C

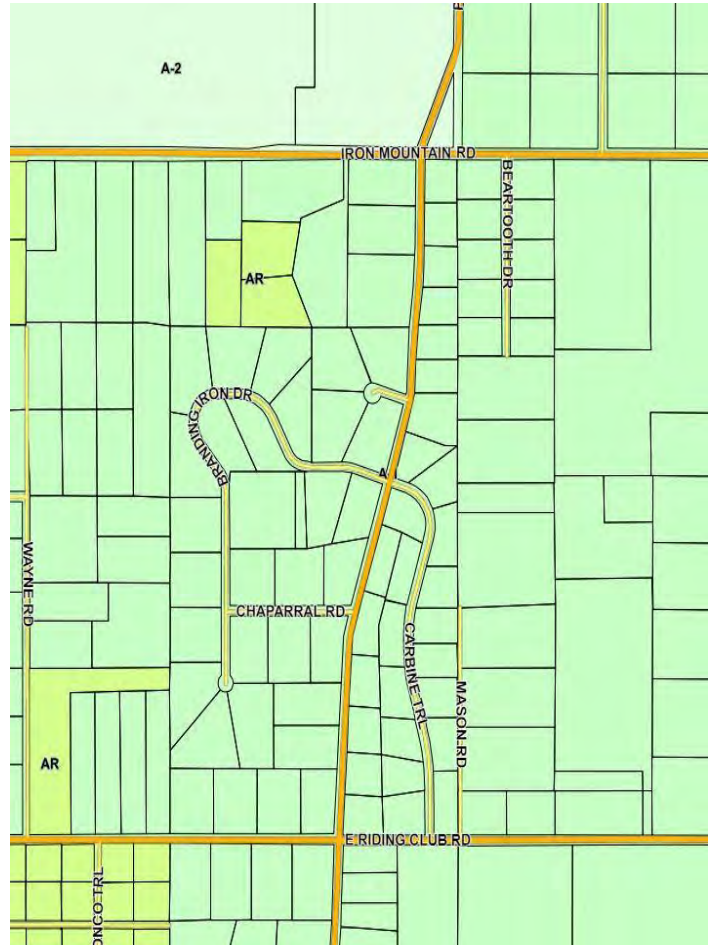


Figure 2-D

POWDERHOUSE ROAD CORRIDOR 35% STUDY

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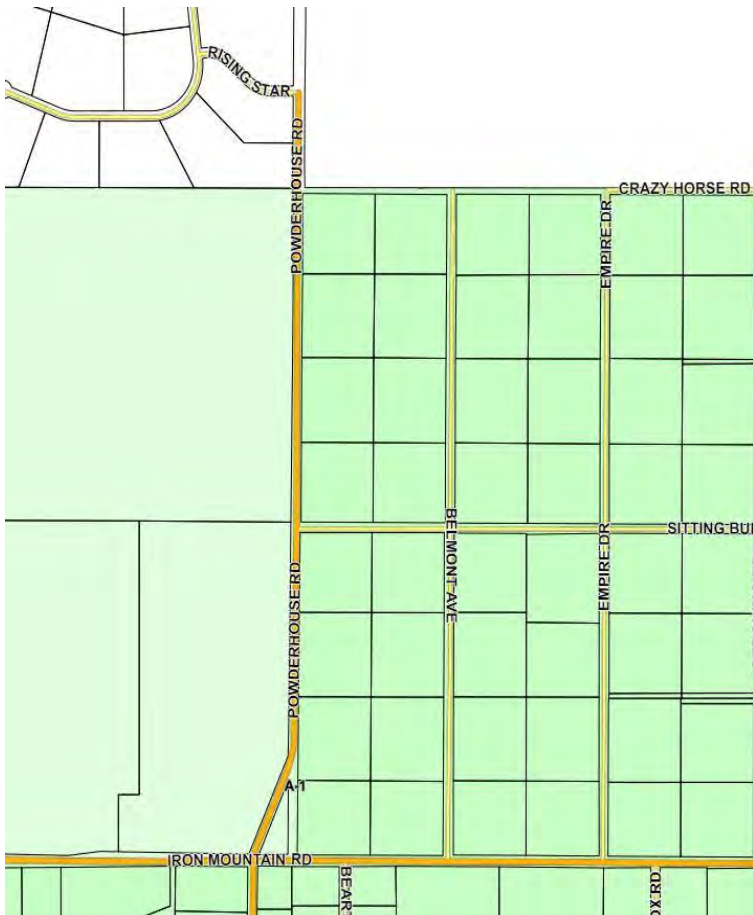


Figure 2-E

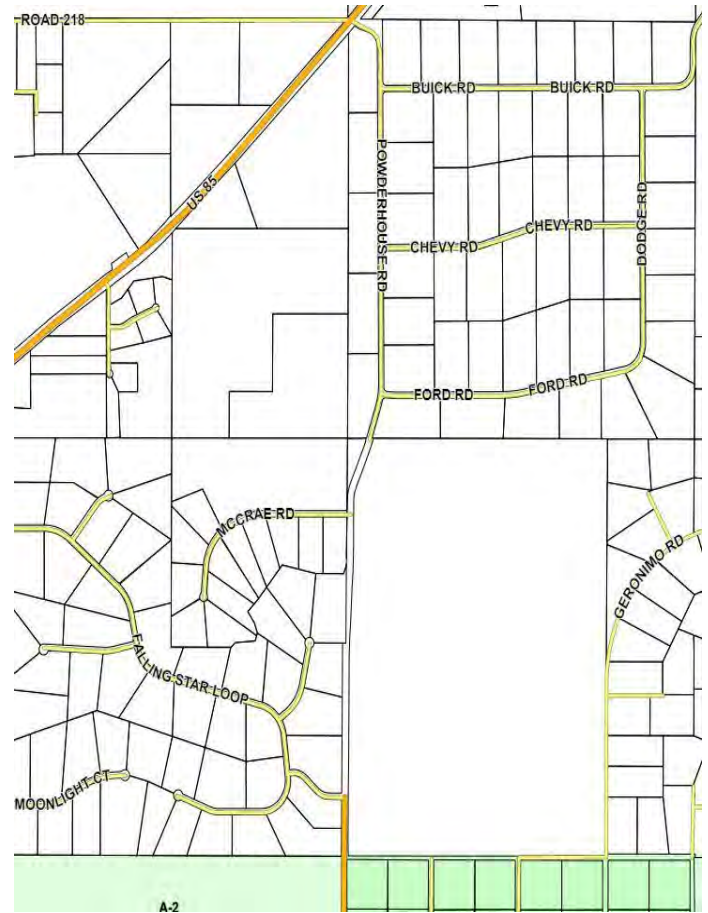


Figure 2-F

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 2. REVIEW OF EXISTING INFORMATION

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Utilities (See Appendix MA-F for utility maps)

Dell Range to Storey Blvd.

- Dry Utilities
 - Overhead east side, relocate may be necessary.
- BOPU Utilities
 - Dual water and sanitary mains Hoy to Prairie Ave.
 - 8" water west, 10" & 12" east.
 - 12" sanitary west, 8" centerline.
 - 12" sanitary north of Storey to 2nd SMH.
 - Dual water main McCue Dr to Storey Blvd.
 - 8" west, 12" east.
 - Gap of 8" water main adjacent Cheyenne Berean Church to Old Town Lane.
- City Storm Sewer
 - Localized site and roadway storm sewer collection from Prairie Ave to McCue Dr. Discharges into conveyance ditch in median on Prairie Ave north of Frontier Mall.
 - Storm Sewer collection at Storey Blvd intersection and businesses on the east between Carlson and Storey Blvd, are conveyed south on Sycamore, west on Carlson, south on Syracuse, west on Apache, south on Wahoo to discharge point in Dry Creek at Mylar Park Lake.

Storey Blvd. to Four Mile Rd.

- BOPU Utilities
 - 12" and 16" water main east side to Gardenia.
 - 12" and 6" FM Storey to Gardenia.
- City Storm Sewer
 - Misc. culvert crossings
 - Storm sewer collection from residential and commercial properties in The Pointe filings, with detention at Powderhouse and Spirit Lane, and outfall into Childs Draw Tributary.

Four Mile Rd. to US HWY 85

- Misc. approach culverts.
- Childs Draw culvert.
- Childs Draw Tributary 1105-2 Culvert.
- Ninemile Draw Tributary 820-2 Culvert.
 - This crossing may require tributary re-alignment as the drainage runs parallel and within (for approximately 750') the ROW easement of the State section,
- Ninemile Draw Culvert.
- Ninemile Draw Tributary 820-1 Culvert

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 2. REVIEW OF EXISTING INFORMATION

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Bicycle & Pedestrian Infrastructure

Sidewalks, bike lanes, and ADA (Americans with Disabilities Act) accommodations are either absent or inconsistent throughout the corridor. Most of the existing sidewalk in the southern part of the corridor does not meet current development standards, and there are several sections where sidewalk is missing.



Figure 2-G Missing sidewalk on Powderhouse Road

A portion of the Cheyenne Greenway runs north-south along the west side of Powderhouse Road between Gardenia Drive and Storey Boulevard. Here, the sidewalk is 12' wide and can accommodate both bikes and pedestrians. Another section of the Greenway runs east-west on the south side of Storey Boulevard, which is accessible at the intersection of Storey and Powderhouse Road. A second Greenway access point exists at the intersection with Dell Range Boulevard, where the Cheyenne Greenway runs east-west along Dry Creek. Aside from the small section of Greenway, there are no dedicated bicycle facilities along Powderhouse Road. From Dell Range Boulevard to Four Mile Road, the shoulders are fairly wide and are considered part of the City's on-street bike route. However, these areas are not marked exclusively for bicycles, nor are there any features that separate bikes from vehicular traffic.

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 2. REVIEW OF EXISTING INFORMATION

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Figure 2-H Wide shoulders and narrow sidewalk near Dell Range Blvd.

Transit

The Northwest route (yellow) of the Cheyenne Transit Program runs down the southern portion of Powderhouse Road with a dedicated bus shelter located on the westside of Powderhouse Road and McCue Drive. The northwest route is one of six bus routes in Cheyenne that run on an hourly schedule. During the COVID-19 pandemic, this fixed route service was suspended and replaced with an on-call door-to-door service. At the time of this writing, the Cheyenne Metropolitan Planning Organization is undertaking a new Transit Development Plan that will improve transit services in Cheyenne, including a reimagining of the fixed route bus service. Phase 1 of the proposed plan shows a new Route A serving the north side of Cheyenne with a portion of the route passing through the southern end of Powderhouse Road, quite similar to the former Northwest route. It is anticipated that this route will maintain a round-trip travel time of one hour.

The final report of the Cheyenne Transit Development Program 2023 Transit Development Plan was approved and adopted by the MPO Policy Committee on March 22, 2023. It is anticipated that Phase 1 will be implemented in 2023. This will need to be revisited during the design phase of any future work along the corridor to ensure that impacts to transit are taken into consideration.

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 2. REVIEW OF EXISTING INFORMATION

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Figure 2-1 Cheyenne Transit stop at McCue Drive and Powderhouse Road

Environmental (No Environmental Studies were completed with this Project)

Traffic (Refer to Appendix MA-A)

Drainage (Refer to Appendix MA-B)

Previous Plans & Studies

Connect 2045

Connect 2045 is the most recent iteration of the Cheyenne Metropolitan Planning Organization's future Master Transportation Plan. It was completed in December 2020 and outlines transportation investments necessary for Cheyenne/Laramie County to thrive for the next 25 years. The plan identifies numerous opportunities for improvement along Powderhouse Road, and specifically calls out the vacant land south of Storey, east of Powderhouse Road (known as Section 20) as one of seven areas with major growth potential within the area that is currently serviceable by public water and sewer. Table 2-1 below shows the suggested improvements along Powderhouse Road, their priority level, and the projected year of completion.

POWDERHOUSE ROAD CORRIDOR 35% STUDY
SECTION 2. REVIEW OF EXISTING INFORMATION

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Connect 2045 Suggested Improvements for Powderhouse Road			
Route	Description	Priority Level	Projected Year
Powderhouse from Iron Mtn to Rising Star	Improve as collector	Low	N/A
Powderhouse from Rising Star to Lodgepole Creek	Construct new roadway	Low	2036-2045
Powderhouse at Lodgepole Creek	Construct new bridge	Low	2036-2045
Powderhouse from Lodgepole Creek to Ford Rd	Construct new roadway	Low	N/A
Powderhouse from Ford Rd to US 85	Improve as collector	Low	2036-2045
Powderhouse from Storey to Iron Mtn	Widen roadway to 3 lanes	High	2031-2035
Powderhouse and Dell Range Intersection	Improve intersection capacity	High	2024-2025

Table 2-1: Connect 2045 Suggested Improvements for Powderhouse Road

Dell Range Corridor Study

The Dell Range Corridor Study was completed in 2016 and was an in-depth study of one of the most heavily used roads in Wyoming. The study identified a number of safety improvements for the Dell Range and Powderhouse Road intersection, including signal timing improvements and a recommendation to reconstruct the southbound to westbound and westbound to northbound high speed channelized right turn lanes, as shown in Figure 2-J below.



Figure 2-J: Suggested Improvements for Powderhouse and Dell Range Intersection, per Dell Range Corridor Study, 2016

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 2. REVIEW OF EXISTING INFORMATION

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Section 20 Plan

The Section 20 Plan was created as a second phase of the Dell Range Boulevard Corridor study and analyzed the future road network inside of Section 20, which is an area of approximately 350 acres of undeveloped land bound by Powderhouse Road to the west, Storey Boulevard to the north, Converse Avenue to the east, and Prairie Road to the south. The proposed street network that came out of the plan shows two connections to Powderhouse Road – an extension of Carlson Street through to Converse Avenue, and an extension of Melton Street as a local road connecting to a new north-south road within Section 20. The Section 20 Road Network from this study is shown below in Figure 2-K.



Figure 2-K: Section 20 Road Network

POWDERHOUSE ROAD CORRIDOR 35% STUDY
SECTION 3. PUBLIC ENGAGEMENT

Aug-23

3.0 PUBLIC ENGAGEMENT

The Powderhouse Road Corridor Study relied upon extensive public and stakeholder participation to guide the 35% planning and design process. A project Steering Committee helped bring expertise and input from affected public agencies, such as the City of Cheyenne, Laramie County, and Laramie County School District One. Two public open houses gave members of the community opportunities to learn about the project, connect with the design team, and share their thoughts on how to move forward. Digital engagement opportunities were also a key component of this project so that people who were not able to make it to open houses still had the chance to be involved.

This report will be presented and adopted at MPO Policy Committee, Laramie County Planning Commission, City Planning Commission, City Council, and Laramie County Board of Commissioners meetings per the schedule listed below.

Table 3- 1 Public Engagement Meeting Dates

Activity	Date(s)
Public Open House (2)	October 4, 2022 June 14, 2023
Project Steering Committee	August 30, 2022 May 4, 2023
MPO Citizens & Technical Committee (2)	May 17, 2023 August 16, 2023
MPO Policy Committee (2)	June 15, 2023 September 20, 2023 (adopted)
City Planning Commission	August 21, 2023
City Council (2)	August 28, 2023 (introduced) September 11, 2023 (adopted)
City Public Service	September 5, 2023
County Planning Commission	August 24, 2023
Board of County Commissioners	September 5, 2023 (adopted)

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 3. PUBLIC ENGAGEMENT

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Steering Committee

At the beginning of the Project, a Steering Committee was developed and comprised of the following staff and key stakeholders from the MPO/City/County/WYDOT and other agencies:

- Tom Mason, Cheyenne Metropolitan Planning Organization
- Ginni Stevens, Cheyenne Metropolitan Planning Organization
- Tom Cobb, City of Cheyenne
- Charles Bloom, City of Cheyenne
- Bryce Dorr, Board of Public Utilities
- Molly Bennett, Laramie County Public Works
- John Poelma, Laramie County Public Works
- Justin Arnold, Laramie County Planning & Development
- Julianne Monahan, WYDOT
- Jeff Daugherty, Laramie County School District 1
- Scott Cowley, AVI, Professional Corporation
- Tristan Cordier, AVI, Professional Corporation
- Kelly Schroeder, AVI, Professional Corporation
- Chris Annala, AVI, Professional Corporation
- Benjamin Weaver, Stantec Consultants
- Aaron Cvar, Front Range Stormwater and Floodplain Consulting

The Steering Committee met two (2) times throughout the course of 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.

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 3. PUBLIC ENGAGEMENT

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Digital Engagement

A key feature of the public engagement strategy for the Powderhouse Road Corridor Study was the robust digital engagement opportunities for people to learn about the project and provide feedback. The consultant team put together an interactive online StoryMap that could be accessed via the project website. A StoryMap is a feature of Esri's ArcGIS Online program that allows geographic information to be presented alongside images, text, and other links to create a narrative about any particular subject, in this case, the Powderhouse Road Corridor.

The StoryMap served as the main source of information for the project. All communication about the project directed the public to visit the project StoryMap to learn more, provide feedback, and ask questions. The StoryMap was updated periodically throughout the life of the project to include existing conditions, traffic data, and different design options.

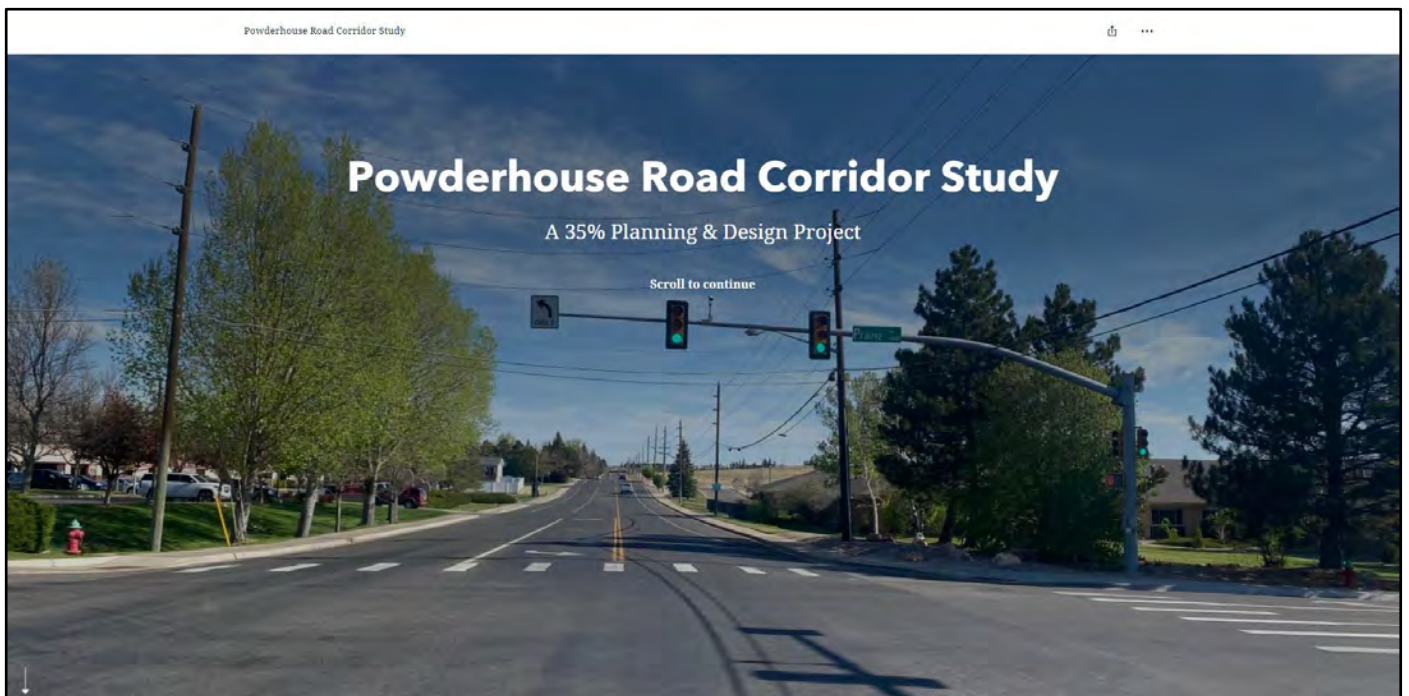


Figure 3-1: Landing Page for Project StoryMap

The consultant team also set up an email list using Mailchimp that people could sign up for to receive project updates. A sign-up button was featured in the project StoryMap, and people were given the option to receive email updates whenever they filled out a survey, whether it was online or in person at one of the public meetings. A total of 128 people signed up for project updates and received periodic emails about upcoming public meetings, surveys, and design options. The average open rate for the emails sent using this list was 76.26%.

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 3. PUBLIC ENGAGEMENT

Aug-23

Public Open Houses

Open House #1 – October 4, 2022

The first public meeting was held on October 4, 2022, from 5:00 p.m. to 6:30 p.m. at the Cheyenne Berean Church, located at 5716 Powderhouse Road, Cheyenne, WY. This was an ideal location for the first open house given its proximity to the corridor. The meeting was advertised through various media including newspaper, Cheyenne Metropolitan Planning Organization (MPO) website, the project StoryMap, and a variable message board sign placed on Powderhouse Road directly across from the church. Postcards with information on the meeting were sent to property owners within a 300-foot radius of the corridor.

The open house was set up to include a brief presentation at the beginning that introduced the project team and outlined the goals of the corridor study. Exhibit boards placed throughout the room displayed existing conditions, different design priorities, and a general project timeline. The City, and County Representatives, along with the Planning and Engineering consultants from AVI, MPO, and Stantec were available to discuss the project further, answer questions, and listen to public comment throughout the duration of the meeting. A total of 101 people were listed on the sign-in-sheet as attending the meeting.



Figure 3-1: Attendees learn about the project at Open House #1

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SECTION 3. PUBLIC ENGAGEMENT

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Figure 3-3: Attendees engage with interactive exhibits at Open House #1

There were also two interactive exhibits that invited attendees to draw or write down ideas, concerns, or opinions about the corridor. The first of these was a large 17-foot-long print out of the corridor area from Dell Range Boulevard to US 85. This was by far the busiest of the exhibits and yielded significant dialogue among area residents, City and County staff, engineers, and other community members. The second interactive exhibit asked attendees to share their vision of Powderhouse Road by drawing on a large blank sheet of paper. See below for a selection of some of the thoughts people shared at these exhibits.

POWDERHOUSE ROAD CORRIDOR 35% STUDY SECTION 3. PUBLIC ENGAGEMENT

Aug-23

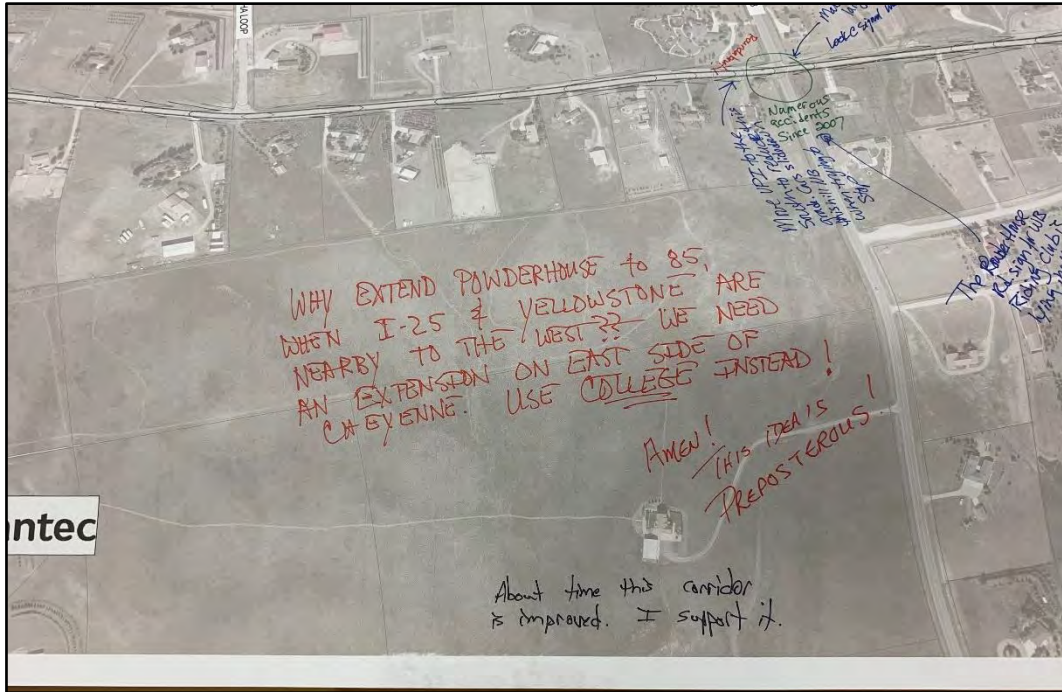


Figure 3-4: Interactive exhibit comments

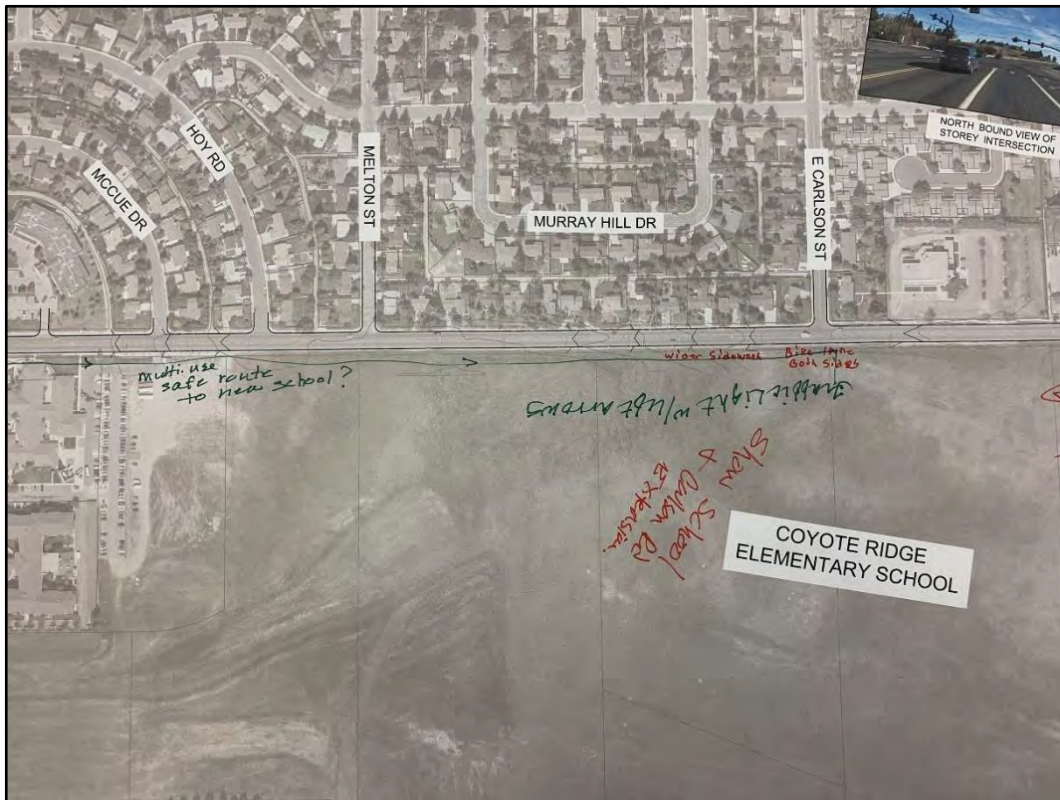


Figure 3-5: Interactive exhibit comments

**POWDERHOUSE ROAD CORRIDOR 35% STUDY
SECTION 3. PUBLIC ENGAGEMENT**

Aug-23

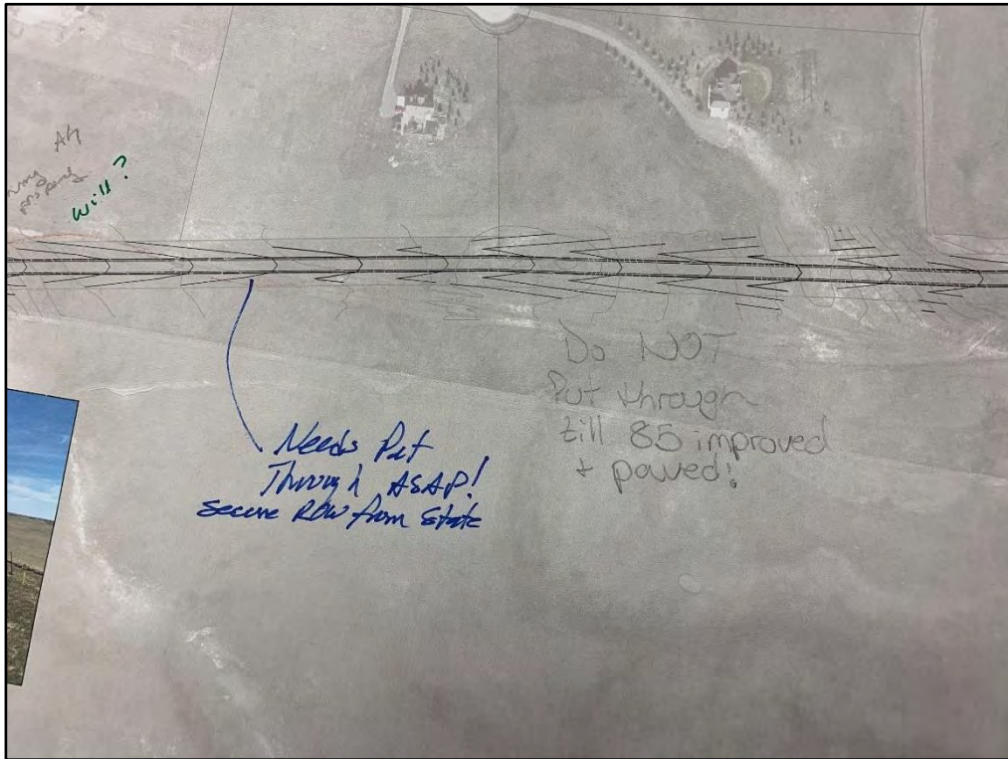


Figure 3-6: Interactive exhibit comments

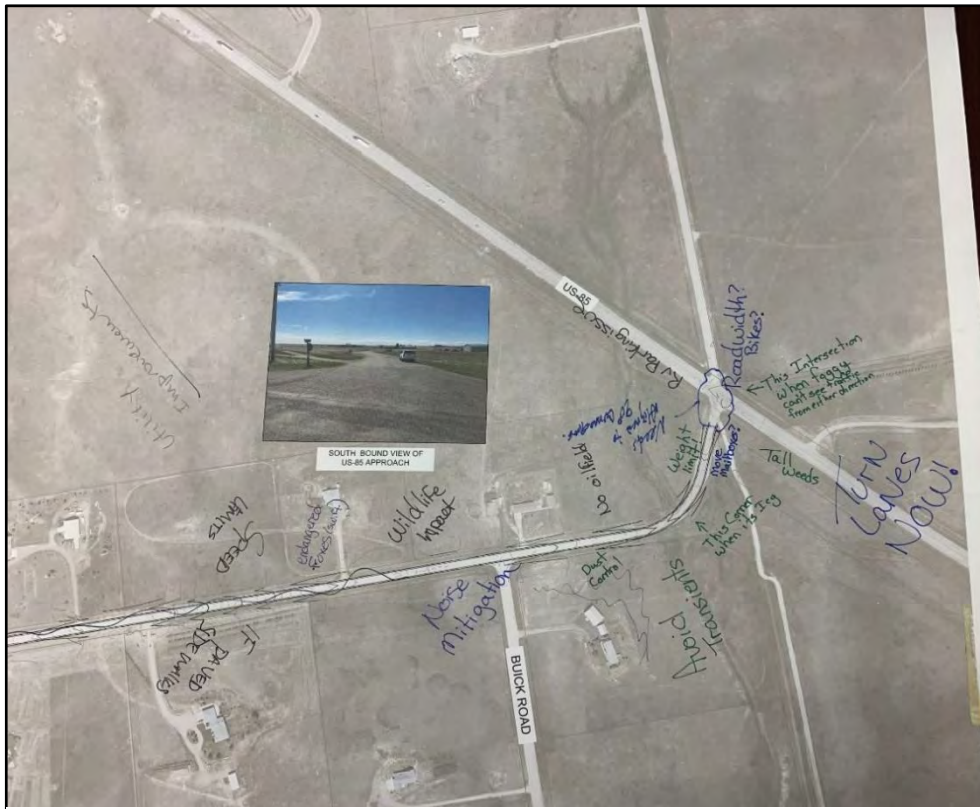


Figure 3-7: Interactive exhibit comments

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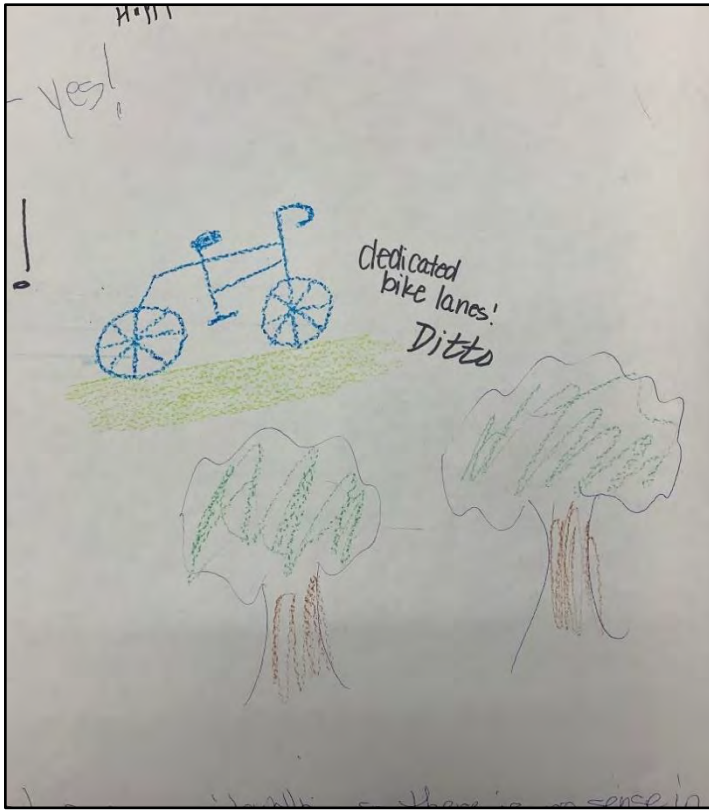


Figure 3-8: Interactive exhibit comments

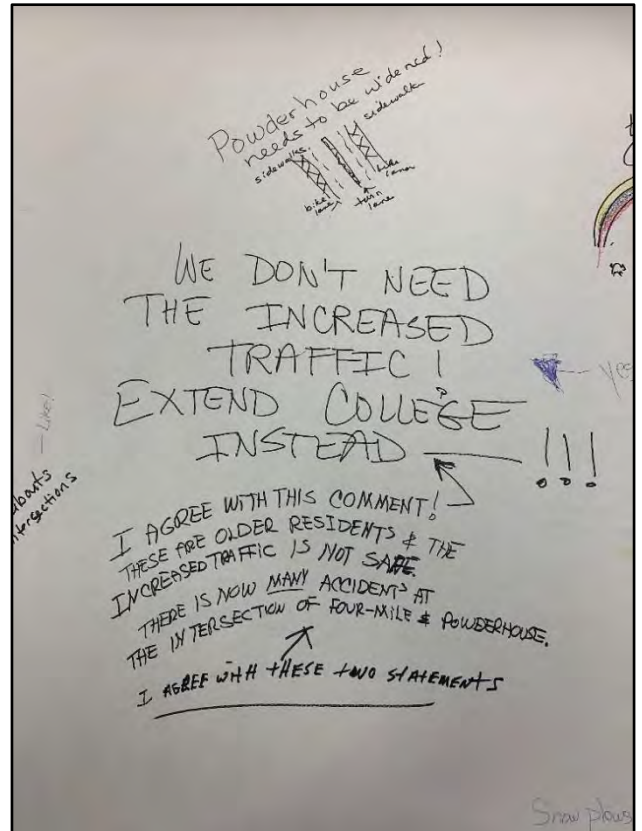


Figure 3-9: Interactive exhibit comments

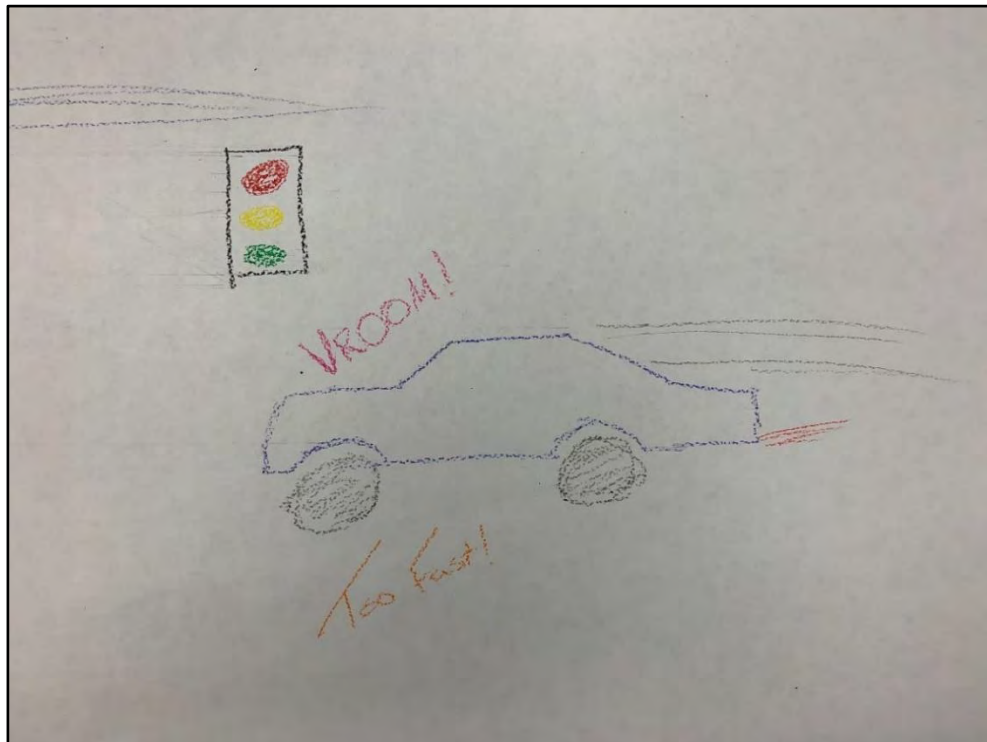


Figure 3-10: Interactive exhibit comments

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Open House #1 Survey

Following the first open house, a paper survey was distributed to attendees of the meeting who had the option of filling it out and leaving it with the project team at the meeting or filling it out at home and sending it back to AVI, PC. A digital version of the survey was created using Survey Monkey, linked in the project StoryMap, and sent to members of the community who signed up to receive email updates. The survey collected basic demographic data and asked respondents to rate the importance of different design considerations for three different areas of the Powderhouse Road Corridor. Respondents were then given the opportunity to share additional feedback in two free response questions. Responses that were collected in pencil and paper format at the public meeting were then entered by the consultant into the Survey Monkey link so that all responses could be analyzed together. Refer to **Appendix MA-D** for a sample of this survey.

The Survey Monkey link was open until Monday, November 21, 2022, at which time the survey was closed to additional responses. Reminders were sent via email in the weeks prior to closing so that people could be sure to get their responses counted and to alert new sign-ups that a survey was available. A total of 116 survey responses were collected, including those submitted in-person at the meeting and those completed online via Survey Monkey. A summary of results for each question are shown below, followed by an in-depth analysis of the open house, and accompanying survey results. Note that questions 1 and 2 were related to contact information and therefore will not be shared.

Q3: Which of the following best describes you?

Most respondents identified as homeowners in the area with 87.93% of the total, while route users came in as the next highest category with 22.41% of the respondents identifying as such. Percentages shown are based on the total number of survey responses (116). Respondents were able to select more than one answer.

Respondent Type	#	Percent of Total
Homeowner in the Area	102	87.93%
Renter in the Area	1	0.86%
Business Owner in the Area	7	6.03%
Employee in the Area	4	3.45%
Route User	26	22.41%
Other	7	6.03%

Figure 3-11: Responses to Q3

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Q4: Considering Focus Area 1, Dell Range Boulevard to Storey Boulevard, please rate the importance of the following design considerations for Powderhouse Road:

This question asked respondents to think about Focus Area 1, the section of Powderhouse Road from Dell Range Boulevard to Storey Boulevard. A total of 106 respondents answered this question and showed overwhelming support for accommodating more vehicles, accommodating pedestrians, and accommodating bicyclists. 67 respondents indicated that accommodating more vehicles was either extremely important or important, 67 said that accommodating pedestrians was either extremely important or important, while 62 respondents said that accommodating bicyclists was either extremely important or important. The idea of raising vehicle speeds appeared to be unpopular, with 60 respondents marking that this was either extremely not important or not important. Conversely, the proposition to lower vehicle speeds showed most respondents being neutral to the idea.

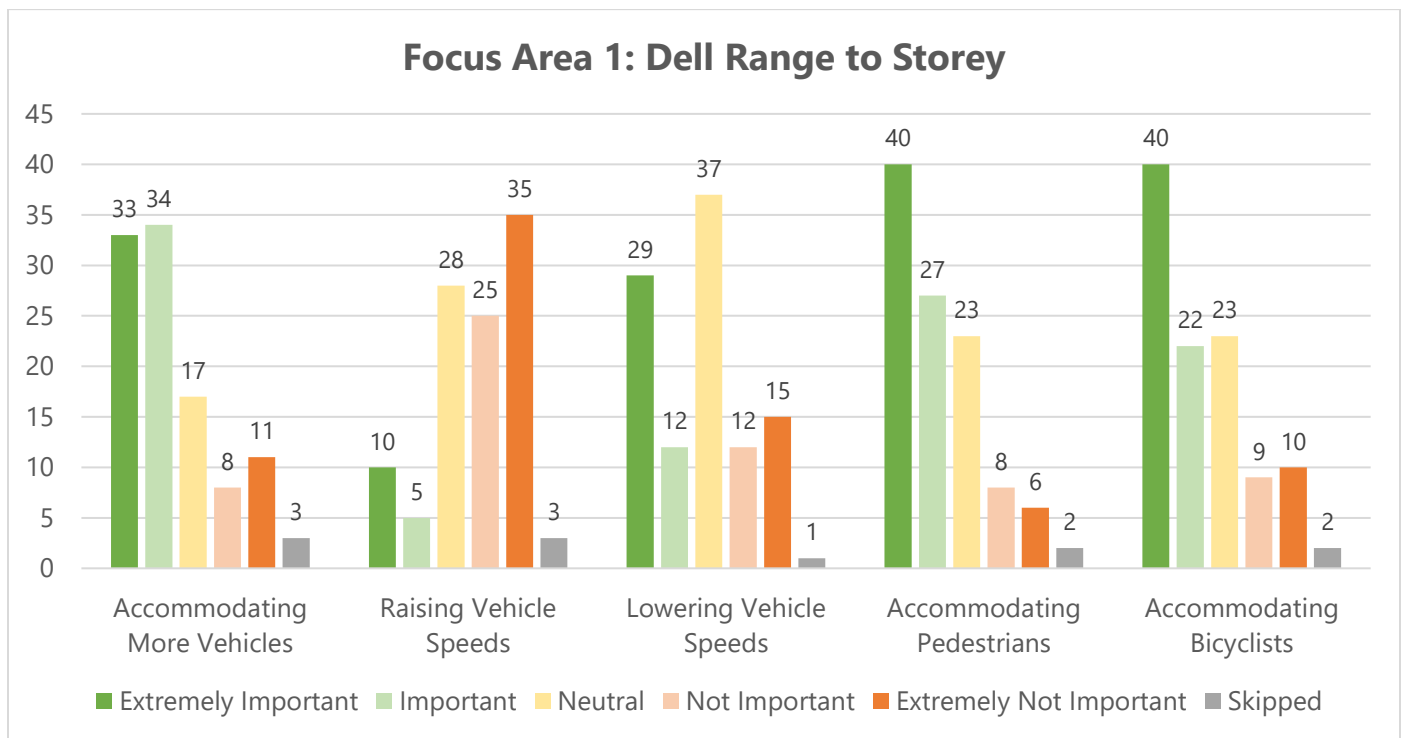


Figure 3-12: Results from Q4

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Q5: Considering Focus Area 2, Storey Boulevard to Four Mile Road, please rate the importance of the following design considerations for Powderhouse Road:

This question asked respondents to think about Focus Area 2, the section of Powderhouse Road from Storey Boulevard to Four Mile Road. A total of 104 respondents answered this question, and again, the most favorable responses were for accommodating more vehicles, accommodating pedestrians, and accommodating bicyclists. 60 respondents marked accommodating more vehicles as either extremely important or important, 62 respondents indicated that accommodating pedestrians was extremely important or important, while a total of 59 said that accommodating bicyclists was either extremely important or important. Raising vehicle speeds was again an unpopular idea with 57 respondents indicating this would be extremely not important or not important to do. Lowering vehicle speeds had mixed results with most people indicating that they were neutral to the idea. Lowering vehicle speeds had mixed results with most people indicating that they were neutral to the idea.

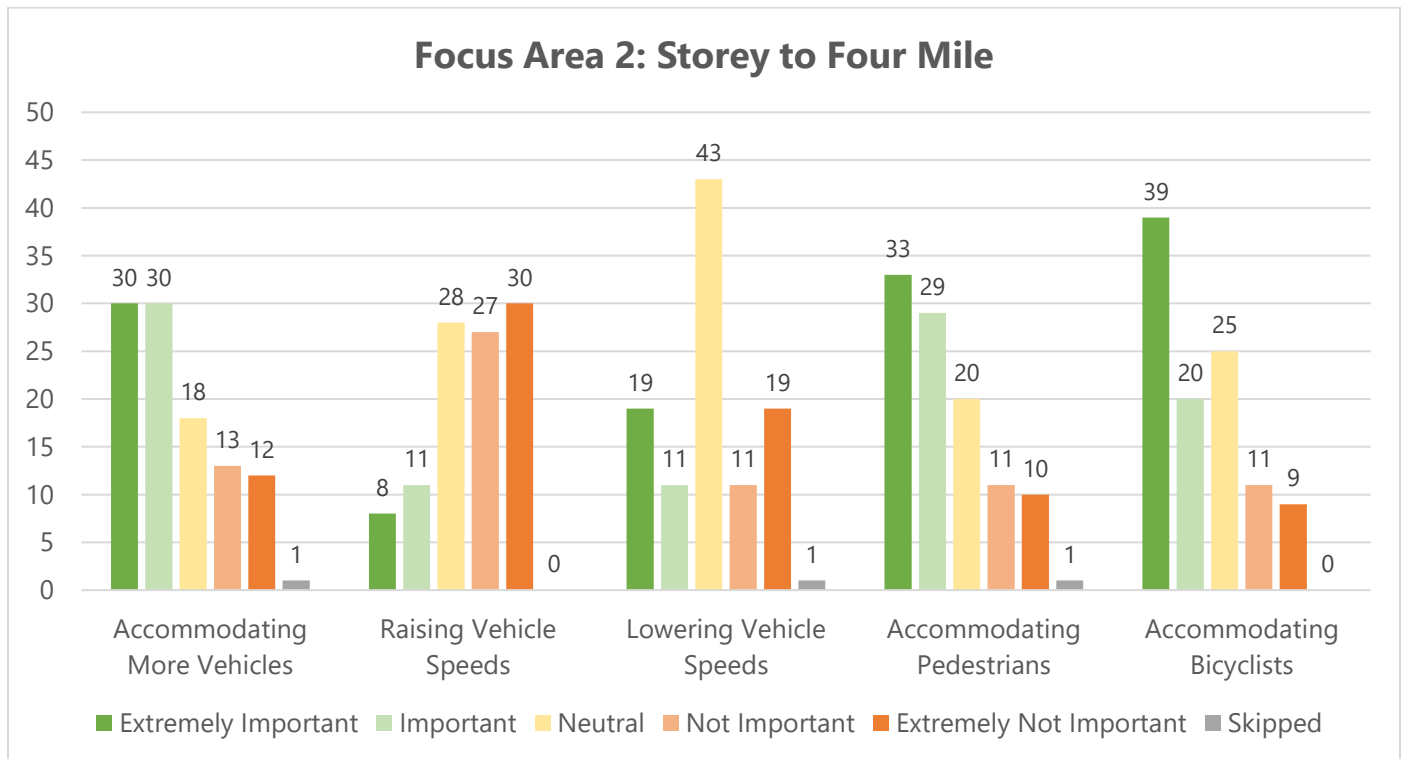


Figure 3-13: Results from Q5

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Q6: Considering Focus Area 3, Four Mile Road to US Highway 85, please rate the importance of the following design considerations for Powderhouse Road:

This question asked respondents to think about Focus Area 3, the section of Powderhouse Road from Four Mile Road to US Highway 85. A total of 105 respondents answered this question and indicated that accommodating more vehicles would be the most favorable idea. 58 respondents indicated that this would be either extremely important or important to them. The second most popular idea was accommodating bicyclists, with 55 respondents marking this as either extremely important or important. Raising vehicle speeds was once again an unpopular idea with 46 respondents saying this would be extremely not important or not important. Accommodating pedestrians and lowering vehicle speeds both appeared to be neutral options, with slightly more people falling on the more favorable side for each question.

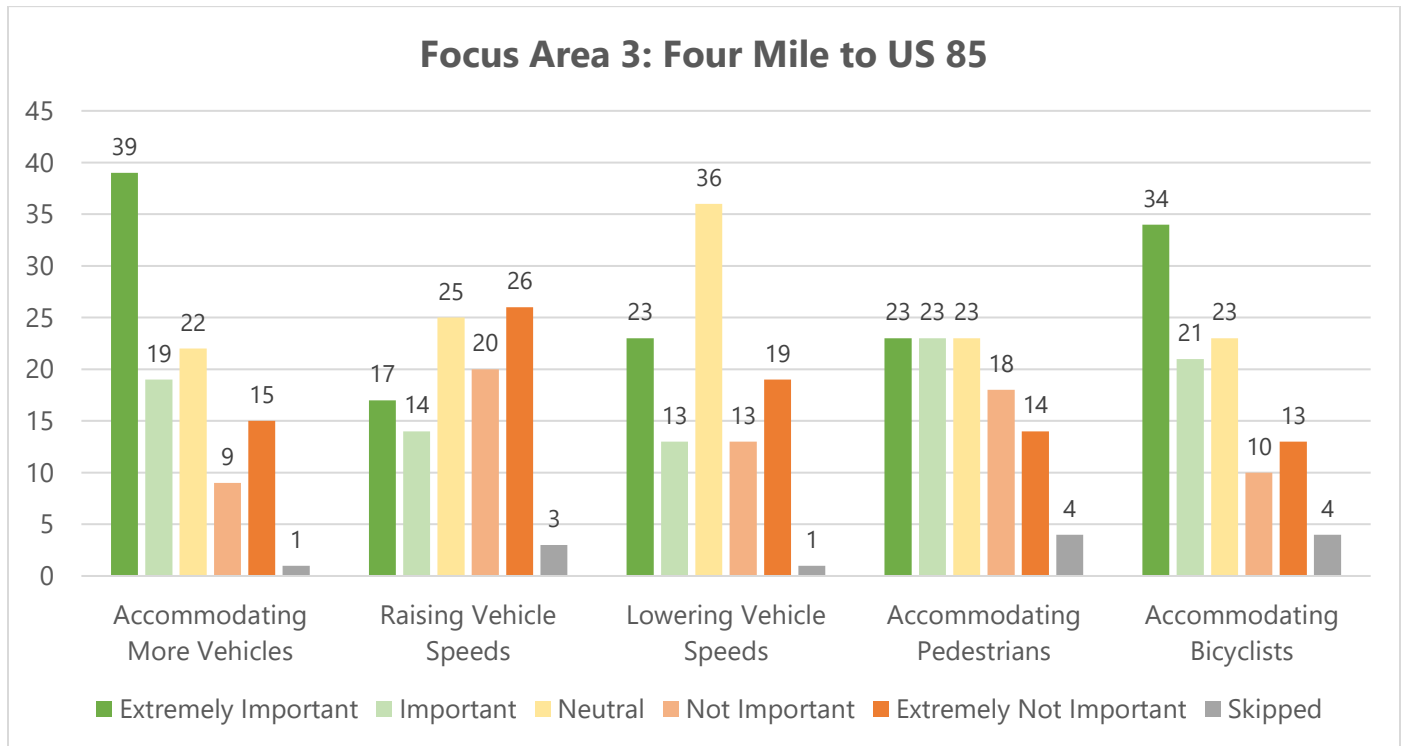


Figure 3-14: Results from Q6

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Q7: If you could make one change to the Powderhouse Road Corridor, what change would you make?

82 respondents answered this free response question. While each response was different, there were some clear themes that emerged from the responses. Some of the most common responses mentioned were a desire to add lanes or widen roads with 14 mentions, a favorable opinion of connecting to US Highway 85 with 12 mentions, and the addition of turn lanes and pedestrian and/or bike amenities with 10 mentions each. A summary of the most common mentions can be found in the table below, while each individual free response answer can be found in **Appendix MA-D**.

Topic or Concern	Number of Mentions
Unfavorable Opinion of US 85 Connection	6
Favorable Opinion of US 85 Connection	12
Add Turn Lanes	10
Add Lanes/Widen Road	14
Pavement or Surfacing Improvements	8
Concern About Commercial/Truck Traffic	7
Speed Concerns	9
Add Pedestrian/Bike Amenities	10
Add Stop Light	7
Traffic Concerns	5
Powderhouse/Carlson Intersection Improvements	9
Other	17

Figure 3-15: Results from Q7

A select few quotes from responses to this question are also listed below:

- *"I would like to add bike lanes. My kids like to ride around here, and a designated lane would make my wife and I feel better. Also with the school completion, traffic is going to get heavy. I think a traffic light would be great there. Even flashing most of the time, just solid during morning drop off and afternoon pick-ups."*
- *"Totally unnecessary to connect Powderhouse to Hwy.#85 since Yellowstone Rd. connects to Hwy.#85."*
- *"BADLY needs to be widened and paved!"*
- *"Our facility is located on the corner of Prairie and Powderhouse. Adding the light has been a nightmare. It has created major headaches for staff and patients. Excessive speed is already a concern"*
- *"Push through to US 85 ASAP"*
- *"I would put Powderhouse through to Highway 85 before the cost increases and the regulations for ROW become harder. This would make Falling Star Loop a neighborhood road once again and not a dust bowl that is continually wash boarded. Saying the north end of Powderhouse is not a priority is a huge disservice to the county residents. The southern Powderhouse corridor, except for the new school turn lane, is fine for the traffic loads currently in place."*

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Q8: Do you have any additional ideas, information, or comments that you would like to share at this time?

60 respondents answered this free response question. While each response was different, there were some clear themes that emerged from the responses. Some of the most common responses mentioned were an unfavorable opinion of connecting to US Highway 85 with 10 mentions, and the addition of pedestrian and/or bike amenities also with 10 mentions. A summary of the most common mentions can be found in the table below, while each individual free response answer can be found in **Appendix MA-D**.

Topic or Concern	Number of Mentions
Unfavorable Opinion of US 85 Connection	10
Favorable Opinion of US 85 Connection	4
Add Turn Lanes	1
Add Lanes/Widen Road	4
Pavement or Surfacing Improvements	2
Concern About Commercial/Truck Traffic	3
Speed Concerns	7
Add Pedestrian/Bike Amenities	10
Add Stop Light	3
Traffic Concerns	7
Powderhouse/Carlson Intersection Improvements	3
Other	15

Figure 3-16: Results from Q7

A select few quotes from responses to this question are also listed below:

- *“From Four Mile on to 85 is county which is the reason we moved out here. Keep it county! Pushing it through and changing it will just increase traffic. Not why we moved out here.”*
- *“I would love an alternate route to town for myself, employees, and teenage drivers. It would cut a significant amount of driving time and take it off Torrington Hwy which has a significant amount of accidents.”*
- *“Safe route to new school, option to take kids off of Powderhouse in future?”*
- *“Bicycle path from Storey to Frontier mall on east side. Bicycle lanes from Storey to Four Mile Rd.”*
- *“Add traffic control measures, such as speed bumps and traffic circles, to increase safety.”*

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Analysis

A few key takeaways after the first public open house and associated survey are as follows:

1. People are concerned about the impact that the new Coyote Ridge Elementary School at Powderhouse and Carlson will have on traffic along Powderhouse Road.

While many people expressed concern about how children will get safely to and from school, many people were also concerned about how traffic along the corridor would be impacted during drop-off and pick-up times. Lots of ideas were presented to help alleviate these issues, such as adding turn lanes, adding a traffic light at the intersection, or adding other traffic calming mechanisms.

2. Bicycle accommodations and pedestrian amenities are a high priority for residents, business owners, and other route users in the area.

Accommodating bicyclists and pedestrians ranked favorably in all three focus areas presented in the first open house survey. This was also supported by many of the conversations the consultant team had at the open house, as well as what people chose to write or draw on the interactive exhibits. Of all three focus areas, Focus Area 1 from Dell Range Boulevard to Storey Boulevard was the most favored location for additional bike and/or pedestrian amenities.

3. The idea of connecting Powderhouse Road to US Highway 85 is either strongly supported, or strongly opposed, with these two factions being relatively equally divided.

This topic was deeply debated at the open house, with several residents in the area saying that they opposed such a connection because they felt it would bring too much traffic to their otherwise quiet neighborhood. However, many area residents also pointed out that if this connection were to be made, it should be made soon, and the road should be paved the entire way so as to improve traffic safety in the area. These differing views also showed up in the free response questions of the survey. In Q7, the first of the free response questions, 12 people mentioned a favorable opinion of making the connection, while 6 mentioned an unfavorable opinion. Conversely, in Q8, the second of the free response questions, 10 people mentioned an unfavorable opinion of connection to US 85, while only 4 mentioned a favorable opinion. Taken together, these two free response questions show an even split between those for and those opposed, with 16 mentions each when combined.

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One-on-One Resident Meetings

Prior to the second open house, members of the consultant team reached out to the residents that would be most directly affected by the proposed intersection realignments. These people were Cynthia and Robin Jahnke of 1608 Columbia Drive, Jerry, and Lana Schlotthauer of 7826 Powderhouse Road, Cheyenne Light Fuel and Power located at 1701 East Four Mile Road, Pegasus Ranch, LLC located at the northwest corner of Powderhouse Road and Iron Mountain Road, and Anna and Craig Hazlip of 1790 Powderhouse Road. One-on-one meetings were set up to explain to these residents the purpose of the study, what the plan recommendations were, and how it could affect their property in the future. It was emphasized that these were just recommendations and that no actual construction plans were in place. Most residents understood the reasoning for the proposed realignments and expressed a willingness to be open to further discussion if such realignments were ever to take place. The exception to this was Mr. Schlotthauer who expressed concern about the proposed realignment and how much it encroached onto his property. It was explained to Mr. Schlotthauer that if the County ever did move forward with squaring up the intersection of Four Mile and Powderhouse, the design phase could consider alternative options that would encroach less or not at all onto his property.

The consultant team also met with Leroy and Linda Rusk of 7715 Powderhouse Road who had reached out on their own to request a one-on-one meeting. While their property is unaffected by the current design recommendations, they were unable to attend the second open house and wanted to be able to learn about the project. Mr. Rusk followed up via email after our meeting with the following comment:

Per our conversation on 18 July 2023, I expressed my concern with the 50-mph speed limit on four-mile road being too fast for safety reasons. Living at the intersection of four-mile and Powderhouse I have witnessed many near misses and minor accidents that might not be recorded by the county. Plus, pedestrian traffic crossing four-mile onto Powderhouse road has increased greatly with all the new houses in this area. My 35 plus years living at this intersection has allowed me to watch all this. Two main roads North of me, Iron Mountain Road which has much less traffic, has a speed limit of only 45 mph.

Open House # 2 – June 14, 2023

The second public meeting was held on June 14, 2023, from 5:00 p.m. to 6:30 p.m. at the Cheyenne Berean Church, located at 5716 Powderhouse Road, Cheyenne, WY. Feedback from the first meeting indicated that people had a hard time hearing in the gym, so this meeting was held in the church sanctuary in order to make use of the audio equipment. As with the first meeting, the second open house was advertised through various media including newspaper, Cheyenne Metropolitan Planning Organization (MPO) website, the project StoryMap, and a variable message board sign placed on Powderhouse Road directly across from the church. Postcards with information about the meeting were sent to property owners within a 300-foot radius of the corridor.

This open house began with a brief presentation that gave an overview of findings and recommendations from the study. Exhibit boards placed throughout the room displayed the results from survey #1, turning movement data collected during the traffic study portion, recommended cross-sections, as well as a large-scale print out of the corridor with the team's 35% design plans. Two computers were set up in the back that had the project StoryMap available for attendees to explore. Members of the consultant team along with City, County, and MPO staff were available to discuss the project further, answer questions, and listen to public comment throughout the duration of the meeting. A total of 72 people were listed on the sign-in-

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sheet as attending the meeting.

Concerns about speed were raised throughout the meeting, with several residents stating that the proposed 45 miles per hour from Storey Boulevard to Iron Mountain was too fast. Other concerns were that there would be an increase in traffic if the connection to US 85 was ever made. Stantec, the traffic engineers for the project, explained the reasoning for the design speed recommendation and how the traffic model only showed a small increase in the number of cars using Powderhouse Road if the connection were made. Due to the numerous stop-controlled intersections along the corridor, it would still be faster to take Yellowstone Road as a connection between US 85 and Dell Range as it only has signalized intersections.

Open House #2 Survey

Following the second open house, a paper survey was distributed to attendees who had the option of filling it out and leaving it with the project team at the meeting or filling it out at home and sending it back to AVI, PC. A digital version of the survey was created using Survey Monkey, linked in the project StoryMap, and sent to members of the community who signed up to receive email updates. The survey collected basic demographic data and asked respondents several questions about the design recommendations along the Powderhouse Road corridor. Respondents were also asked to rate the quality of the public engagement efforts as well as the project team's success in achieving the stated project goal. A free response question at the end gave respondents space to share additional feedback. Responses that were collected in pencil and paper format at the public meeting were then entered by the consultant into the Survey Monkey link so that all responses could be analyzed together. Refer to **Appendix MA-D** for a sample of this survey.

The Survey Monkey link was open until the end of the day on Friday, June 30, 2023, at which time the survey was closed to additional responses. Reminders were sent via email prior to closing so that people could be sure to get their responses counted and to alert new sign-ups that a survey was available. A total of 56 survey responses were collected, including those submitted in-person at the meeting and those completed online via Survey Monkey. A summary of results for each question are shown below, followed by an in-depth analysis of the open house, and accompanying survey results.

Q1: Which of the following best describes you?

Most respondents identified as homeowners in the area with 92.86% of the total, while route users came in as the next highest category with 16.07% identifying as such. Percentages shown are based on the total number of survey responses (56). Respondents were able to select more than one answer.

Respondent Type	#	Percent of Total
Homeowner in the Area	52	92.86%
Renter in the Area	0	0.00%
Business Owner in the Area	1	1.79%
Employee in the Area	1	1.79%
Route User	9	16.07%
Other	2	3.57%

Figure 3-11: Responses to Q1

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Q2: Which phase impacts you the MOST? (Please select one)

Most respondents indicated that the more rural phases, Phase 3A and 3B, would impact them the most with 33.93% and 32.14% of the total, respectively.

Phase	#	Percent of Total
Phase 1 (Dell Range to Storey)	10	17.86%
Phase 2 (Storey to Four Mile)	9	16.07%
Phase 3A (Four Mile to Iron Mountain)	19	33.93%
Phase 3B (Iron Mountain to US 85)	1	32.14%

Figure 3-11: Responses to Q2

Q3: Considering the recommended improvements along the corridor, how do you feel about the following statements?

This question asked respondents to think about several statements and how they related to the recommended improvements. These statements were based off of ideas and concerns we collected with the first public open house and survey, which indicated strong support for bicycle and pedestrian amenities, intersection safety, and increased corridor safety with the construction of the new Coyote Ridge Elementary School at the intersection of Carlson and Powderhouse.

Given the recommended improvements along the corridor, people responded that they would generally feel safer than not riding a bicycle between Dell Range and Storey, and Storey and Four Mile with several being neutral to the statement. In this section, bicycle improvements include dedicated bicycle lanes on both sides of the road, except in the areas where there is existing Greenway. Despite recommended improvements, respondents indicated that they would generally feel unsafe riding a bicycle between Four Mile and US 85, where the proposed improvement is to widen the shoulder.

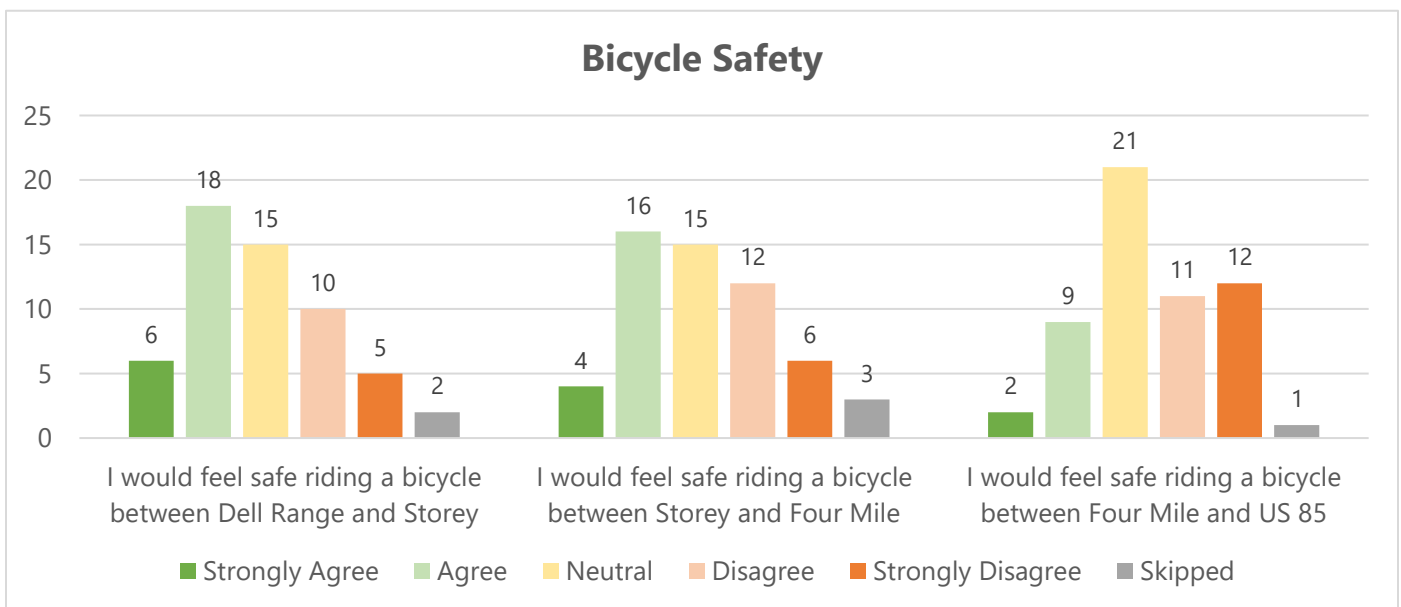


Figure 3-13: Results from Q3

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The recommended improvements call for mostly detached sidewalk on both sides throughout the urban area of the corridor (Dell Range to Four Mile), except in some areas where existing topography warrants attached sidewalk. Give this, most respondents indicated that they would generally feel safe using the sidewalk between Dell Range and Storey and between Storey and Four Mile. However, 14 of the 56 respondents, or 25%, indicated that the stretch between Storey and Four Mile would still leave them feeling unsafe while using the sidewalk.

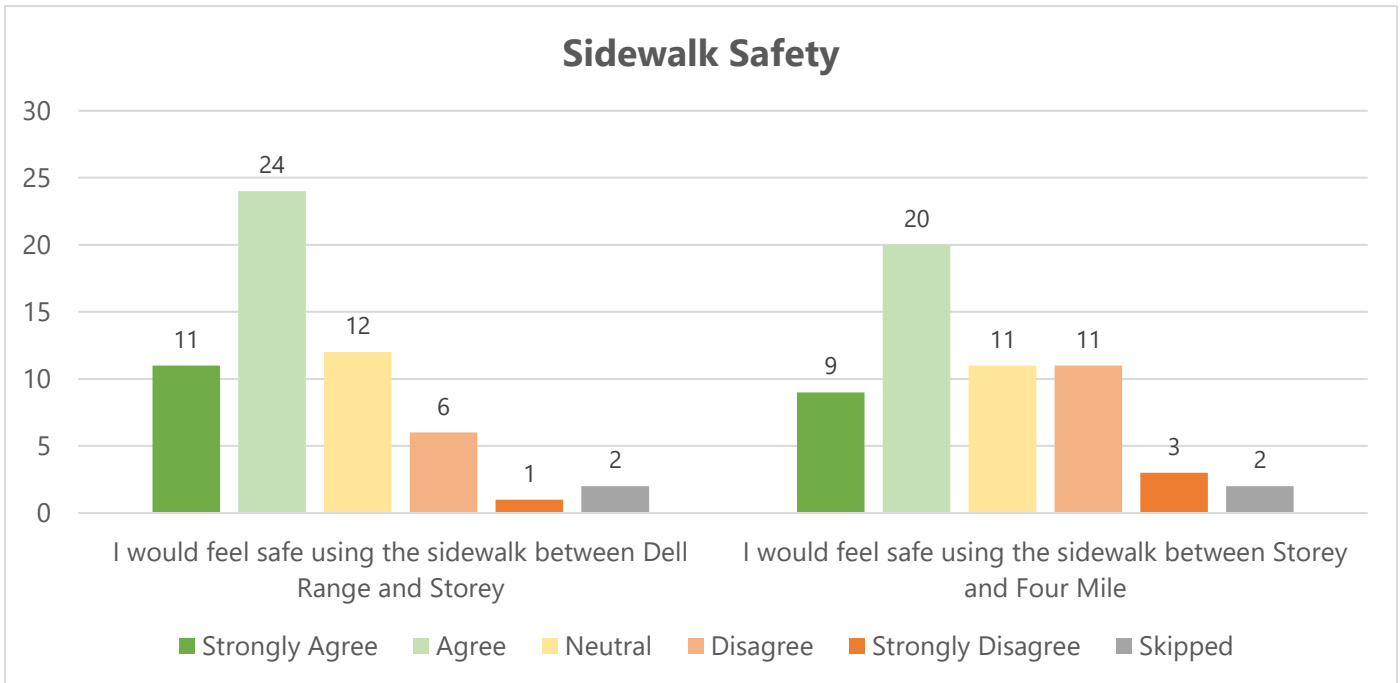


Figure 3-13: Results from Q3

Three intersection realignment recommendations throughout the corridor are intended to make crossing for all users safer, reduce speeds, and improve sight distance. These three intersections are at Four Mile, Iron Mountain, and US 85. For all three, respondents were mostly neutral to the statement that these realignments would adequately address safety concerns. The most supported realignment, in terms of being able to address safety, was the intersection at Four Mile with 20 of the 56 respondents, or 35.71%, either strongly agreeing or agreeing that this realignment would adequately address safety concerns.

Respondents were also asked about the proposed improvements addressing safety and traffic concerns at the intersection of Carlson and Powderhouse where the new Coyote Ridge Elementary School is located. Respondents were either neutral or in general agreement that these improvements would address their concerns, with 21 of the 56 respondents, or 37.50%, either strongly agreeing or agreeing with the statement.

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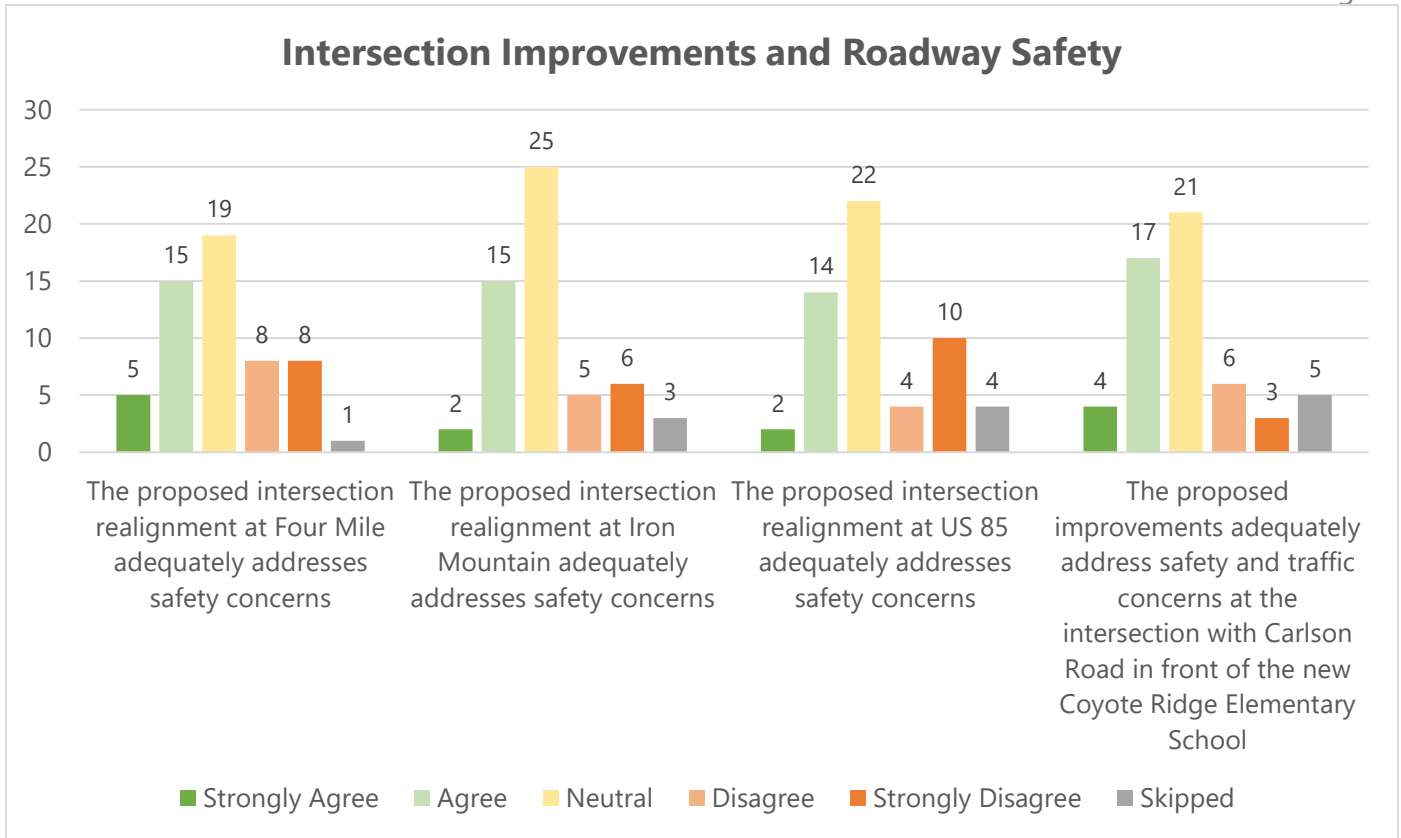


Figure 3-13: Results from Q3

Q4: Please rank from the following recommended improvements their level of importance to you (1 is the highest priority, 6 is the lowest priority).

This question presented 5 different recommended improvements along with an “other” option and asked respondents to rank them in priority from 1 being the highest priority to 6 being the lowest priority. The table below presents two different measures of central tendency for the data – the average response (mean) and the most common response (mode).

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Recommended Improvement	Average Ranking (Mean)	Most Common Ranking (Mode)
Connection to US 85, realignment of the intersection, and addition of southbound left and northbound right turn auxiliary lanes	4.36	6
Bicycle and pedestrian improvements from Dell Range to Storey	3.15	3
Bicycle and pedestrian improvements from Storey to Four Mile	2.85	2
Realignment of the intersection with Four Mile and addition of eastbound right turn auxiliary lane	3.13	3
Realignment of the intersection with Iron Mountain	4.06	5
Other (please specify below)	2.07	1

Figure 3-13: Results from Q4

Both measures show that the lowest priority among respondents is the connection to US 85, realignment of the intersection, and addition of southbound left and northbound right turn auxiliary lanes with the average priority ranking being 4.36 and the most common response being 6. The second lowest priority among respondents is the realignment of the Iron Mountain intersection with the average priority ranking being 4.06 and the most common response being 5. The next two recommended improvements that had a most common priority ranking of 3 and average priority ranking of 3.15 and 3.13 respectively are bicycle and pedestrian improvements from Dell Range to Storey and the realignment of the intersection with Four Mile and addition of an eastbound right turn auxiliary lane. The second highest ranked priority are the proposed bicycle and pedestrian improvements from Storey to Four Mile with an average ranking of 2.85 and a most common ranking of 2.

Interestingly, despite all of the recommended improvements, people felt that “other” options that were not presented deserved the highest priority with an average ranking of 2.07 and a most common ranking of 1. Many of these responses were about the desire to see the speed limit reduced. All of the answers people gave for what should be the highest priority (1) are shown below.

- *“No commercial truck traffic on Powderhouse north of Four Mile.”*
- *“Speed limits should be lower or stop signs should be put in place at every intersection between Iron Mountain and 85.”*
- *“Reduce speed.”*
- *“Parking west side Melton to Storey.”*
- *“On-street parking available in front of my house.”*
- *“Bike lane from Dell Range through to US 85.”*
- *“Traffic signal at Powderhouse and Four Mile Road.”*
- *“Reduce vehicle speeds between Four Mile Road and Iron Mountain Road.”*
- *“Enlarge Powderhouse road between Riding Club Road and Four Mile and fix the road. It’s dangerous and people on bikes are creating dangerous problems for both themselves and the drivers.”*
- *“Decrease speed limit to 35 mph.”*
- *“Northbound Powderhouse as you approach Riding Club is too steep - please pull the grade back to the south to lessen the slope.”*

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Q5: How would you rate the public engagement process for this project? (Project website, StoryMap, email list, open houses, etc.)

Respondents were asked to comment on how well they thought the project team did at engaging the public throughout the process. Public engagement was a strong component of this project with a heavy emphasis on digital engagement as described above in the Digital Engagement section. Overall, respondents felt that the project team was successful with their public engagement efforts with 7 people, or 12.50%, stating it was outstanding and 26, or 46.43%, stating it was good. Only 8 total people, or 14.29%, stated that public engagement was either poor or very poor.

Answer	#	Percent of Total
Outstanding	7	12.50%
Good	26	46.43%
Neutral	12	21.43%
Poor	7	12.50%
Very Poor	1	1.79%
No Response	3	5.36%

Figure 3-11: Responses to Q5

Q6: How well do you think the project team did in terms of meeting the stated project goal (shown below)?

“We want to generate a 35% conceptual design that establishes a common vision for future mobility along Powderhouse Road. The plan should address immediate challenges, as well as anticipate the needs of the future. We envision a Powderhouse Road that is built to safely accommodate users of various modes of transportation and that is scaled properly for our growing community”.

For this question, respondents were asked to think back to the project goal that was outlined at the beginning of this project and in the first public meeting. Overall, respondents felt that the project team did a good job of meeting the stated goal, with 6 people, or 10.71% of the total, saying the process was outstanding, while 23, or 41.07% of the total, said it was good. Only 7 total people, or 12.50% of the total, gave the project team a poor or very poor score for their efforts to meet the stated project goal.

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Answer	#	Percent of Total
Outstanding	6	10.71%
Good	23	41.07%
Neutral	16	28.57%
Poor	6	10.71%
Very Poor	1	1.79%
No Response	4	7.14%

Figure 3-11: Responses to Q6

Q7: Do you have any additional ideas, information, or comments that you would like to share at this time?

38 respondents answered this free response question. While each response was different, there were some clear themes that emerged from the responses. Many of responses included comments about a specific area or scenario and were considered “other” in terms of response theme. The most common mentions included an unfavorable opinion of the proposed connection to US 85 with 5 mentions and speed concerns with 6 mentions. A summary of the most common mentions can be found in the table below, while each individual free response answer can be found in **MA-D**.

Topic or Concern	Number of Mentions
Unfavorable Opinion of US 85 Connection	5
Favorable Opinion of US 85 Connection	2
Speed Concerns	6
Concern About Commercial/Truck Traffic	3
Need for Traffic Signals	4
Cost of Project	4
Pedestrian/Bike Amenities	2
Improvements Related to Coyote Ridge	3
Negative Public Engagement Experience	4
Other	14

Figure 3-16: Results from Q7

A select few quotes from responses to this question are also listed below:

- *“Our comments and concerns are falling on deaf ears. Speed limits should be lower on the stretch from Iron Mountain to 85 NOT HIGHER!! Put stop signs in at every cross road. We moved out to the country to be in the country not to live on a race track. Lower speed limits.”*
- *“I have not heard about how you will improve the situation at Powderhouse and Prairie. This has become very congested.”*

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- *"StoryMap is hard to use due to excessive scrolling. Design @ corner of Hoy (north) and Powderhouse - any movement of the sidewalk further into 5191 Hoy would make the driveway too steep for on-road vehicles. As property owner, willing to consider alternative solution such as a rebuild of driveway and attached garage to back alleyway."*
- *"Even though the final connection to US 85 is either supported or not, we as a community need more connections to the North and East. Limit the truck traffic from Four Mile north."*
- *"This road expansion is unnecessary, a waste of money and just plain stupid. There is nothing wrong with the current road situation. Focus on maintaining the roads we do have and leave our quiet neighborhood alone."*

Analysis

A few key takeaways after the second public open house and associated survey are as follows:

1. People are very concerned about the proposed speed limits, especially for the northern section of the corridor from Four Mile to US 85.

Many people at the second open house expressed concern that proposed speed limits were too high and had follow-up questions for the traffic engineers about the traffic data. Although the methodology and reasoning behind the proposed speed limits was thoroughly explained, this concern remained persistent and showed up often in the survey following the second open house. Question 4, which asked respondents to rank the priority level of various recommended improvements, had 4 people respond in the "other" category that reducing speed should be the top priority for this project moving forward. Similarly, speed concerns were the most mentioned topic in Question 7, the free response question.

2. People were generally approving of the proposed intersection realignments, bicycle and pedestrian upgrades, and other traffic safety improvement recommendations.

While some residents were outspoken to specific recommendations as presented by the project team, the majority of people who attended the meeting and responded to the survey indicated an overall positive response to what was proposed. People were most supportive of recommended improvements along the more urban section of the Powderhouse Road corridor (Dell Range to Four Mile) which includes upgrades to bicycle and pedestrian amenities as well as a signalized intersection with turning lanes at the Carlson and Powderhouse Road intersection. This can be seen in the answers to the statements in Question 3, as well as the priority ranking responses in Question 4. People were also generally supportive of the proposed intersection realignments, but felt that they should be a lower priority than bicycle and pedestrian improvements.

3. Although there are many people who still support the connection to US 85, the number of residents who do not support this connection along with the cost concerns for completing that stretch of road warrant further consideration and a closer analysis by the County, MPO, or others if and when such a connection becomes a legitimate option for construction.

The results of the first public meeting and accompanying survey indicated that the idea of completing the Powderhouse Road connection to US 85 is either strongly supported or strongly denied, and that both factions are relatively equal. Upon completion of the second open house and survey, this seems to still be true. A preliminary cost estimate (Refer to **Appendix MA-A**) shows that this phase could cost nearly \$20 million if construction were to begin 15 years from now (in 2038).

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Much of this cost is due to the fact that significant grading and earthwork would have to be completed, and an entirely new roadway put in. Given this high price tag and the mixed feelings from the public on whether this connection is needed, closer consideration and a more thorough cost-benefit analysis is recommended should the County more seriously consider completing that stretch of the Powderhouse Road corridor.

4.0 a. PROFILE

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

- Foundation 1: 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 corridor area. The map focuses on areas where new development will likely occur in the future and some redevelopment areas. The Land Use Plan located on the Laramie County GIS mapping system, was considered regarding future traffic volumes. The corridor is nearly completely developed with minor residential developments possible north of Iron Mountain Rd. Further continuity and connection throughout the corridor will however increase bicycle traffic. This use was incorporated into recommended typical sections with either delineated bicycle lanes and widened shoulders. See Figure 4-1 below.

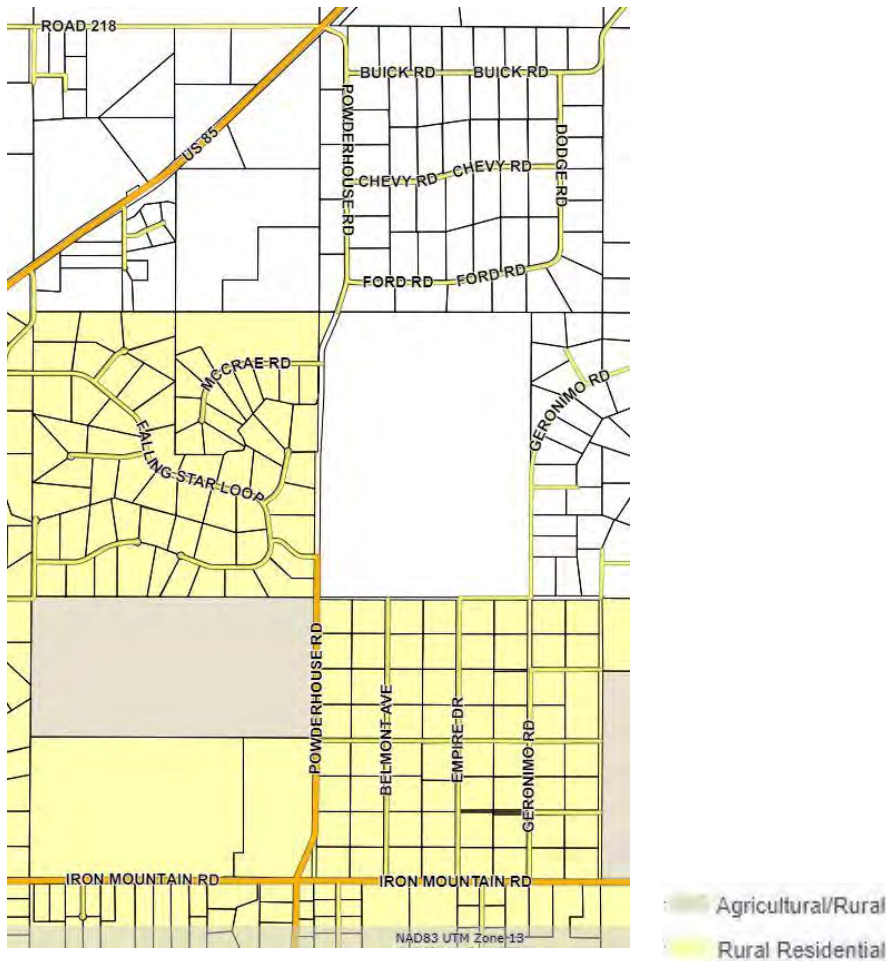


Figure 4-1

Foundation 2: Key-Planning Considerations

Future land development along the corridor will influence future roadway improvements that are well-connected and appropriately sized for future capacity needs. In order to meet the vision of various stakeholders throughout the process, the following planning considerations will shape corridor recommendations: Transit and Non-motorized Transportation

- Provide a safe, accessible, and continuous pedestrian connection along the entire corridor
- Provide street lighting at intersections
- Provide separated multi-use or bicycle path
- Review of options to expand the Greenway within 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.
- Maintain commercial and residential access approaches.
- Where appropriate, provide for proper turning widths 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).
- Detailed Traffic Study Findings can be found in **Appendix MA-A**

Roadway Connectivity

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

Dry and Wet Utilities

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

Foundation 3: Potential Funding Mechanisms

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

- A clear vision, taking into account the market and economic reality;
- A proactive strategy for reinvestment (public and private);
- Educated citizenry and implementers;
- 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, County, WYDOT, etc.) 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.

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SECTION 4.0 a. PROFILE

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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; and general obligation bonds. 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.

Foundation 4: Environmental Constraints

Environmental constraints were not included with the Project scope and no significant constraints are anticipated. However during the design of any portion of the corridor, these constraints should be considered. Example tables have been provided in **Appendix MA-E** to aid in these considerations.

4.0 b. RECOMMENDED DESIGN ELEMENTS

Key-Planning Considerations

This phase of the project provides a framework for the future land development and corridor vision of the various stakeholders. The Powderhouse Road Corridor from Dell Range Blvd. to US HWY 85 are nearing full development with urban residential/commercial density to the south and rural residential to the north. Two locations along the corridor remain undeveloped including the area known as "Section 20" (east side of corridor, north of Prairie Ave and south of Storey Blvd) and also 80 acres located at the northwest corner of Powderhouse Rd. and Iron Mountain Rd.

Section 20 has been previously studied and noted in this report. It will incorporate high density residential/commercial uses. Future traffic volumes and connection of future Melton St. and Carlson have been considered with traffic study provided in **Appendix MA-A**.

The 80 acre parcel will incorporate future rural residential parcels. Although considered as well for future traffic volumes, these are considered minimal. All additional developments will incorporate additional pedestrian and bicycle traffic and have been incorporated into recommended roadway sections. See **Appendix MA-I** for 35% Construction Drawings.

The corridor incorporates both City of Cheyenne, WYDOT and Laramie County jurisdictions, therefore improvements to the corridor will be required it to be constructed to the City of Cheyenne Unified Development Code Standards, WYDOT Construction Standards and the Laramie County Land Use Regulations. The corridor between Storey Blvd. and Four Mile Rd. include City Limits west and Laramie County Limits east. This section will require a "mixture" to be incorporate into construction. At time of design, consultant will be required to coordinate efforts between these jurisdictions.

The traffic study provided in **Appendix MA-A** along with the 35% Construction Drawings in **Appendix MA- I** provide the recommended sections throughout the corridor. These typical sections and proposed alignment include:

- Realignment of the Powderhouse Rd centerline to square it with Four Mile Rd.
- Realignment of the Powderhouse Rd centerline to square it with US HWY 85
- Safe, accessible, and continuous pedestrian connection along the entire corridor
- Provide continuous bike lanes (City) and widened shoulders (County) along the entire corridor
- Provide street lighting at the key intersections described in this report and non-motorized crossings where appropriate; (note: not incorporated into drawings, or design. For information to be included in future design only)
- Connectivity of current Greenway was deemed to be appropriate by the Project Steering Committee during the initial reviews of the project. However, the sidewalk along Section 20 described should be designed at eight (8) feet in width to provide for multipurpose use. During future design, the Greenway should be reviewed for any modifications/additions required.
- Recommended vertical and horizontal curve alignment "k" values were assessed to be appropriate. Refer to **Figures 4-1** and **Figure 4-2** following for curve design information.

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SECTION 4b. RECOMMENDED DESIGN ELEMENTS

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Normal Crown		HORIZONTAL CURVE INFO								
Speed (MPH)	Rmin (FT)	COUNT	SPEED	Number	Type	Length	Radius	Chord length	PI Station	IS R GOOD?
45	1039	1	40	2	Curve	456.03'	800.00'	449.88'	52+71.85'	TRUE
40	762	2	45	4	Curve	295.42'	1040.00'	294.42'	59+48.71'	TRUE
35	510	3	45	6	Curve	464.56'	1050.00'	460.78'	84+06.61'	TRUE
30	333	4	45	8	Curve	274.61'	1050.00'	273.83'	100+52.30'	TRUE
25	198	5	30	10	Curve	162.84'	350.00'	161.37'	107+52.96'	TRUE
		6	30	12	Curve	295.57'	350.00'	286.86'	110+62.92'	TRUE
		7	30	14	Curve	249.07'	340.00'	243.54'	116+56.53'	TRUE
		8	30	16	Curve	120.39'	350.00'	119.80'	118+75.80'	TRUE
		9	45	18	Curve	160.86'	1150.00'	160.73'	127+96.05'	TRUE
		10	45	20	Curve	270.04'	1045.00'	269.29'	148+75.16'	TRUE
		11	45	22	Curve	158.74'	5000.00'	158.73'	162+71.77'	TRUE
		12	45	24	Curve	297.41'	1200.00'	296.65'	185+00.51'	TRUE
		13	45	26	Curve	277.56'	1300.00'	277.04'	204+67.01'	TRUE
		14	45	28	Curve	318.24'	5000.00'	318.19'	214+11.98'	TRUE
		15	35	30	Curve	288.20'	520.00'	284.53'	226+26.53'	TRUE
		16	45	32	Curve	585.41'	1040.00'	577.71'	232+38.68'	TRUE
		17	45	34	Curve	211.34'	5000.00'	211.33'	303+43.31'	TRUE
		18	45	36	Curve	194.87'	5000.00'	194.86'	313+29.44'	TRUE
		19	45	38	Curve	440.56'	1100.00'	437.62'	322+51.13'	TRUE
		20	45	40	Curve	228.23'	2500.00'	228.15'	327+97.48'	TRUE
		21	45	42	Curve	425.28'	1300.00'	423.38'	335+62.01'	TRUE
		22	30	44	Curve	364.32'	335.00'	346.63'	379+54.62'	TRUE
		23	30	46	Curve	87.39'	335.00'	87.14'	382+53.57'	TRUE
		24	30	49	Curve	413.63'	335.00'	387.85'	389+53.76'	TRUE
		25	30	51	Curve	148.57'	335.00'	147.36'	395+64.99'	TRUE

Figure 4-1

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SECTION 4b. RECOMMENDED DESIGN ELEMENTS

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CREST	
SPEED (MPH)	Kmin
45	61
40	44
35	29
30	19

SAG	
SPEED (MPH)	Kmin
45	79
40	64
35	49
30	37

POWDERHOUSE VERTICAL CURVE INFO								
No.	PVI Station	Grade In	Grade Out	Profile Cur	Profile Curve Le	K Value	Design Speed	IS K GOOD?
1	3+07.58'	-1.75%	1.73%	Sag	295.00'	84.85	45	TRUE
2	5+92.44'	1.73%	4.09%	Sag	190.00'	80.41	45	TRUE
3	8+67.01'	4.09%	0.56%	Crest	300.00'	85.1	45	TRUE
4	13+57.45'	0.56%	-0.79%	Crest	300.00'	221.96	45	TRUE
5	16+29.61'	-0.79%	0.27%	Sag	85.00'	80.54	45	TRUE
6	19+22.77'	0.27%	4.33%	Sag	325.00'	79.91	45	TRUE
7	22+47.76'	4.33%	-0.52%	Crest	300.00'	61.75	45	TRUE
8	31+54.93'	-0.52%	4.12%	Sag	708.00'	152.38	45	TRUE
9	37+39.39'	4.12%	0.88%	Crest	200.00'	61.6	45	TRUE
10	50+83.44'	0.88%	4.02%	Sag	1260.00'	400.76	45	TRUE
11	59+29.23'	4.02%	-1.42%	Crest	355.00'	65.28	45	TRUE
12	74+11.87'	-1.42%	2.81%	Sag	760.00'	179.81	45	TRUE
13	82+53.70'	2.81%	-2.81%	Crest	561.00'	99.94	45	TRUE
14	94+80.81'	-2.81%	-0.44%	Sag	472.00'	199.45	45	TRUE
15	100+35.44'	-0.44%	-1.71%	Crest	222.00'	175.09	45	TRUE
16	110+16.98'	-1.71%	0.76%	Sag	555.00'	224.98	45	TRUE
17	117+90.48'	0.76%	-0.29%	Crest	293.00'	279.6	45	TRUE
18	128+93.70'	-0.29%	2.13%	Sag	422.00'	174.95	45	TRUE
19	139+81.97'	2.13%	2.65%	Sag	745.00'	470.41	45	TRUE
20	149+08.54'	2.65%	-1.63%	Crest	385.00'	90.13	45	TRUE
21	155+51.16'	-1.63%	2.61%	Sag	530.00'	125.21	45	TRUE
22	163+48.35'	2.61%	-3.46%	Crest	390.00'	64.33	45	TRUE
23	172+62.45'	-3.46%	2.28%	Sag	550.00'	95.84	45	TRUE
24	193+92.55'	2.28%	4.52%	Sag	1200.00'	536.9	45	TRUE
25	202+92.68'	4.52%	-0.06%	Crest	372.00'	81.2	45	TRUE
26	213+73.55'	-0.06%	-6.34%	Crest	435.00'	69.31	45	TRUE
27	221+42.37'	-6.34%	-0.67%	Sag	451.00'	79.55	45	TRUE
28	233+93.89'	-0.67%	-2.67%	Crest	160.00'	79.99	45	TRUE
29	240+85.76'	-2.67%	4.99%	Sag	615.00'	80.31	45	TRUE
30	247+15.60'	4.99%	-4.56%	Crest	585.00'	61.26	45	TRUE
31	254+59.82'	-4.56%	-1.45%	Sag	703.00'	226.05	45	TRUE
32	264+04.97'	-1.45%	2.21%	Sag	290.00'	79.11	45	TRUE
33	267+29.25'	2.21%	-1.95%	Crest	255.00'	61.28	45	TRUE
34	273+96.27'	-1.95%	1.83%	Sag	304.24'	80.61	45	TRUE
35	284+35.31'	1.83%	-2.77%	Crest	321.58'	70.01	45	TRUE
36	313+55.85'	-2.77%	0.13%	Sag	964.68'	332.79	45	TRUE
37	336+10.83'	0.13%	-1.24%	Crest	283.40'	206.92	45	TRUE
38	348+06.27'	-1.24%	3.20%	Sag	798.00'	179.94	45	TRUE
39	355+37.81'	3.20%	1.55%	Crest	435.00'	264.59	45	TRUE
40	361+58.28'	1.55%	-4.17%	Crest	372.00'	65.04	45	TRUE
41	367+91.74'	-4.17%	-0.24%	Sag	393.00'	100.06	45	TRUE
42	374+66.22'	-0.24%	-1.08%	Crest	290.00'	343.48	45	TRUE
43	381+30.23'	-1.08%	2.57%	Sag	160.00'	43.84	30	TRUE
44	384+40.59'	2.57%	2.00%	Crest	90.00'	158.51	45	TRUE

Figure 4-2

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SECTION 4b. RECOMMENDED DESIGN ELEMENTS

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The intersection of East Four Mile Road and Powderhouse Road will need to incorporate significant efforts in future design phases. It was assumed towards the beginning of the Project that this intersection had high potential to warrant signal installation. This was conveyed to the public at the first open house conducted in October of 2022. Following the traffic study however, it was determined that a signal could not be warranted currently, nor with the 2045 projected traffic volumes. It should be noted that during the design phase which would incorporate this intersection, traffic analysis should be reviewed and updated. The design consultant, City of Cheyenne, WYDOT and Laramie County should make a determination at that time as to whether or not a signal is warranted, regardless of the time past between this study and future design. This report recommends the re-alignment of the intersection and is justified regardless of the intersection control. The proposed alignment veers east from existing south of the intersection, between a utility gas main hut and power substation, then veers west north of the intersection before returning to existing location. See the 35% construction drawings in **Appendix MA-I**.

Right of Way Acquisition

The proposed alignment also requires acquisitions from five property owners along the studied corridor. AVI met with all owners who would be impacted with acquisitions, but most significantly, those regarding those within the vicinity of the East Four Mile and Powderhouse roads include;

1. 1608 Columbia Dr. **(0.22 ac., sheet R8 in the construction drawings)**
 - a. The owners of 1608 Columbia Dr. expressed little hesitation as their impact could be considered minimal. The owners were excited to hear of the pedestrian amenities recommended (bike lanes and consistent shoulder widths. One area of concern for them was eastbound traffic on Dorothy Ln. with traffic not stopping at Powderhouse Rd., sliding through the intersection onto their property. This property has seen vehicles departing Powderhouse Rd. in previous years, crossing the right of way fence and coming to a stop on their property. The specific causes of this particular incident are not documented in this report. However, consideration should be given to the noted eastbound Dorothy Ln. traffic and driver awareness at the stop control, i.e. barricade signage on the east side of the intersection.
2. 1701 East Four Mile Rd. **(0.89 ac., sheet R9 in the construction drawings)**
 - a. The owner of this property is Cheyenne Light Fuel and Power Co. (Black Hills Energy). The parcel incorporates a gas utility hut, and a large power substation. When meeting with Black Hills Energy, it was expressed by them that the re-alignment was possible, (align between the gas hut and substation) but neither facilities could be relocated without extensive or non-feasible work. Roadside protection (barricades etc.) of the facilities should be considered with the proximity of the travel lanes, especially the small hut.
3. 7826 Powderhouse Rd. **(0.42 ac., sheet R9 in the construction drawings)**
 - a. This property includes the most significantly impacted parcel adjacent to the intersection. The pie shaped parcel is narrowest at the intersection and widens to the north. This geometry limits the owners available use, and the proposed re-alignment increasingly limits use in the southern portion of the parcel. Other concerns discussed with this owner include the currently “non-warranted” signal, driveway approach grades and surfacing, past non-

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SECTION 4b. RECOMMENDED DESIGN ELEMENTS

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communication with utility construction on the parcel and personally being witness to intersection crashes. Due to the impacts recommended with this study, and concerns from the owner, the future design consultant along with the agencies noted need to ensure higher levels of review, coordination, and negotiations with the parcel owner.

A fourth property may be impacted at this intersection due to a fragment parcel remaining on the east side of Powderhouse Rd, located at 7715. Considerations should be given to this fragment parcel to determine future ownership.

As noted earlier, AVI also met with Pegasus Ranch LLC and the owner of 1790 Powderhouse Road (**1.05 ac., sheet R17 of the construction drawings**). Pegasus Ranch LLC has been in tune with the corridor improvements and the benefits to development for some time. They are open to future negotiations regarding the recommended acquisition at the northwest corner of Iron Mountain and Powderhouse roads. The owner of 1790 Powderhouse Road (**0.31 ac., sheet R29 of the construction drawings**), although not excited about the recommendation, expressed understanding to the need. Their concern was with that of the proposed speeds in the curve adjacent to the noted property, mailbox locations and protection. All acquisition areas are summarized in **Section 5**.

It is notable to mention in this report that residents of the North Country subdivision raised significant concern regarding speed control through the residential subdivision. Two resident whom highlighted these concerns were that of 1770 Powderhouse Rd. and 2620 Buick Rd. During the second open house, it was suggested that speed bumps be incorporated into the design. This report does not recommend this and notes that speed bumps anywhere along the corridor would produce traffic hazards. However, during design of this phase, other considerations should be considered for "traffic calming." These could include additional signage, roadside landscape features, narrowing of travel lanes, striping, all while considering bicycle and pedestrian usage. Traffic enforcement was discussed at the open house as well, this study does not discuss enforcement. The two residents noted made inquiries regarding the data collection through email correspondence, these emails are included in **Appendix MA-D**.

Utilities

The wet utilities (water and sewer) within the corridor are considered "modern" and are currently not in need of replacement or updating. The Project does, however, identify two additional connections in the corridor which should be included in the final design.

- 8" connecting stub for future Melton St.
- 8" connecting stub on Tranquility for possible future connection to the Storey Blvd storage tank.

These two additions to the BOPU system will promote Section 20 development and provide for efficiency/redundancy. Please see 35% Construction Drawings in **Appendix MA-I** at these locations.

There were no known future updates or expansions to dry utilities provided by franchises at the time of this report. It is recommended however that during design of any phase of the corridor, the coordinate efforts to install conduit throughout the corridor for future communication lines. This technique to install prior to the immediate need will provide for future cost savings, and disruption of installations following major road construction.

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SECTION 4b. RECOMMENDED DESIGN ELEMENTS

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Traffic Study

A Traffic study was performed by Stantec Consultants and evaluated traffic safety, transportation needs, and provided recommendations for managing vehicular traffic and promoting a multi-modal transportation approach along the corridor.

The traffic analysis includes the evaluation of the existing and long term 2045 horizon traffic for the purposes of this study. In addition to applying a standardized traffic volume growth rate, trip generation, and trip distribution. Please refer to **Appendix MA-A**, Pages 12-14, of the traffic study for detailed recommendations.

Drainage Analysis

A drainage analysis was performed by Front Range Stormwater & Floodplain Consulting and evaluated the drainage basins contributing to the Powderhouse Rd. corridor crossings. These basins include five (5) major basins (1,200 to 14,577 acres), each of them potentially warranting its own study. Inlet and line capacities were analyzed; along with the 2yr, 10yr, and 100yr culvert capacity and recommended sizing. These recommendations were incorporated into the 35% Construction Drawings. Please refer to **Appendix MA-B**, drainage analysis, for detailed summaries and recommendations.

5.0 PRELIMINARY 35% IMPROVEMENT COST ESTIMATES

Quantities were developed from the proposed construction drawings and cost estimates were developed using current dollar values. In recent years, annual cost increases have been significantly volatile and difficult to quantify. This is due to the COVID-19 pandemic and historically high inflation starting in 2022. The industry has seen estimates as high as 10% cost increases annually. For the purposes of this report, we have assessed future costs at 5yr, 10yr, and 15yr intervals, utilizing a 5% annual increase.

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SECTION 5. ESTIMATES

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Powderhouse Road Corridor Study Project					
Estimate Totals		Current Amount (\$)	5-Year Amount (\$)	10-Year Amount (\$)	15-Year Amount (\$)
Phase 1 - Dell Range Blvd to Storey Blvd Improvements		\$5,040,386.09	\$6,432,951.83	\$8,210,257.82	\$10,478,600.68
Phase 2 - Storey Blvd to Four Mile Road Improvements		\$5,497,997.51	\$7,016,992.85	\$8,955,658.60	\$11,429,941.95
Phase 3a - Four Mile Road to Iron Mountain Road Improvements		\$6,615,047.88	\$8,442,663.64	\$10,775,215.95	\$13,752,209.45
Phase 3b - iron Mountain Road to US HWY 85 Improvements		\$9,555,897.34	\$12,196,015.59	\$15,565,549.83	\$19,866,024.26
Project Subtotal (Construction Costs)		\$26,709,328.82	\$34,088,623.92	\$43,506,682.20	\$55,526,776.33

Phase 2 Land Acquisition	Jahnke, Cynthia	9,584	SF	\$6.00	\$57,504.00
Phase 2 Land Acquisition	Cheyenne Light Fuel & Power (BHE)	38,770	SF	\$6.00	\$232,620.00
Phase 3a Land Acquisition	Schlotthauer, Jerry	18,296	SF	\$6.00	\$109,776.00
Phase 3b Land Acquisition	Pegasus Ranch LLC	45,738	SF	\$6.00	\$274,428.00
Phase 3b Land Acquisition	Hazlip, Anna	50,006	SF	\$6.00	\$300,036.00
ROW Acquisition Total					\$974,364.00

Engineers Estimate Total Cost

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SECTION 5. ESTIMATES

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Phase 1 - Dell Range Blvd to Storey Blvd Improvements					
Item No.	Item	Total Estimated Quantity	Unit	Unit Price	Total (Current Dollars)
1020.00	Bonds & Insurance	1	LS	\$40,000.00	\$40,000.00
1020.10	Quality Control & Materials Testing	1	LS	\$50,000.00	\$50,000.00
1030.00	Mobilization	1	LS	\$325,000.00	\$325,000.00
1035.00	Force Account	1	FA	\$400,000.00	\$400,000.00
1041.00	Construction Surveying	1	LS	\$60,000.00	\$60,000.00
1050.10	Traffic Control	1	LS	\$40,000.00	\$40,000.00
1563.00	Erosion Control & Stormwater Management	1	LS	\$30,000.00	\$30,000.00
2050.10	Remove & Reset Fence (Vinyl, Wood Slat, Ornamental, Split Rail, etc)	200	LF	\$60.00	\$12,000.00
2050.50	Remove & Reset Street Signs	19	EA	\$600.00	\$11,400.00
2206.00	Potholing	10	EA	\$1,650.00	\$16,500.00
2210.00	Unclassified Excavation	12,292	CY	\$5.12	\$62,934.99
2231.00	Remove Existing Crushed Base - 4" (Curb & Gutter and Sidewalk)	4,312	SY	\$5.50	\$23,716.00
2231.00	Remove Existing Asphalt & Crushed Base (Asphalt Roadway)	26,508	SY	\$22.95	\$608,358.60
2231.00	Crushed Base, Grading W 4" (Curb & Gutter and Sidewalk)	8,367	SY	\$18.75	\$156,881.25
2231.10	Crushed Base, Grading W 6" (Streets, Driveways, Fillets, & Approaches)	27,520	SY	\$11.00	\$302,720.00
2235.00	Pozzolan Treated Subgrade 12"	500	SY	\$27.50	\$13,750.00
2512.10	Plant Mix Bit. Pvmt - 5"	26,508	SY	\$49.50	\$1,312,146.00
2900.10	Irrigation System Modifications & Repair	1	LS	\$20,000.00	\$20,000.00
2900.21	Seeding (Hydro Seed/ Hydro Mulch)	15,980	SY	\$3.85	\$61,523.00
2900.50	Topsoil Placing 4"	15,980	SY	\$4.40	\$70,312.00
2900.61	Landscape Retaining Wall	1,110	LF	\$176.00	\$195,360.00
3330.00	Remove Existing Curb and Gutter	7,027	LF	\$15.15	\$106,459.05
3330.10	New Curb and Gutter, 24-inch, type A	9,492	LF	\$29.75	\$282,387.00
3340.00	Remove Existing Concrete Sidewalk	2,750	SY	\$32.50	\$89,375.00
3340.10	New Concrete Sidewalk, 4"	6,258	SY	\$90.00	\$563,220.00
3340.20	Remove Existing Curb Turn Fillets (Including ADA Ramps)	22	EA	\$2,200.00	\$48,400.00
3340.30	New Curb Turn Fillets, R15 (Includes C+G, ADA Ramps)	22	EA	\$2,860.00	\$62,920.00
4000.00	Striping - Yellow Centerline (Length of Double Yellow)	9,293	LF	\$0.45	\$4,181.85
4000.10	Striping - White Striping	10,963	LF	\$0.45	\$4,933.35
4000.20	Miscellaneous Striping	1	LS	\$5,000.00	\$5,000.00
3340.50	New Drive Approach, 6" Residential	400	SY	\$100.00	\$40,000.00
	2" Communication Conduit (dbl line)	5,227	LF	\$4.00	\$20,908.00
Total Phase 1 Improvements					\$ 5,040,386.09
5 Year Total (5% Annual Growth Rate)					\$ 6,432,951.83
10 Year Total (5% Annual Growth Rate)					\$ 8,210,257.82
15 Year Total (5% Annual Growth Rate)					\$ 10,478,600.68

Phase 1 - Dell Range Blvd to Storey Blvd Improvements Engineers Estimate

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 5. ESTIMATES

Aug-23

Phase 2 - Storey Blvd to Four Mile Rd Improvements					
Item No.	Item	Total Estimated Quantity	Unit	Unit Price	Total (Current Dollars)
1020.00	Bonds & Insurance	1	LS	\$44,000.00	\$44,000.00
1020.10	Quality Control & Materials Testing	1	LS	\$55,000.00	\$55,000.00
1030.00	Mobilization	1	LS	\$355,000.00	\$355,000.00
1035.00	Force Account	1	FA	\$445,000.00	\$445,000.00
1041.00	Construction Surveying	1	LS	\$67,500.00	\$67,500.00
1050.10	Traffic Control	1	LS	\$44,000.00	\$44,000.00
1563.00	Erosion Control & Stormwater Management	1	LS	\$33,000.00	\$33,000.00
2050.00	Remove & Reset Street Signs	19	EA	\$600.00	\$11,400.00
2206.00	Potholing	10	EA	\$1,650.00	\$16,500.00
2210.00	Unclassified Excavation	9,233	CY	\$5.12	\$47,272.96
2210.01	Import Borrow Excavation	10,506	CY	\$14.00	\$147,084.00
2231.00	Remove Existing Crushed Base - 4" (Curb & Gutter and Sidewalk)	3,554	SY	\$5.50	\$19,547.00
2231.10	Remove Existing Asphalt & Crushed Base (Asphalt Roadway)	30,576	SY	\$22.95	\$701,719.20
2231.20	Crushed Base, Grading W 4" (Curb & Gutter and Sidewalk)	9,648	SY	\$18.75	\$180,900.00
2231.10	Crushed Base, Grading W 6" (Streets, Driveways, Fillets, & Approaches)	30,372	SY	\$11.00	\$334,092.00
2235.00	Pozzolan Treated Subgrade 12"	500	SY	\$27.50	\$13,750.00
2512.10	Plant Mix Bit. Pvmt - 5"	29,583	SY	\$49.50	\$1,464,358.50
2900.21	Seeding (Hydro Seed/ Hydro Mulch)	29,483	SY	\$3.85	\$113,509.55
2900.50	Topsoil Placing 4"	29,483	SY	\$4.40	\$129,725.20
3330.00	Remove Existing Curb and Gutter	1,423	LF	\$15.15	\$21,558.45
3330.10	New Curb and Gutter, 24-inch, type A	11,872	LF	\$29.75	\$353,192.00
3340.00	Remove Existing Concrete Sidewalk	3,238	SY	\$32.50	\$105,235.00
3340.10	New Concrete Sidewalk, 4"	7,010	SY	\$90.00	\$630,900.00
3340.20	Remove Existing Curb Turn Fillets (Including ADA Ramps)	12	EA	\$2,200.00	\$26,400.00
3340.30	New Curb Turn Fillets, R15 (Includes C+G, ADA Ramps)	20	EA	\$2,860.00	\$57,200.00
4000.00	Striping - Yellow Centerline (Length of Double Yellow)	12,102	LF	\$0.45	\$5,445.90
4000.10	Striping - White Striping	13,615	LF	\$0.45	\$6,126.75
4000.20	Miscellaneous Striping	1	LS	\$5,000.00	\$5,000.00
3338.50	New Drive Approach, 6" Residential	176	SY	\$100.00	\$17,600.00
2665.30	Water Main, 8-Inch PVC C900	125	LF	\$89.00	\$11,125.00
2665.40	Water Main Fittings, 8"x8" Tee	1	EA	\$3,960.00	\$3,960.00
2665.41	Water Main Fittings, 11.25 Deg Bend	1	EA	\$3,630.00	\$3,630.00
2665.42	Water Main Fittings, 8" Plug	1	EA	\$2,970.00	\$2,970.00
	2" Communication Conduit (dbl line)	6,074	LF	\$4.00	\$24,296.00
Total Phase 2 Improvements					\$ 5,497,997.51
5 Year Total (5% Annual Growth Rate)					\$ 7,016,992.85
10 Year Total (5% Annual Growth Rate)					\$ 8,955,658.60
15 Year Total (5% Annual Growth Rate)					\$ 11,429,941.95

Phase 2 - Storey Blvd to Four Mile Rd Improvements Engineers Estimate

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 5. ESTIMATES

Aug-23

Phase 3a - Four Mile Rd to Iron Mountain Rd Improvements					
Item No.	Item	Total Estimated Quantity	Unit	Unit Price	Total (Current Dollars)
1020.00	Bonds & Insurance	1	LS	\$53,000.00	\$53,000.00
1020.10	Quality Control & Materials Testing	1	LS	\$66,000.00	\$66,000.00
1030.00	Mobilization	1	LS	\$425,000.00	\$425,000.00
1035.00	Force Account	1	FA	\$530,000.00	\$530,000.00
1041.00	Construction Surveying	1	LS	\$80,000.00	\$80,000.00
1050.10	Traffic Control	1	LS	\$53,000.00	\$53,000.00
1563.00	Erosion Control & Stormwater Management	1	LS	\$40,000.00	\$40,000.00
2050.00	Remove & Reset Street Signs	18	EA	\$600.00	\$10,800.00
2206.00	Potholing	5	EA	\$1,650.00	\$8,250.00
2210.00	Unclassified Excavation	23,104	CY	\$5.12	\$118,292.48
2231.00	Removals (Existing Base & Asphalt Pavement)	49,058	SY	\$22.95	\$1,125,881.10
2231.10	Crushed Base, Grading W 6" (Streets, Driveways, Fillets, & Approaches)	58,782	SY	\$11.00	\$646,602.00
2512.10	Plant Mix Bit. Pvmt - 5"	49,058	SY	\$49.50	\$2,428,371.00
2725.00	24" CMP Culvert	136	LF	\$116.00	\$15,776.00
2725.10	24" F.E.S	4	EA	\$176.00	\$704.00
2725.20	30" RCP Culvert	344	LF	\$495.00	\$170,280.00
2725.30	30" F.E.S	8	EA	\$1,820.00	\$14,560.00
2725.40	36" RCP Culvert	200	LF	\$275.00	\$55,000.00
2725.50	36" F.E.S	8	EA	\$2,180.00	\$17,440.00
2725.60	72" RCP Culvert	348	LF	\$980.00	\$341,040.00
2725.70	72" F.E.S	6	EA	\$6,960.00	\$41,760.00
2900.10	Seeding (Hydro Seed/ Hydro Mulch)	37,528	SY	\$3.85	\$144,482.80
2900.20	Topsoil Placing 4"	37,528	SY	\$4.40	\$165,123.20
4000.00	Striping - Yellow Centerline (Length of Double Yellow)	10,931	LF	\$0.45	\$4,918.95
4000.10	Striping - White Striping	21,863	LF	\$0.45	\$9,838.35
4000.20	Miscellaneous Striping	1	LS	\$5,000.00	\$5,000.00
	2" Communication Conduit (dbl line)	10,982	LF	\$4.00	\$43,928.00
Total Phase 3a Improvements					\$6,615,047.88
5 Year Total (5% Annual Growth Rate)					\$8,442,663.64
10 Year Total (5% Annual Growth Rate)					\$10,775,215.95
15 Year Total (5% Annual Growth Rate)					\$13,752,209.45

Phase 3a - Four Mile Rd to Iron Mountain Rd Improvements Engineers Estimate

POWDERHOUSE ROAD CORRIDOR 35% STUDY

SECTION 5. ESTIMATES

Aug-23

Phase 3b - Iron Mountain Rd to US HWY 85 Improvements					
Item No.	Item	Total Estimated Quantity	Unit	Unit Price	Total (Current Dollars)
1020.00	Bonds & Insurance	1	LS	\$75,000.00	\$75,000.00
1020.10	Quality Control & Materials Testing	1	LS	\$96,000.00	\$96,000.00
1030.00	Mobilization	1	LS	\$615,000.00	\$615,000.00
1035.00	Force Account	1	FA	\$770,000.00	\$770,000.00
1041.00	Construction Surveying	1	LS	\$115,000.00	\$115,000.00
1050.10	Traffic Control	1	LS	\$75,000.00	\$75,000.00
1563.00	Erosion Control & Stormwater Management	1	LS	\$57,500.00	\$57,500.00
2050.00	Remove & Reset Street Signs	18	EA	\$600.00	\$10,800.00
2206.00	Potholing	5	EA	\$1,650.00	\$8,250.00
2210.00	Unclassified Excavation	1,177	CY	\$5.12	\$6,026.24
2231.00	Removals (Existing Base & Asphalt Pavement)	49,452	SY	\$22.95	\$1,134,923.40
2231.10	Crushed Base, Grading W 6" (Streets, Driveways, Fillets, & Approaches)	86,652	SY	\$11.00	\$953,172.00
2512.10	Plant Mix Bit. Pvmt - 5"	72,325	SY	\$49.50	\$3,580,087.50
2725.00	15" RCP Culvert	55	LF	\$92.00	\$5,060.00
2725.10	15" F.E.S	2	EA	\$1,055.00	\$2,110.00
2725.20	24" RCP Culvert	122	LF	\$112.00	\$13,664.00
2725.30	24" F.E.S	4	EA	\$1,925.00	\$7,700.00
2725.40	36" RCP Culvert	500	LF	\$275.00	\$137,500.00
2725.50	36" F.E.S	10	EA	\$2,180.00	\$21,800.00
2725.60	72" RCP Culvert	1,011	LF	\$980.00	\$990,780.00
2725.70	72" F.E.S	30	EA	\$6,960.00	\$208,800.00
2900.10	Seeding (Hydro Seed/ Hydro Mulch)	70,290	SY	\$3.85	\$270,616.50
2900.20	Topsoil Placing 4"	70,290	SY	\$4.40	\$309,276.00
4000.00	Striping - Yellow Centerline (Length of Double Yellow)	16,170	LF	\$0.45	\$7,276.50
4000.10	Striping - White Striping	33,056	LF	\$0.45	\$14,875.20
4000.20	Miscellaneous Striping	1	LS	\$5,000.00	\$5,000.00
	2" Communication Conduit (dbl line)	16,170	LF	\$4.00	\$64,680.00
Total Phase 3b Improvements					\$9,555,897.34
5 Year Total (5% Annual Growth Rate)					\$12,196,015.59
10 Year Total (5% Annual Growth Rate)					\$15,565,549.83
15 Year Total (5% Annual Growth Rate)					\$19,866,024.26

Phase 3b - Iron Mountain Rd to US HWY 85 Improvements Engineers Estimate