Direct Testimony and Schedule
Rick J. Moser

Before the Office of Administrative Hearings
600 North Robert Street
St. Paul, Minnesota 55101

For the Minnesota Public Utilities Commission
121 Seventh Place East, Suite 350
St. Paul, Minnesota 55101

In the Matter of a Petition by Minnesota Energy Resources Corporation for a Route Permit for the Rochester Natural Gas Pipeline in Olmsted County

MPUC Docket No. G011/GP-15-858
OAH Docket No. 8-2500-33180
Exhibit _____

Direct Testimony
Environmental

October 24, 2016

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Rick J. Moser, my business address is 700 N Adams Street, Green Bay, WI 54307.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT POSITION?

A. I am Manager – Environmental Programs & Asset Licensing for WEC Business Services ("WBS"). WBS is the service company that provides service to Minnesota Energy Resources Corporation ("MERC" or the "Company"). MERC is a public utility subsidiary of WEC Energy Group, Inc. ("WEC"), a utility holding company headquartered in Milwaukee, Wisconsin. WEC's operating public utility subsidiaries provide electric and natural gas service to approximately 4.4 million customers over four states, including MERC's approximately 230,000 natural gas customers in Minnesota.

Q. FOR WHOM ARE YOU PROVIDING TESTIMONY?

A. I am testifying on behalf of MERC.

Q. PLEASE SUMMARIZE YOUR QUALIFICATIONS AND EXPERIENCE.

A. I received a Bachelor of Science degree in biology and a minor in environmental science from St. Norbert College in De Pere, Wisconsin. I have been managing environmental-related issues on utility projects since 1998. I joined this company's environmental department in 2001. For MERC, I lead the portion of the environmental department that is responsible for identifying and ensuring compliance with environmental regulations

commonly encountered on natural gas pipeline distribution projects. My team participates in the planning, routing, and permitting of major utility projects and is responsible for identifying environmental resources and recommending avoidance, minimization, or mitigation measures related to those resources.

I have been actively involved in overseeing the environmental planning and route development aspects of the Rochester Natural Gas Pipeline Project in Olmsted County, Minnesota ("Rochester Project" or "Project") since January 2016 and a member of my team was involved prior to my involvement.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. I am testifying in support of MERC's application to the Minnesota Public Utilities Commission ("Commission") for a Route Permit for MERC's proposed Rochester Project. Specifically, I am testifying in support of the following sections of MERC's Route Permit Application ("Application"): Section 7 Subpart 3 (Description of Existing Environment), Section 8 (Environmental Impact of the Preferred Route (Minn. R. 7852.2700)) (with the exception of Pipeline Cost and Accessibility), Section 9 (Evidence of Consideration of Alternative Routes (Minn. R. 7852.3100)), Section 11, Subpart 2 (Right-of-Way Restoration Measures (Minn. R. 7852.2800)), and Section 13 (List of Government Agencies and Permits (Minn. R. 7852.3000)).

Q. ARE YOU SPONSORING ANY SCHEDULES WITH YOUR DIRECT TESTIMONY?

A. Yes. I am sponsoring the following:

Schedule 1. Relative Merits Analysis Summary Table and Segment Alternative Key.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. My testimony sponsors the Company's Application for the Project related to environmental review and route development. I also discuss certain aspects of the Comparative Environmental Analysis ("CEA") prepared for the Project by the Department of Commerce, Energy Environmental Review and Analysis ("EERA").

II. ROUTE DEVELOPMENT FOR THE ROCHESTER PROJECT

Q. HOW DID THE COMPANY UNDERTAKE DEVELOPMENT OF THE ROUTES PROPOSED IN THE APPLICATION?

A. MERC began identifying possible routes for the Rochester Project during the summer of 2014. To identify possible routes for the Project, MERC started by identifying the necessary interconnection points for the Project. Based on input from Ms. Lindsay Lyle and her department, MERC determined that the pipeline would need to connect to a Town Border Station ("TBS") near the existing Northern Natural Gas ("NNG") TBS 1D, to a new TBS west of the City of Rochester near the intersection of County Road 25 and County Road 15 ("Proposed TBS"), and to a District Regulator Station ("DRS") located east of US Highway 63, in the area near the existing TBS 1B.

Q. AFTER IDENTIFYING THE NECESSARY INTERCONNECTION POINTS, HOW DID MERC IDENTIFY ITS PREFERRED AND ALTERNATE ROUTE FOR THE PROJECT APPLICATION?

A. Using Minnesota Rule 7852.1900, the criteria for the Commission's selection of a final route for a pipeline project, as a guide, MERC identified existing infrastructure and rights-of-way between the TBS 1D, Proposed TBS, and DRS interconnection points for potential right-of-way sharing or paralleling opportunities. Additionally, MERC enlisted the assistance of an environmental consultant to evaluate aerial photography for the purpose of identifying human settlement and the other criteria in Minnesota Rule 7852.1900 along the identified existing infrastructure.

In June 2014, MERC sent letters to 27 agencies to obtain information on existing and planned developments, agricultural practices, sensitive natural resources, cultural resources, permitting requirements, and highway crossing requirements, to name a few. After evaluating all this information, MERC identified a Preferred Route as required by Minnesota Statutes Section 216G.02, subdivision 3(b)(1) and Minnesota Rule 7852.2600, Subpart 1. MERC also decided that instead of including only evidence of consideration of alternative routes in its Application, it would also identify an Alternate Route.

Q. DID MERC PROVIDE ANY OPPORTUNITIES FOR PUBLIC INPUT IN ITS ROUTE SELECTION PROCESS BEFORE FILING ITS APPLICATION?

A. Yes. Prior to filing its Application, but after it had tentatively identified its Preferred and Alternate Routes, MERC invited landowners within the 500-foot-wide route and 1.5-

mile-wide TBS and DRS buffers to attend a public open house in September 2015. Other stakeholders such as city, state, and county officials were also invited to the open house.

Q. DID MERC MAKE ANY CHANGES TO ITS PREFERRED AND ALTERNATE ROUTES AS A RESULT OF FEEDBACK RECEIVED DURING THE PUBLIC OPEN HOUSE?

A. There were two changes as a result of the public open house. First, MERC added the "Route Alternative Buffer" starting at milepost 11.4 (west of 11th Ave SW) to the end of the project. This was a result of a conversation with a City official indicating that this area was actively being developed. The Route Alternative Buffer was intended to ensure MERC had the flexibility to avoid conflicts with future development plans. Second, MERC added an alternative route segment that proceeds south along 60th Ave SW from milepost 6.6 to 40th Street SW and then turns and continues east to the intersection of 40th Street SW, 55th Avenue SW, and the BP Pipeline. Mileposts can be found in Figure 6 of the Route Permit Application or Figure 2 of the CEA.

MERC initially intended to avoid this portion of 60th Ave SW due to potential conflicts with a mining operation located in this area. During the open house, the operators of the mine indicated that they did not have concerns with locating a pipeline adjacent to their property. At this open house, MERC started to hear concerns regarding the depth of the existing BP Pipeline in the area and as a result, we began to think an alternative may be required for portions of the Application Preferred Route that followed the existing BP Pipeline.

Q. WHAT WERE THE REASONS MERC SUPPORTED THE "PREFERRED ROUTE" IN THE APPLICATION FOR THE PROJECT?

A. MERC selected the "Application Preferred Route" as the route it preferred for the Project in its Application because MERC concluded, that on balance and based on the information available to MERC at the time, that route, of those considered, was the preferential route for the Project. When compared to the alternative segments included in the Application, the Application Preferred Route crossed fewer feet of wetlands, fewer feet of agricultural land, and fewer feet of forest land. The Application Preferred Route paralleled existing infrastructure for approximately 60 percent of its length and where it deviated, it was located in agricultural land to minimize the environmental impacts.

III. MODIFIED PREFERRED ROUTE

Q. HAS MERC REVISED ITS ROUTE PREFERENCE SINCE FILING THE APPLICATION?

A. Yes. After hearing from landowners during the Scoping Meetings on February 29, 2016, and reading comments filed during the commend period, MERC reevaluated the portions of the Application Preferred Route that paralleled the BP Pipeline as well as a portion of the route that proceeded cross-country to the northeast from 11th Avenue SW to 40th Street SW primarily in Section 26, T106N, R14W.

Q. WHY DID MERC REEVALUATE THE PORTIONS OF THE PREFERRED ROUTE THAT FOLLOWED THE BP PIPELINE?

A. During the Scoping Meetings on February 28, 2016, MERC once again heard from landowners that there were depth-of-cover issues with the BP Pipeline. The BP Pipeline was constructed in the late 1940s, before the enactment of federal or state standards associated with petroleum pipeline depth of cover. Landowners commented that there were places where the BP Line was either exposed through soil or where farm equipment was encountering the BP Line at shallow depths. As discussed by Ms. Lyle, depth of cover issues for an existing pipeline in a parallel corridor would create construction, maintenance, and accessibility concerns not associated with any of the other Segment Alternatives under consideration for the Project.

Q. WHY DID MERC REEVALUATE THE PORTION OF THE PREFERRED ROUTE THAT CROSSED DIAGONALLY TO THE NORTHWEST FROM 11TH AVENUE SW TO 40TH STREET SW IN SECTION 26, T106N, R41W?

A. During the Scoping Comment period, the landowner of the property crossed by this portion of the Project filed comments indicating that a portion of this land was platted and recorded with Olmsted County in November 2014 as part of the Willow Creek Commons development and the rest was within an approved General Development Plan ("GDP"). This was the first time MERC learned of this GDP and the Willow Creek Commons development. Based on the stage of development, MERC reevaluated whether an alternative could be identified that would minimize the impacts to the platted lots and avoid a diagonal crossing of small parcels covered by the Willow Creek Commons GDP.

Q. WHAT WAS THE RESULT OF THESE ADDITIONAL REVIEWS?

A. As a result of these additional reviews, MERC identified the Modified Preferred Route in its Scoping Comments dated April 13, 2016. The Modified Preferred Route follows 60th Avenue SW from milepost 6.6 south to 40th Street SW, proceeds east to County Road 8 where it turns south until it rejoins the Application Preferred Route, to avoid following the BP Pipeline. The Modified Preferred Route also parallels 11th Avenue SW to 40th Street SW to avoid a diagonal crossing of the Willow Creek Commons GDP and internal parcels. Comparison maps of these areas between the Application Preferred Route and the Modified Preferred Route are available as Schedule 1 to the testimony of Ms. Amber Lee.

IV. OTHER ROUTE ADJUSTMENTS

Q. HAVE YOU REVIEWED ALL THE ROUTES AND SEGMENT ALTERNATIVES INCLUDED IN THE CEA?

A. Yes. I have reviewed the Routes and Segment Alternatives included in the CEA.

Q. ARE ALL OF THE SEGMENT ALTERNATIVES CAPABLE OF BEING CONSTRUCTED FROM AN ENVIRONMENTAL PERSPECTIVE?

A. Yes. I have not identified any environmental features that would render any of the Segment Alternatives incapable of being constructed.

Q. DO YOU BELIEVE THE CEA ACCURATELY REFLECTS THE RELATIVE MERITS OF THE SEGMENT ALTERNATIVES?

A. Not entirely. While I think the CEA does a good job of analyzing and evaluating the Segment Alternatives, I believe the relative merits analysis in Chapter 6 fails to consider two key issues. The first is the cost to construct Segment Alternatives HJ-3, HJ-4, IJ-3 and IJ-4. As discussed in the testimony of Ms. Lee, these four Segment Alternatives would be more expensive to construct than other options because of the existing commercial development in the area. The second is the accessibility for construction and maintenance purposes of Segment Alternatives CD-2, DE-2, EF-2, EG-2, EG-3, EG-4, and EG-7, as discussed in the testimony of Ms. Lyle, due to the fact they follow the BP Pipeline. For purposes of comparing the potential impacts of Segment Alternatives in these areas for the criteria of surface water, wetlands, vegetation, wildlife and wildlife habitat, and threatened, endangered, and other special status species, all Segment Alternatives are anticipated to have minimal impacts on these criteria.

I have provided a summary table that reflects the conclusions of Chapter 6 of the CEA relative merits analysis as **Schedule 1** to my testimony. As noted in that schedule, I have added a column for Criteria E, cost and accessibility, to reflect the analysis I discuss above.

Q. DO YOU BELIEVE ANY OF THE SEGMENT ALTERNATIVES IDENTIFIED IN THE CEA COMPLY MORE FULLY WITH THE CRITERIA IDENTIFIED IN MINNESOTA RULE 7852.1900 THAN THE MODIFIED PREFERRED ROUTE?

A. No. MERC continues to advocate that the Modified Preferred Route best addresses the criteria identified in Minnesota Rule 7852.1900 and is the most appropriate route for the Project.

V. ENVIRONMENTAL COMMENTS

Q. HAVE ANY AREAS ALONG MERC'S MODIFIED PREFERRED ROUTE BEEN IDENTIFIED FOR ENVIRONMENTAL CONCERNS BY ANY STATE OR FEDERAL AGENCIES?

A. Yes. In Scoping Comments filed on April 13, 2016, the Minnesota Department of Natural Resources ("MnDNR") commented that it was concerned about the crossing of native plant communities and/or Minnesota Biologic Survey ("MBS") sites of moderate to high biodiversity. The MnDNR requested that "greenfield routes" be avoided and that the Company use wildlife friendly erosion control materials during Project construction. The Minnesota Pollution Control Agency ("MPCA") also provided comments to EERA on the Project on October 7, 2016.

A. MnDNR

Q. HOW DOES MERC RESPOND TO THE REQUEST TO USE WILDLIFE FRIENDLY EROSION CONTROL MATERIALS?

A. MERC has no objection to using wildlife friendly erosion control materials in higher priority areas, consistent with the guidelines provided by the MnDNR. Areas of higher priority of wildlife-friendly erosion control will include areas with higher amphibian use, such as wetland and water crossings, and rare species habitat.

Q. WHAT MBS SITES OF MODERATE TO HIGH BIODIVERSITY ARE LOCATED ALONG THE SEGMENT ALTERNATIVES AND HOW MIGHT THEY BE IMPACTED BY SEGMENT ALTERNATIVES UNDER CONSIDERATION?

A. There are five sites of native plant communities and/or MBS sites of moderate to high biodiversity crossed by a Segment Alternative or the DRS Buffer for the Project. One Railroad Rights-of-Way prairie is crossed by Segment Alternative BC-1. One MBS site of moderate biodiversity is crossed by Segment Alternative EG-8. One MBS site of moderate biodiversity is located north of 40th Street SW and is crossed by Segment Alternatives HJ-1, HJ-2, IJ-1, and IJ-2. Segment Alternatives BC-1 and HJ-1 are incorporated into MERC's Modified Preferred Route. One MBS site of moderate biodiversity is located within the buffer for the Proposed TBS. One MBS site of high biodiversity is within the DRS Buffer. These MBS sites can be found on Figure 2, Pages 3 and 4 of the CEA.

Q. WHAT MITIGATION MEASURES ARE AVAILABLE TO MINIMIZE IMPACTS TO THE MBS SITES OF MODERATE BIODIVERSITY CROSSED BY PROPOSED PIPELINE SEGMENT ALTERNATIVES?

A. As discussed in the CEA at pages 108-109, for areas that might contain rare features, horizontal directional drilling ("HDD") may be used. If any route were selected that incorporated Segment Alternatives HJ-1, HJ-2, IJ-1, or IJ-2, MERC would install the pipeline using HDD underneath the wetland complex. Any large woody vegetation that would prevent access for inspection purposes in a 10-foot wide area above the pipeline would need to be removed. The identified MBS site in this area, however, is not classified as forested or a forested wetland, so vegetation clearing is anticipated to be minimal. All vegetation management in this area could be accomplished during the winter months to minimize overall impacts to the site.

With respect to the MBS site of moderate biodiversity crossed by Segment Alternative EG-8,[1] MERC would prefer to entirely avoid direct impacts to this site by not routing the project along this Segment Alternative. However, if the Commission selects Segment Alternative EG-8 for the Project, MERC believes it can avoid direct impacts to this site by locating the permanent and temporary rights-of-way outside of the MBS site.

[1] This Segment Alternative was added to consideration by a member of the public during the Scoping Comment process.

Q. WHAT MITIGATION MEASURES ARE AVAILABLE TO AVOID THE IMPACTS TO THE MBS SITES OF BIODIVERSITY WITHIN THE DRS AND PROPOSED TBS BUFFERS?

A. Both the Proposed TBS and the DRS can be located to avoid the MBS sites of moderate and high biodiversity, respectively, that have been identified in these areas.

Q. WOULD MERC BE ABLE TO AVOID IMPACTS ON THE RAILROAD RIGHTS-OF-WAY PRAIRIE?

A. Yes. Open-cut trenching through the railroad and U.S. Highway 14 is not a viable option. Therefore, MERC would avoid direct impacts to this prairie through the use of HDD underneath the railroad right-of-way. Due to the design constraints of 16-inch steel pipe, a setback beyond the railroad right-of-way would be necessary for this crossing. Direct impacts to the prairie would be avoided through the use of HDD.

B. MPCA

Q. WHAT COMMENTS DID THE MPCA PROVIDE ON THE PROJECT?

A. The MPCA provided several comments and requests related to Minnesota's Section 401 Water Quality Certification Program and the construction of the Project.

Q. HOW DOES MERC RESPOND TO THE MPCA'S COMMENTS?

A. All of the issues identified by the MPCA will be addressed during the permitting process undertaken by MERC with the MPCA after issuance of the Route Permit. MERC commits to complying with the requirements of the MPCA's Section 401 program and to

develop a Project-specific stormwater pollution prevention plan in compliance with the MPCA's general construction stormwater permit.

VI. CONCLUSION

Q. DOES THIS COMPLETE YOUR DIRECT TESTIMONY?

A. Yes, it does.

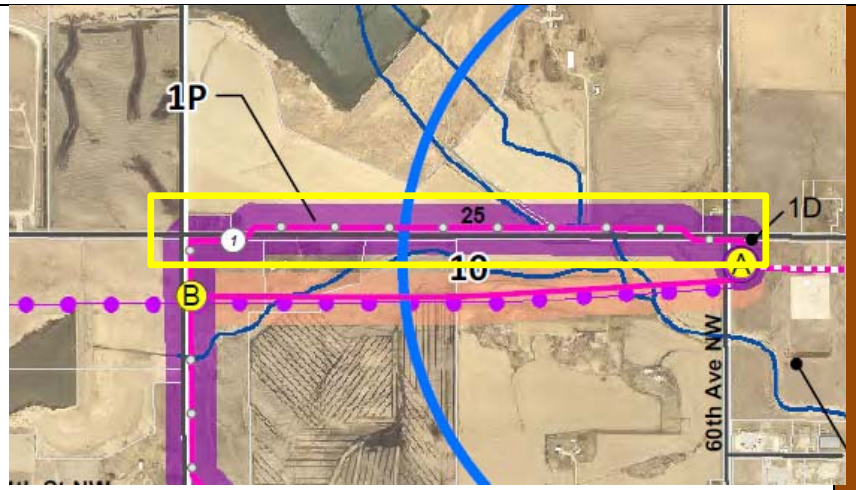
Rochester Natural Gas Pipeline Project Route Segments

TBS 1D to Proposed TBS Segment Alternatives

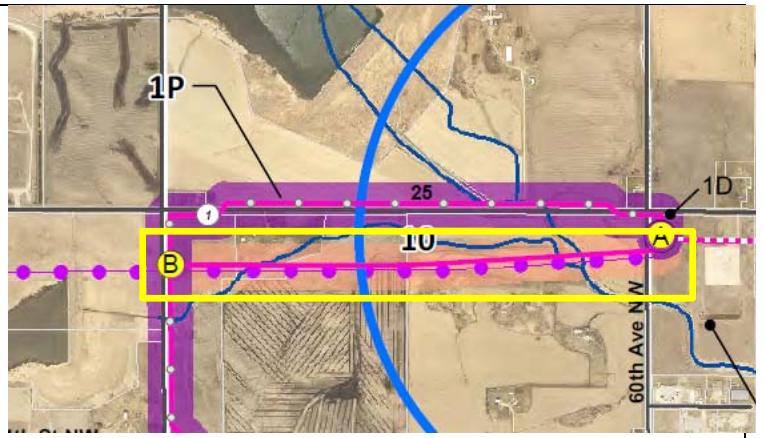
Proposed TBS to County Road 8 Segment Alternatives

County Road 8 to 11th Avenue SW Segment Alternatives

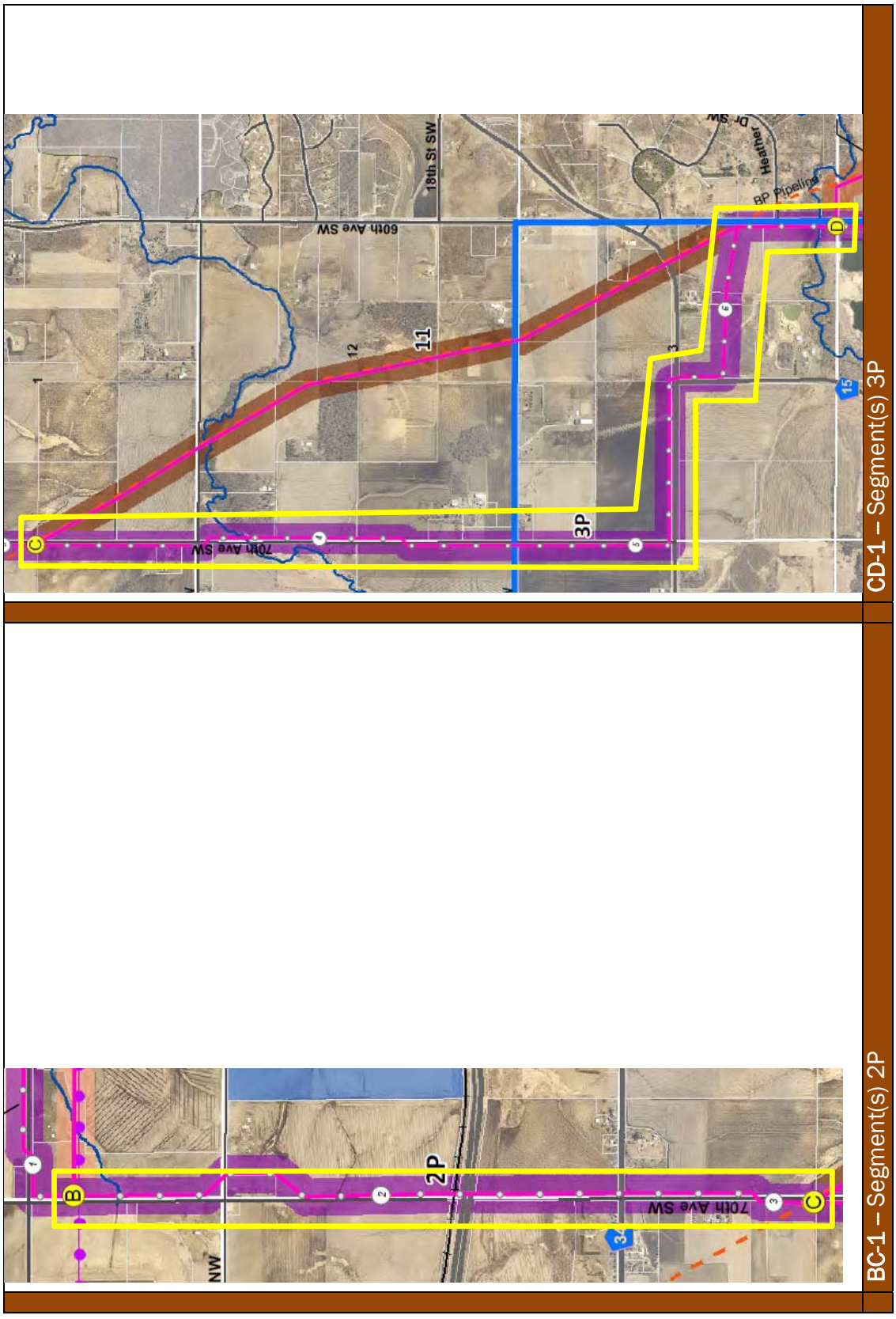
11th Avenue SW to Proposed District Regulator Station Segment Alternatives

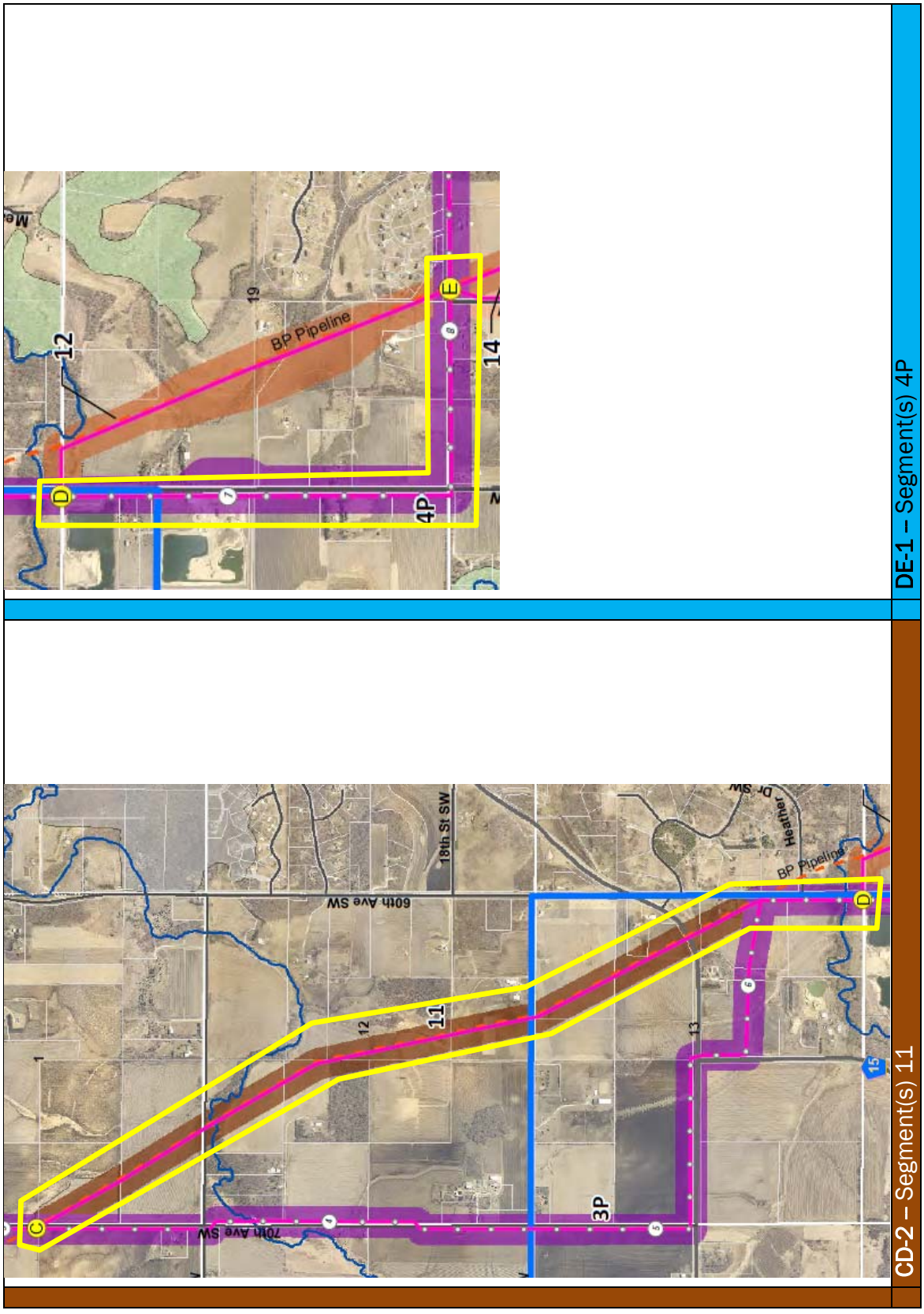


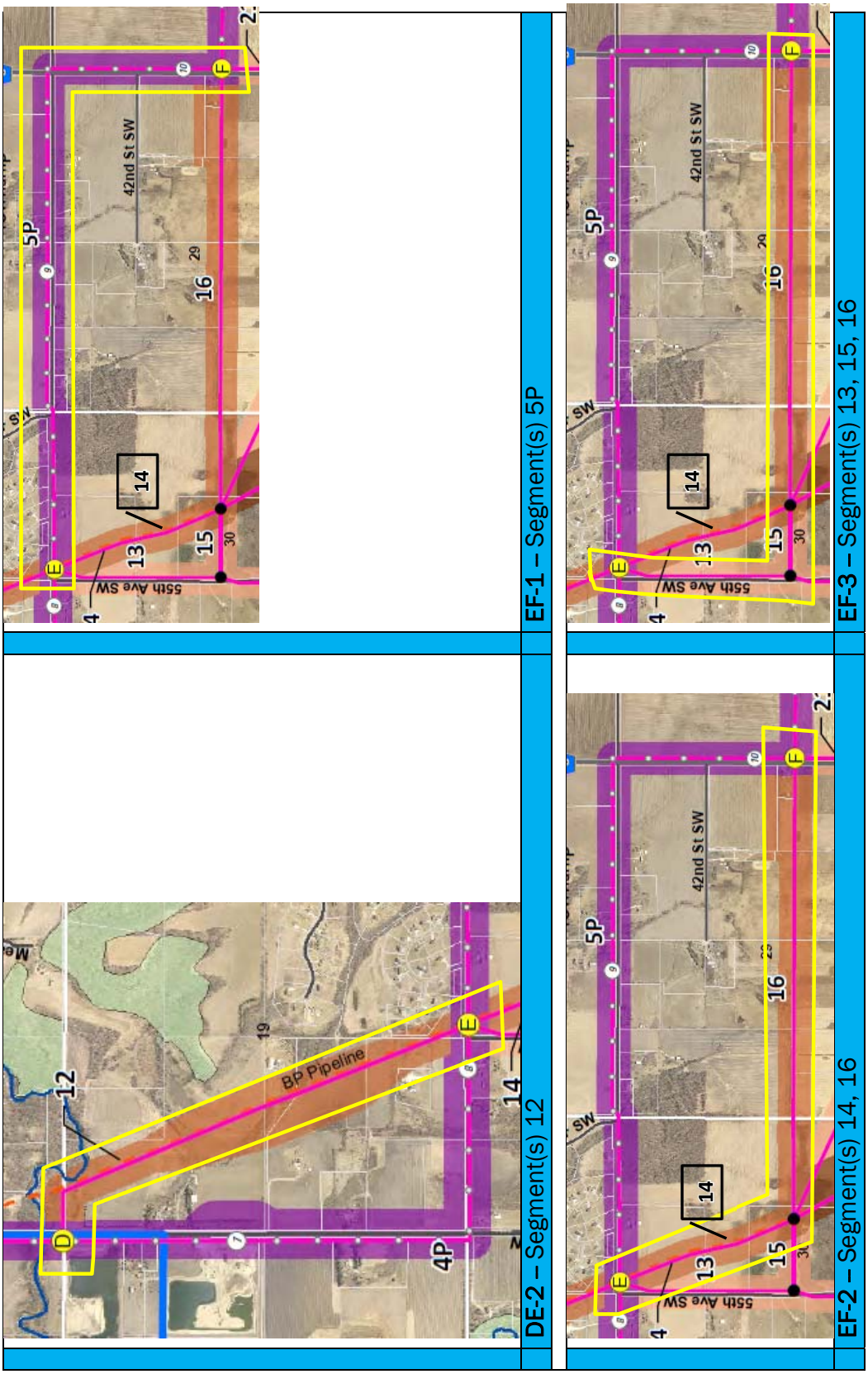
AB-1 – Segment(s) 1P

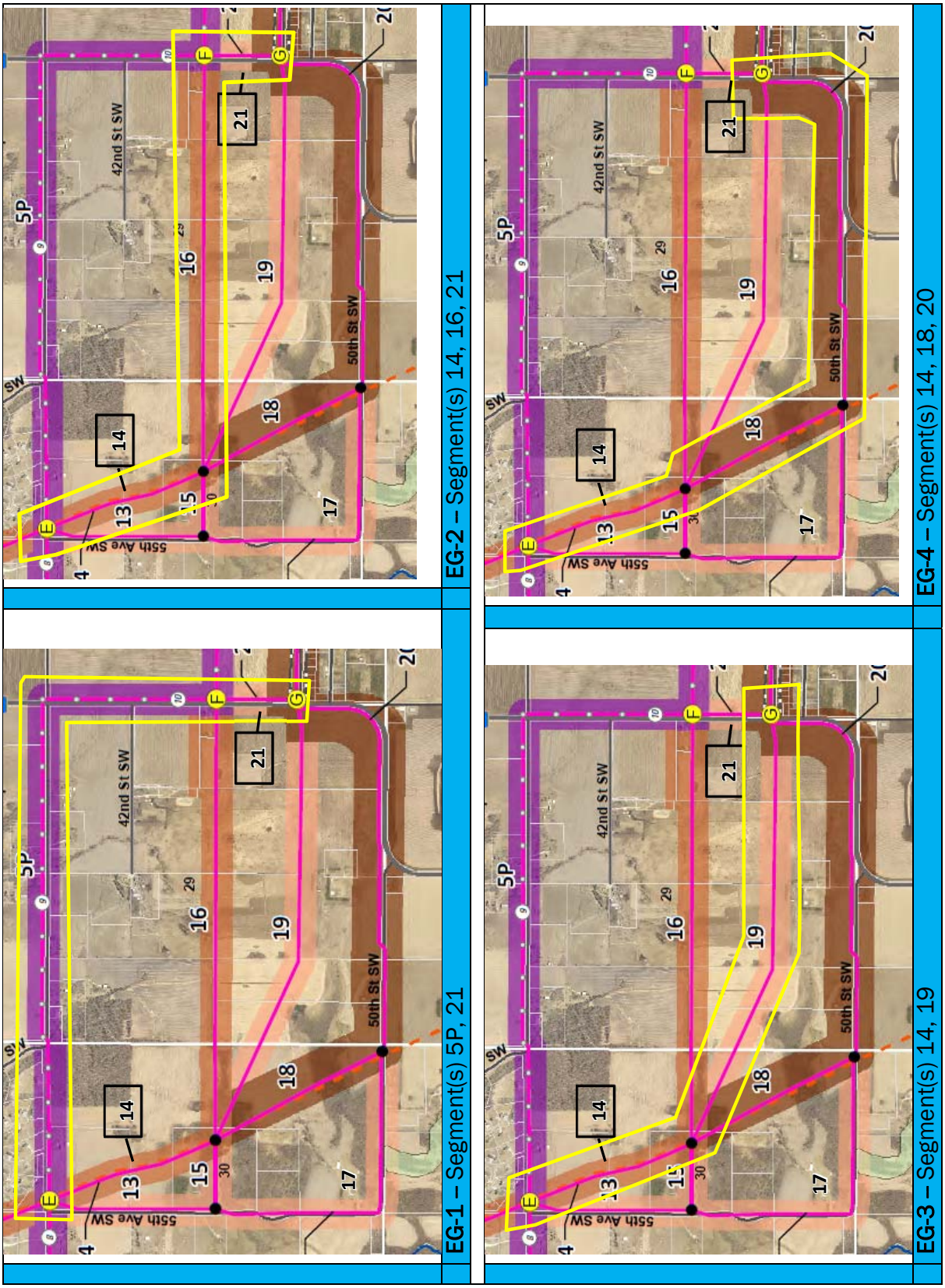


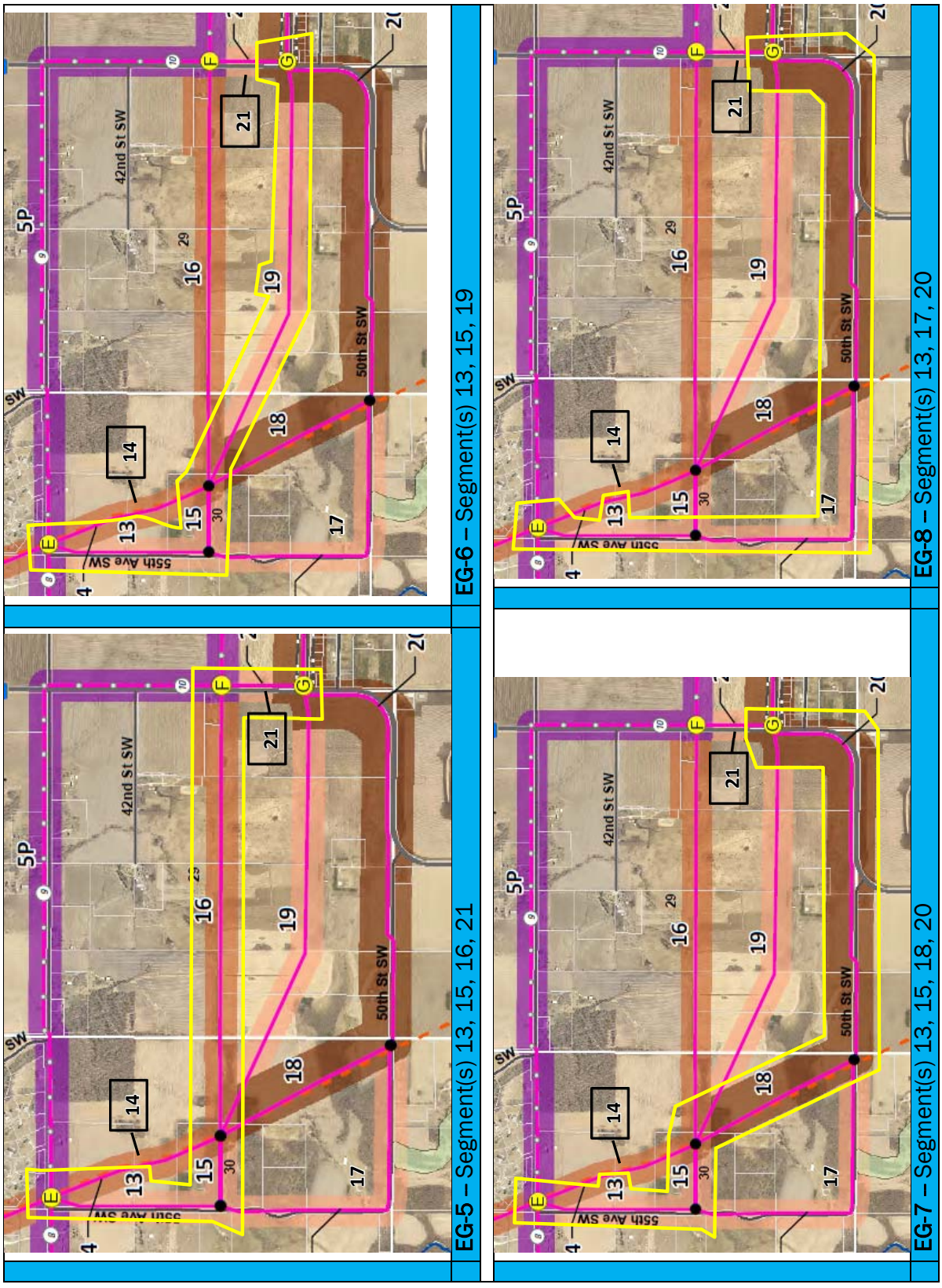
AB-2 – Segment(s) 10


CD-1 – Segment(s) 3P
18th St SW
60th Ave SW
70th Ave SW
Heather
BP Pipeline
11
12
3P
C
D
BC-1 – Segment(s) 2P
2P
B
C
70th Ave SW
NW


DE-1 – Segment(s) 4P
BP Pipeline
12
19
14
4P
D
E
CD-2 – Segment(s) 11
18th St SW
60th Ave SW
70th Ave SW
Heather
BP Pipeline
11
12
13
3P
C
D


42nd St SW
55th Ave SW
5P
4P
BP Pipeline
EF-1 – Segment(s) 5P
EF-3 – Segment(s) 13, 15, 16
DE-2 – Segment(s) 12
EF-2 – Segment(s) 14, 16

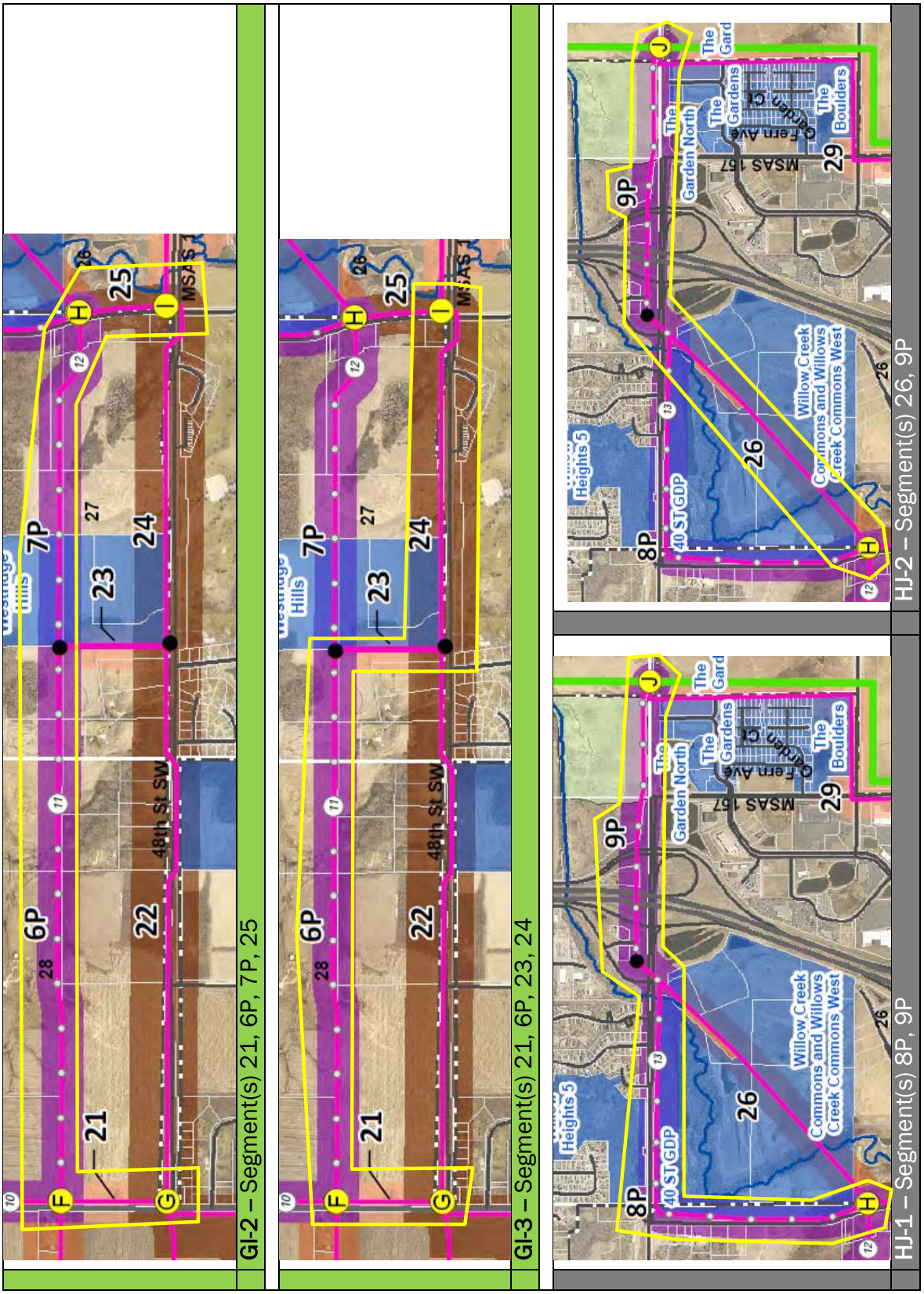

EG-1 – Segment(s) 5P, 21
EG-2 – Segment(s) 14, 16, 21
EG-3 – Segment(s) 14, 19
EG-4 – Segment(s) 14, 18, 20
42nd St SW
50th St SW
55th Ave SW
5P
13
14
15
16
17
18
19
21

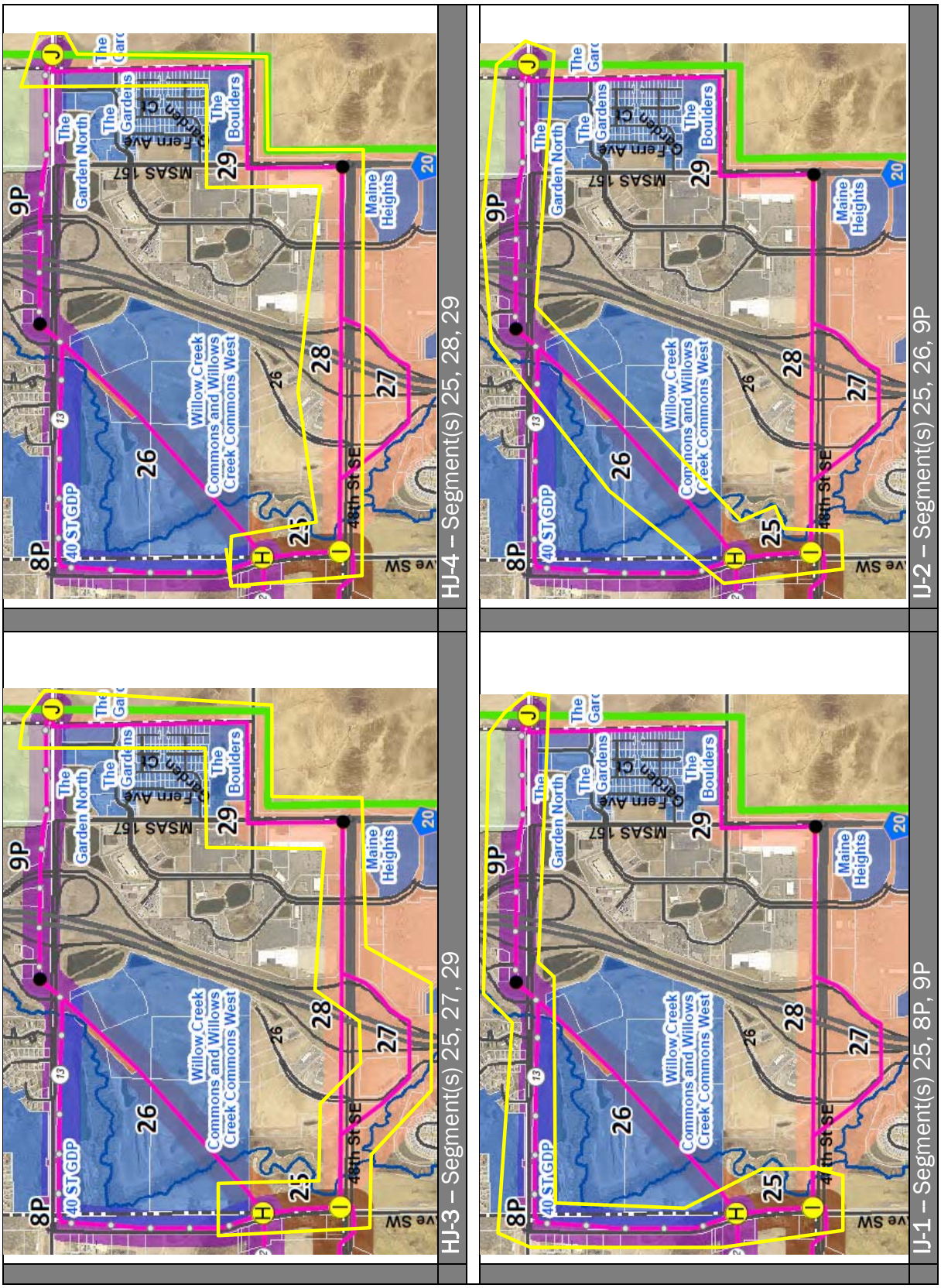

EG-5 – Segment(s) 13, 15, 16, 21
EG-6 – Segment(s) 13, 15, 19
EG-7 – Segment(s) 13, 15, 18, 20
EG-8 – Segment(s) 13, 17, 20
42nd St SW
50th St SW
55th Ave SW
5P
13
14
15
16
17
18
19
21
E
F
G


FH-1 – Segment(s) 6P, 7P
FH-2 – Segment(s) 6P, 23, 24, 25
FH-3 – Segment(s) 21, 22, 24, 25
6P
7P
21
22
23
24
25
27
28
48th St SW
MSAS 1


FI-1 – Segment(s) 6P, 23, 24
FI-2 – Segment(s) 6P, 7P, 25
FI-3 – Segment(s) 21, 22, 23
6P
7P
21
22
23
24
25
27
28
F
G
H
I
48th St SW
Hills


GH-1 – Segment(s) 22, 24, 25
GH-2 – Segment(s) 21, 6P, 7P
GI-1 – Segment(s) 22, 24
21
22
23
24
25
6P
7P
27
28
48th St SW
Westridge Hills
MSAS 1
F
G
H
I


GI-2 – Segment(s) 21, 6P, 7P, 25
GI-3 – Segment(s) 21, 6P, 23, 24
HJ-1 – Segment(s) 8P, 9P
HJ-2 – Segment(s) 26, 9P
MSAS 157
48th St SW
Willow Creek Commons and Willows Creek Commons West
The Boulders
The Gardens
The Garden North
Heights 5
40 STGDP


HJ-4 – Segment(s) 25, 28, 29
IJ-2 – Segment(s) 25, 26, 9P
HJ-3 – Segment(s) 25, 27, 29
IJ-1 – Segment(s) 25, 8P, 9P
MSAS 157
Willow Creek Commons and Willows Creek Commons West
Maine Heights
40 St GDP
46th St SE
The Garden North
The Gardens
The Boulders
25
26
27
28
29
8P
9P
H
I
J
20

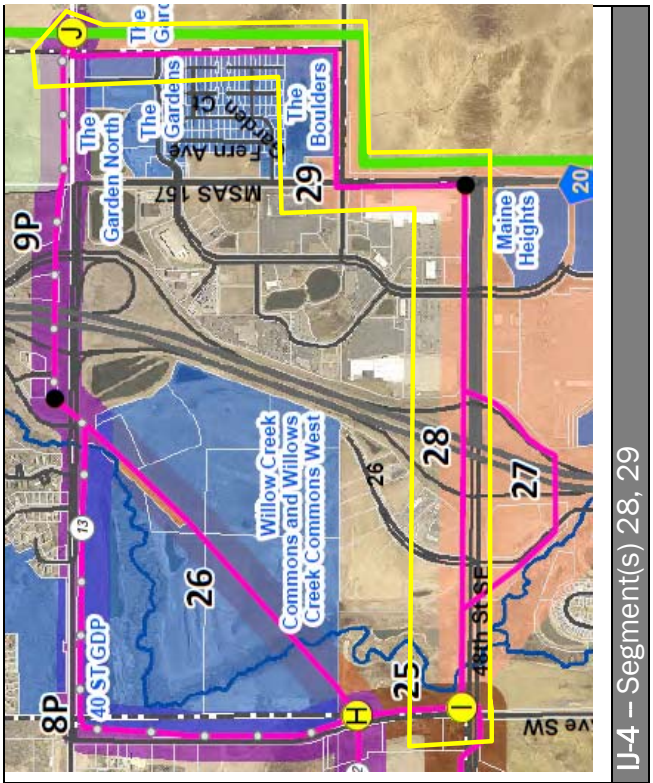

IJ-4 – Segment(s) 28, 29
IJ-3 – Segment(s) 27, 29
MSAS 157
Willow Creek Commons and Willows Creek Commons West
The Garden North
The Boulders
Maine Heights
40 St GDP
46th St SE
9P
8P
26
27
28
29
25

Table 1: TBS 1D to Proposed TBS Segment Alternatives

Segment Alternative	Route Segment(s)	Length (mi appx.)	Description	Land Use and Zoning	Geology	Groundwater Resources	Mining	Paralleling	Planned Future Development	Cost and Accessibility[1]
AB-1	1P	1.1	Originates at TBS 1D on the southeast corner of 19th St NW and 60th Ave NW. Follows 19th St NW west for 1.0 miles and then 70th Ave NW south for 0.1 miles.							
AB-2	10	1.0	Originates at TBS 1D and follows the existing Northern Natural Gas Pipeline right-of-way for 1.0 miles to 70th Ave NW, approximately 0.1 mile south of 19th St NW. Route Segment 10 was added.							
BC-1	2P	1.9	Originates on 70th Ave NW approximately 0.1 mile south of 19th St NW and follows 70th Ave NW south to the junction of BP pipeline.							
CD-1	3P	3.4	Originates at junction of BP pipeline and 70th Ave SW and follows 70th Ave SW south for 2.0 miles to CSAH 25, then follows CSAH 25 east for 0.5 miles to CR 15, then south for 0.2 miles, then east for 0.6 miles to 60th Ave SW, then follows 60th Ave SW south for 0.3 miles to Comparison Endpoint D.				▲			
CD-2	11	2.7	Originates at junction of BP pipeline and 70th Ave SW and follows BP pipeline to 60th Ave SW.							▲

[1] Column not included in Comparative Environmental Analysis Relative Merits Analysis Tables.

Table 2: Proposed TBS to County Road 8 Segment Alternatives

Segment Alternatives	Route Segment(s)	Length (mi appx.)	Description	Land Use and Zoning	Geology	Groundwater Resources	Mining	Paralleling	Planned Future Development	Cost and Accessibility[2]
DE-1	4P	1.5	Follows 60th Ave SW south to 40th St SW and east along 40th St SW. Route Segment 4P was widened along 60th Ave SW.	▲			▲			
DE-2	12	1.2	From 60th Ave SW, heads east to the existing BP pipeline. Follows the BP pipeline southeast to 40th St SW. Route Segment 12 was widened along the BP pipeline.							▲
EF-1	5P	2.0	Follows 40th St SW east for 1.5 miles to CR 8, then south along CR 8 for 0.5 miles. Route Segment 5P was added.							
EF-2	14, 16	1.8	Follows the BP pipeline southeast to about 0.5 mile south of 40th St SW. Heads east cross country along the half section to CR 8.		▲			▲		▲
EF-3	13, 15, 16	2.0	From the intersection of 55th Ave SW and 40th St SW, follows 55th Ave SW south to about 0.5 miles south of 40th St SW. Heads east cross country along the half section to CR 8. Route Segments 13 and 15 were added.		▲			▲		
EG-1	5P, 21	2.2	From the intersection of 55th Ave SW and 40th St SW, follows 40th St SW. Turns south and follows CR 8 to 48th St SW. Route Segments 5P and 21 were added.							
EG-2	14, 16, 21	2.1	Follows the BP pipeline southeast to about 0.5 mile south of 40th St SW. Heads east cross country along the half section to CR 8. Follows CR 8 south to intersection with 48th St SW. Route Segment 21 was added.		▲			▲		▲
EG-3	14, 19	1.9	Follows the BP pipeline southeast to about 0.5 mile south of 40th St SW. Heads southeast cross country (following property boundaries where available) to intersection of CR 8 and 48th St SW. Route Segment 19 was added.		▲			▲		▲
EG-4	14, 18, 20	2.3	Follows the BP pipeline southeast to 50th St SW. Follows 50th St SW to CR 8 and then follows CR 8 north to the intersection with 48th St SW. The Route Segments 18 and 20 were widened along the BP pipeline, 50th St SW, and CR 8.		▲					▲
EG-5	13, 15, 16, 21	2.2	From the intersection of 55th Ave SW and 40th St SW, follows 55th Ave SW south to about 0.5 miles south of 40th St SW. Heads east cross country along the half section to CR 8. Follows CR 8 south to intersection with 48th St SW. Route Segments 13, 15, and 21 were added.		▲					
EG-6	13, 15, 19	2.1	From the intersection of 55th Ave SW and 40th St SW, follows 55th Ave SW south to about 0.5 miles south of 40th St SW. Heads east cross county to the BP pipeline. Heads southeast cross county (following property boundaries where available) to intersection of CR 8 and 48th St SW. Route Segments 13, 15, and 19 were added.		▲			▲		

[2] Column not included in Comparative Environmental Analysis Relative Merits Analysis Tables.

Segment Alternatives	Route Segment(s)	Length (mi appx.)	Description	Land Use and Zoning	Geology	Groundwater Resources	Mining	Paralleling	Planned Future Development	Cost and Accessibility[2]
EG-7	13, 15, 18, 20	2.5	From the intersection of 55th Ave SW and 40th St SW, follows 55th Ave SW south to about 0.5 miles south of 40th St SW. Heads east cross county to the BP pipeline. Follows the BP pipeline southeast to 50th St SW. Follows 50th St SW to CR 8 and then CR 8 north to the intersection with 48th St SW. Route Segments 18 and 20 were widened along the BP pipeline, 50th St SW, and CR 8. Route Segments 13 and 15 were added.		▲					▲
EG-8	13, 17, 20	2.7	From the intersection of 55th Ave SW and 40th St SW, follows 55th Ave SW south to 50th St SW. Follows 50th St SW to CR 8 and then CR 8 north to intersection with 48th St SW. Route Segment 20 was widened along 50th St SW and CR 8. Route Segments 13 and 17 were added.		▲	▲				

Table 3: County Road 8 to 11th Avenue SW Segment Alternatives

Segment Alternatives	Route Segments	Length (mi appx.)	Description	Land Use and Zoning	Geology	Groundwater Resources	Mining	Paralleling	Planned Future Development	Cost and Accessibility[3]
FH-1	6P, 7P	2.0	From CR 8, heads east cross county along the half section to 11th Ave SW.					▲	■	
FH-2	6P, 23, 24, 25	2.5	From CR 8, heads east cross county along the half section to the western boundary of the Westridge Hills Development. Follows property boundaries south to 48th St SW. Heads east on 48th St SW to 11th Ave SW. Heads north on 11th Ave SW for 0.2 mile. Route Segment 24 was widened along 48th St SW. Route Segment 23 was added.					▲	▲	
FH-3	21, 22, 24, 25	2.5	Follows CR 8 south to intersection with 48th St SW. Follows 48th St SW east to 11th Ave SW. Follows 11th Ave SW north for 0.2 mile. Route Segments 22 and 24 were widened along 48th St SW. Route Segment 21 was added.						▲	
FI-1	6P, 23, 24	2.3	From CR 8, heads east cross county along the half section to the western boundary of the Westridge Hills Development. Follows property boundaries south to 48th St SW. Heads east on 48th St SW to 11th Ave SW. Route Segment 24 was widened along 48th St SW. Route Segment 23 was added.					▲	▲	
FI-2	6P, 7P, 25	2.2	From CR 8, heads east cross county along the half section to 11th Ave SW. Follows 11th Ave SW south for 0.2 mile.					▲	■	
FI-3	21, 22, 24	2.3	Follows CR 8 south to intersection with 48th St SW. Follows 48th St SW east to 11th Ave SW. Route Segments 22 and 24 was widened along 48th St SW. Route Segment 21 was added.						▲	
GH-1	22, 24, 25	2.3	From the intersection of CR 8 and 48th St SW, follows 48th St SW east to 11th Ave SW. Follows 11th Ave SW north for 0.2 mile. Route Segments 22 and 24 were widened along 48th St SW.						▲	
GH-2	21, 6P, 7P	2.2	From the intersection of CR 8 and 48th St SW, follows CR 8 north for 0.2 mile. From CR 8, heads east cross county along the half section to 11th Ave SW. Route Segment 21 was added.					▲	■	
GI-1	22, 24	2.1	From the intersection of CR 8 and 48th St SW, follows 48th St SW east to 11th Ave SW. Route Segments 22 and 24 were widened along 48th St SW.						▲	
GI-2	21, 6P, 7P, 25	2.4	From the intersection of CR 8 and 48th St SW, follows CR 8 north for 0.2 mile. From CR 8, heads east cross county along the half section to 11th Ave SW. Follows 11th Ave SW south for 0.2 mile. Route Segment 21 was added.					▲	■	

[3] Column not included in Comparative Environmental Analysis Relative Merits Analysis Tables.

Segment Alternatives	Route Segments	Length (mi appx.)	Description	Land Use and Zoning	Geology	Groundwater Resources	Mining	Paralleling	Planned Future Development	Cost and Accessibility[3]
GI-3	21, 6P, 23, 24	2.5	From the intersection of CR 8 and 48th St SW, follows CR 8 north for 0.2 mile. From CR 8, heads east cross county along the half section to the western boundary of the Westridge Hills Development. Follows property boundaries south to 48th St SW. Heads east on 48th St SW to 11th Ave SW. Route Segment 24 was widened along 48th St SW. Route Segments 21 and 23 were added.					◀	◀	

Table 4: 11th Avenue SW to Proposed District Regulator Station Segment Alternatives

Segment Alternatives	Route Segments	Length (mi appx.)	Description	Land Use and Zoning	Geology	Groundwater Resources	Mining	Paralleling	Planned Future Development	Cost and Accessibility[4]
HJ-1	8P, 9P	1.8	From 11th Ave SW, continues north along 11th Ave SW and then east along 40th St SW, crossing US Highway 63 in the 40th St SW interchange, to the Proposed DRS. Route Segment 8P was added.						▲	
HJ-2	26, 9P	1.5	From 11th Ave SW, heads cross county northeast to 40th St SW. Follows 40th St SW, crossing US Highway 63 in the 40th St SW interchange, to the Proposed DRS.			▲		▲	■	
HJ-3	25, 27, 29	2.4	Follows 11th Ave SW south for 0.2 mile. Follows 48th St SE east, crossing US Highway 63 south of the 48th St SE interchange, to CR 20. Continues north along CR 20 to 45th St SE, east along 45th St SE for 0.25 mile, and north along property boundaries, to the Proposed DRS. Route Segments 27 and 29 were added.					▲	▲	▲
HJ-4	25, 28, 29	2.2	Follows 11th Ave SW south for 0.2 mile. Follows 48th St SE east, crossing US Highway 63 within the 48th St SE interchange, to CR 20. Continues north along CR 20 to 45th St SE, east along 45th St SE for 0.25 mile, and north along property boundaries, to the Proposed DRS. Route Segments 28 and 29 were added.					▲	▲	▲
IJ-1	25, 8P, 9P	2.0	Follows 11th Ave SW north for 0.7 mile. Continues east along 40th St SW, crossing US Highway 63 in the 40th St SW interchange, to the Proposed DRS. Route Segment 8P was added.						▲	
IJ-2	25, 26, 9P	1.7	Follows 11th Ave SW north for 0.2 mile. Continues cross country northeast to 40th St SW. Follows 40th St SW, crossing US Highway 63 in the 40th St SW interchange, to the Proposed DRS.			▲		▲	■	
IJ-3	27, 29	2.2	Follows 48th St SE east, crossing US Highway 63 south of the 48th St SE interchange, to CR 20. Continues north along CR 20 to 45th St SE, east along 45th St SE for 0.25 mile, and north along property boundaries to the Proposed DRS. Route Segments 27 and 29 were added.					▲	▲	▲
IJ-4	28, 29	2.0	Follows 48th St SE east, crossing US Highway 63 within the 48th St SE interchange, to CR 20. Continues north along CR 20 to 45th St SE, east along 45th St SE for 0.25 mile, and north along property boundaries to the Proposed DRS. Route Segments 28 and 29 were added.					▲	▲	▲

[4] Column not included in Comparative Environmental Analysis Relative Merits Analysis Tables.