Appendix B

Section 5 Tables

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Table B-1. Groundwater Resources Impacts by Route

	Application Preferred Route		Application Alternative Route		Modified Preferred Route	
	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Length of pipeline in Decorah Edge (feet)	18,530		17,507		20,253	
Geologic Sensitivity (acres)[a]						
Very high	15.6	31.2	18.0	36.1	18.7	37.5
High	15.7	31.7	23.7	48.0	23.8	47.9
High moderate	8.9	18.0	9.4	18.8	3.6	7.2
Moderate	13.8	27.5	8.7	17.3	13.0	25.9
Low moderate	9.4	18.8	7.0	14.0	9.4	18.8
Low	16.5	33.2	15.5	31.2	16.5	33.2
Total	**79.8**	**160.5**	**82.2**	**165.4**	**84.9**	**170.6**

Notes:
Perm. = permanent; Const. = construction; Very High= contaminants will almost certainly reach the system in hours to months; High= contaminates will probably reach the system in weeks to years; High moderate = contaminants will reach the system in several years to about a decade; Moderate = contaminants will reach the system in years to decades; Low moderate = contaminants will probably not reach the system for decades; Low = contaminants will require decades to centuries to reach the system; Very low = contaminants will probably require centuries to reach the system. 1
a Reported acreages do not include permanent impact to 2.76 acres for the TBS 1D, Proposed TBS, Proposed DRS and temporary impact to 10.0 acres for the temporary storage yard as precise locations have not yet been determined. These facilities would not be sited in areas of high or very high geologic sensitivity to the extent practicable.

Table B-2. Land Requirements of Evaluated Segment Alternatives

Segment Alternative	Route Segments	Pipeline length (feet)	Pipeline length (miles)	Construction Area (acres)	Permanent Right-of-Way (acres)
TBS 1D to Proposed TBS					
AB-1	1P	6,240	1.2	14.5	7.2
AB-2	10	5,443	1.0	12.7	6.3
BC	2P	10,122	1.9	23.4	11.7
CD-1	3P	18,316	3.5	42.2	21.1
CD-2	11	14,485	2.7	33.4	16.7
Proposed TBS to County Road 8					
DE-1	4P	8,109	1.5	18.8	9.3

[1] Meyer, G. 1990. *Sensitivity of Ground-Water Systems to Pollution*. County Atlas Series. Atlas C-5, Plate 6 of 7. Pollution Sensitivity. Minnesota Geological Survey.

Segment Alternative	Route Segments	Pipeline length (feet)	Pipeline length (miles)	Construction Area (acres)	Permanent Right-of-Way (acres)
DE-2	12	6,358	1.2	14.8	7.3
EF-1	5P	10,583	2.0	24.5	12.2
EF-2	14, 16	9,635	1.8	22.5	11.1
EF-3	13, 15, 16	10,544	2.0	24.7	12.2
EG-1	5P, 21	11,829	2.2	27.5	13.7
EG-2	14, 16, 21	10,880	2.1	25.5	12.6
EG-3	14, 19	9,926	1.9	23.1	11.5
EG-4	14, 18, 20	12,332	2.3	28.8	14.3
EG-5	13, 15, 16, 21	11,789	2.2	27.8	13.7
EG-6	13, 15, 19	10,835	2.1	25.4	12.6
EG-7	13, 15, 18, 20	13,241	2.5	31.1	15.4
EG-8	13, 17, 20	14,318	2.7	33.4	16.6
Country Road 8 to 11th Avenue SW					
FH-1	6P, 7P	10,541	2.0	24.6	12.2
FH-2	6P, 23, 24, 25	13,084	2.5	30.7	15.2
FH-3	21, 22, 24, 25	13,140	2.5	30.9	15.3
FI-1	6P, 23, 24	12,040	2.3	28.2	14.0
FI-2	6P, 7P, 25	11,585	2.2	27.1	13.4
FI-3	21, 22, 24	12,097	2.3	28.3	14.0
GH-1	22, 24, 25	11,895	2.3	27.8	13.8
GH-2	21, 6P, 7P	11,787	2.2	27.6	13.7
GI-1	22, 24	10,851	2.1	25.3	12.5
GI-2	21, 6P, 7P, 25	12,830	2.4	30.2	14.9
GI-3	21, 6P, 23, 24	13,286	2.5	31.2	15.4
11th Avenue SW to Proposed DRS					
HJ-1	8P, 9P	9,742	1.8	22.7	11.3
HJ-2	26, 9P	7,956	1.5	18.6	9.2

Segment Alternative	Route Segments	Pipeline length (feet)	Pipeline length (miles)	Construction Area (acres)	Permanent Right-of-Way (acres)
HJ-3	25, 27, 29	12,516	2.4	29.3	14.5
HJ-4	25, 28, 29	11,597	2.2	27.2	13.5
IJ-1	25, 8P, 9P	10,786	2.0	25.3	12.5
IJ-2	25, 26, 9P	9,000	1.7	21.2	10.5
IJ-3	27, 29	11,473	2.2	26.7	13.3
IJ-4	28, 29	10,553	2.0	24.6	12.2

Notes:
TBS = Town Border Station; DRS = District Regulator Station

Table B-3. Land Requirements of Evaluated Routes

	Application Preferred Route		Application Alternative Route		Modified Preferred Route	
	Permanent Right-of-Way	Const. Area	Permanent Right-of-Way	Const. Area	Permanent Right-of-Way	Const. Area
Land Requirements (acres)						
Pipeline	79.8	160.5	82.2	165.4	84.9	170.6
TBS 1D	0.92	-	0.92	-	0.92	-
Proposed TBS	0.92	-	0.92	-	0.92	-
Proposed DRS	0.92	-	0.92	-	0.92	-
Temporary storage area	-	10.0	-	10.0	-	10.0
Total acreage	**82.6**	**170.5**	**85.0**	**175.4**	**87.7**	**180.6**
Total pipeline length (miles)	13.1	-	13.4	-	13.9	-

Notes:
Const. = construction; TBS = Town Border Station; DRS = District Regulator Station

Table B-4. Geologic Resource Impacts by Route

Resource Category	Application Preferred Route		Application Alternative Route		Modified Preferred Route	
	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Length of pipeline in bedrock less than 5 feet (feet)	16,188		20,525		19,098	
Sinkhole Formation Probability (acres)						
High probability	1.4	2.9	4.3	8.7	-	-
Moderate to high probability	-	-	-	-	-	-
Low to moderate probability	44.4	89.3	48.1	96.8	52.9	106.2
Low probability	34.0	68.3	25.6	59.8	32.1	64.4
Total	**79.8**	**160.5**	**78.1**	**165.4**	**84.9**	**170.6**

Notes:
Perm. = permanent; Const. = construction
Reported acreages do not include permanent impact to 2.76 acres for the Town Border Station (TBS) 1D, Proposed TBS, Proposed District Regulator Station and temporary impact to 10.0 acres for the temporary storage yard as precise locations have not yet been determined.

Table B-5. Geologic Resource Impacts - TBS 1D to Proposed TBS Segment Alternatives

Segment Alternative	AB-1[a,b]		AB-2		BC[a,b]		CD-1[a]		CD-2[b]	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	1P		10		2P		3P		11	
Length of pipeline in bedrock less than 5 feet (feet)	-		-		-		503		-	
Sinkhole Formation Probability (acres)										
High probability	-	-	-	-	-	-	-	-	-	-
Moderate to high probability	-	-	-	-	-	-	-	-	-	-
Low to moderate probability	-	-	-	-	-	-	13.3	26.6	12.5	25.1
Low probability	7.2	14.5	6.3	12.7	11.7	23.4	7.8	15.6	4.1	8.3
Total	**7.2**	**14.5**	**6.3**	**12.7**	**11.7**	**23.4**	**21.1**	**42.2**	**16.7**	**33.4**

Notes:
TBS = Town Border Station; Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Application Preferred and Modified Preferred Routes*
[b] *Evaluated as part of the Application Alternative Route*

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Table B-6. Geologic Resource Impacts - Proposed TBS to County Road 8 Segment Alternatives

Segment Alternative	DE-1[a]		DE-2[b]		EF-1[c]		EF-2[b]		EF-3		EG-1		EG-2		EG-3		EG-4[a]		EG-5		EG-6		EG-7		EG-8	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	4P		12		5P		14, 16		13, 15, 16		5P, 21		14, 16, 21		14, 19		14, 18, 20		13, 15 16, 21		13, 15, 19		13, 15 18, 20		13, 17, 20	
Length of pipeline in bedrock less than 5 feet (feet)	1,521		277		8,519		6,045		6,880		9,764		7,290		8,623		9,130		8,125		9,459		9,965		8,050	
Sinkhole Formation Probability (acres)																										
High probability	-	-	-	-	-	-	1.4	2.9	1.4	2.9	-	-	1.4	2.9	3.3	6.6	4.3	8.7	1.4	2.9	3.3	6.6	4.3	8.7	4.7	9.5
Moderate to high probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low to moderate probability	9.0	18.0	6.4	12.8	12.2	24.5	9.7	19.6	10.8	21.9	13.7	27.5	11.2	22.6	8.2	16.6	10.0	20.1	12.3	24.9	9.3	18.8	11.1	22.4	11.9	23.9
Low probability	0.4	0.8	1.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**9.3**	**18.8**	**7.3**	**14.8**	**12.2**	**24.5**	**11.1**	**22.5**	**12.2**	**24.7**	**13.7**	**27.5**	**12.6**	**25.5**	**11.5**	**23.4**	**14.3**	**28.8**	**13.7**	**27.8**	**12.6**	**25.4**	**15.4**	**31.1**	**16.6**	**33.4**

Notes:
TBS = Town Border Station; Perm. = permanent; Const. = construction
[a] *Included as part of the Application Alternative Route*
[b] *Included as part of the Application Preferred Route*
[c] *Included as part of the Modified Preferred Route*

Table B-7. Geologic Resource Impacts - County Road 8 to 11th Avenue SW Segment Alternatives

Segment Alternative	FH-1[a]		FH-2		FH-3		FI-1		FI-2		FI-3		GH-1[b]		GH-2		GI-1		GI-2		GI-3	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	6P, 7P		6P, 23, 24, 25		21, 22, 24, 25		6P, 23, 24		6P, 7P, 25		21, 22, 24		22, 24, 25		21, 6P, 7P		22, 24		21, 6P, 7P, 25		21, 6P, 23, 24	
Length of pipeline in bedrock less than 5 feet (feet)	8,138		7,142		9,340		7,142		8,138		9,340		8,095		9,383		8,095		9,383		8,388	
Sinkhole Formation Probability (acres)																						
High probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moderate to high probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low to moderate probability	12.2	24.6	15.2	30.7	15.3	30.9	14.0	28.2	13.4	27.1	14.0	28.3	13.8	27.8	13.7	27.6	12.5	25.3	14.9	30.2	15.4	31.2
Low probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**12.2**	**24.6**	**15.2**	**30.7**	**15.3**	**30.9**	**14.0**	**28.2**	**13.4**	**27.1**	**14.0**	**28.3**	**13.8**	**27.8**	**13.7**	**27.6**	**12.5**	**25.3**	**14.9**	**30.2**	**15.4**	**31.2**

Notes:
Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Application Preferred Route and the Modified Preferred Route*
[b] *Evaluated as part of the Application Alternative Route*

Table B-8. Geologic Resource Impacts - 11th Avenue SW to Proposed District Regulator Station Segment Alternatives

Segment Alternative	HJ-1[a]		HJ-2[b]		HJ-3		HJ-4		IJ-1		IJ-2		IJ-3		IJ-4	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	8P, 9P		26, 9P		25, 27, 29		25, 28, 29		25, 8P, 9P		25, 26, 9P		27, 29		28, 29	
Length of pipeline in bedrock less than 5 feet (feet)	416		1,502		738		1,448		416		1,502		738		1,448	
Sinkhole Formation Probability (acres)																
High probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moderate to high probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low to moderate probability	6.3	12.6	2.9	5.8	5.8	11.7	5.1	10.3	7.5	15.2	4.1	8.4	4.5	9.1	3.8	7.7
Low probability	5.0	10.1	6.4	12.8	8.7	17.6	8.4	16.9	5.0	10.1	6.4	12.8	8.7	17.6	8.4	16.9
Total	**11.3**	**22.7**	**9.2**	**18.6**	**14.5**	**29.3**	**13.5**	**27.2**	**12.5**	**25.3**	**10.5**	**21.2**	**13.3**	**26.7**	**12.2**	**24.6**

Notes:
Perm. = permanent; Const. = construction
[a] Evaluated as part of the Modified Preferred Route.
[b] Evaluated as part of the Application Preferred Route and the Application Alternative Route.

Table B-9. Soil Resource Impacts by Route

Resource Category	Application Preferred Route		Application Alternative Route		Modified Preferred Route	
	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Soils (acres)[a]						
Prime farmland	41.9	83.9	45.8	92.4	48.0	96.3
Farmland of statewide importance	12.9	25.7	2.9	25.5	12.3	24.4
Prime farmland if drained	14.2	28.4	10.4	20.9	13.7	27.5
Prime farmland if drained and protected from flooding or not frequently flooded	0.7	1.4	1.1	2.3	0.7	1.4
Not prime farmland	10.1	21.0	12.0	24.4	10.2	21.0
Total	**79.8**	**160.5**	**82.2**	**165.4**	**84.9**	**170.6**
Highly Erodible Land (acres)	**6.7**	**13.9**	**6.6**	**13.5**	**6.1**	**12.5**

Notes:
Perm. = permanent; Const. = construction
[a] *Reported acreages do not include permanent impact to 2.76 acres for the TBS 1D, Proposed TBS, Proposed DRS and temporary impact to 10.0 acres for the temporary storage yard as precise locations have not yet been determined.*

Table B-10. Soil Resource Impacts - TBS 1D to Proposed TBS Segment Alternatives

Segment Alternative	AB-1[a,b]		AB-2		BC[a,b]		CD-1[a]		CD-2[b]	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	1P		10		2P		3P		11	
Soils (acres)										
Prime farmland	3.8	7.8	4.1	8.2	4.3	8.5	10.7	21.5	8.9	18.1
Farmland of statewide importance	2.7	5.2	0.2	0.5	5.5	11.1	2.4	4.8	3.4	6.7
Prime farmland if drained	-	-	1.5	3.0	0.7	1.4	6.7	13.5	2.9	5.8
Prime farmland if drained and protected from flooding or not frequently flooded	0.7	1.4	0.5	1.0	-	-	-	-	-	-
Not prime farmland	-	-	-	-	1.2	2.5	1.2	2.4	1.4	2.8
Total	**7.2**	**14.5**	**6.3**	**12.7**	**11.7**	**23.4**	**21.1**	**42.2**	**16.7**	**33.4**
Highly Erodible Land (acres)	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Notes:
TBS = Town Border Station; Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Application Preferred and Modified Preferred Routes*
[b] *Evaluated as part of the Application Alternative Route*

Table B-11. Soil Resource Impacts - Proposed TBS to County Road 8 Segment Alternatives

Segment Alternative	DE-1[a]		DE-2[b]		EF-1[c]		EF-2[b]		EF-3		EG-1		EG-2		EG-3		EG-4[a]		EG-5		EG-6		EG-7		EG-8	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	4P		12		5P		14, 16		13, 15, 16		5P, 21		14, 16, 21		14, 19		14, 18, 20		13, 15 16, 21		13, 15, 19		13, 15 18, 20		13, 17, 20	
Soils (acres)																										
Prime farmland	6.5	13.0	4.9	9.8	9.0	18.0	6.8	13.7	7.1	14.4	10.4	21.0	8.3	16.7	8.9	17.7	11.8	23.8	8.6	17.4	9.2	18.4	12.2	24.4	12.7	25.5
Farmland of statewide importance	-	-	0.2	0.5	0.2	0.4	0.5	1.1	0.5	1.1	0.2	0.4	0.5	1.1	0.1	0.2	0.1	0.2	0.5	1.1	0.1	0.2	0.1	0.2	0.2	0.3
Prime farmland if drained	2.0	3.9	0.8	1.6	-	-	1.1	2.2	1.5	2.9	-	-	1.1	2.2	0.5	1.0	-	-	1.5	2.9	0.9	1.7	0.4	0.7	0.4	0.7
Prime farmland if drained and protected from flooding or not frequently flooded	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Not prime farmland	0.9	1.8	1.4	2.8	3.0	6.1	2.7	5.5	3.0	6.3	3.0	6.1	2.7	5.5	2.1	4.3	2.3	4.9	3.0	6.3	2.5	5.2	2.7	5.7	3.3	6.8
Total	**9.3**	**18.8**	**7.3**	**14.8**	**12.2**	**24.5**	**11.1**	**22.5**	**12.2**	**24.7**	**13.7**	**27.5**	**12.6**	**25.5**	**11.5**	**23.1**	**14.3**	**28.8**	**13.7**	**27.8**	**12.6**	**25.4**	**15.4**	**31.1**	**16.6**	**33.4**
Highly Erodible Land (acres)	**0.5**	**1.1**	**0.8**	**1.6**	**3.2**	**6.6**	**2,7**	**5.4**	**3.0**	**6.4**	**2.7**	**5.5**	**2.7**	**5.4**	**2.1**	**4.2**	**2.3**	**4.7**	**3.0**	**6.4**	**2.4**	**5.2**	**2.6**	**5.7**	**2.5**	**5.2**

Notes:
TBS = Town Border Station; Perm. = permanent; Const. = construction
[a] Included as part of the Application Alternative Route
[b] Included as part of the Application Preferred Route
[c] Included as part of the Modified Preferred Route

Table B-12. Soil Resource Impacts - County Road 8 to 11th Avenue SW Segment Alternatives

Segment Alternative	FH-1[a]		FH-2		FH-3		FI-1		FI-2		FI-3		GH-1[b]		GH-2		GI-1		GI-2		GI-3	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	6P, 7P		6P, 23, 24, 25		21, 22, 24, 25		6P, 23, 24		6P, 7P, 25		21, 22, 24		22, 24, 25		21, 6P, 7P		22, 24		21, 6P, 7P, 25		21, 6P, 23, 24	
Soils (acres)																						
Prime farmland	7.8	15.2	6.9	13.6	8.3	16.9	6.6	13.1	8.0	15.8	8.1	16.3	6.9	13.8	9.2	18.3	6.6	13.2	9.5	18.9	8.1	16.1
Farmland of statewide importance	1.5	3.0	2.7	5.3	1.1	2.2	2.7	5.3	1.5	3.0	1.1	2.2	1.1	2.2	1.5	3.0	1.1	2.2	1.5	3.0	2.7	5.3
Prime farmland if drained	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prime farmland if drained and protected from flooding or not frequently flooded	-	-	0.4	0.9	0.4	0.9	0.4	0.9	-	-	0.4	0.9	0.4	0.9	-	-	0.4	0.9	-	-	0.4	0.9
Not prime farmland	3.0	6.4	5.3	10.9	5.4	11.0	4.3	8.9	3.9	8.4	4.4	9.0	5.4	11.0	3.0	6.4	4.4	9.0	3.9	8.4	4.3	8.9
Total	**12.2**	**24.6**	**15.2**	**30.7**	**15.3**	**30.9**	**14.0**	**28.2**	**13.4**	**27.1**	**14.0**	**28.3**	**13.8**	**27.8**	**13.7**	**27.6**	**12.5**	**25.3**	**14.9**	**30.2**	**15.4**	**31.2**
Highly Erodible Land (acres)	**2.8**	**6.0**	**2.8**	**6.0**	**3.3**	**6.7**	**3.8**	**7.6**	**2.8**	**6.0**	**3.3**	**6.7**	**3.3**	**6.7**	**2.8**	**6.0**	**3.3**	**6.7**	**2.8**	**6.0**	**3.8**	**7.6**

Notes:
Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Application Preferred Route and the Modified Preferred Route*
[b] *Evaluated as part of the Application Alternative Route*

Table B-13. Soil Resource Impacts - 11th Avenue SW to Proposed District Regulator Station Segment Alternatives

Segment Alternative	HJ-1[a]		HJ-2[b]		HJ-3		HJ-4		IJ-1		IJ-2		IJ-3		IJ-4	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	8P, 9P		26, 9P		25, 27, 29		25, 28, 29		25, 8P, 9P		25, 26, 9P		27, 29		28, 29	
Soils (acres)																
Prime farmland	6.1	12.2	3.7	7.4	8.2	16.3	7.9	15.8	6.3	12.8	3.9	8.0	7.9	15.7	7.6	15.3
Farmland of statewide importance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prime farmland if drained	4.3	8.6	4.9	9.7	3.2	6.7	3.3	6.7	4.3	8.6	4.9	9.7	3.2	6.7	3.3	6.7
Prime farmland if drained and protected from flooding or not frequently flooded	-	-	-	-	0.8	1.7	-	-	-	-	-	-	0.8	1.7	-	-
Not prime farmland	0.9	1.9	0.7	1.5	2.3	4.6	2.3	4.7	1.9	3.9	1.7	3.5	1.3	2.6	1.4	2.7
Total	**11.3**	**22.7**	**9.2**	**18.6**	**14.5**	**29.3**	**13.5**	**27.2**	**12.5**	**25.3**	**10.5**	**21.2**	**13.3**	**26.7**	**12.2**	**24.6**
Highly Erodible Land (acres)	-	-	**0.5**	**0.9**	-	-	**0.6**	**1.1**	-	-	**0.5**	**0.9**	-	-	**0.6**	**1.1**

Notes:
Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Modified Preferred Route.*
[b] *Evaluated as part of the Application Preferred Route and the Application Alternative Route.*

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Table B-14. Township and City of Rochester Crossing Lengths by Route

Jurisdiction[a]	Application Preferred Route		Application Alternative Route		Modified Preferred Route	
	Length (miles)	Percent of Route	Length (miles)	Percent of Route	Length (miles)	Percent of Route
Cascade Township	0.1	0.5	0.1	0.5	0.1	0.5
Kalmar Township	2.5	19.3	2.5	18.8	2.5	18.1
Salem Township	4.0	30.4	4.3	31.6	5.0	35.8
Rochester Township	5.0	38.5	3.4	25.6	25.1	35.8
City of Rochester	1.5	11.2	3.2	23.5	1.3	9.1
Total	**13.1**	**100**	**13.5**	**100**	**13.9**	**100**

Notes:
[a] *Reported acreages do not include permanent impact to 2.76 acres for the Town Border Station (TBS) 1D, Proposed TBS, Proposed District Regulator Station (DRS) and temporary impact to 10.0 acres for the temporary storage yard and additional temporary workspaces as precise locations have not yet been determined. TBS 1D, the Proposed TBS, and the Proposed DRS would be located in Kalmar/Cascade Townships, Salem Township, and Marion Township respectively.*

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Table B-15. Township and City of Rochester Crossing Lengths - TBS 1D to Proposed TBS Segment Alternatives

Segment Alternative	AB-1[a,b]		AB-2		BC[a,b]		CD-1[a]		CD-2[b]	
Resource	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.
Route Segment(s)	1P		10		2P		3P		11	
Jurisdiction										
Cascade Township	0.1	6.0	<0.1	4.1	-	-	-	-	-	-
Kalmar Township	1.1	94.0	1.0	95.9	1.4	77	-	-	-	-
Salem Township	-	-	-	-	0.5	23	3.5	100	2.7	100
Rochester Township	-	-	-	-	-	-	-	-	-	-
City of Rochester	-	-	-	-	-	-	-	-	-	-
Total	**1.2**	**100**	**1.0**	**100**	**1.9**	**100**	**3.5**	**100**	**2.7**	**100**

Notes:
TBS = Town Border Station; mi = miles; Alt. = alternative
[a] *Evaluated as part of the Application Preferred and Modified Preferred Routes*
[b] *Evaluated as part of the Application Alternative Route*

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Table B-16. Township and City of Rochester Crossing Lengths - Proposed TBS to County Road 8 Segment Alternatives

Segment Alternative	DE-1[a]		DE-2[b]		EF-1[c]		EF-2[b]		EF-3		EG-1		EG-2		EG-3		EG-4[a]		EG-5		EG-6		EG-7		EG-8	
Resource	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.
Route Segment(s)	4P		12		5P		14, 16		13, 15, 16		5P, 21		14, 16, 21		14, 19		14, 18, 20		13, 15 16, 21		13, 15, 19		13, 15 18, 20		13, 17, 20	
Jurisdiction																										
Cascade Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kalmar Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salem Township	1.0	66.6	<0.1	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rochester Township	0.5	33.4	1.2	98.7	2.0	100	1.8	100	2.0	100	2.2	99.1	2.0	99.0	1.9	99.2	2.3	99.4	2.2	99.1	2.0	99.3	2.5	99.4	2.7	99.5
City of Rochester	-	-	-	-	-	-	-	-	-	-	<0.1	0.9	<0.1	1.0	<0.1	0.8	<0.1	0.6	<0.1	0.9	<0.1	0.7	<0.1	0.6	<0.1	0.5
Total	**1.5**	**100.**	**1.2**	**100**	**2.0**	**100**	**1.8**	**100**	**2.0**	**100**	**2.2**	**100**	**2.1**	**100**	**1.9**	**100**	**2.3**	**100**	**2.2**	**100**	**2.1**	**100**	**2.5**	**100**	**2.7**	**100**

Notes:
TBS = Town Border Station; mi = miles; Alt. = Alternative
[a] Evaluated as part of the Application Alternative Route
[b] Evaluated as part of the Application Preferred Route
[c] Evaluated as part of the Modified Preferred Route

Table B-17. Township and City of Rochester Crossing Lengths - County Road 8 to 11th Avenue SW Segment Alternatives

Segment Alternative	FH-1[a]		FH-2		FH-3		FI-1		FI-2		FI-3		GH-1[b]		GH-2		GI-1		GI-2		GI-3	
Resource	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.
Route Segment(s)	6P, 7P		6P, 23, 24, 25		21, 22, 24, 25		6P, 23, 24		6P, 7P, 25		21, 22, 24		22, 24, 25		21, 6P, 7P		22, 24		21, 6P, 7P, 25		21, 6P, 23, 24	
Jurisdiction																						
Cascade Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kalmar Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salem Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rochester Township	2.0	100	1.9	75.9	0.8	31.8	1.9	82.3	2.0	91.3	0.8	34.3	0.6	25.6	2.2	99.1	0.6	27.7	2.2	91.3	2.1	83.1
City of Rochester	-	-	0.6	24.1	1.7	68.2	0.4	17.7	0.2	8.7	1.5	65.7	1.7	74.4	<0.1	0.9	1.5	72.3	0.2	8.7	0.4	16.9
Total	**2.0**	**100**	**2.5**	**100**	**2.5**	**100**	**2.3**	**100**	**2.2**	**100**	**2.3**	**100**	**2.3**	**100**	**2.2**	**100**	**2.1**	**100**	**2.4**	**100**	**2.5**	**100**

Notes:
mi= miles; Alt. = Alternative
[a] Evaluated as part of the Application Preferred Route and the Modified Preferred Route
[b] Evaluated as part of the Application Alternative Route

Table B-18. Township and City of Rochester Crossing Lengths - 11th Avenue SW to Proposed District Regulator Station Segment Alternatives

Segment Alternative	HJ-1[a]		HJ-2[b]		HJ-3		HJ-4		IJ-1		IJ-2		IJ-3		IJ-4	
Resource	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.	Length (mi)	Percent of Alt.
Route Segment(s)	8P, 9P		26, 9P		25, 27, 29		25, 28, 29		25, 8P, 9P		25, 26, 9P		27, 29		28, 29	
Jurisdiction																
Cascade Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kalmar Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salem Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rochester Township	0.6	31.0	<0.1	2.5	<0.1	1.6	<0.1	1.8	0.6	28.3	<0.1	2.5	<0.1	1.5	<0.1	1.6
City of Rochester	1.3	69.0	1.5	97.5	2.3	98.4	2.2	98.2	1.5	71.7	1.7	97.5	2.1	98.5	2.0	98.4
Total	**1.8**	**100**	**1.5**	**100**	**2.4**	**100**	**2.2**	**100**	**2.0**	**100**	**1.7**	**100**	**2.2**	**100**	**2.0**	**100**

Notes:
mi = miles; Alt. = Alternative
[a] Evaluated as part of the Modified Preferred Route.
[b] Evaluated as part of the Application Preferred Route and the Application Alternative Route.

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Table B-19. City and County Zoning Districts

Olmsted County Zoning Districts		City of Rochester Zoning Districts	
Symbol	District	Symbol	District
A-1, A-2	Agricultural Protection	**Performance Districts**	
A-3	Agricultural	D	Developing District
A-4	Agricultural Urban Expansion	CDC	Central Development Core
A/RC-AER	Agricultural/Resource Commercial – Aggregate Extraction and Reuse	CN	Core Neighborhood District
A/RC-LILI	Agricultural/Resource Commercial – Land Intensive Low Impact Uses	**Established Districts**	
ARC	Agricultural Residential Cluster	R-Sa	Mixed Single Family Overlay
RSD	Rural Service Center	R-1	Mixed Single Family
RA	Rural Residential	R-1x	Mixed Single Family Extra
R-1	Low Density Residential	R-2	Low Density Residential
R-2	Mixed Low Density Residential	R-3	Medium Density Residential
RC	Recreational Commercial	R-4	High Density Residential
SC	Commercial Service	B-1	Restricted Commercial
HC	Highway Commercial	B-2	Pedestrian Oriented Restricted Commercial
I	Industrial	B-4	General Commercial
MI	Medical Institutional	B-5	Residential Commercial
Overlay Zoning Districts		M-1	Mixed Commercial-Industrial
FW	Floodway	M-2	Industrial
FFA, FFB	Flood Fringe	M-3	Low Intensity Mixed Commercial-Industrial
FP	Flood Plain	AG	Agricultural
-	Shoreland	MRD	Mixed Redevelopment
DE	Decorah Edge	FF	Flood Fringe
		FW	Floodway
		FP	Flood Prone
		PUD	Planned Unit Development
		SD	Special District
		H	Holding Zone
		I	Interim Zone

Table B-20. Zoning Districts for Each Route[2,3]

	Application Preferred Route		Application Alternative Route		Modified Preferred Route	
	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
City and County Zoning Districts (acres)[a]						
Olmsted County Zoning Districts						
Agricultural/Resource Commercial District - Aggregate Extraction and Reuse (A/RC AER)	0.2	0.4	1.0	2.0	1.0	2.0
Agricultural Protection District (A-1, A-2)	54.1	108.6	55.0	108.4	58.5	116.8
Agricultural District (A-3)	9.3	18.7	5.5	11.0	5.6	11.2
Agricultural Urban Expansion District (A-4)	6.5	13.2	5.0	9.3	9.7	19.5
Sand and Gravel Mining (AgRM)	-	-	2.1	4.5	2.1	4.5
Low Density Residential (R-1)	-	-	-	-	-	-
Rural Residential District (RA)	0.4	0.8	0.4	0.8	0.4	0.8
Special District (other) (SD)	0.4	0.9	-	0.0	-	0.1
City of Rochester Zoning Districts						
General Commercial (B-4)	3.6	7.2	3.6	7.2	3.6	7.2
Mixed Commercial-Industrial (M-1)	3.4	6.9	3.4	6.9	0.8	1.8
Mixed Single Family (R-1)	1.5	3.0	4.5	12.1	0.6	1.1

[2] Rochester-Olmsted Planning Department (2013) Olmsted County Zoning GIS Mapping. GIS Department. Updated 2013.
[3] Rochester-Olmsted Planning Department (2014) City of Rochester Zoning GIS Mapping. GIS Department. Updated 2014.

	Application Preferred Route		Application Alternative Route		Modified Preferred Route	
	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Low Density Residential (R-2)	0.4	0.9	1.7	3.3	2.7	5.6
Medium Density Residential (R-3)	-	-	-	-	-	-
Total	79.8	160.5	82.2	165.4	84.9	170.6

Notes:
Perm. = permanent; Const. = construction
[a] Reported acreages do not include permanent impact to 2.76 acres for the TBS 1D, Proposed TBS, Proposed DRS, and temporary impact of 10.0 acres for the temporary storage yard and additional temporary workspaces as precise locations have not yet been determined.

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Table B-21. Zoning Districts - TBS 1D to Proposed TBS Segment Alternatives[4,5]

Segment Alternative	AB-1[a,b]		AB-2		BC[a,b]		CD-1[a]		CD-2[b]	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	1P		10		2P		3P		11	
City and County Zoning Districts (acres)										
Olmsted County Zoning Districts										
Agricultural/Resource Commercial District - Aggregate Extraction and Reuse (A/RC AER)	-	-	-	-	-	-	0.1	0.1	0.1	0.1
Agricultural Protection District (A-1, A-2)	6.8	13.6	6.0	12.1	6.3	12.6	21.0	41.9	16.6	33.2
Agricultural District (A-3)	-	-	-	-	5.4	10.8	0.1	0.1	0.1	0.2
Agricultural Urban Expansion District (A-4)	0.4	0.9	0.3	0.6	-	-	-	-	-	-
Sand and Gravel Mining (AgRM)	-	-	-	-	-	-	-	-	-	-
Low Density Residential (R-1)	-	-	-	-	-	-	-	-	-	-
Rural Residential District (RA)	-	-	-	-	-	-	-	-	-	-
Special District (other) (SD)	-	-	-	-	-	-	-	-	-	-
City of Rochester Zoning Districts										
General Commercial (B-4)	-	-	-	-	-	-	-	-	-	-
Mixed Commercial-Industrial (M-1)	-	-	-	-	-	-	-	-	-	-
Mixed Single Family (R-1)	-	-	-	-	-	-	-	-	-	-
Low Density Residential (R-2)	-	-	-	-	-	-	-	-	-	-
Medium Density Residential (R-3)	-	-	-	-	-	-	-	-	-	-

[4] Rochester-Olmsted Planning Department (2013) Olmsted County Zoning GIS Mapping. GIS Department. Updated 2013.
[5] Rochester-Olmsted Planning Department (2014) City of Rochester Zoning GIS Mapping. GIS Department. Updated 2014.

Segment Alternative	AB-1[a,b]		AB-2		BC[a,b]		CD-1[a]		CD-2[b]	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Total	7.2	14.5	6.3	12.7	11.7	23.4	21.1	42.2	16.7	33.5

Notes:
Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Application Preferred and Modified Preferred Routes*
[b] *Evaluated as part of the Application Alternative Route*

Table B-22. Zoning Districts - Proposed TBS to County Road 8 Segment Alternatives[6,7]

Segment Alternative	DE-1[a]		DE-2[b]		EF-1[c]		EF-2[b]		EF-3		EG-1		EG-2		EG-3		EG-4[a]		EG-5		EG-6		EG-7		EG-8	
Resource	Perm. Right-of-	Const. Area	Perm. Right-of-	Const. Area	Perm. Right-of-	Const. Area	Perm. Right-of-	Const. Area	Perm. Right-of-	Const. Area	Perm. Right-of-	Const. Area	Perm. Right-of-	Const. Area	Perm. Right-of-	Const. Area	Perm. Right-of-	Const. Area	Perm. Right-of-	Const. Area	Perm. Right-of-	Const. Area	Perm. Right-of-	Const. Area	Perm. Right-of-	Const. Area
Route Segment(s)	4P		12		5P		14, 16		13, 15, 16		5P, 21		14, 16, 21		14, 19		14, 18, 20		13, 15 16, 21		13, 15, 19		13, 15 18, 20		13, 17, 20	
City and County Zoning Districts (acres)																										
Olmsted County Zoning Districts																										
Agricultural/Resource Commercial District - Aggregate Extraction and Reuse (A/RC AER)	0.9	1.8	0.1	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Agricultural Protection District (A-1, A-2)	6.4	12.5	2.9	5.9	12.1	24.1	11.1	22.5	12.2	24.8	13.5	27.1	12.6	25.5	11.4	23.1	14.3	28.8	13.7	27.7	12.5	25.3	15.4	31.0	16.5	33.3
Agricultural District (A-3)	-	-	3.9	7.8	0.1	0.2	-	-	-	-	0.1	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Agricultural Urban Expansion District (A-4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sand and Gravel Mining (AgRM)	2.1	4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rural Residential District (RA)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low Density Residential (R-1)	-	-	-	-	-	<0.1	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Special District (other) (SD)	-	<0.1	0.4	0.9	-	0.1	-	<0.1	-	<0.1	-	0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1
City of Rochester Zoning Districts																										
General Commercial (B-4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mixed Commercial-Industrial (M-1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mixed Single Family (R-1)	-	-	-	-	-	-	-	-	-	-	<0.1	0.1	<0.1	0.1	<0.1	0.1	<0.1	0.1	<0.1	0.1	<0.1	0.1	<0.1	0.1	<0.1	0.1
Low Density Residential (R-2)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medium Density Residential (R-3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**9.3**	**18.8**	**7.3**	**14.8**	**12.2**	**24.5**	**11.1**	**22.5**	**12.2**	**24.7**	**13.7**	**27.5**	**12.6**	**25.5**	**11.5**	**23.1**	**14.3**	**28.8**	**13.7**	**27.8**	**12.6**	**25.4**	**15.4**	**31.1**	**16.6**	**33.4**

Notes:
Perm. = permanent; Const. = construction
[a] Evaluated as part of the Application Alternative Route
[b] Evaluated as part of the Application Preferred Route
[c] Evaluated as part of the Modified Preferred Route

[6] Rochester-Olmsted Planning Department (2013) Olmsted County Zoning GIS Mapping. GIS Department. Updated 2013.
[7] Rochester-Olmsted Planning Department (2014) City of Rochester Zoning GIS Mapping. GIS Department. Updated 2014.

Table B-23. Zoning Districts - County Road 8 to 11th Avenue SW Segment Alternatives[8,9]

Segment Alternative	FH-1[a]		FH-2		FH-3		FI-1		FI-2		FI-3		GH-1b		GH-2		GI-1		GI-2		GI-3	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	6P, 7P		6P, 23, 24, 25		21, 22, 24, 25		6P, 23, 24		6P, 7P, 25		21, 22, 24		22, 24, 25		21, 6P, 7P		22, 24		21, 6P, 7P, 25		21, 6P, 23, 24	
City and County Zoning Districts (acres)																						
Olmsted County Zoning Districts																						
Agricultural/Resource Commercial District - Aggregate Extraction and Reuse (A/RC AER)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Agricultural Protection District (A-1, A-2)	6.0	12.1	6.0	12.1	6.2	10.8	6.0	12.1	6.0	12.1	6.2	10.8	4.7	7.8	7.5	15.1	4.7	7.8	7.5	15.1	7.5	15.1
Agricultural District (A-3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Agricultural Urban Expansion District (A-4)	5.8	11.6	6.7	12.7	4.3	7.7	6.6	12.4	5.9	12.0	4.2	7.4	4.3	7.7	5.8	11.6	4.2	7.4	5.9	12.0	6.6	12.4
Sand and Gravel Mining (AgRM)	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low Density Residential (R-1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rural Residential District (RA)	0.4	0.8	-	<0.1	0.4	0.8	-	<0.1	0.4	0.8	0.4	0.7	0.4	0.8	0.4	0.8	0.4	0.7	0.4	0.8	-	<0.1
Special District (other) (SD)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
City of Rochester Zoning Districts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Commercial (B-4)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mixed Commercial-Industrial (M-1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mixed Single Family (R-1)	-	-	1.2	3.5	3.0	9.1	1.2	3.5	-	-	3.0	9.1	3.0	9.0	<0.1	0.1	3.0	9.0	<0.1	0.1	1.2	3.5
Low Density Residential (R-2)	<0.1	0.1	1.3	2.5	1.3	2.5	0.1	0.3	1.2	2.3	0.1	0.3	1.3	2.5	<0.1	0.1	0.1	0.3	1.2	2.3	0.1	0.3
Medium Density Residential (R-3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**12.2**	**24.6**	**15.2**	**30.7**	**15.3**	**30.9**	**14.0**	**28.2**	**13.4**	**27.1**	**14.0**	**28.3**	**13.8**	**27.8**	**13.7**	**27.6**	**12.5**	**25.3**	**14.9**	**30.2**	**15.4**	**31.2**

Notes:
Perm. = permanent; Const. = construction
[a] Evaluated as part of the Application Preferred Route and the Modified Preferred Route
[b] Evaluated as part of the Application Alternative Route

[8] Rochester-Olmsted Planning Department (2013) Olmsted County Zoning GIS Mapping. GIS Department. Updated 2013.
[9] Rochester-Olmsted Planning Department (2014) City of Rochester Zoning GIS Mapping. GIS Department. Updated 2014.

Table B-24. Zoning Districts - 11th Avenue SW to Proposed District Regulator Station Segment Alternatives[10,11]

Segment Alternative	HJ-1[a]		HJ-2[b]		HJ-3		HJ-4		IJ-1		IJ-2		IJ-3		IJ-4	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	8P, 9P		26, 9P		25, 27, 29		25, 28, 29		25, 8P, 9P		25, 26, 9P		27, 29		28, 29	
City and County Zoning Districts (acres)																
Olmsted County Zoning Districts																
Agricultural/Resource Commercial District - Aggregate Extraction and Reuse (A/RC AER)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Agricultural Protection District (A-1, A-2)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Agricultural District (A-3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Agricultural Urban Expansion District (A-4)	3.5	7.0	0.3	0.6	0.3	1.6	0.3	1.6	3.6	7.3	0.4	1.0	0.2	1.3	0.2	1.3
Sand and Gravel Mining (AgRM)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low Density Residential (R-1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rural Residential District (RA)	-	<0.1	-	-	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	-	-
Special District (other) (SD)	-	<0.1	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-
City of Rochester Zoning Districts																
General Commercial (B-4)	3.6	7.2	3.6	7.2	1.8	3.6	<0.1	0.1	3.6	7.2	3.6	7.2	1.8	3.6	<0.1	0.1
Mixed Commercial-Industrial (M-1)	0.8	1.8	3.4	6.9	6.3	12.8	7.1	14.4	0.8	1.8	3.4	6.9	6.3	12.8	7.1	14.4
Mixed Single Family (R-1)	0.6	1.1	1.5	3.0	<0.1	0.1	-	-	0.6	1.1	1.5	3.0	<0.1	0.1	-	-
Low Density Residential (R-2)	2.7	5.5	0.4	0.8	4.8	9.3	4.8	9.3	3.8	7.7	1.5	3.0	3.7	7.1	3.7	7.0
Medium Density Residential (R-3)	-	-	-	-	.1.1	1.7	1.1	1.7	-	-	-	-	1.1	1.7	1.1	1.7
Total	**11.3**	**22.7**	**9.2**	**18.6**	**14.5**	**29.3**	**13.5**	**27.2**	**12.5**	**25.3**	**10.5**	**21.2**	**13.3**	**26.7**	**12.2**	**24.6**

Notes:
Perm. = permanent; Const. = construction
[a] Evaluated as part of the Modified Preferred Route.
[b] Evaluated as part of the Application Preferred Route and the Application Alternative Route.

[10] Rochester-Olmsted Planning Department (2013) Olmsted County Zoning GIS Mapping. GIS Department. Updated 2013.
[11] Rochester-Olmsted Planning Department (2014) City of Rochester Zoning GIS Mapping. GIS Department. Updated 2014.

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Table B-25. Structures Located near Each Route

# of Structures	Building Type	Application Preferred Route		Application Alternative Route		Modified Preferred Route	
		Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Within right-of-way	Residence	-	-	-	-	-	-
	Commercial	-	-	1	1	1	1
	Agricultural	1	1	1	1	2	4
	Other	-	-	-	-	-	-
	Total	**1**	**1**	**2**	**2**	**3**	**5**
Within 50 feet	Residence	-	-	-	1	-	1
	Commercial	-	-	1	1	1-	1
	Agricultural	1	3	3	6	5	6
	Other	-	-	-	-	-	-
	Total	**1**	**3**	**4**	**8**	**6**	**8**
Within 100 feet	Residence	1	3	7	29	2	7
	Commercial	-	1	1	1	1	1
	Agricultural	3	4	8	12	7	11
	Other	-	-	-	-	10	1
	Total	**4**	**8**	**16**	**42**	**20**	**20**
Within 200 feet	Residence	20	24	69	85	27	32
	Commercial	1	3	2	3	4	6
	Agricultural	7	11	31	46	20	27
	Other	-	-	-		1	1
	Total	**28**	**38**	**102**	**134**	**52**	**66**

Notes:
Perm. = permanent; Const. = construction

Table B-26. Structures Located within the Associated Facilities' Buffers

Building Type	TBS 1D Buffer	Proposed TBS Buffer	Proposed DRS Buffer
Residence	13	15	16
Commercial	15	4	12
Agricultural	24	45	26
Other	-	1	
Total	39	65	54

Notes:
TBS = Town Border Station; DRS = District Regulation Station
The buildings within the buffers of the associated facilities may include some of the same buildings counted for each of the Routes and listed in Table B-25.

Table B-27. Residences and Commercial Buildings - TBS 1D to New TBS Segment Alternatives

Segment Alternative		AB-1[a,b]		AB-2		BC [a,b]		CD-1[a]		CD-2[b]	
Resource Type		Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)		1P		10		2P		3P		11	
# of Structures	*Building Type*										
Within right-of-way	Residence	-	-	-	-	-	-	-	-	-	-
	Commercial	-	-	-	-	-	-	-	-	-	-
	Agricultural	-	-	-	-	-	-	-	-	-	-
	Other	-	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-	-
Within 50 Feet	Residence	-	-	-	-	-	-	-	-	-	-
	Commercial	-	-	-	-	-	-	-	-	-	-
	Agricultural	-	-	-	-	-	-	-	-	-	1
	Other	-	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-	1
Within 100 Feet	Residence	-	1	-	-	-	-	-	1	-	1
	Commercial	-	-	-	-	-	-	-	-	-	-
	Agricultural	-	-	-	-	-	-	-	1	1	1
	Other	-	-	-	-	-	-	-	-	-	-
	Total	-	1	-	-	-	-	-	2	1	2
Within 200 Feet	Residence	2	4	-	-	-	-	5	5	1	2
	Commercial	-	-	-	-	-	-	-	-	-	-
	Agricultural	1	2	-	1	-	-	1	2	1	1

Segment Alternative		AB-1[a,b]		AB-2		BC [a,b]		CD-1[a]		CD-2[b]	
Resource Type		Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
	Other	-	-	-	-	-	-	-	-	-	-
	Total	3	6	-	1	-	-	6	7	2	3

Notes:
TBS = Town Border Station; Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Application Preferred, Application Alternative, and Modified Preferred Routes*
[b] *Evaluated as part of the Application Alternative Route*

Table B-28. Residences and Commercial Buildings - Proposed TBS to County Road 8 Segment Alternatives

Segment Alternative		DE-1[a]		DE-2[b]		EF-1[c]		EF-2[b]		EF-3		EG-1		EG-2		EG-3		EG-4[a]		EG-5		EG-6		EG-7		EG-8	
Resource Type		Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)		4P		12		5P		14, 16		13, 15, 16		5P, 21		14, 16, 21		14, 19		14, 18, 20		13, 15 16, 21		13, 15, 19		13, 15 18, 20		13, 17, 20	
# of Structures	*Building Type*																										
Within right-of-way	Residence	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Commercial	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Agricultural	1	1	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**2**	**2**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Within 50 Feet	Residence	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Commercial	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Agricultural	1	2	-	-	2	3	-	2	-	2	1	3	-	2	-	-	-	1	-	2	-	-	-	1	-	1
	Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**3**	**4**	**-**	**-**	**2**	**3**	**-**	**2**	**-**	**2**	**1**	**3**	**-**	**2**	**-**	**-**	**-**	**1**	**-**	**2**	**-**	**-**	**-**	**1**	**-**	**1**
Within 100 Feet	Residence	1	1	-	-	-	3	-	-	1	1	1	4	1	1	4	5	2	9	2	2	5	6	3	10	2	11
	Commercial	1	1	-	-	-	-	-	1	-	1	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-
	Agricultural	3	5	-	-	3	4	2	2	2	2	3	4	2	2	-	-	1	1	2	2	-	-	1	1	2	2
	Other	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**5**	**7**	**-**	**-**	**3**	**8**	**2**	**3**	**3**	**4**	**4**	**9**	**3**	**4**	**4**	**5**	**3**	**10**	**4**	**5**	**5**	**6**	**4**	**11**	**4**	**13**
Within 200 Feet	Residence	4	4	1	1	8	9	7	8	12	17	10	14	9	13	11	13	22	24	14	22	16	22	27	33	14	17
	Commercial	2	2	-	-	-	1	1	2	1	2	-	1	1	2	-	-	-	-	1	2	-	-	-	-	-	-
	Agricultural	6	7	1	1	11	12	3	3	4	5	12	17	4	8	1	5	7	12	5	10	2	7	8	14	9	15
	Other	-	-	-	-	1	1	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**12**	**13**	**2**	**2**	**20**	**23**	**11**	**13**	**17**	**24**	**23**	**33**	**14**	**23**	**12**	**18**	**29**	**36**	**20**	**34**	**18**	**29**	**35**	**47**	**23**	**32**

Notes:
TBS = Town Border Station; Perm. = permanent; Const. = construction
[a] Included as part of the Application Alternative Route
[b] Included as part of the Application Preferred Route
[c] Included as part of the Modified Preferred Route

Table B-29. Residences and Commercial Buildings - County Road 8 to 11th Avenue SW Segment Alternatives

Segment Alternative		FH-1[a]		FH-2		FH-3		FI-1		FI-2		FI-3		GH-1[b]		GH-2		GI-1		GI-2		GI-3	
Resource Type		Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)		6P, 7P		6P, 23, 24, 25		21, 22, 24, 25		6P, 23, 24		6P, 7P, 25		21, 22, 24		22, 24, 25		21, 6P, 7P		22, 24		21, 6P, 7P, 25		21, 6P, 23, 24	
# of Structures	*Building Type*																						
Within right-of-way	Residence	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Commercial	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Agricultural	1	1	-	-	-	-	-	-	1	1	-	-	-	-	1	1	-	-	1	1	-	-
	Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**1**	**1**	**-**	**-**
Within 50 Feet	Residence	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Commercial	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Agricultural	1	1	-	-	1	2	-	-	1	1	1	2	1	2	1	1	1	2	1	1	-	-
	Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**1**	**1**	**-**	**-**	**1**	**2**	**-**	**-**	**1**	**1**	**1**	**2**	**1**	**2**	**1**	**1**	**1**	**2**	**1**	**1**	**-**	**-**
Within 100 Feet	Residence	1	1	-	2	5	18	-	1	1	2	5	17	4	17	2	2	4	16	2	3	1	2
	Commercial	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Agricultural	1	1	-	1	3	5	-	-	1	2	3	5	3	5	1	1	3	4	1	2	-	-
	Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**2**	**2**	**-**	**3**	**8**	**23**	**-**	**1**	**2**	**4**	**8**	**22**	**7**	**22**	**3**	**3**	**7**	**20**	**3**	**5**	**1**	**2**
Within 200 Feet	Residence	3	2	15	17	40	52	12	14	6	5	37	49	38	47	5	7	35	44	8	10	14	19
	Commercial	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Agricultural	1	3	2	2	17	29	-	-	3	5	15	27	16	24	2	8	14	22	4	10	1	5
	Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**4**	**5**	**17**	**19**	**57**	**81**	**12**	**14**	**9**	**10**	**52**	**76**	**54**	**71**	**7**	**15**	**49**	**66**	**12**	**20**	**15**	**24**

Notes:
Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Application Preferred Route and the Modified Preferred Route*
[b] *Evaluated as part of the Application Alternative Route*

Table B-30. Residences and Commercial Buildings - 11th Avenue SW to Proposed District Regulator Station Segment Alternatives

Segment Alternative		HJ-1[a]		HJ-2[b]		HJ-3		HJ-4		IJ-1		IJ-2		IJ-3		IJ-4	
Resource Type		Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)		8P, 9P		26, 9P		25, 27, 29		25, 28, 29		25, 8P, 9P		25, 26, 9P		27, 29		28, 29	
# of Structures	*Building Type*																
Within right-of-way	Residence	-	-	-	-	10	15	10	15	-	-	-	-	10	15	10	15
	Commercial	-	-	-	-	-	1	-	1	-	-	-	-	-	1	-	1
	Agricultural	-	-	-	-	-	2	-	2	-	-	-	-	-	2	-	2
	Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	**10**	**18**	**10**	**18**	**-**	**-**	**-**	**-**	**10**	**18**	**10**	**18**
Within 50 Feet	Residence	-	-	-	-	16	16	16	16	-	-	-	-	16	16	16	16
	Commercial	-	-	-	-	2	4	2	5	-	-	-	-	2	4	2	5
	Agricultural	-	-	-	-	4	5	4	5	-	-	-	-	-	5	-	5
	Other	-	-	-	-	-	-	-	-	-	-	-	-	4	-	4	-
	Total	-	-	-	-	**22**	**25**	**22**	**26**	**-**	**-**	**-**	**-**	**22**	**25**	**22**	**26**
Within 100 Feet	Residence	-	-	-	-	16	18	16	18	-	1	-	1	16	17	16	17
	Commercial	-	-	-	-	4	7	5	9	-	-	-	-	4	7	5	9
	Agricultural	-	-	-	-	5	6	5	6	-	1	-	1	5	5	5	5
	Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	3	4	-	-	**25**	**31**	**26**	**33**	**-**	**2**	**-**	**2**	**25**	**29**	**26**	**31**
Within 200 Feet	Residence	2	3	-	1	28	28	28	28	6	7	3	3	25	25	25	25
	Commercial	-	1	-	-	7	7	10	10	2	3	-	1	7	7	10	10
	Agricultural	-	-	-	-	10	10	10	10	2	3	2	2	8	8	8	8
	Other	**5**	**8**	**-**	**1**	-	-	-	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	**45**	**45**	**48**	**48**	**10**	**13**	**5**	**6**	**40**	**40**	**43**	**43**

Notes:
Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Application Preferred Route and the Modified Preferred Route*
[b] *Evaluated as part of the Application Alternative Route*

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Table B-31. Length of Pipeline Located Parallel to Existing Rights-of-Way for Each Route

Routes	Length of pipeline parallel to existing rights-of-way			Length of pipeline not parallel to existing Rights-of-Way
	Existing Road Right-of-Way	Existing Pipeline Right-of-Way	Existing Electrical Distribution Line Right-of-Way	
Application Preferred Route	29,882 (43%)	8,478 (12%)	3,388 (5%)	27,421 (40%)
Application Alternative Route	42,332 (60%)	18,546 (26%)	3,388 (5%)	6,874 (10%)
Modified Preferred Route	54,294 (74%)	-	3,388 (5%)	15,972 (22%)

Table B-32. Length of Pipeline Located Parallel to Existing Rights-of-Way for Each Segment Alternative

Segment Alternative	Route Segment(s)	Length of Pipeline Parallel to Existing Rights-of-Way (feet)			Length of Pipeline Not Parallel to Existing Rights-of-Way (feet)
		Existing Road Right-of-Way	Existing Pipeline Right-of-Way	Existing Electrical Distribution Line	
TBS 1D to Proposed TBS					
AB-1	1P	6,240 (100%)	-	-	-
AB-2	10	-	5,443 (100%)	-	-
BC	2P	5,181 (51%)	-	3,388 (33%)	1,553 (15%)
CD-1	3P	15,825 (86%)	-	-	2,491 (14%)
CD-2	11	1,637 (11%)	12,848 (89%)	-	-
Proposed TBS to County Road 8					
DE-1	4P	8,109 (100%)	-	-	-
DE-2	12	-	5,710 (90%)	-	648 (10%)
EF-1	5P	10,583 (100%)	-	-	-
EF-2	14, 16	-	2,767 (29%)	-	6,867 (71%)
EF-3	13, 15, 16	2,618 (25%)	-	-	7,926 (75%)
EG-1	5P, 21	11,829 (100%)	-	-	-
EG-2	14, 16, 21	1,245 (11%)	2,767 (25%)	-	6,867 (63%)
EG-3	14, 19	-	2,767 (28%)	-	7,159 (72%)
EG-4	14, 18, 20	6,634 (54%)	5,697 (46%)	-	-

Segment Alternative	Route Segment(s)	Length of Pipeline Parallel to Existing Rights-of-Way (feet)			Length of Pipeline Not Parallel to Existing Rights-of-Way (feet)
		Existing Road Right-of-Way	Existing Pipeline Right-of-Way	Existing Electrical Distribution Line	
EG-5	13, 15, 16, 21	3,863 (33%)	-	-	7,926 (67%)
EG-6	13, 15, 19	2,618 (24%)	-	-	8,217 (76%)
EG-7	13, 15, 18, 20	9,252 (70%)	2,930 (22%)	-	1,059 (8%)
EG-8	13, 17, 20	14,318 (100%)	-	-	-
Country Road 8 to 11th Avenue SW					
FH-1	6P, 7P		-	-	10,541 (100%)
FH-2	6P, 23, 24, 25	5,290 (40%)	-	-	7,794 (60%)
FH-3	21, 22, 24, 25	13,140 (100%)	-	-	-
FI-1	6P, 23, 24	4,247 (35%)	-	-	7,794 (65%)
FI-2	6P, 7P, 25	1,044 (9%)	-	-	10,541 (91%)
FI-3	21, 22, 24	12,097 (100%)	-	-	-
GH-1	22, 24, 25	11,895 (100%)	-	-	-
GH-2	21, 6P, 7P	1,245 (11%)	-	-	10,541 (89%)
GI-1	22, 24	10,851 (100%)	-	-	-
GI-2	21, 6P, 7P, 25	2,289 (18%)	-	-	10,541 (82
GI-3	21, 6P, 23, 24	5,492 (41%)	-	-	7,794 (59
11th Avenue SW to Proposed DRS					
HJ-1	8P, 9P	8,355 (86%)	-	-	1,387 (14%)
HJ-2	26, 9P	2,635 (33%)	-	-	5,321 (67%)
HJ-3	25, 27, 29	3,660 (29%)	-	-	8,857 (71%)
HJ-4	25, 28, 29	8,801 (76%)	-	-	2,797 (24%)
IJ-1	25, 8P, 9P	9,399 (87%)	-	-	1,387 (13%)
IJ-2	25, 26, 9P	3,679 (41%)	-	-	5,321 (59%)
IJ-3	27, 29	2,616 (23%)	-	-	8,857 (77%)
IJ-4	28, 29	7,757 (74%)	-	-	2,797 (26%)

Notes:
TBS = Town Border Station; DRS = District Regulator Station

Table B-33. Existing Roads, Railroads, and Pipelines Crossed or Adjacent to Each Route

Name	Application Preferred Route		Application Alternative Route		Modified Preferred Route	
	Route Segment(s)	Type	Route Segment(s)	Type	Route Segment(s)	Type
60th Street NW	1P	Crossing	1P	Crossing	1P	Crossing
19th Avenue NW	1P	Parallel/ Crossing	1P	Parallel/ Crossing	1P	Parallel/ Crossing
NNG Pipeline	2P	Crossing	2P	Crossing	2P	Crossing
70th Avenue NW	2P	Parallel	2P	Parallel	2P	Parallel
14th Street NW	2P	Crossing	2P	Crossing	2P	Crossing
DM&E Railroad	2P	Crossing	2P	Crossing	2P	Crossing
Trunk Highway 14	2P	Crossing	2P	Crossing	2P	Crossing
70th Avenue SW	2P	Parallel/ Crossing	2P	Parallel/ Crossing	2P	Parallel/ Crossing
CR 34/Country Club Road W	2P	Crossing	2P	Crossing	2P	Crossing
BP Pipeline	2P	Crossing	2P, 11	Crossing/ Parallel	2P	Crossing
70th Avenue SW	3P	Parallel/ Crossing	11	Crossing	3P	Parallel/ Crossing
10th Street SW	3P	Crossing	11	Crossing	3P	Crossing
20th Street SW	3P	Crossing	11	Crossing	3P	Crossing
CR 25/Salem Road SW	3P	Parallel/ Crossing	11	Crossing	3P	Parallel/ Crossing
CR 15	3P	Parallel	-	-	3P	Parallel
60th Avenue SW	3P, 12	Parallel/ Crossing	11, 4P	Parallel/ Crossing	3P, 4P	Parallel/ Crossing
BP Pipeline	12	Parallel	-	-	-	-
40th Street SW	12	Crossing	4P	Parallel	4P, 5P	Parallel/ Crossing
55th Avenue SW	-	-	4P	Crossing	4P	Crossing
BP Pipeline	14, 16	Parallel/ Crossing	14, 18	Parallel/ Crossing	5P	Crossing
50th Street SW	-	-	20	Parallel/ Crossing	-	-
CR 8/Bamber Valley Road SW	16	Crossing	20	Parallel/ Crossing	5P	Parallel/ Crossing
48th Street SW	-	-	22, 24	Parallel/ Crossing	-	-
48th Street SE	-	-	24	Crossing	-	-
11th Avenue SW	7P	Crossing	24, 25	Parallel/ Crossing	7P, 8P	Parallel/ Crossing
40th Street SW	9P	Parallel/ Crossing	9P	Parallel/ Crossing	8P, 9P	Parallel/ Crossing
U.S. Highway 63/ Broadway Ave	9P	Crossing	9P	Crossing	9P	Crossing
Wood Lake Drive SE	9P	Crossing	9P	Crossing	9P	Crossing

Notes:
NNG = Northern Natural Gas; DM&E = Dakota, Minnesota and Eastern; CR = County Road; BP = British Petroleum

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Table B-34. Existing Roads, Railroads, and Pipelines Crossed or Adjacent to the Segment Alternatives

Segment Alternative	Route Segment	Name	Type
TBS 1D to Proposed TBS			
AB-1	1P	60th Street NW	Crossing
		19th Avenue NW	Parallel/Crossing
AB-2	10	60th Street NW	Crossing
		NNG Pipeline	Parallel
BC	2P	NNG Pipeline	Crossing
		70th Avenue NW	Parallel
		14th Street NW	Crossing
		DM&E Railroad	Crossing
		Trunk Highway 14	Crossing
		70th Avenue SW	Parallel/Crossing
		CR 34/Country Club Road W	Crossing
		BP Pipeline	Crossing
CD-1	3P	70th Avenue SW	Parallel/Crossing
		10th Street SW	Crossing
		20th Street SW	Crossing
		CR 25/Salem Road SW	Parallel/Crossing
		CR 15	Parallel
		60th Avenue SW	Parallel
CD-2	11	70th Avenue SW	Crossing
		BP Pipeline	Parallel
		10th Street SW	Crossing
		20th Street SW	Crossing
		CR 25/Salem Road SW	Crossing
		60th Avenue SW	Parallel
Proposed TBS to County Road 8			
DE-1	4P	60th Avenue SW	Parallel/Crossing
		40th Street SW	Parallel
		55th Avenue SW	Crossing
DE-2	12	60th Avenue SW	Crossing
		BP Pipeline	Parallel

Segment Alternative	Route Segment	Name	Type
		40th Street SW	Crossing
		BP Pipeline	Crossing
		40th Street SW	Parallel/Crossing
EF-1	5P	CR 8/Bamber Valley Road SW	Parallel/Crossing
	14	BP Pipeline	Parallel
		BP Pipeline	Crossing
EF-2	16	CR 8/Bamber Valley Road SW	Crossing
	13	55th Avenue SW	Parallel
	15	-	-
		BP Pipeline	Crossing
EF-3	16	CR 8/Bamber Valley Road SW	Crossing
		BP Pipeline	Crossing
		40th Street SW	Parallel/Crossing
	5P	CR 8/Bamber Valley Road SW	Parallel/Crossing
EG-1	21	CR 8/Bamber Valley Road SW	Parallel
	14	BP Pipeline	Parallel
		BP Pipeline	Crossing
	16	CR 8/Bamber Valley Road SW	Crossing
EG-2	21	CR 8/Bamber Valley Road SW	Parallel
	14	BP Pipeline	Parallel
		BP Pipeline	Crossing
EG-3	19	CR 8/Bamber Valley Road SW	Crossing
	14	BP Pipeline	Parallel
	18	BP Pipeline	Crossing
		50th Street SW	Parallel/Crossing
EG-4	20	CR 8/Bamber Valley Road SW	Parallel/Crossing
	13	55th Avenue SW	Parallel
	15	-	-
	16	BP Pipeline	Crossing
		CR 8/Bamber Valley Road SW	Crossing
EG-5	21	CR 8/Bamber Valley Road SW	Parallel
	13	55th Avenue SW	Parallel
EG-6	15	-	-

Segment Alternative	Route Segment	Name	Type
		BP Pipeline	Crossing
	19	CR 8/Bamber Valley Road SW	Crossing
	13	55th Avenue SW	Parallel
	15	-	-
	18	BP Pipeline	Crossing
		50th Street SW	Parallel/Crossing
EG-7	20	CR 8/Bamber Valley Road SW	Parallel/Crossing
	13	55th Avenue SW	Parallel
		55th Avenue SW	Parallel/Crossing
		50th Street SW	Parallel
	17	BP Pipeline	Crossing
		50th Street SW	Parallel/Crossing
EG-8	20	CR 8/Bamber Valley Road SW	Parallel/Crossing
Country Road 8 to 11th Avenue SW			
	6P	-	-
FH-1	7P	11th Avenue SW	Crossing
	6P	-	-
	23	-	-
		48th Street SW	Parallel/Crossing
	24	11th Avenue SW	Crossing
FH-2	25	11th Avenue SW	Parallel
	21	CR 8/Bamber Valley Road SW	Parallel
	22	48th Street SW	Parallel/Crossing
		48th Street SW	Parallel/Crossing
	24	11th Avenue SW	Crossing
FH-3	25	11th Avenue SW	Parallel
	6P	-	-
	23	-	-
		48th Street SW	Parallel/Crossing
FI-1	24	11th Avenue SW	Crossing
	6P	-	-
	7P	11th Avenue SW	Crossing
FI-2	25	11th Avenue SW	Parallel

Segment Alternative	Route Segment	Name	Type
	21	CR 8/Bamber Valley Road SW	Parallel
	22	48th Street SW	Parallel/Crossing
		48th Street SW	Parallel/Crossing
FI-3	24	11th Avenue SW	Crossing
	22	48th Street SW	Parallel/Crossing
		48th Street SW	Parallel/Crossing
	24	11th Avenue SW	Crossing
GH-1	25	11th Avenue SW	Parallel
	21	CR 8/Bamber Valley Road SW	Parallel
	6P	-	-
GH-2	7P	11th Avenue SW	Crossing
	22	48th Street SW	Parallel/Crossing
		48th Street SW	Parallel/Crossing
GI-1	24	11th Avenue SW	Crossing
	21	CR 8/Bamber Valley Road SW	Parallel
	6P	-	-
	7P	11th Avenue SW	Crossing
GI-2	25	11th Avenue SW	Parallel
	21	CR 8/Bamber Valley Road SW	Parallel
	6P	-	-
	23	-	-
		48th Street SW	Parallel/Crossing
GI-3	24	11th Avenue SW	Crossing
11th Avenue SW to Proposed DRS			
		11th Avenue SW	Parallel
	8P	40th Street SW	Parallel
		40th Street SW	Parallel/Crossing
		U.S. Highway 63/Broadway Ave	Crossing
HJ-1	9P	Wood Lake Drive SE	Crossing
	26	-	-
HJ-2	9P	40th Street SW	Parallel/Crossing

Segment Alternative	Route Segment	Name	Type
		U.S. Highway 63/Broadway Ave	Crossing
		Wood Lake Drive SE	Crossing
	25	11th Avenue SW	Parallel
		48th Street SW	Parallel/Crossing
		Commercial Drive SW	Parallel/Crossing
		U.S. Highway 63/Broadway Ave	Parallel/Crossing
	27	Maine Avenue SE	Crossing
		St. Bridget Road SE	Crossing/Parallel
		45th Street SE	Parallel
HJ-3	29	Fern Avenue SE	Crossing
	25	11th Avenue SW	Parallel
		48th Street SW	Parallel
		Commercial Drive SW	Crossing
		U.S. Highway 63/Broadway Ave	Crossing
	28	Maine Avenue SE	Crossing
		St. Bridget Road SE	Crossing/Parallel
		45th Street SE	Parallel
HJ-4	29	Fern Avenue SE	Crossing
	25	11th Avenue SW	Parallel
		11th Avenue SW	Parallel
	8P	40th Street SW	Parallel
		40th Street SW	Parallel/Crossing
		U.S. Highway 63/Broadway Ave	Crossing
IJ-1	9P	Wood Lake Drive SE	Crossing
	25	11th Avenue SW	Parallel
	26	-	-
		40th Street SW	Parallel/Crossing
		U.S. Highway 63/Broadway Ave	Crossing
IJ-2	9P	Wood Lake Drive SE	Crossing

Segment Alternative	Route Segment	Name	Type
IJ-3	27	48th Street SW	Parallel/Crossing
		Commercial Drive SW	Parallel/Crossing
		U.S. Highway 63/Broadway Ave	Parallel/Crossing
		Maine Avenue SE	Crossing
	29	St. Bridget Road SE	Crossing/Parallel
		45th Street SE	Parallel
		Fern Avenue SE	Crossing
IJ-4	28	48th Street SW	Parallel
		Commercial Drive SW	Crossing
		U.S. Highway 63/Broadway Ave	Crossing
		Maine Avenue SE	Crossing
	29	St. Bridget Road SE	Crossing/Parallel
		45th Street SE	Parallel
		Fern Avenue SE	Crossing

Notes:
TBS = Town Border Station; NNG = Northern Natural Gas; DM&E = Dakota, Minnesota and Eastern; CR = County Road; BP = British Petroleum; DRS = District Regulator Station

Table B-35. MPCA Listing of Potentially Contaminated Sites within 500 feet of the Project Area[12]

Name	Address	Minnesota Pollution Control Agency ID	Activity	Segment	Distance (ft)	Risk Ranking
MERC Rochester 1D TBS	1836 NW 60th Ave, Rochester	MNS 000176628	Hazardous Waste, Small to Minimal QG	10	123	Low
				1P	147	Low
L & S Services	303 40th St SW, Rochester	PW 5103028481	Hazardous Waste, Small to Minimal QG	8P	157	Low
				26	290	Low
				9P	292	Low
Health East Transportation	303 C 40th St SW, Rochester	MNR 000061812	Hazardous Waste, Small to Minimal QG	8P	157	Low
				26	290	Low
				9P	292	Low
Donovan Bodyworks	3701 60th Ave SW, Rochester	MND 985686518	Hazardous Waste, Small to Minimal QG	4P	47	Low
Willow Creek Golf Course	1700 48th St SW, Rochester	Multiple Activities Tank Site- 4906 Generator 108506	Hazardous Waste, Small to Minimal QG, Active Tank Site (AST), and removed USTs	24	117	Medium
Drain Master Plumbing	4011 11th Ave SW, Rochester	MND 985694694	Hazardous Waste, Small to Minimal QG	8P	180	Low
Elcor Construction Inc.	5000 Saint Bridget Rd SE, Rochester	Multiple Activities	Hazardous Waste, Small to Minimal QG	TBS 1D	Inside Buffer Area	Low
Elcor Construction Quarry	5000 Saint Bridget Rd SE, Rochester	Multiple Activities Leak Site- 16969	Inactive Tank Site (removed USTs) and Closed Leak Site (2008)	TBS 1D	Inside Buffer Area	Medium
Envoy	Rochester International Airport, Rochester	Multiple Activities	Hazardous Waste, Small to Minimal QG	16	294	Low

[12] Minnesota Pollution Control Agency (2016) "What's In My Neighborhood?" Database queried on June 24, 2016.

Name	Address	Minnesota Pollution Control Agency ID	Activity	Segment	Distance (ft)	Risk Ranking
Evers Carl	1035 40th St SW, Rochester	MNR 000018234	Hazardous Waste, Small to Minimal QG	8P	128	Low
Former Hadley Valley School	1295 48th St NE, Rochester	20797	Inactive Tank Site (removed USTs)	24	73	Medium
Milestone Materials Donovan Pit	3105 60th Ave SW, Rochester	126226	Active Tank Site (AST)	3P	44	Medium
				11	44	Medium
				12	343	Medium
				4P	346	Medium
				Proposed TBS	Inside Buffer Area	Medium
Northwest Airlines - Rochester	Rochester International Airport, Rochester	Multiple Activities	Hazardous Waste, Small to Minimal QG, and Closed Leak Site (1998)	16	294	Medium
RDO Equipment Co - Rochester	1328 60th Ave NW, Rochester	MND 980901326	Hazardous Waste, Small to Minimal QG	TBS 1D	Inside Buffer Area	Low
Superior Mechanical	1244 60th Ave NW, Rochester	MNR 000078154	Hazardous Waste, Small to Minimal QG	TBS 1D	Inside Buffer Area	Low
Township of Rochester	4111 11th Ave SW, Rochester	MNR 000066696	Hazardous Waste, Small to Minimal QG	8P	124	Low
Veit Disposal Systems	5920 15th St NW, Rochester	SW516	Landfill, Open	TBS1D	Inside Buffer Area	High
Veit Disposal Systems Inc.	5920 15th St NW, Rochester	Multiple Activities Tank Site-122920 A00002183	Hazardous Waste, Small to Minimal QG, and Active Tank Site (AST)	TBS 1D	Inside Buffer Area	Medium

Notes:
TBS= Town Border Station; QG = Quantity Generator, AST=aboveground storage tank; UST= underground storage tank.

Table B-36. Surface Water Resources for Each Route

Resources	Application Preferred Route		Application Alternative Route		Modified Preferred Route	
	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Number of waterbody crossings	5[b]	-	5[b]	-	5	-
Wetlands (acres)[a]						
PEM	2.0	3.7	2.6	5.0	2.3	4.5
PFO, PSS	0.1	0.2	0.1	0.1	0.4	0.9
Total	**2.1**	**3.9**	**2.6**	**5.1**	**2.8**	**5.4**

Notes:
Perm. = permanent; Const. = construction; PEM = palustrine emergent; PFO = palustrine forested; PSS = palustrine shrub
[a] Reported acreages do not include permanent impact to 2.76 acres for the TBS 1D, Proposed TBS, Proposed DRS and temporary impact to 10.0 acres for the temporary storage yard as precise locations have not yet been determined. These facilities would not be sited in wetlands or waterbodies.
[b] include crossing of Willow Creek in location not adjacent to existing road/pipeline rights-of-way.

Table B-37. Decorah Edge and Groundwater Sensitivity - TBS 1D to Proposed TBS Segment Alternative

Segment Alternative	AB-1[a,b]		AB-2		BC		CD-1[a]		CD-2[b]	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	1P		10		2P		3P		11	
Length of pipeline in Decorah Edge (feet)	-		-		-		11,983.1		8,235.1	
Groundwater Sensitivity (acres) [c]										
Very high	-	-	-	-	-	-	-	-	-	-
High	-	-	-	-	-	-	0.6	1.2	2.4	4.8
High moderate	-	-	-	-	-	-	2.6	5.1	4.1	8.3
Moderate	-	-	-	-	-	-	11.3	22.5	6.9	13.9
Low moderate	4.7	9.5	6.3	12.6	1.8	3.6	2.4	4.8	-	-
Low	2.5	4.9	0.0	0.1	9.8	19.8	4.2	8.5	3.2	6.5

Segment Alternative	AB-1[a,b]		AB-2		BC		CD-1[a]		CD-2[b]	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Total	7.2	14.5	6.3	12.7	11.7	23.4	21.1	42.2	16.7	33.4
Number of waterbody crossings	1	-	2	-	1	-	2	-	2	-
Wetlands (acres)										
PEM	-	-	-	-	-	-	0.4	0.8	0.8	1.6
PFO, PSS	-	-	-	-	-	-	-	-	-	-
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.8	0.8	1.6

Notes:
Perm. = permanent; Const. = Construction; PEM = palustrine emergent; PFO = palustrine forested; PSS = palustrine shrub
[a] *Evaluated as part of the Application Preferred and Modified Preferred Routes*
[b] *Evaluated as part of the Application Alternative Route*
[c] *Very high = contaminants will almost certainly reach the system in hours to months; High = contaminants will probably reach the system in weeks to years; High moderate = contaminants will reach the system in several years to about a decade; Moderate = contaminants will reach the system in years to decades; Low moderate = contaminants will probably not reach the system for decades; Low = contaminants will require decades to centuries to reach the system.*

Table B-38. Decorah Edge and Groundwater Sensitivity - Proposed TBS to County Road 8 Segment Alternatives

Segment Alternative	DE-1[a]		DE-2[b]		EF-1[c]		EF-2[b]		EF-3		EG-1		EG-2		EG-3		EG-4[a]		EG-5		EG-6		EG-7		EG-8	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	4P		12		5P		14, 16		13, 15, 16		5P, 21		14, 16, 21		14, 19		14, 18, 20		13, 15 16, 21		13, 15, 19		13, 15 18, 20		13, 17, 20	
Length of pipeline in Decorah Edge (feet)	3,677		3,186		-		-		-		-		-		-		-		-		-		-		2,103	
Groundwater Sensitivity (acres)[d]																										
Very high	0.3	0.6	-	-	8.4	16.9	5.7	11.2	7.3	14.5	9.9	20.0	7.1	14.2	7.9	15.9	9.9	19.9	8.8	17.6	9.6	19.3	11.5	23.2	8.7	17.7
High	7.4	14.8	4.8	9.8	3.3	6.7	0.3	0.7	0.3	0.7	3.3	6.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.7	1.5
High moderate	-	-	-	-	0.4	0.8	5.2	10.6	4.6	9.5	0.4	0.8	5.2	10.6	3.2	6.5	4.1	8.2	4.6	9.5	2.7	5.5	3.5	7.2	5.5	11.0
Moderate	1.7	3.4	2.5	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6	3.1
Low moderate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**9.3**	**18.8**	**7.3**	**14.8**	**12.2**	**24.5**	**11.1**	**22.5**	**12.2**	**24.7**	**13.7**	**27.5**	**12.6**	**25.5**	**11.5**	**23.1**	**14.3**	**28.8**	**13.7**	**27.8**	**12.6**	**25.4**	**15.4**	**31.1**	**16.6**	**33.4**
Number of waterbody crossings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wetlands (acres)																										
PEM	0.3	0.7	0.2	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PFO, PSS	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**0.3**	**0.7**	**0.2**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Notes:
Perm. = permanent; Const. = construction; PEM = palustrine emergent; PFO = palustrine forested; PSS = palustrine shrub
[a] *Included as part of the Application Alternative Route*
[b] *Included as part of the Application Preferred Route*
[c] *Included as part of the Modified Preferred Route*
[d] *Very high = contaminants will almost certainly reach the system in hours to months; High = contaminants will probably reach the system in weeks to years; High moderate = contaminants will reach the system in several years to about a decade; Moderate = contaminants will reach the system in years to decades; Low moderate = contaminants will probably not reach the system for decades; Low = contaminants will require decades to centuries to reach the system.*

Table B-39. Decorah Edge and Groundwater Sensitivity - County Road 8 to 11th Avenue SW Segment Alternatives

Segment Alternative	FH-1[a]		FH-2		FH-3		FI-1		FI-2		FI-3		GH-1[b]		GH-2		GI-1		GI-2		GI-3	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	6P, 7P		6P, 23, 24, 25		21, 22, 24, 25		6P, 23, 24		6P, 7P, 25		21, 22, 24		22, 24, 25		21, 6P, 7P		22, 24		21, 6P, 7P, 25		21, 6P, 23, 24	
Length of pipeline in Decorah Edge (feet)	463		2,696		2,696		1,653		1,507		1,653		2,696		463		1,653		1,507		1,653	
Groundwater Sensitivity (acres)[d]																						
Very high	9.9	20.0	9.8	19.6	9.3	18.6	9.8	19.6	9.9	20.0	9.3	18.6	7.8	15.6	11.4	23.0	7.8	15.6	11.4	23.0	11.3	22.7
High	2.3	4.6	5.4	11.1	6.0	12.2	4.2	8.5	3.5	7.1	4.8	9.6	6.0	12.2	2.3	4.6	4.8	9.6	3.5	7.1	4.2	8.5
High moderate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moderate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low moderate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**12.2**	**24.6**	**15.2**	**30.7**	**15.3**	**30.9**	**14.0**	**28.2**	**13.4**	**27.1**	**14.0**	**28.3**	**13.8**	**27.8**	**13.7**	**27.6**	**12.5**	**25.3**	**14.9**	**30.2**	**15.4**	**31.2**
Number of waterbody crossings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wetlands (acres)																						
PEM	-	-	-	-	-	0.1	-	-	-	-	-	0.1	-	0.1	-	-	-	0.1	-	-	-	-
PFO, PSS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**

Notes:
Perm. = permanent; Const. = Construction; PEM = palustrine emergent; PFO = palustrine forested; PSS = palustrine shrub
[a] Evaluated as part of the Application Preferred Route and the Modified Preferred Route
[b] Evaluated as part of the Application Alternative Route
[d] Very high = contaminants will almost certainly reach the system in hours to months; High = contaminants will probably reach the system in weeks to years; High moderate = contaminants will reach the system in several years to about a decade; Moderate = contaminants will reach the system in years to decades; Low moderate = contaminants will probably not reach the system for decades; Low = contaminants will require decades to centuries to reach the system.

Table B-40. Decorah Edge and Groundwater Sensitivity - 11th Avenue SW to Proposed District Regulator Station Segment Alternatives

Segment Alternative	HJ-1[a]		HJ-2[b]		HJ-3		HJ-4		IJ-1		IJ-2		IJ-3		IJ-4	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	8P, 9P		26, 9P		25, 27, 29		25, 28, 29		25, 8P, 9P		25, 26, 9P		27, 29		28, 29	
Length of pipeline in Decorah Edge Overlay (feet)	4,129		2,898		9,540		8,621		5,173		3,942		8,496		7,577	
Groundwater Sensitivity (acres)[d]																
Very high	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
High	10.2	20.6	7.7	15.5	4.0	8.1	3.3	6.7	11.5	23.2	8.9	18.0	2.7	5.6	2.0	4.1
High moderate	0.6	1.3	1.2	2.3	3.1	6.1	2.8	5.5	0.6	1.3	1.2	2.3	3.1	6.1	2.8	5.5
Moderate	-	-	-	-	0.8	1.6	0.8	1.6	-	-	-	-	0.8	1.6	0.8	1.6
Low moderate	0.4	0.8	0.4	0.8	6.0	12.2	6.0	12.2	0.4	0.8	0.4	0.8	6.0	12.2	6.0	12.2
Low	-	-	-	-	0.6	1.2	0.6	1.2	-	-	-	-	0.6	1.2	0.6	1.2
Total	**11.3**	**22.7**	**9.2**	**18.6**	**14.5**	**29.3**	**13.5**	**27.2**	**12.5**	**25.3**	**10.5**	**21.2**	**13.3**	**26.7**	**12.2**	**24.6**
Number of waterbody crossings	1[c]	-	1	-	1	-	1	-	1	-	1[c]	-	1	-	1	-
Wetlands (acres)																
PEM	1.7	2.9	1.4	2.6	0.1	0.3	0.1	0.3	1.7	2.9	1.4	2.6	0.1	0.3	0.1	0.3
PFO, PSS	0.4	0.9	0.1	0.1	0.1	0.4	-	-	0.4	0.9	0.1	0.1	0.1	0.4	-	-
Total	**2.1**	**3.8**	**1.5**	**2.7**	**0.2**	**0.7**	**0.1**	**0.3**	**2.1**	**3.8**	**1.5**	**2.7**	**0.2**	**0.7**	**0.1**	**0.3**

Notes:
Perm. = permanent; Const. = Construction; PEM = palustrine emergent; PFO = palustrine forested; PSS = palustrine shrub
[a] Evaluated as part of the Modified Preferred Route.
[b] Evaluated as part of the Application Preferred Route and the Application Alternative Route.
[c] Waterbody crossing location not adjacent to existing road or pipeline rights-of-way
[d] Very high = contaminants will almost certainly reach the system in hours to months; High = contaminants will probably reach the system in weeks to years; High moderate = contaminants will reach the system in several years to about a decade; Moderate = contaminants will reach the system in years to decades; Low moderate = contaminants will probably not reach the system for decades; Low = contaminants will require decades to centuries to reach the system.

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Table B-41. National Wetlands Inventory Wetlands within the Project Area[13]

Wetland Type	Area Within Project Area (acres)
Emergent wetland (PEM)	39.1
Forested, scrub/shrub wetland (PFO, PSS)	23.2
Freshwater pond (PUB)	0.7
Total	**63**

Notes:
PEM = palustrine emergent; PFO = palustrine forested; PSS = palustrine shrub; PUB = palustrine unconsolidated bottom

Table B-42. MLCCS Land Cover Types

MLCCS Land Cover Type
Agricultural Land
Maintained Tall Grasses
Tree Plantation
Forest
Wetland Forest
Shrubland
Wetland Emergent Vegetation
Short Grasses
Tall Grasses
Dry Tall Grasses
Open Water
Impervious Lands[a]

Notes:
MLCCS = Minnesota Land Cover Classification System
[a] Over 5% covered by impervious surfaces.

Table B-43. Native Plant Communities within 1 Mile of Project Area[14]

NHIS Site Name and/or Database Source	Associated Native Community Type(s) (State Rank[a])	Location	Overlaps Project Area?	Biodiversity
Meadow Crossing - MCBS	Dry Bedrock Bluff Prairie (Southern) (S3)	Sections 17, 18, 19, and 20 of Rochester Township (T106, R14)	No	Moderate

[13] Ibid.
[14] DNR. June 22, 2016. *Natural Heritage Information System*. Minnesota Department of Natural Resources, Division of Ecological and Water Resources.

NHIS Site Name and/or Database Source	Associated Native Community Type(s) (State Rank[a])	Location	Overlaps Project Area?	Biodiversity
Mayowood - MCBS	Sugar Maple - Basswood - Red Oak - (Blue Beech) Forest (S1)	Sections 7, 8, 17 and 18, of Rochester Township (T106, R14)	No	High
Salem 14 - MCBS	-	Section 14 of Salem Township (T106, R15)	Yes	Moderate
Salem 25 - MCBS	Elm - Ash – Basswood Terrace Forest (S2)	Sections 24 and 25 of Salem Township (T106, R15)	No	Moderate
Rochester 16, 21 Woods - MCBS	-	Sections 15, 16, 21 and 22 of Rochester Township (T106, R14)	No	Moderate
Rochester 22 – MCBS Rochester 23 (Calcareous fen)	Calcareous Fen (Southeastern) (S1)	Section 22 and 23 of Rochester Township (T106, R14)	No	Moderate
Rochester 24 - MCBS	Shrubby wetland complex	Section 24 of Rochester Township (T106, R14)	Yes	Moderate
Rochester 31 - MCBS	Dry Bedrock Bluff Prairie (Southern) (S3)	Section 31 of Rochester Township (T016, R14)	Yes	Moderate
Marion 30 - MCBS	Calcareous Fen (Southeastern) (S1) Seepage Meadow/Carr, Tussock Sedge Subtype (S3) Wet Seepage Prairie (Southern) (S1)	Section 30 of Marion Township (T106, R 13)	Yes	High
Gamehaven Boyscout Ranch - MCBS	Dry Bedrock Bluff Prairie (Southern)(S3)	Section 30 and 31 of Marion Township (106 Range 13) and Section 36 of Rochester Township (106 R 14)	No	Moderate
Railroad Rights-of-Way Prairie - MBS		Sections 35 and 36 of Kalmar Township (T107 R 15)	Yes	-

Note:
NHIS = Natural Heritage Information System; MCBS = Minnesota County Biological Survey
[a] S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable to Extirpation; S4 = uncommon but not rare; S5 = not ranked.

Table B-44. MLCCS Land Cover Types by Route[15]

	Application Preferred Route		Application Alternative Route		Modified Preferred Route	
	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
MLCCS Land Cover Type (acres)[a]						
Agricultural Land	43.1	77.3	45.6	81.7	45.4	79.1
Maintained Tall Grasses	1.5	3.1	1.5	3.1	0.4	0.8
Tree Plantation	-	-	0.1	0.1	0.1	0.2
Forest	3.4	8.5	7.2	13.2	5.4	10.6
Wetland Forest	-	-	0.2	0.4	0.2	0.4
Shrubland	0.1	0.2	0.2	0.3	0.1	0.2
Wetland Emergent Vegetation	0.7	1.3	1.0	2.1	0.6	1.2
Short Grasses	-	-	0.3	0.6	-	-
Tall Grasses	8.3	16.3	8.7	16.1	11.6	21.7
Dry Tall Grasses	17.4	31.5	8.6	15.1	10.4	17.0
Open Water	0.1	0.1	0.1	0.1	0.1	0.1
Impervious Lands	5.3	22.3	8.7	32.5	10.6	39.3
Total	**79.8**	**160.5**	**82.2**	**165.4**	**84.9**	**170.6**

Notes:
MLCCS = Minnesota Land Cover Classification System; Perm = permanent; Const. = construction
[a] Reported acreages do not include permanent impact to 2.76 acres for the TBS 1D, Proposed TBS, Proposed DRS, and temporary impact of 10.0 acres for the temporary storage yard and additional temporary workspaces as precise locations have not yet been determined.

[15] DNR. December 17, 2015. *Minnesota Land Cover Classification System land cover data set*. Minnesota Department of Natural Resources.

Table B-45. MLCCS Land Cover Types - TBS 1D to Proposed TBS Segment Alternatives[16]

Segment Alternative	AB-1[a,b]		AB-2		BC[a,b]		CD-1[a]		CD-2[b]	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	1P		10		2P		3P		11	
MLCCS Land Cover Type (acres)										
Agricultural Land	6.3	10.2	5.2	10.5	8.4	14.9	12.4	20.6	13.2	25.7
Maintained Tall Grasses	-	-	-	-	-	-	-	-	-	-
Tree Plantation	-	-	-	-	-	-	-	-	-	-
Forest	-	-	-	-	-	0.3	0.2	0.4	0.7	1.4
Wetland Forest	-	-	-	-	-	-	-	-	-	-
Shrubland	-	-	-	-	-	0.1	0.1	0.1	0.1	0.3
Wetland Emergent Vegetation	-	-	-	-	-	-	0.1	0.3	-	-
Short Grasses	-	-	-	-	-	-	-	-	-	-
Tall Grasses	-	-	-	-	0.1	0.6	0.8	1.4	1.5	3.1
Dry Tall Grasses	0.2	0.3	0.9	1.8	2.0	3.3	5.4	8.8	0.3	0.6
Open Water	-	-	-	-	-	-	0.1	0.1	0.1	0.1
Impervious Lands	0.7	4.0	0.1	0.4	1.1	4.3	1.9	10.5	0.7	2.3
Total	**7.2**	**14.5**	**6.3**	**12.7**	**11.7**	**23.4**	**21.1**	**42.2**	**16.7**	**33.5**

Notes:
MLCCS = Minnesota Land Cover Classification System; Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Application Preferred and Modified Preferred Routes*
[b] *Evaluated as part of the Application Alternative Route*

[16] DNR. December 17, 2015. *Minnesota Land Cover Classification System land cover data set*. Minnesota Department of Natural Resources.

Table B-46. MLCCS Land Cover Types - Proposed TBS to County Road 8 Segment Alternatives[17]

Segment Alternative	DE-1[a]		DE-2[b]		EF-1[c]		EF-2 [b]		EF-3		EG-1		EG-2		EG-3		EG-4[a]		EG-5		EG-6		EG-7		EG-8	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	4P		12		5P		14, 16		13, 15, 16		5P, 21		14, 16, 21		14, 19		14, 18, 20		13, 15 16, 21		13, 15, 19		13, 15 18, 20		13, 17, 20	
MLCCS Land Cover Type (acres)																										
Agricultural Land	5.4	8.9	0.6	1.4	3.6	6.0	6.7	12.8	5.9	11.1	4.0	6.7	7.1	13.5	5.5	11.9	6.9	12.3	6.3	11.8	4.7	10.1	6.1	10.5	5.2	9.5
Maintained Tall Grasses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tree Plantation	0.1	0.1	-	-	<0.1	0.1	-	-	-	-	0.1	0.1	<0.1	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.1
Forest	1.3	2.2	0.6	1.4	1.1	1.8	1.4	3.4	2.8	6.2	1.2	2.1	1.6	3.7	2.2	4.0	1.5	3.1	3.0	6.5	3.6	6.8	2.9	5.8	0.7	2.5
Wetland Forest	0.2	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shrubland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wetland Emergent Vegetation	<0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Short Grasses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tall Grasses	0.1	0.2	-	-	3.5	5.8	0.7	1.2	0.7	1.2	4.1	6.6	1.2	2.0	0.1	0.2	0.6	1.3	1.2	2.0	0.1	0.2	0.6	1.3	0.2	0.8
Dry Tall Grasses	1.0	1.5	5.9	11.6	-	6.0	2.3	4.5	1.7	3.4	-	6.7	2.3	4.5	3.6	6.7	3.6	6.4	1.7	3.4	3.1	5.6	3.0	5.3	2.7	4.9
Open Water	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Impervious Lands	1.1	5.4	0.2	0.4	4.0	10.8	0.1	0.5	1.1	2.8	4.2	12.0	0.4	1.6	0.1	0.3	1.7	5.8	1.4	4.0	1.1	2.7	2.7	8.1	7.8	15.7
Total	**9.3**	**18.8**	**7.3**	**14.8**	**12.2**	**24.5**	**11.1**	**22.5**	**12.2**	**24.7**	**13.7**	**27.5**	**12.6**	**25.5**	**11.5**	**23.1**	**14.3**	**28.8**	**13.7**	**27.8**	**12.6**	**25.4**	**15.4**	**31.1**	**16.6**	**33.4**

Notes:
MLCCS = Minnesota Land Cover Classification System; TBS = Town Border Station; Perm. = permanent; Const. = construction
[a] Evaluated as part of the Application Alternative Route
[b] Evaluated as part of the Application Preferred Route
[c] Evaluated as part of the Modified Preferred Route

[17] DNR. December 17, 2015. Minnesota Land Cover Classification System land cover data set. Minnesota Department of Natural Resources.

Table B-47. MLCCS Land Cover Types - County Road 8 to 11th Avenue SW Segment Alternatives[18]

Segment Alternative	FH-1[a]		FH-2		FH-3		FI-1		FI-2		FI-3		GH-1[b]		GH-2		GI-1		GI-2		GI-3	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	6P, 7P		6P, 23, 24, 25		21, 22, 24, 25		6P, 23, 24		6P, 7P, 25		21, 22, 24		22, 24, 25		21, 6P, 7P		22, 24		21, 6P, 7P, 25		21, 6P, 23, 24	
MLCCS Land Cover Type (acres)																						
Agricultural Land	6.8	13.4	4.4	8.5	3.9	6.5	4.4	8.5	6.8	13.4	3.9	6.5	3.5	5.8	7.3	14.1	3.5	5.8	7.3	14.1	4.9	9.1
Maintained Tall Grasses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tree Plantation	-	-	-	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1
Forest	0.6	1.8	1.3	2.7	3.3	5.4	0.5	1.4	1.4	3.1	2.5	4.1	3.2	5.1	0.8	2.1	2.3	3.8	1.6	3.4	0.6	1.7
Wetland Forest	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shrubland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wetland Emergent Vegetation	-	-	0.5	1.1	0.4	0.9	0.3	0.6	0.3	0.5	0.2	0.4	0.4	0.9	-	-	0.2	0.4	0.3	0.5	0.3	0.6
Short Grasses	-	-	0.3	0.6	0.3	0.6	0.3	0.6	-	-	0.3	0.6	0.3	0.6	-	-	0.3	0.6	-	-	0.3	0.6
Tall Grasses	4.6	9.0	8.1	14.7	4.7	7.6	8.1	14.7	4.6	9.0	4.7	7.6	4.2	6.7	5.2	9.8	4.2	6.7	5.2	9.8	8.7	15.6
Dry Tall Grasses	<0.1	0.1	<0.1	0.1	<0.1	0.1	4.4	8.5	0.1	0.2	3.9	6.5	<0.1	0.1	<0.1	0.1	-	5.8	0.1	0.2	4.9	9.1
Open Water	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Impervious Lands	0.1	0.3	0.5	3.1	2.5	9.7	0.3	2.4	0.3	1.0	2.4	9.0	2.2	8.5	0.4	1.5	2.1	7.8	0.6	2.2	0.6	3.5
Total	**12.2**	**24.6**	**15.2**	**30.7**	**15.3**	**30.9**	**14.0**	**28.2**	**13.4**	**27.1**	**14.0**	**28.3**	**13.8**	**27.8**	**13.7**	**27.6**	**12.5**	**25.3**	**14.9**	**30.2**	**15.4**	**31.2**

Notes:
MLCCS = Minnesota Land Cover Classification System; Perm. = permanent; Const. = construction
[a] Evaluated as part of the Application Preferred Route and the Modified Preferred Route
[b] Evaluated as part of the Application Alternative Route

[18] DNR. December 17, 2015. Minnesota Land Cover Classification System land cover data set. Minnesota Department of Natural Resources.

Table B-48. MLCCS Land Cover Types - 11th Avenue SW to Proposed District Regulator Station Segment Alternatives[19]

Segment Alternative	HJ-1[a]		HJ-2[b]		HJ-3		HJ-4		IJ-1		IJ-2		IJ-3		IJ-4	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	8P, 9P		26, 9P		25, 27, 29		25, 28, 29		25, 8P, 9P		25, 26, 9P		27, 29		28, 29	
MLCCS Land Cover Type (acres)																
Agricultural Land	2.5	5.2	1.9	3.9	6.5	13.3	6.6	13.3	2.5	5.2	1.9	3.9	6.5	13.3	6.6	13.3
Maintained Tall Grasses	0.4	0.8	1.5	3.1	0.1	0.2	-	-	0.4	0.8	1.5	3.1	0.1	0.2	-	-
Tree Plantation	-	-	-	-	0.2	0.3	-	-	-	-	-	-	0.2	0.3	-	-
Forest	2.1	4.1	0.6	1.2	0.9	1.5	0.8	1.3	3.0	5.4	1.4	2.5	0.1	0.3	-	-
Wetland Forest	-	-	-	-	0.2	0.6	-	-	-	-	-	-	0.2	0.6	-	-
Shrubland	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
Wetland Emergent Vegetation	0.5	0.9	0.5	1.0	1.2	2.4	1.2	2.4	0.7	1.4	0.8	1.5	0.9	1.9	0.9	1.9
Short Grasses	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
Tall Grasses	2.4	4.8	2.1	4.2	0.6	1.3	0.3	0.8	2.4	4.8	2.1	4.2	0.6	1.3	0.3	0.8
Dry Tall Grasses	1.6	3.0	1.4	2.8	0.3	0.8	1.9	3.8	1.7	3.1	1.5	2.9	0.3	0.7	1.8	3.7
Open Water	-	-	-	-	0.2	0.3	-	-	-	-	-	-	-	0.3	-	-
Impervious Lands	1.8	2.8	1.2	1.1	4.3	8.5	2.7	5.6	1.9	3.5	1.3	1.8	4.1	7.8	2.6	4.9
Total	**11.3**	**22.7**	**9.2**	**18.6**	**14.5**	**29.3**	**13.5**	**27.2**	**12.5**	**25.3**	**10.5**	**21.2**	**13.3**	**26.7**	**12.2**	**24.6**

Notes:
MLCCS = Minnesota Land Cover Classification System; Perm. = permanent; Const. = construction
[a] Evaluated as part of the Modified Preferred Route.
[b] Evaluated as part of the Application Preferred Route and the Application Alternative Route.

[19] DNR. December 17, 2015. Minnesota Land Cover Classification System land cover data set. Minnesota Department of Natural Resources.

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Table B-49. Fish Species Occurring in Zumbro Lake[20]

Common Name	Scientific Name
black bullhead	*Ameiurus melas*
black crappie	*Pomoxis nigromaculatus*
bluegill	*Lepomis macrochirus*
bluntnose minnow	*Pimephales notatus*
carpsucker	*Carpiodes carpio*
channel catfish	*Ictalurus punctatus*
common carp	*Cyprinus carpio*
freshwater drum	*Aplodinotus grunniens*
golden redhorse	*Moxostoma erythrurum*
highfin carpsucker	*Carpiodes velifer*
Johnny darter	*Etheostoma nigrum*
largemouth bass	*Micropterus salmoides*
muskellunge	*Esox masquinongy*
logperch	*Percina caprodes*
northern pike	*Esox lucius*
orangespotted sunfish	*Lepomis humilis*
quillback	*Carpiodes cyprinus*
river carpsucker	*Carpiodes carpio*
shorthead redhorse	*Moxostoma macrolepidotum*
silver redhorse	*Moxostoma anisurum*
smallmouth bass	*Micropterus dolomieu*
walleye	*Sander vitreus*
white bass	*Morone chrysops*
white crappie	*Pomoxis annularis*
white sucker	*Catostomus commersonii*
yellow bullhead	*Ameiurus natalis*
yellow perch	*Perca flavescens*

[20] Ibid.

Table B-50. Typical Wildlife Species Commonly Occurring in Olmsted County[21]

Common Name	Scientific Name	Common Name	Scientific Name
Mammals			
meadow vole	Microtus pennsylvanicus	eastern cottontail	Sylvilagus floridanus
raccoon	*Procyon lotor*	eastern gray squirrel	*Sciurus carolinensis*
white-tailed deer	*Odocoileus virginianus*	thirteen-lined ground squirrel	*Ictidomys tridecemlineatus*
stripped skunk	*Mephitis mephitis*	Virginia opossum	*Didelphis virginiana*
little brown bat	*Myotis lucifugus*	coyote	*Canis latrans*
big brown bat	*Eptesicus fuscus*		
Birds[22]			
American crow	*Corvus brachyrhynchos*	horned lark	*Eremophila alpestris*
American goldfinch	*Spinus tristis*	house sparrow	*Passer domesticus*
American robin	*Turdus migratorius*	house wren	*Troglodytes aedon*
barn swallow	*Hirundao rustica*	killdeer	*Charadrius vociferous*
belted kingfisher	*Megaceryle alcyon*	mallard	*Anas platyrhynchos*
black-capped chickadee	*Poecile atricapillus*	mourning dove	*Zenaida macroura*
Canada goose	*Branta canadensis*	red-tailed hawk	*Buteo jamaicensis*
chimney swift	*Chaetura pelagica*	red-winged blackbird	*Agelaius phoeniceus*
eastern bluebird	*Sialia sialis*	rock pigeon	*Columba livia*
eastern kingbird	*Tyrannus tyrannus*	song sparrow	*Melospiza melodia*
eastern meadowlark	*Sturnella magna*	tree swallow	*Tachycineta bicolor*
European starling	*Sturnus vulgaris*	vesper sparrow	*Pooecetes gramineus*
great blue heron	*Ardea herodias*	wild turkey	*Meleagris gallopavo*
great horned owl	*Bubo virginianus*		
Amphibians and Reptiles[23]			
mudpuppy	*Necturus maculosus*	snapping turtle	*Chelydra serpentina*
eastern tiger salamander	*Ambystoma tigrinum*	pond slider	*Trachemys scripta*
spring peeper	*Pseudacris crucifer*	eastern musk turtle	*Sternotherus odoratus*
eastern gray tree frog	*Hyla versicolor*	eastern garter snake	*Thamnophis sirtalis*
American toad	*Bufo americanus*	plains garter snake	*Thamnophis radix*
northern leopard frog	*Rana pipiens*	redbelly snake	*Storeria occiptomaculata*

[21] DNR 2014.
[22] MBBA. 2014. "Breeding Bird County Checklists". Minnesota Breeding Bird Atlas Project – Online. http://www.mnbba.org/cgi-bin/countychecklist.pl.
[23] DNR. October 30, 2013. Minnesota Distribution Map of Salamanders and Amphibians of Minnesota. Minnesota Department of Natural Resources. http://files.dnr.state.mn.us/eco/mcbs/herp_maps/reptile_and_amphibian_maps_2ecs.pdf.

Common Name	Scientific Name	Common Name	Scientific Name
green frog	*Lithobates clamitans*	western fox snake	*Mintonius ramspotti*
northern map turtle	*Graptemys geographica*	northern water snake	*Nerodia sipedon*
wood turtle	*Glyptemys insculpta*	milk snake	*Lampropeltis triangulum*
Blanding's turtle	*Emydoidea blandingii*	North American racer	*Coluber constrictor*
painted turtle	*Chrysemys picta*		

Table B-51. Wildlife Habits within Each Route

	Application Preferred Route		Application Alternative Route		Modified Preferred Route	
	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Habitat Types (acres)[a,b]						
Upland forest[c]	3.4	8.5	7.3	13.4	5.5	10.8
Wetland forest	-	-	0.2	0.4	0.2	0.4
Scrubland	0.1	0.2	0.2	0.3	0.1	0.2
Grasslands[d]	27.2	50.8	19.1	34.9	22.3	39.4
Emergent wetland	0.7	1.3	1.0	2.1	0.6	1.2
Open water	0.1	0.1	0.1	0.1	0.1	0.1
Total	**31.5**	**61.0**	**27.8**	**51.2**	**28.9**	**52.1**

Notes:
Perm. = permanent; Const. = construction
[a] *Habitat types do not include agricultural land and impervious lands*
[b] *Reported acreages do not include permanent impact to 2.76 acres for the TBS 1D, Proposed TBS, Proposed DRS and temporary impact to 10.0 acres for the temporary storage yard and additional temporary workspaces as precise locations have not yet been determined. These facilities would be sited in agricultural areas to the extent practicable.*
[c] *Includes forest and tree plantations*
[d] *includes maintained tall grass, dry tall grass, tall grasses, and short grasses*

Table B-52. Wildlife Habitats - TBS 1D to Proposed TBS Segment Alternatives

Segment Alternative	AB-1[a,b]		AB-2		BC[a,b]		CD-1[a]		CD-2[b]	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	1P		10		2P		3P		11	
Habitat Type (acres)[c]										
Upland forest[d]	-	-	-	-	-	0.3	0.2	0.4	0.7	1.4
Wetland forest	-	-	-	-	-	-	-	-	-	-
Scrubland	-	-	-	-	-	0.1	0.1	0.1	0.1	0.3
Grasslands[e]	0.2	0.3	0.9	1.8	2.2	3.8	6.3	10.2	1.8	3.7
Emergent wetland	-	-	-	-	-	-	0.1	0.3	-	-
Open water	-	-	-	-	-	-	0.1	0.1	0.1	0.1
Total	**0.2**	**0.3**	**0.9**	**1.8**	**2.2**	**4.2**	**6.8**	**11.1**	**2.7**	**5.5**

Notes:
TBS = Town Border Station; Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Application Preferred and Modified Preferred Routes*
[b] *Evaluated as part of the Application Alternative Route*
[c] *Habitat types do not include agricultural land and impervious lands*
[d] *Includes forest and tree plantations*
[e] *includes maintained tall grass, dry tall grass, tall grasses, and short grasses*

Table B-53. Wildlife Habitats - Proposed TBS to County Road 8 Segment Alternatives

Segment Alternative	DE-1[a]		DE-2[b]		EF-1[c]		EF-2[b]		EF-3		EG-1		EG-2		EG-3		EG-4[a]		EG-5		EG-6		EG-7		EG-8	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	4P		12		5P		14, 16		13, 15, 16		5P, 21		14, 16, 21		14, 19		14, 18, 20		13, 15 16, 21		13, 15, 19		13, 15 18, 20		13, 17, 20	
Habitat Type (acres)[d]																										
Upland forest[e]	1.4	2.3	0.6	1.4	1.1	1.9	1.4	3.4	2.8	6.2	1.3	2.2	1.6	3.8	2.2	4.0	1.5	3.1	3.0	6.5	3.6	6.8	2.9	5.8	0.7	2.5
Wetland forest	0.2	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scrubland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grasslands[f]	1.1	1.7	5.9	11.6	3.5	5.8	3.0	5.7	2.4	4.6	4.1	6.6	3.5	6.6	3.7	6.9	4.2	7.8	3.0	5.5	3.2	5.8	3.7	6.7	2.9	5.7
Emergent wetland	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Open water	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	2.8	4.5	6.5	13.0	4.7	7.7	4.4	9.2	5.2	10.8	5.4	8.8	5.1	10.4	5.9	10.9	5.7	10.8	6.0	12.0	6.7	12.6	6.6	12.5	3.6	8.2

Notes:
TBS = Town Border Station; Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Application Alternative Route*
[b] *Evaluated as part of the Application Preferred Route*
[c] *Evaluated as part of the Modified Preferred Route*
[d] *Habitat types do not include agricultural land and impervious lands*
[e] *Includes forest and tree plantations*
[f] *Includes maintained tall grass, dry tall grass, tall grasses, and short grasses*

Table B-54. Wildlife Habitats - County Road 8 to 11th Avenue SW Segment Alternatives

Segment Alternative	FH-1 [a]		FH-2		FH-3		FI-1		FI-2		FI-3		GH-1 [b]		GH-2		GI-1		GI-2		GI-3	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	6P, 7P		6P, 23, 24, 25		21, 22, 24, 25		6P, 23, 24		6P, 7P, 25		21, 22, 24		22, 24, 25		21, 6P, 7P		22, 24		21, 6P, 7P, 25		21, 6P, 23, 24	
Habitat Type (acres)[c]																						
Upland forest[d]	0.6	1.8	1.3	2.7	3.3	5.4	0.5	1.4	1.4	3.1	2.5	4.2	3.2	5.1	0.8	2.2	2.3	3.8	1.6	3.4	0.6	1.8
Wetland forest	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scrubland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grasslands[e]	4.6	9.1	8.5	15.4	5.1	8.3	8.4	15.3	4.6	9.2	5.0	8.2	4.5	7.5	5.2	9.9	4.5	7.4	5.2	10.0	9.0	16.2
Emergent wetland	-	-	0.5	1.1	0.4	0.9	0.3	0.6	0.3	0.5	0.2	0.4	0.4	0.9	-	-	0.2	0.4	0.3	0.5	0.3	0.6
Open water	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**5.2**	**10.9**	**10.3**	**19.2**	**8.8**	**14.7**	**9.2**	**17.3**	**6.3**	**12.8**	**7.7**	**12.8**	**8.1**	**13.5**	**6.0**	**12.1**	**7.0**	**11.6**	**7.1**	**14.0**	**9.9**	**18.5**

Notes:
Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Application Preferred Route and the Modified Preferred Route*
[b] *Evaluated as part of the Application Alternative Route*
[c] *Habitat types do not include agricultural land and impervious lands*
[d] *Includes forest and tree plantations*
[e] *Includes maintained tall grass, dry tall grass, tall grasses, and short grasses*

Table B-55. Wildlife Habitats - 11th Avenue SW to Proposed District Regulator Station Segment Alternatives

Segment Alternative	HJ-1[a]		HJ-2[b]		HJ-3		HJ-4		IJ-1		IJ-2		IJ-3		IJ-4	
Resource	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area	Perm. Right-of-Way	Const. Area
Route Segment(s)	8P, 9P		26, 9P		25, 27, 29		25, 28, 29		25, 8P, 9P		25, 26, 9P		27, 29		28, 29	
Habitat Type (acres)[c]																
Upland forest[d]	2.1	4.1	0.6	1.2	1.1	1.8	0.8	1.3	3.0	5.4	1.4	2.5	0.3	0.5	-	-
Wetland forest	-	-	-	-	0.2	0.6	-	-	-	-	-	-	0.2	0.6	-	-
Scrubland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grasslands[e]	4.4	8.5	5.0	10.1	1.1	2.3	2.2	4.6	4.4	8.6	5.1	10.2	1.0	2.2	2.2	4.5
Emergent wetland	0.5	0.9	0.5	1.0	1.2	2.4	1.2	2.4	0.7	1.4	0.8	1.5	0.9	1.9	0.9	1.9
Open water	-	-	-	-	0.2	0.3	-	-	-	-	-	-	0.2	0.3	-	-
Total	**7.0**	**13.5**	**6.1**	**12.4**	**3.7**	**7.5**	**4.2**	**8.3**	**8.1**	**15.4**	**7.3**	**14.2**	**2.6**	**5.6**	**3.1**	**6.4**

Notes:
Perm. = permanent; Const. = construction
[a] *Evaluated as part of the Modified Preferred Route.*
[b] *Evaluated as part of the Application Preferred Route and the Application Alternative Route.*
[c] *Habitat types do not include agricultural land and impervious lands*
[d] *Includes forest and tree plantations*
[e] *Includes maintained tall grass, dry tall grass, tall grasses, and short grasses*

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Table B-56. Previously Recorded Cultural Resource Sites near Each Route

Resource Category	Application Preferred Route		Application Alternative Route		Modified Preferred Route	
	Route[a]	Const. Area	Route[a]	Const. Area	Route[a]	Const. Area
Number of Architectural Sites	1	-	1	-	1	-
Number of GLO Sites	33	22	33	22	33	22

Notes:
Const. = construction; GLO = General Land Office
[a] *The route is comprised of the 500- to 2,000-foot-wide area in which the alignment will be sited (see **Figure 2**).*

Table B-57. Previously Recorded Cultural Resource Sites - TBS 1D to Proposed TBS Segment Alternatives

Segment Alternative	AB-1[a,b]		AB-2		BC[a,b]		CD-1[a]		CD-2[b]	
Resource	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area
Route Segment(s)	1P		10		2P		3P		11	
Number of Architectural Sites	1	-	-	-	-		-		-	
Number of GLO Sites	3	1	2	1	6	5	7	5	6	5

Notes:
Const. = construction; GLO = General Land Office
[a] *Evaluated as part of the Application Preferred and Modified Preferred Routes*
[b] *Evaluated as part of the Application Alternative Route*
[c] *The route is comprised of the 500- to 2,000-foot-wide area in which the alignment will be sited (see **Figure 2**).*

Table B-58. Previously Recorded Cultural Resource Sites - Proposed TBS to County Road 8 Segment Alternatives

Segment Alternative	DE-1[a]		DE-2[b]		EF-1[c]		EF-2[b]		EF-3		EG-1		EG-2		EG-3		EG-4[a]		EG-5		EG-6		EG-7		EG-8	
Resource	Route[d]	Const. Area	Route[d]	Const. Area	Route[d]	Const. Area	Route[d]	Const. Area	Route[d]	Const. Area	Route[d]	Const. Area	Route[d]	Const. Area	Route[d]	Const. Area	Route[d]	Const. Area	Route[d]	Const. Area	Route[d]	Const. Area	Route[d]	Const. Area	Route[d]	Const. Area
Route Segment(s)	4P		12		5P		14, 16		13, 15, 16		5P, 21		14, 16, 21		14, 19		14, 18, 20		13, 15 16, 21		13, 15, 19		13, 15 18, 20		13, 17, 20	
Number of Architectural Sites	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Number of GLO	4	2	2	2	6	3	4	4	4	4	7	4	5	4	4	3	7	4	6	5	5	4	8	5	8	5

Notes:
Const. = construction; GLO = General Land Office
[a] *Included as part of the Application Alternative Route*
[b] *Included as part of the Application Preferred Route*
[c] *Included as part of the Modified Preferred Route*
[d] *The route is comprised of the 500- to 2,000-foot-wide area in which the alignment will be sited (see **Figure 2**).*

Table B-59. Previously Recorded Cultural Resource Sites - County Road 8 to 11th Avenue SW Segment Alternatives

Segment Alternative	FH-1[a]		FH-2		FH-3		FI-1		FI-2		FI-3		GH-1[b]		GH-2		GI-1		GI-2		GI-3	
Resource	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area
Route Segment(s)	6P, 7P		6P, 23, 24, 25		21, 22, 24, 25		6P, 23, 24		6P, 7P, 25		21, 22, 24		22, 24, 25		21, 6P, 7P		22, 24		21, 6P, 7P, 25		21, 6P, 23, 24	
Number of Architectural Sites	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Number of GLO	5	3	5	3	7	4	5	3	5	3	7	4	6	3	6	4	5	3	6	3	6	4

Notes:
Const. = construction; GLO = General Land Office;
[a] *Evaluated as part of the Application Preferred Route and the Modified Preferred Route*
[b] *Evaluated as part of the Application Alternative Route*
[c] *The route is comprised of the 500- to 2,000-foot-wide area in which the alignment will be sited (see **Figure 2**).*

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Table B-60. Previously Recorded Cultural Resource Sites - 11th Avenue SW to Proposed District Regulator Station Segment Alternatives

Segment Alternative	HJ-1[a]		HJ-2[b]		HJ-3		HJ-4		IJ-1		IJ-2		IJ-3		IJ-4	
Route Segment(s)	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area	Route[c]	Const. Area
Route Segment(s)	8P, 9P		26, 9P		25, 27, 29		25, 28, 29		25, 8P, 9P		25, 26, 9P		27, 29		28, 29	
Number of Architectural Sites	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Number of GLO	4	3	3	3	3	2	3	2	4	3	3	3	3	1	3	1

Notes:
Const. = construction; GLO = General Land Office
[a] *Evaluated as part of the Modified Preferred Route.*
[b] *Evaluated as part of the Application Preferred Route and the Application Alternative Route.*
[c] *The route is comprised of the 500 to 2,000 foot-wide area in which the alignment will be sited (see **Figure 2**)*

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Appendix C

Route Segment Calculation Tables

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The following tables summarize the impacts for each route segment. The impact categories are the same categories discussed throughout the CEA. These tables are provided so that the reader can better understand the impacts for any given route segment, segment alternative or route.

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Table 1. Route Segment Calculations

Segment		Land Requirements			Geology					Soils					
		Length		Area		Sinkhole Formation Probability (acres)				Farmland Soils (acres)					
		Segment Length (Ft)	Segment Length (miles)	Acres	Length of pipeline in bedrock less than 5 feet (feet)	High probability	Moderate to high probability	Low to moderate probability	Low probability	Prime farmland	Farmland of statewide importance	Prime farmland if drained	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	Not prime farmland	Highly Erodible Land (acres)
1P	Permanent ROW	6,239.83	1.2	7.2	0.0	0.0	0.0	0.0	7.2	3.8	2.7	0.0	0.7	0.0	0.0
	Construction Area			14.5		0.0	0.0	0.0	14.5	7.8	5.2	0.0	1.4	0.0	0.0
2P	Permanent ROW	10,121.94	1.9	11.7	0.0	0.0	0.0	0.0	11.7	4.3	5.5	0.7	0.0	1.2	0.0
	Construction Area			23.4		0.0	0.0	0.0	23.4	8.5	11.1	1.4	0.0	2.5	0.0
3P	Permanent ROW	18,316.27	3.5	21.1	503.2	0.0	0.0	13.3	7.8	10.7	2.4	6.7	0.0	1.2	0.0
	Construction Area			42.2		0.0	0.0	26.6	15.6	21.5	4.8	13.5	0.0	2.4	0.0
4P	Permanent ROW	8,109.19	1.5	9.3	1,521.5	0.0	0.0	9.0	0.4	6.5	0.0	2.0	0.0	0.9	0.5
	Construction Area			18.8		0.0	0.0	18.0	0.8	13.0	0.0	3.9	0.0	1.8	1.1
5P	Permanent ROW	10,583.34	2.0	12.2	8,518.8	0.0	0.0	12.2	0.0	9.0	0.2	0.0	0.0	3.0	2.7
	Construction Area			24.5		0.0	0.0	24.5	0.0	18.0	0.4	0.0	0.0	6.1	5.5
6P	Permanent ROW	6,537.58	1.2	7.5	4,645.8	0.0	0.0	7.5	0.0	5.2	0.7	0.0	0.0	1.7	1.7
	Construction Area			15.2		0.0	0.0	15.2	0.0	10.2	1.4	0.0	0.0	3.6	3.6
7P	Permanent ROW	4,003.80	0.8	4.6	3,492.3	0.0	0.0	4.6	0.0	2.6	0.8	0.0	0.0	1.3	1.1
	Construction Area			9.4		0.0	0.0	9.4	0.0	5.1	1.5	0.0	0.0	2.8	2.4
8P	Permanent ROW	5,719.78	1.1	6.6	0.0	0.0	0.0	6.3	0.4	5.5	0.0	0.2	0.0	0.9	0.0
	Construction Area			13.3		0.0	0.0	12.5	0.8	11.1	0.0	0.4	0.0	1.9	0.0
9P	Permanent ROW	4,022.67	0.8	4.7	416.2	0.0	0.0	0.0	4.7	0.5	0.0	4.1	0.0	0.0	0.0
	Construction Area			9.4		0.0	0.0	0.1	9.3	1.1	0.0	8.3	0.0	0.0	0.0
10	Permanent ROW	5,442.95	1.0	6.3	0.0	0.0	0.0	0.0	6.3	4.1	0.2	1.5	0.5	0.0	0.0
	Construction Area			12.7		0.0	0.0	0.0	12.7	8.2	0.5	3.0	1.0	0.0	0.0
11	Permanent ROW	14,485.10	2.7	16.7	0.0	0.0	0.0	12.5	4.1	9.0	3.4	2.9	0.0	1.4	0.0
	Construction Area			33.4		0.0	0.0	25.1	8.3	18.1	6.7	5.8	0.0	2.8	0.0
12	Permanent ROW	6,358.00	1.2	7.3	277.3	0.0	0.0	6.4	1.0	4.9	0.2	0.8	0.0	1.4	0.8
	Construction Area			14.8		0.0	0.0	12.8	2.0	9.8	0.5	1.6	0.0	2.8	1.6
13	Permanent ROW	2,617.77	0.5	3.0	2,122.9	0.0	0.0	3.0	0.0	2.0	0.0	0.4	0.0	0.6	0.6

Segment		Land Requirements			Geology					Soils					
		Length		Area		Sinkhole Formation Probability (acres)				Farmland Soils (acres)					
		Segment Length (Ft)	Segment Length (miles)	Acres	Length of pipeline in bedrock less than 5 feet (feet)	High probability	Moderate to high probability	Low to moderate probability	Low probability	Prime farmland	Farmland of statewide importance	Prime farmland if drained	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	Not prime farmland	Highly Erodible Land (acres)
	Construction Area			6.2		0.0	0.0	6.2	0.0	4.1	0.0	0.7	0.0	1.4	1.4
14	Permanent ROW	2,767.46	0.5	3.2	2,346.2	0.0	0.0	3.2	0.0	2.5	0.0	0.0	0.0	0.7	0.7
	Construction Area			6.5		0.0	0.0	6.5	0.0	5.0	0.0	0.0	0.0	1.5	1.4
15	Permanent ROW	1,058.70	0.2	1.3	758.7	0.0	0.0	1.3	0.0	0.8	0.0	0.0	0.0	0.4	0.4
	Construction Area			2.6		0.0	0.0	2.6	0.0	1.7	0.0	0.0	0.0	0.9	1.0
16	Permanent ROW	6,867.13	1.3	7.9	3,698.4	1.4	0.0	6.5	0.0	4.3	0.5	1.1	0.0	2.0	2.0
	Construction Area			15.9		2.9	0.0	13.1	0.0	8.7	1.1	2.2	0.0	4.0	4.0
17	Permanent ROW	5,066.34	1.0	5.9	1,380.7	1.8	0.0	4.1	0.0	3.0	0.2	0.0	0.0	2.7	1.9
	Construction Area			11.8		3.7	0.0	8.1	0.0	6.1	0.3	0.0	0.0	5.4	3.8
18	Permanent ROW	2,930.03	0.6	3.4	2,237.6	1.4	0.0	2.0	0.0	1.6	0.1	0.0	0.0	1.6	1.6
	Construction Area			6.9		2.9	0.0	4.0	0.0	3.4	0.2	0.0	0.0	3.3	3.3
19	Permanent ROW	7,158.56	1.4	8.3	6,276.9	3.3	0.0	5.0	0.0	6.3	0.1	0.5	0.0	1.4	1.4
	Construction Area			16.6		6.6	0.0	10.0	0.0	12.7	0.2	1.0	0.0	2.8	2.8
20	Permanent ROW	6,634.23	1.3	7.7	4,546.2	2.9	0.0	4.8	0.0	7.7	0.0	0.0	0.0	0.0	0.0
	Construction Area			15.4		5.8	0.0	9.6	0.0	15.4	0.0	0.0	0.0	0.0	0.0
21	Permanent ROW	1,245.34	0.2	1.5	1,245.4	0.0	0.0	1.5	0.0	1.5	0.0	0.0	0.0	0.0	0.0
	Construction Area			3.0		0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0
22	Permanent ROW	6,604.57	1.3	7.6	5,730.1	0.0	0.0	7.6	0.0	5.2	0.1	0.0	0.0	2.4	1.4
	Construction Area			15.3		0.0	0.0	15.3	0.0	10.4	0.2	0.0	0.0	4.8	3.0
23	Permanent ROW	1,255.97	0.2	1.5	131.6	0.0	0.0	1.5	0.0	0.0	1.0	0.0	0.0	0.5	0.2
	Construction Area			3.1		0.0	0.0	3.1	0.0	0.0	1.9	0.0	0.0	1.1	0.3
24	Permanent ROW	4,246.64	0.8	4.9	2,364.8	0.0	0.0	4.9	0.0	1.4	1.0	0.0	0.4	2.1	1.9
	Construction Area			9.9		0.0	0.0	9.9	0.0	2.9	2.0	0.0	0.9	4.2	3.7
25	Permanent ROW	1,043.69	0.2	1.2	0.0	0.0	0.0	1.2	0.0	0.3	0.0	0.0	0.0	1.0	0.0
	Construction Area			2.6		0.0	0.0	2.6	0.0	0.6	0.0	0.0	0.0	2.0	0.0
26	Permanent ROW	3,933.54	0.7	4.6	1,085.5	0.0	0.0	2.9	1.7	3.1	0.0	0.7	0.0	0.7	0.5

Segment		Land Requirements			Geology					Soils					
		Length		Area		Sinkhole Formation Probability (acres)				Farmland Soils (acres)					
		Segment Length (Ft)	Segment Length (miles)	Acres	Length of pipeline in bedrock less than 5 feet (feet)	High probability	Moderate to high probability	Low to moderate probability	Low probability	Prime farmland	Farmland of statewide importance	Prime farmland if drained	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	Not prime farmland	Highly Erodible Land (acres)
	Construction Area			9.2		0.0	0.0	5.7	3.5	6.2	0.0	1.5	0.0	1.5	0.9
27	Permanent ROW	6,060.34	1.1	7.0	0.0	0.0	0.0	3.3	3.7	3.4	0.0	1.9	0.8	0.8	0.0
	Construction Area			14.1		0.0	0.0	6.7	7.4	6.9	0.0	3.9	1.7	1.5	0.0
28	Permanent ROW	5,141.06	1.0	5.9	709.5	0.0	0.0	2.6	3.3	3.2	0.0	1.9	0.0	0.8	0.6
	Construction Area			12.0		0.0	0.0	5.3	6.7	6.4	0.0	3.9	0.0	1.6	1.1
29	Permanent ROW	5,412.42	1.0	6.3	738.2	0.0	0.0	1.2	5.0	4.4	0.0	1.3	0.0	0.5	0.0
	Construction Area			12.6		0.0	0.0	2.4	10.2	8.8	0.0	2.7	0.0	1.1	0.0

Segment		Human Settlement																
		Length of Pipeline by Municipality (miles)					Olmstead County Zoning Districts (acres)							City of Rochester Zoning Districts (acres)				
		Township Cascade	Kalmar Township	Rochester Township	Salem Township	City of Rochester	Agricultural/Resource Commercial District - Aggregate Extraction and Reuse (A/RC AER)	Agricultural Protection District (A-1, A-2)	Agricultural District (A-3)	Agricultural Urban Expansion District (A-4)	Sand and Gravel Mining (AgRM)	Rural Residential District (RA)	Special District (other) (SD)	General Commercial (B-4)	Mixed Commercial-Industrial (M-1)	Mixed Single Family (R-1)	Low Density Residential (R-2)	Medium Density Residential (R-3)
1P	Permanent ROW	0.1	1.1	0.0	0.0	0.0	0.0	6.8	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	13.6	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2P	Permanent ROW	0.0	1.4	0.0	0.5	0.0	0.0	6.3	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	12.6	10.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3P	Permanent ROW	0.0	0.0	0.0	3.5	0.0	0.1	21.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.1	41.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4P	Permanent ROW	0.0	0.0	0.5	1.0	0.0	0.9	6.4	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						1.8	12.5	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5P	Permanent ROW	0.0	0.0	2.0	0.0	0.0	0.0	12.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	24.1	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
6P	Permanent ROW	0.0	0.0	1.2	0.0	0.0	0.0	6.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	12.1	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7P	Permanent ROW	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	0.0	0.0	8.5	0.0	0.8	0.0	0.0	0.0	0.0	0.1	0.0
8P	Permanent ROW	0.0	0.0	0.5	0.0	0.5	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.1	0.6	2.7	0.0
	Construction Area						0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.2	1.1	5.5	0.0
9P	Permanent ROW	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.2	0.0	0.0	0.0	3.6	0.7	0.0	0.0	0.0
	Construction Area						0.0	0.0	0.0	0.5	0.0	0.0	0.0	7.2	1.5	0.0	0.0	0.0
10	Permanent ROW	0.0	1.0	0.0	0.0	0.0	0.0	6.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	12.1	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Permanent ROW	0.0	0.0	0.0	2.7	0.0	0.1	16.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.1	33.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Segment		Human Settlement																
		Length of Pipeline by Municipality (miles)					Olmstead County Zoning Districts (acres)							City of Rochester Zoning Districts (acres)				
		Township Cascade	Kalmar Township	Rochester Township	Salem Township	City of Rochester	Agricultural/Resource Commercial District - Aggregate Extraction and Reuse (A/RC AER)	Agricultural Protection District (A-1, A-2)	Agricultural District (A-3)	Agricultural Urban Expansion District (A-4)	Sand and Gravel Mining (AgRM)	Rural Residential District (RA)	Special District (other) (SD)	General Commercial (B-4)	Mixed Commercial-Industrial (M-1)	Mixed Single Family (R-1)	Low Density Residential (R-2)	Medium Density Residential (R-3)
12	Permanent ROW	0.0	0.0	1.2	0.0	0.0	0.1	2.9	3.9	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.2	5.9	7.8	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0
13	Permanent ROW	0.0	0.0	0.5	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	Permanent ROW	0.0	0.0	0.5	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	Permanent ROW	0.0	0.0	0.2	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	Permanent ROW	0.0	0.0	1.3	0.0	0.0	0.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	Permanent ROW	0.0	0.0	1.0	0.0	0.0	0.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	Permanent ROW	0.0	0.0	0.6	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	Permanent ROW	0.0	0.0	1.3	0.0	0.0	0.0	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
20	Permanent ROW	0.0	0.0	1.2	0.0	0.0	0.0	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	15.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
21	Permanent ROW	0.0	0.0	0.2	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
22	Permanent ROW	0.0	0.0	0.2	0.0	1.1	0.0	4.7	0.0	0.6	0.0	0.4	0.0	0.0	0.0	1.8	0.0	0.0
	Construction Area						0.0	7.8	0.0	1.1	0.0	0.7	0.0	0.0	0.0	5.6	0.0	0.0

Segment		Human Settlement																
		Length of Pipeline by Municipality (miles)					Olmstead County Zoning Districts (acres)							City of Rochester Zoning Districts (acres)				
		Township Cascade	Kalmar Township	Rochester Township	Salem Township	City of Rochester	Agricultural/Resource Commercial District - Aggregate Extraction and Reuse (A/RC AER)	Agricultural Protection District (A-1, A-2)	Agricultural District (A-3)	Agricultural Urban Expansion District (A-4)	Sand and Gravel Mining (AgRM)	Rural Residential District (RA)	Special District (other) (SD)	General Commercial (B-4)	Mixed Commercial-Industrial (M-1)	Mixed Single Family (R-1)	Low Density Residential (R-2)	Medium Density Residential (R-3)
23	Permanent ROW	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area						0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
24	Permanent ROW	0.0	0.0	0.4	0.0	0.4	0.0	0.0	0.0	3.6	0.0	0.0	0.0	0.0	0.0	1.2	0.1	0.0
	Construction Area						0.0	0.0	0.0	6.2	0.0	0.0	0.0	0.0	0.0	3.4	0.3	0.0
25	Permanent ROW	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0
	Construction Area						0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0
26	Permanent ROW	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	1.5	0.4	0.0
	Construction Area						0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	5.3	3.0	0.8	0.0
27	Permanent ROW	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	3.9	0.0	1.3	0.0
	Construction Area						0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	7.8	0.1	2.6	0.0
28	Permanent ROW	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.0	1.3	0.0
	Construction Area						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4	0.0	2.6	0.0
29	Permanent ROW	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	2.5	0.0	2.4	1.1
	Construction Area						0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.1	5.0	0.0	4.4	1.7

Human Settlement																				
		Buildings Within ROW				Buildings Within 50 Feet				Buildings Within 100 Feet				Buildings Within 200 Feet						
Segment		Agricultural	Commercial	Residence	Other	Agricultural	Commercial	Residence	Other	Agricultural	Commercial	Residence	Other	Agricultural	Commercial	Residence	Other	Existing Road ROW	Existing Pipeline ROW	Existing Electrical Distribution Line ROW	Length of pipeline not parallel to existing ROWs
1P	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	6,239.8	0.0	0.0	0.0
	Construction Area	0	0	0	0	0	0	0	0	0	0	1	0	2	0	4	0				
2P	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	5,181.5	0.0	3,387.9	1,552.6
	Construction Area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0				
3P	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	1	0	5	0	15,825.3	0.0	0.0	2,491.0
	Construction Area	0	0	0	0	0	0	0	0	1	0	1	0	2	0	5	0				
4P	Permanent ROW	1	1	0	0	2	1	0	0	3	1	1	0	6	2	4	0	8,109.2	0.0	0.0	0.0
	Construction Area	1	1	0	0	2	1	1	0	5	1	1	0	7	2	4	0				
5P	Permanent ROW	0	0	0	0	2	0	0	0	3	0	0	0	11	0	8	1	10,583.3	0.0	0.0	0.0
	Construction Area	2	0	0	0	3	0	0	0	4	0	3	1	12	1	9	1				
6P	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	6,537.6
	Construction Area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
7P	Permanent ROW	1	0	0	0	1	0	0	0	1	0	1	0	1	0	3	0	0.0	0.0	0.0	4,003.8
	Construction Area	1	0	0	0	1	0	0	0	1	0	1	0	3	0	2	0				
8P	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	5,719.8	0.0	0.0	0.0
	Construction Area	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	0				
9P	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,635.2	0.0	0.0	1,387.5
	Construction Area	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0				
10	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	5,443.0	0.0	0.0
	Construction Area	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0				
11	Permanent ROW	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	1,636.9	12,848.2	0.0	0.0
	Construction Area	0	0	0	0	1	0	0	0	1	0	1	0	1	0	2	0				
12	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0.0	5,710.2	0.0	647.8
	Construction Area	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0				

Human Settlement																				
		Buildings Within ROW				Buildings Within 50 Feet				Buildings Within 100 Feet				Buildings Within 200 Feet						
Segment		Agricultural	Commercial	Residence	Other	Agricultural	Commercial	Residence	Other	Agricultural	Commercial	Residence	Other	Agricultural	Commercial	Residence	Other	Existing Road ROW	Existing Pipeline ROW	Existing Electrical Distribution Line ROW	Length of pipeline not parallel to existing ROWs
13	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2,617.8	0.0	0.0	0.0
	Construction Area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0				
14	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0.0	2,767.5	0.0	0.0
	Construction Area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0				
15	Permanent ROW	0	0	0	0	0	0	0	0	0	0	1	0	1	0	8	0	0.0	0.0	0.0	1,058.7
	Construction Area	0	0	0	0	0	0	0	0	0	0	1	0	2	0	11	0				
16	Permanent ROW	0	0	0	0	0	0	0	0	2	0	0	0	3	1	3	0	0.0	0.0	0.0	6,867.1
	Construction Area	0	0	0	0	2	0	0	0	2	1	0	0	3	2	4	0				
17	Permanent ROW	0	0	0	0	0	0	0	0	1	0	0	0	2	0	2	0	5,066.3	0.0	0.0	0.0
	Construction Area	0	0	0	0	0	0	0	0	1	0	2	0	3	0	3	0				
18	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0.0	2,930.0	0.0	0.0
	Construction Area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0				
19	Permanent ROW	0	0	0	0	0	0	0	0	0	0	4	0	1	0	7	0	0.0	0.0	0.0	7,158.6
	Construction Area	0	0	0	0	0	0	0	0	0	0	5	0	5	0	9	0				
20	Permanent ROW	0	0	0	0	0	0	0	0	1	0	2	0	7	0	11	0	6,634.2	0.0	0.0	0.0
	Construction Area	0	0	0	0	1	0	0	0	1	0	9	0	12	0	12	0				
21	Permanent ROW	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	1,245.3	0.0	0.0	0.0
	Construction Area	0	0	0	0	0	0	0	0	0	0	1	0	5	0	5	0				
22	Permanent ROW	0	0	0	0	1	0	0	0	3	0	4	0	14	0	25	0	6,604.6	0.0	0.0	0.0
	Construction Area	0	0	0	0	2	0	0	0	4	0	15	0	22	0	32	0				
23	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0.0	0.0	0.0	1,256.0
	Construction Area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0				
24	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	4,246.6	0.0	0.0	0.0
	Construction Area	0	0	0	0	0	0	0	0	0	0	1	0	0	0	12	0				

Human Settlement																				
		Buildings Within ROW				Buildings Within 50 Feet				Buildings Within 100 Feet				Buildings Within 200 Feet						
Segment		Agricultural	Commercial	Residence	Other	Agricultural	Commercial	Residence	Other	Agricultural	Commercial	Residence	Other	Agricultural	Commercial	Residence	Other	Existing Road ROW	Existing Pipeline ROW	Existing Electrical Distribution Line ROW	Length of pipeline not parallel to existing ROWs
25	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	1,043.7	0.0	0.0	0.0
	Construction Area	0	0	0	0	0	0	0	0	1	0	1	0	2	0	3	0				
26	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	3,933.5
	Construction Area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
27	Permanent ROW	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0	0	6,060.3	0.0	0.0	0.0
	Construction Area	0	0	0	0	0	2	0	0	0	3	0	0	0	3	0	0				
28	Permanent ROW	0	0	0	0	0	0	0	0	0	3	0	0	0	6	0	0	5,141.1	0.0	0.0	0.0
	Construction Area	0	0	0	0	0	3	0	0	0	8	0	0	0	6	0	0				
29	Permanent ROW	0	0	10	0	4	2	16	0	5	2	16	0	8	4	25	0	2,615.8	0.0	0.0	2,796.6
	Construction Area	2	1	15	0	5	2	16	0	5	4	17	0	8	4	25	0				

Segment		Human Settlement																											
		Number of Existing Roads, Railroads, and Pipelines Crossed (# of crossings)																											
		60th Ave NW	19th St NW	NNG Pipeline	14th St NW	DM&E Railroad	Trunk Highway 14	70th Ave SW	County Road 34/ Country Club Rd W	BP Pipeline	10th St SW	20th St SW	County Road 25/ Salem Rd SW	60th Ave SW	40th St SW	55th Ave SW	50th St SW	County Road 8/ Bamber Valley Rd SW	48th St SW	48th St SE/MSAS 155/ CSAH 20	11th Ave SW	U.S. Highway 63/ Broadway Ave	U.S. Highway 63/ Broadway Ave Ramps (1404, 3198, 671, 5756, and 5380)	Wood Lake Dr SE	Commercial Dr SW	Maine Ave SE (Garden Drive/M-1468)	St. Bridget Road SE	45th St SE	Fern Ave SE (MSAS 157)
1P	Permanent ROW	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																												
2P	Permanent ROW	0	0	1	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																												
3P	Permanent ROW	0	0	0	0	0	0	2	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																												
4P	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																												
5P	Permanent ROW	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																												
6P	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																												
7P	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Construction Area																												
8P	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																												
9P	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	1	2	0	0	0	0	0
	Construction Area																												
10	Permanent ROW	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																												
11	Permanent ROW	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																												

Segment		Human Settlement																										
		Number of Existing Roads, Railroads, and Pipelines Crossed (# of crossings)																										
		60th Ave NW	19th St NW	NNG Pipeline	14th St NW	DM&E Railroad	Trunk Highway 14	70th Ave SW	County Road 34/ Country Club Rd W	BP Pipeline	10th St SW	20th St SW	County Road 25/ Salem Rd SW	60th Ave SW	40th St SW	55th Ave SW	50th St SW	County Road 8/ Bamber Valley Rd SW	48th St SW	48th St SE/MSAS 155/ CSAH 20	11th Ave SW	U.S. Highway 63/ Broadway Ave	U.S. Highway 63/ Broadway Ave Ramps (1404, 3198, 671, 5756, and 5380)	Wood Lake Dr SE	Commercial Dr SW	Maine Ave SE (Garden Drive/M-1468)	St. Bridget Road SE	45th St SE	Fern Ave SE (MSAS 157)
12	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																											
13	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																											
14	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																											
15	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																											
16	Permanent ROW	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Construction Area																											
17	Permanent ROW	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																											
18	Permanent ROW	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																											
19	Permanent ROW	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Construction Area																											
20	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
	Construction Area																											
21	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Construction Area																											
22	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	Construction Area																											

Segment		Human Settlement																										
		Number of Existing Roads, Railroads, and Pipelines Crossed (# of crossings)																										
		60th Ave NW	19th St NW	NNG Pipeline	14th St NW	DM&E Railroad	Trunk Highway 14	70th Ave SW	County Road 34/ Country Club Rd W	BP Pipeline	10th St SW	20th St SW	County Road 25/ Salem Rd SW	60th Ave SW	40th St SW	55th Ave SW	50th St SW	County Road 8/ Bamber Valley Rd SW	48th St SW	48th St SE/MSAS 155/ CSAH 20	11th Ave SW	U.S. Highway 63/ Broadway Ave	U.S. Highway 63/ Broadway Ave Ramps (1404, 3198, 671, 5756, and 5380)	Wood Lake Dr SE	Commercial Dr SW	Maine Ave SE (Garden Drive/M-1468)	St. Bridget Road SE	45th St SE	Fern Ave SE (MSAS 157)
23	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																											
24	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0
	Construction Area																											
25	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																											
26	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Construction Area																											
27	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	1	2	0	0	0
	Construction Area																											
28	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	2	2	0	0	0
	Construction Area																											
29	Permanent ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
	Construction Area																											

Segment		Water Resources														Vegetation											
			Geologic Sensitivity (acres)						Number of PWI Stream Crossings					NWI Wetlands (acres)		MLCCS Landcover Types (acres)											
		Length of pipeline in Decorah Edge (feet)	Very High	High	High Moderate	Moderate	Low Moderate	Low	Cascade Creek (M-034-071)	Unnamed Creek (M-034-071-002)	Unnamed Creek (M-034-071-002-001)	Willow Creek (M-034-073-001)	Zumbro River (M-034)	Freshwater Emergent Wetland	Freshwater Forested/ Shrub Wetland	Agricultural Land	Maintained Tall Grass	Tree Plantation	Forest	Wetland Forest	Shrubland	Wetland Emergent Vegetation	Short Grasses	Tall Grasses	Dry Tall Grasses	Open Water	Impervious Lands
1P	Permanent ROW	0.0	0.0	0.0	0.0	0.0	4.7	2.5	0	1	0	0	0	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.7
	Construction Area		0.0	0.0	0.0	0.0	9.5	4.9						0.0	0.0	10.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	4.0
2P	Permanent ROW	0.0	0.0	0.0	0.0	0.0	1.8	9.8	0	0	1	0	0	0.0	0.0	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.0	0.0	1.1
	Construction Area		0.0	0.0	0.0	0.0	3.6	19.8						0.0	0.0	14.9	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.6	3.3	0.0	4.3
3P	Permanent ROW	11,983.1	0.0	0.6	2.6	11.3	2.4	4.2	1	0	0	0	1	0.4	0.0	12.4	0.0	0.0	0.2	0.0	0.1	0.1	0.0	0.8	5.4	0.1	1.9
	Construction Area		0.0	1.2	5.1	22.5	4.8	8.5						0.8	0.0	20.6	0.0	0.0	0.4	0.0	0.1	0.3	0.0	1.4	8.8	0.1	10.5
4P	Permanent ROW	3,677.0	0.3	7.4	0.0	1.7	0.0	0.0	0	0	0	0	0	0.3	0.0	5.4	0.0	0.1	1.3	0.2	0.0	0.0	0.0	0.1	1.0	0.0	1.1
	Construction Area		0.6	14.8	0.0	3.4	0.0	0.0						0.7	0.0	8.9	0.0	0.1	2.2	0.4	0.0	0.1	0.0	0.2	1.5	0.0	5.4
5P	Permanent ROW	0.0	8.4	3.3	0.4	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	3.6	0.0	0.0	1.1	0.0	0.0	0.0	0.0	3.5	0.0	0.0	4.0
	Construction Area		16.9	6.7	0.8	0.0	0.0	0.0						0.0	0.0	6.0	0.0	0.1	1.8	0.0	0.0	0.0	0.0	5.8	0.0	0.0	10.8
6P	Permanent ROW	0.0	7.1	0.5	0.0	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	3.6	0.0	0.0	0.5	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0
	Construction Area		14.2	1.0	0.0	0.0	0.0	0.0						0.0	0.0	7.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0
7P	Permanent ROW	463.4	2.9	1.8	0.0	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	3.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.1
	Construction Area		5.8	3.6	0.0	0.0	0.0	0.0						0.0	0.0	6.4	0.0	0.0	0.4	0.0	0.0	0.0	0.0	2.3	0.1	0.0	0.2
8P	Permanent ROW	4,129.3	0.0	6.0	0.6	0.0	0.0	0.0	0	0	0	1	0	0.2	0.4	2.5	0.2	0.0	2.1	0.0	0.0	0.0	0.0	0.4	0.8	0.0	0.6
	Construction Area		0.0	12.1	1.3	0.0	0.0	0.0						0.4	0.9	5.0	0.4	0.0	4.1	0.0	0.0	0.0	0.0	0.7	1.3	0.0	1.7
9P	Permanent ROW	0.0	0.0	4.3	0.0	0.0	0.4	0.0	0	0	0	0	0	1.4	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.5	0.0	2.0	0.8	0.0	1.2
	Construction Area		0.0	8.6	0.0	0.0	0.8	0.0						2.6	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.9	0.0	4.0	1.7	0.0	2.3
10	Permanent ROW	0.0	0.0	0.0	0.0	0.0	6.3	0.0	0	1	1	0	0	0.0	0.0	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.1
	Construction Area		0.0	0.0	0.0	0.0	12.6	0.1						0.0	0.0	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.1	0.4
11	Permanent ROW	8,235.1	0.0	2.4	4.1	7.0	0.0	3.2	1	0	0	0	1	0.8	0.0	13.2	0.0	0.0	0.7	0.0	0.1	0.0	0.0	1.5	0.3	0.1	0.7
	Construction Area		0.0	4.8	8.3	13.9	0.0	6.5						1.6	0.0	25.7	0.0	0.0	1.4	0.0	0.3	0.0	0.0	3.1	0.6	0.0	2.3

Segment		Water Resources														Vegetation											
			Geologic Sensitivity (acres)						Number of PWI Stream Crossings					NWI Wetlands (acres)		MLCCS Landcover Types (acres)											
		Length of pipeline in Decorah Edge (feet)	Very High	High	High Moderate	Moderate	Low Moderate	Low	Cascade Creek (M-034-071)	Unnamed Creek (M-034-071-002)	Unnamed Creek (M-034-071-002-001)	Willow Creek (M-034-073-001)	Zumbro River (M-034)	Freshwater Emergent Wetland	Freshwater Forested/ Shrub Wetland	Agricultural Land	Maintained Tall Grass	Tree Plantation	Forest	Wetland Forest	Shrubland	Wetland Emergent Vegetation	Short Grasses	Tall Grasses	Dry Tall Grasses	Open Water	Impervious Lands
12	Permanent ROW	3,185.6	0.0	4.8	0.0	2.5	0.0	0.0	0	0	0	0	0	0.2	0.0	0.6	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.2
	Construction Area		0.0	9.8	0.0	5.0	0.0	0.0						0.4	0.1	1.4	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	11.6	0.0	0.4
13	Permanent ROW	0.0	1.9	0.3	0.9	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	1.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	Construction Area		3.8	0.7	1.8	0.0	0.0	0.0						0.0	0.0	2.8	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.4
14	Permanent ROW	0.0	1.3	0.3	1.6	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	2.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
	Construction Area		2.6	0.7	3.2	0.0	0.0	0.0						0.0	0.0	4.6	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.1
15	Permanent ROW	0.0	1.1	0.0	0.2	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Construction Area		2.2	0.0	0.4	0.0	0.0	0.0						0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	Permanent ROW	0.0	4.4	0.0	3.6	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	4.4	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.7	1.7	0.0	0.1
	Construction Area		8.6	0.0	7.4	0.0	0.0	0.0						0.0	0.0	8.3	0.0	0.0	2.7	0.0	0.0	0.0	0.0	1.2	3.4	0.0	0.4
17	Permanent ROW	2,103.2	0.9	0.4	3.0	1.6	0.0	0.0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.6	0.0	5.1
	Construction Area		1.9	0.9	5.9	3.1	0.0	0.0						0.0	0.0	0.8	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.4	1.3	0.0	7.8
18	Permanent ROW	0.0	2.6	0.0	0.8	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.9	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.5	0.9	0.0	0.1
	Construction Area		5.3	0.0	1.6	0.0	0.0	0.0						0.0	0.0	1.8	0.0	0.0	2.2	0.0	0.0	0.0	0.0	1.0	1.7	0.0	0.2
19	Permanent ROW	0.0	6.6	0.0	1.6	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	3.2	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.1	3.1	0.0	0.1
	Construction Area		13.3	0.0	3.3	0.0	0.0	0.0						0.0	0.0	7.3	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.2	5.6	0.0	0.3
20	Permanent ROW	0.0	6.0	0.0	1.7	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	3.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	2.1	0.0	1.7
	Construction Area		12.0	0.0	3.4	0.0	0.0	0.0						0.0	0.0	5.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	3.5	0.0	5.5
21	Permanent ROW	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.3
	Construction Area		3.0	0.0	0.0	0.0	0.0	0.0						0.0	0.0	0.7	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.8	0.0	0.0	1.2
22	Permanent ROW	0.0	6.0	1.6	0.0	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	3.1	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.7
	Construction Area		12.1	3.3	0.0	0.0	0.0	0.0						0.1	0.0	5.1	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.8	0.0	0.0	5.6
23	Permanent ROW	0.0	0.9	0.5	0.0	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.0	0.0	0.0	0.0

Segment		Water Resources														Vegetation											
			Geologic Sensitivity (acres)						Number of PWI Stream Crossings					NWI Wetlands (acres)		MLCCS Landcover Types (acres)											
		Length of pipeline in Decorah Edge (feet)	Very High	High	High Moderate	Moderate	Low Moderate	Low	Cascade Creek (M-034-071)	Unnamed Creek (M-034-071-002)	Unnamed Creek (M-034-071-002-001)	Willow Creek (M-034-073-001)	Zumbro River (M-034)	Freshwater Emergent Wetland	Freshwater Forested/ Shrub Wetland	Agricultural Land	Maintained Tall Grass	Tree Plantation	Forest	Wetland Forest	Shrubland	Wetland Emergent Vegetation	Short Grasses	Tall Grasses	Dry Tall Grasses	Open Water	Impervious Lands
	Construction Area		1.9	1.2	0.0	0.0	0.0	0.0						0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.2	0.0	2.1	0.0	0.0	0.0
24	Permanent ROW	1,652.7	1.8	3.1	0.0	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.2	0.3	3.7	0.0	0.0	0.3
	Construction Area		3.6	6.4	0.0	0.0	0.0	0.0						0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.4	0.6	5.9	0.0	0.0	2.3
25	Permanent ROW	1,043.7	0.0	1.2	0.0	0.0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.1
	Construction Area		0.0	2.6	0.0	0.0	0.0	0.0						0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.5	0.0	0.0	0.1	0.0	0.7
26	Permanent ROW	2,898.1	0.0	3.4	1.2	0.0	0.0	0.0	0	0	0	1	0	0.0	0.1	1.9	1.3	0.0	0.6	0.0	0.0	0.1	0.0	0.1	0.6	0.0	0.0
	Construction Area		0.0	6.9	2.3	0.0	0.0	0.0						0.0	0.1	3.8	2.7	0.0	1.2	0.0	0.0	0.2	0.0	0.1	1.2	0.0	0.0
27	Permanent ROW	5,381.3	0.0	2.7	2.7	0.0	0.9	0.6	0	0	0	1	0	0.0	0.1	2.7	0.1	0.2	0.1	0.2	0.0	0.9	0.0	0.3	0.3	0.2	2.0
	Construction Area		0.0	5.6	5.4	0.0	1.9	1.2						0.0	0.4	5.5	0.2	0.3	0.3	0.6	0.0	1.9	0.0	0.5	0.7	0.3	3.9
28	Permanent ROW	4,462.0	0.0	2.0	2.4	0.0	0.4	0.6	0	0	0	1	0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.3	1.8	0.0	0.4
	Construction Area		0.0	4.1	4.8	0.0	1.9	1.2						0.0	0.0	5.5	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	3.7	0.0	0.9
29	Permanent ROW	3,115.4	0.0	0.0	0.4	0.8	5.1	0.0	0	0	0	0	0	0.1	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1
	Construction Area		0.0	0.0	0.7	1.6	10.3	0.0						0.3	0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	3.9

Segment		Wildlife						Cultural Resources	
		Wildlife Habitat Types (acres)						Previously Recorded Cultural Resource Sites	
		Upland Forest	Wetland Forest	Scrubland	Grasslands	Emergent wetland	Open Water	Number of Architectural Sites (Construction Area/1 Mile Region of Influence)	Number of GLO Sites (Construction Area/1 Mile Region of Influence)
1P	Permanent ROW	0.0	0.0	0.0	0.2	0.0	0.0		
	Construction Area	0.0	0.0	0.0	0.3	0.0	0.0	0/0	4/38
2P	Permanent ROW	0.0	0.0	0.0	2.2	0.0	0.0		
	Construction Area	0.3	0.0	0.1	3.8	0.0	0.0	0/0	6/56
3P	Permanent ROW	0.2	0.0	0.1	6.3	0.1	0.1		
	Construction Area	0.4	0.0	0.1	10.2	0.3	0.1	0/0	5/81
4P	Permanent ROW	1.4	0.2	0.0	1.1	0.0	0.0		
	Construction Area	2.3	0.4	0.0	1.7	0.1	0.0	0/0	7/59
5P	Permanent ROW	1.1	0.0	0.0	3.5	0.0	0.0		
	Construction Area	1.9	0.0	0.0	5.8	0.0	0.0	0/0	8/82
6P	Permanent ROW	0.5	0.0	0.0	3.5	0.0	0.0		
	Construction Area	1.4	0.0	0.0	6.7	0.0	0.0	0/0	3/85
7P	Permanent ROW	0.1	0.0	0.0	1.1	0.0	0.0		
	Construction Area	0.4	0.0	0.0	2.4	0.0	0.0	0/1	5/57
8P	Permanent ROW	2.1	0.0	0.0	1.4	0.0	0.0		
	Construction Area	4.1	0.0	0.0	2.4	0.0	0.0	0/1	4/62
9P	Permanent ROW	0.0	0.0	0.0	3.0	0.5	0.0		
	Construction Area	0.0	0.0	0.0	6.1	0.9	0.0	0/0	2/56
10	Permanent ROW	0.0	0.0	0.0	0.9	0.0	0.0		
	Construction Area	0.0	0.0	0.0	1.8	0.0	0.1	0/0	3/37
11	Permanent ROW	0.7	0.0	0.1	1.8	0.0	0.1		
	Construction Area	1.4	0.0	0.3	3.7	0.0	0.0	0/0	4/78
12	Permanent ROW	0.6	0.0	0.0	5.9	0.0	0.0		
	Construction Area	1.4	0.0	0.0	11.6	0.0	0.0	0/0	3/52
13	Permanent ROW	0.5	0.0	0.0	0.0	0.0	0.0		
	Construction Area	0.9	0.0	0.0	0.1	0.0	0.0	0/0	8/55
14	Permanent ROW	0.3	0.0	0.0	0.6	0.0	0.0		
	Construction Area	0.7	0.0	0.0	1.2	0.0	0.0	0/0	5/49

Segment		Wildlife						Cultural Resources	
		Wildlife Habitat Types (acres)						Previously Recorded Cultural Resource Sites	
		Upland Forest	Wetland Forest	Scrubland	Grasslands	Emergent wetland	Open Water	Number of Architectural Sites (Construction Area/1 Mile Region of Influence)	Number of GLO Sites (Construction Area/1 Mile Region of Influence)
15	Permanent ROW	1.3	0.0	0.0	0.0	0.0	0.0		
	Construction Area	2.6	0.0	0.0	0.0	0.0	0.0	0/0	3/50
16	Permanent ROW	1.1	0.0	0.0	2.4	0.0	0.0		
	Construction Area	2.7	0.0	0.0	4.6	0.0	0.0	0/0	5/79
17	Permanent ROW	0.1	0.0	0.0	0.6	0.0	0.0		
	Construction Area	1.5	0.0	0.0	1.8	0.0	0.0	0/0	3/66
18	Permanent ROW	1.1	0.0	0.0	1.3	0.0	0.0		
	Construction Area	2.2	0.0	0.0	2.7	0.0	0.0	0/0	0/53
19	Permanent ROW	1.8	0.0	0.0	3.1	0.0	0.0		
	Construction Area	3.3	0.0	0.0	5.8	0.0	0.0	0/0	3/79
20	Permanent ROW	0.1	0.0	0.0	2.3	0.0	0.0		
	Construction Area	0.1	0.0	0.0	3.9	0.0	0.0	0/0	6/83
21	Permanent ROW	0.2	0.0	0.0	0.6	0.0	0.0		
	Construction Area	0.3	0.0	0.0	0.8	0.0	0.0	0/0	2/59
22	Permanent ROW	2.3	0.0	0.0	0.5	0.0	0.0		
	Construction Area	3.8	0.0	0.0	0.8	0.0	0.0	0/0	2/80
23	Permanent ROW	0.0	0.0	0.0	1.0	0.1	0.0		
	Construction Area	0.0	0.0	0.0	2.1	0.2	0.0	0/0	0/49
24	Permanent ROW	0.0	0.0	0.0	4.0	0.2	0.0		
	Construction Area	0.0	0.0	0.0	6.5	0.4	0.0	0/1	2/59
25	Permanent ROW	0.8	0.0	0.0	0.0	0.3	0.0		
	Construction Area	1.3	0.0	0.0	0.1	0.5	0.0	0/1	4/46
26	Permanent ROW	0.6	0.0	0.0	2.0	0.1	0.0		
	Construction Area	1.2	0.0	0.0	4.0	0.2	0.0	0/1	1/54
27	Permanent ROW	0.3	0.2	0.0	0.7	0.9	0.2		
	Construction Area	0.5	0.6	0.0	1.4	1.9	0.3	0/1	0/64
28	Permanent ROW	0.0	0.0	0.0	2.2	0.9	0.0		
	Construction Area	0.0	0.0	0.0	3.7	1.9	0.0	0/1	0/60

Segment		Wildlife						Cultural Resources	
		Wildlife Habitat Types (acres)						Previously Recorded Cultural Resource Sites	
		Upland Forest	Wetland Forest	Scrubland	Grasslands	Emergent wetland	Open Water	Number of Architectural Sites (Construction Area/1 Mile Region of Influence)	Number of GLO Sites (Construction Area/1 Mile Region of Influence)
29	Permanent ROW	0.0	0.0	0.0	0.0	0.0	0.0		
	Construction Area	0.0	0.0	0.0	0.8	0.0	0.0	0/2	2/54

Appendix D

Commission Order Accepting Route Segments for Public Hearing

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BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Beverly Jones Heydinger	Chair
Nancy Lange	Commissioner
Dan Lipschultz	Commissioner
Matthew Schuerger	Commissioner
John Tuma	Commissioner

To: Official Service List

SERVICE DATE: July 26, 2016

DOCKET NO. G-011/GP-15-858

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

The above entitled matter has been considered by the Commission and the following disposition made:

Accepted the June 27, 2016 comments and recommendations of the EERA staff for route segments for consideration at the public hearing, as summarized below:

TABLE 1			
ROCHESTER NATURAL GAS PIPELINE ROUTE SEGMENT PROPOSALS			
MERC MODIFIED PREFERRED ROUTE SEGMENTS	ROUTE SEGMENT LOCTION ON FIGURE 2 MAPS	OTHER PROPOSED ROUTE SEGMENTS	ROUTE SEGMENT LOCTION ON FIGURE 2 MAPS
1P	Fig 2. P. 1	10	Fig 2. P. 1
2P	Fig 2. P. 1 & 2	11	Fig 2. P. 1 & 2
3P	Fig 2. P. 2 & 3	12	Fig 2. P. 2 & 3
4P	Fig 2. P. 2 & 3	13	Fig 2. P. 3
5P	Fig 2. P. 3 & 4	14	Fig 2. P. 3
6P	Fig 2. P. 3 & 4	15	Fig 2. P. 3
7P	Fig 2. P.3 & 4	16	Fig 2. P. 3
8P	Fig 2. P. 3 & 4	17	Fig 2. P. 3
9P	Fig 2. P. 4	18	Fig 2. P. 3
		19	Fig 2. P.3
		20	Fig 2. P. 3
		21	Fig 2. P. 3 & 4
		22	Fig 2. P. 3 & 4
		23	Fig 2. P. 3 & 4
		24	Fig 2. P. 3 & 4
		25	Fig 2. P. 3 & 4
		26	Fig 2. P. 3 & 4
		27	Fig 2. P. 4
		28	Fig 2. P. 4
		29	Fig 2. P. 4

TABLE 2			
ROUTE SEGMENT WIDTH INCREASES			
Route Segment No.	Original Route Width	Proposed Route Width	Figure 2 Page No.
4P	500'	700'	3
12	500'	865'	2 & 3
16	500'	700'	3 & 4
18 & 20	500'	800'	3
20 & 22	500'	800'	3 & 4
27	500'	2,000'	4

The Commission agrees with and adopts the recommendations of the Department of Commerce, which are attached and hereby incorporated into the Order. This Order shall become effective immediately.

BY ORDER OF THE COMMISSION

Daniel P. Wolf
Executive Secretary

This document can be made available in alternative formats (e.g., large print or audio) by calling 651.296.0406 (voice). Persons with hearing loss or speech disabilities may call us through their preferred Telecommunications Relay Service.

MINNESOTA DEPARTMENT OF COMMERCE

85 7TH PLACE EAST, SUITE 500
SAINT PAUL, MINNESOTA 55101-2198
MN.GOV/COMMERCE
651.539.1500 FAX: 651.539.1547
AN EQUAL OPPORTUNITY EMPLOYER

June 27, 2016

Mr. Daniel P. Wolf, Executive Secretary
Minnesota Public Utilities Commission
127 7th Place East, Suite 350
Saint Paul, MN 55101-2147

RE: Scoping for Comparative Environmental Analysis (CEA) and Route Proposals for the Rochester Natural Gas Pipeline Project
eDockets No. G-011/GP-15-858

Dear Mr. Wolf:

On February 3, 2016, the Minnesota Public Utilities Commission (Commission) issued an order (eDockets, Document ID 201510-114930-01) in the following matter:

> **In the Matter of the Application of Minnesota Energy Resources Corporation For a Route Permit for the Rochester Natural Gas Pipeline Project in Olmsted County**

In this order the Commission requested that the Minnesota Department of Commerce (DOC) "begin preparation and development of the comparative environmental analysis, including administering the route development process." The Commission also requested "that the Department file a summary, analysis, and recommendation on all route alternatives identified during the public comment period."

DOC Energy Environmental Review and Analysis (EERA) staff herein provide comments and recommendations in response to the Commission's request.

DOC EERA staff is available to answer questions the Commission may have.

Sincerely,

/s/Larry B. Hartman
Environmental Review Manager
Energy Environmental Review and Analysis
(651) 539-1839 | larry.hartman@state.mn.us

MINNESOTA DEPARTMENT OF COMMERCE

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

COMMENTS AND RECOMMENDATIONS OF MINNESOTA DEPARTMENT OF COMMERCE ENERGY ENVIRONMENTAL REVIEW AND ANALYSIS STAFF

DOCKET NO. G-011/GP-15-858

Date: June 27, 2016

DOC EERA Staff: Larry B. Hartman (larry.hartman@state.mn.us).....651-539-1839
Andrew Levi (andrew.levi@state.mn.us).....651-539-1840

In the Matter of the Application of Minnesota Energy Resources Corporation for a Pipeline Routing Permit for the Rochester Natural Gas Pipeline Project

Issues Addressed: These comments provide 1) an overview of the proposed project and associated facilities 2) an overview of non-jurisdictional projects, 3) procedural steps and requirements for jurisdictional and non-jurisdictional projects, 4) environmental review requirements, 5) scoping comments and route alternatives received, and 6) staff analysis and recommendations

Figures and Documents Attached:
Figure 1 Project Overview
Figure 2 Route Alternatives

Attachment 1 Pipeline Permitting Flow Chart
Attachment 2 Draft Scoping Document
Attachment 3 Scoping Comment Form
Attachment 4 Guidance Document: How to Suggest an Alternative Pipeline Route
Attachment 5 Index to eDocket Filings Submitted on Behalf of Franklin Kottschade

Additional documents and information can be found on the Minnesota eDockets webpage at: https://www.edockets.state.mn.us/EFiling/search.jsp by selecting "15" for year and "858" for number, or the Department of Commerce's Energy Environmental Review and Analysis website at: http://mn.gov/commerce/energyfacilities/Docket.html?Id=34318.

This document can be made available in alternative formats (that is, large print or audio) by calling 651-539-1530 (voice).

Introduction and Background

On November 3, 2015, Minnesota Energy Resources Corporation (MERC or applicant) filed an application for a Route Permit (Docket No. G-011/GP-15-858) with the Minnesota Public Utilities Commission (Commission) for its proposed Rochester Natural Gas Pipeline Project (proposed project) to construct and operate approximately 13.1 miles of new natural gas pipeline and associated facilities. Upon completion the proposed project will tie together the northern and southern portions of MERC's existing natural gas distribution system in and around the city of Rochester in Olmsted County, Minnesota.[1]

On November 9, 2015, MERC provided supplemental information summarizing existing environmental conditions for its proposed route alternatives.[2]

MERC is the sole provider of natural gas services to the city of Rochester and surrounding communities.[3] MERC supplies natural gas to approximately 230,000 customers (residents and businesses) in 165 communities across Minnesota.

The terms – route, route segment and right-of-way – are used extensively throughout this document. They are defined here to aid those unfamiliar with their legal definition.

> "Route" means the proposed location of a pipeline between two endpoints. A route may have a variable width from the minimum required for the pipeline right-of-way up to 1.25 miles. (Minn. R. 7852.0100, subp 31).
>
> "Route Segment" means a portion of a route. (Minn. R. 7852.0100, subp. 32).
>
> "Right-of-Way" means the interest in real property used or proposed to be used within a route to accommodate a pipeline and associated facilities. (Minn. R. 7852.0100, subp. 30).

Project Purpose

The proposed project is designed to expand the capacity of MERC's natural gas distribution system to meet the projected increase in demand from its existing Rochester area customers, as well as from new customers. The city of Rochester is expected to grow significantly as a result of the development of Mayo Clinic as a Destination Medical Center. Additionally, the proposed project—coupled with actions to be taken by Northern Natural Gas (NNG)-- will provide MERC with the ability to shift the supply of natural gas to where it is

[1] Minnesota Energy Resources Corporation, *Application to the Minnesota Public Utilities Commission for a Route Permit for the Rochester Natural Gas Pipeline Project*, November 3, 2015, eDockets No. 201511-115408-01, 201511-115408-02, 201511-115408-03, 201511-115408-04, 201511-115408-05, 201511- 115408-06, 201511-115408-07, 201511-115408-08. (Hereinafter "Application").

[2] Minnesota Energy Resources Corporation, *Supplemental Tables Regarding Existing Environmental Conditions for Route Alternatives*, November 9, 2015, eDockets No. 201511-115590-01.

[3] See eDockets, Document ID 201511-115408-01, p. 4.

needed on MERC's high pressure distribution system within the Rochester service area.[4]

Project Overview and Description

The proposed project will include installation of approximately 5.1 miles of 16-inch outside diameter and 8.0 miles of 12-inch outside diameter steel pipe designed to operate at pressures between 400-475 pounds per square inch gauge (psig). Additionally, MERC proposes to construct two town border stations (TBS) and one district regulator station (DRS). These facilities are described in more detail below.

- **Town Border Station (TBS).** Typically, a TBS serves as the custody transfer point for natural gas carried by transmission pipelines (usually from an "interstate transmission operator" to an "intrastate distribution operator" (public utility)), neither of which is the ultimate consumer of the gas. The TBS is also the point where the high pressure transmission gas (900 to 1000 or more psig) is regulated down to the level of high pressure distribution gas (400 to 500 psig). With the addition of the proposed TBSs, MERC will have three TBSs serving its distribution system in the Rochester service area.[5]

- **District Regulator Station (DRS).** The proposed district regulator station (DRS) will regulate high pressure distribution gas (400 to 500 psig) down to standard distribution pressure (60 to 100 psig) for delivery to MERC's low pressure distribution system that directly serves customers.[6]

As illustrated on (Figure 1), the proposed project will be constructed in three distinct phases.

- Phase 1 of the proposed project includes construction of a new MERC TBS 1D in the same area as the existing NNG TBS 1D located in the northwest quarter of section 30 in Cascade Township. With the new MERC TBS 1D, MERC, will be taking responsibility for all activities. To do this MERC will be installing pressure regulation and flow control valves, a line heater, odorization, and supervisory control and data acquisition (SCADA) station and metering. The new MERC TBS 1D will serve as the interface or transfer point between the gas transmission system owned by NNG and MERC's proposed high pressure distribution system. Construction of Phase 1 is scheduled for completion in 2017.[7]

  MERC only has control of odorization at NNG TBS 1D, while NNG controls the pressure regulation, line heater, flow metering and SCADA. MERC anticipates that NNG will modify TBS 1D as necessary to interface with the new proposed TBS 1D.

- Phase 2 of the project includes the installation of 5.1 miles of 16-inch outside

[4] See eDockets, Document ID 201511-115408-01, p. 5.
[5] *Id.* at p. 17.
[6] *Id.* at p. 17.
[7] *Id.* at p. 9.

diameter pipe with an operating pressure of 400 to 475 psig and construction of a new TBS. This phase of the proposed project will connect the new MERC TBS 1D with the proposed new TBS. The expected in-service date for completion of Phase 2 is 2019.[8]

MERC intends to locate the proposed TBS within or immediately adjacent to the designated route. In the new TBS, MERC will assume responsibility for all activities. MERC will be installing pressure regulation and flow control valves, a line heater, odorization, SCADA and metering. NNG will be responsible for the upstream natural gas transmission feed line entering the new TBS. It is assumed NNG will provide its own SCADA and metering equipment.

- Phase 3 of the project includes the installation of 8.0 miles of 12-inch pipe outside diameter pipe with an operating pressure of 250 to 275 psig from the new TBS to the new district regulator station (DRS).[9] This phase also includes construction of a new DRS, with an expected in-service date of 2022.[10] MERC will be installing pressure regulation and flow control valves, a line heater and SCADA at this site. After completion of Phase 3, NNG will be removing the existing Rochester 1B TBS.

Design Pressure

The proposed pipelines will be designed and constructed with a maximum allowable operating pressure of 500 psig.[11]

Class Location

Natural gas transmission pipelines are designed to comply with a "class location designation" as required by U.S. Code of Federal Regulations, 49 CFR 192.5. Class location refers to a regulatory designation for natural gas transmission lines that indicate the level of human population within a certain distance on either side of the pipeline. The class location of a pipeline is a factor in determining the maximum allowable pressure of the pipeline, and is based on the number and type of buildings intended for human occupancy that are situated in an area that extends 220 yards on either side of the centerline of any continuous 1.0 mile length of a gas pipeline.

Class locations are specified as Class 1, 2, 3 or 4. Class 1 indicates the least heavily populated of the class locations, representing an area with 10 or fewer buildings intended for human occupancy. Class 4 indicates the most heavily populated of the class locations, representing an area where buildings with four or more stories above ground are present. The proposed pipeline will be designed to a minimum of a Class 3 location.[12]

[8] *Id* at p. 9.
[9] I*d.* at p. 12.
[10] See eDockets, Document ID 201511-115408-01, p. 9.
[11] *Id.* at p. 9.
[12] *Id.* at p. 10.

Depth of Burial

Depth of burial for a natural gas transmission line under 49 CFR 192.327, for Class 2, 3 and 4 locations must be at least of 36-inches in normal soil conditions, 24-inches in consolidated rock, and 48-inches under navigable rivers and streams.

Minnesota Law regarding depth of cover is more stringent than the federal requirement. Minnesota Statutes 216G.07, Subdivision 1. [Depth of Cover] states:

> Unless waived in the manner provided in subdivisions 2 or 3, any pipeline installed after May 26, 1979, shall be buried with a minimum level of cover of not less than 4-1/2 feet in all areas where the pipeline crosses the right of way of any public drainage facility or any county, town, or municipal street or highway and where the pipeline crosses cultivated agricultural land. Where the pipeline crosses the right-of-way of any drainage ditch, the pipeline shall be at least 4-1/2 feet below the authorized depth of the ditch, unless waived in the manner provided in subdivisions 2 and 3.

Olmsted County Zoning Ordinance Article X, Section 10.40 also requires 4.5 feet of cover.[13]

Right-of-Way

The proposed project requires a permanent right-of-way of 50 feet (25 feet on each side of the center line) and an additional temporary right-of-way of 50-feet during project construction.[14] A right-of-way consists of consecutive property easements acquired by, or granted to the pipeline company. The easement or permanent right-of-way (50 feet) will provide sufficient space to perform pipeline maintenance and inspections, as well as a clear zone where encroachments can be monitored and prevented.

In its application, MERC requested a 500-foot route width along the length of the proposed project in which the permanent and temporary construction right-of-way could be located and a 1.25-mile buffer area in select locations to site or locate the proposed pipeline, TBSs, and DRS.[15]

Non-Jurisdictional Facilities

On occasion proposed energy projects may have associated facilities that are constructed in support of the project, but are outside the Commission's jurisdiction. These non-jurisdictional facilities are constructed upstream (before) or downstream (after) the jurisdictional facilities for the purpose of delivering, receiving, or using the proposed natural gas.

MERC's proposed project will require upstream facilities for delivery of natural gas to the

[13] See eDockets, Document ID 201511-115408-01, p. 17.
[14] *Id*. at p. 16.
[15] I*d*. at p. 16.

proposed transmission system and downstream facilities for distribution of natural gas to end users, including the proposed Rochester Public Utilities (RPU) 48-Megawatt (MW) natural gas fired generating facility that will be located just east and south of NNG's existing TBS 1D as shown in Figure 2, page 1.

The following provides an overview of the project's related non-jurisdictional facilities. The primary permitting requirements for these non-jurisdictional facilities are discussed in the "Regulatory Process and Procedures" section of this document.

Northern Natural Gas (NNG)—Upstream Facilities

To assure firm and reliable natural gas service at increased levels in the Rochester area for the foreseeable future, MERC and NNG, an interstate natural gas company, are negotiating a 30-year pipeline capacity contract whereby NNG will increase the capacity of its existing interstate pipeline transmission infrastructure to provide natural gas at volumes sufficient to meet the projected growth in MERC's customer demand.[16]

On March 22, 2016, EERA staff contacted Craig Eller of NNG, to inquire about the upstream facility requirements NNG has identified as necessary to support MERC's Rochester expansion project. In a March 24, 2016, email, Mr. Eller provided EERA staff with information and a map identifying NNNG's preliminary facility requirements.[17] Mr. Eller's email noted that their proposed facilities, similar to MERC's project, will be constructed in two phases as follows:

Phase 1: The first phase is expected to be completed in 2018 and consists of the following facilities:

- A new 15,900-hp (ISO) rated compressor station near Lake Mills, Iowa.
- Modifications at existing NNG TBS 1D.

Phase 2: The second phase is expected to be completed in 2019 and consists of the following facilities:

- Installation of a new 12-mile pipeline lateral from the LaCrosse/Tomah branch line to MERC's proposed new TBS and pipeline near the intersection of 70th Avenue and Salem Road.
- A new TBS at the terminus of the lateral.
- Piping modifications at the existing LaCrosse/Tomah branch line take-off.
- Uprating the maximum allowable operating pressure (MAOP) of 8 miles of the existing LaCrosse/Tomah branch line.

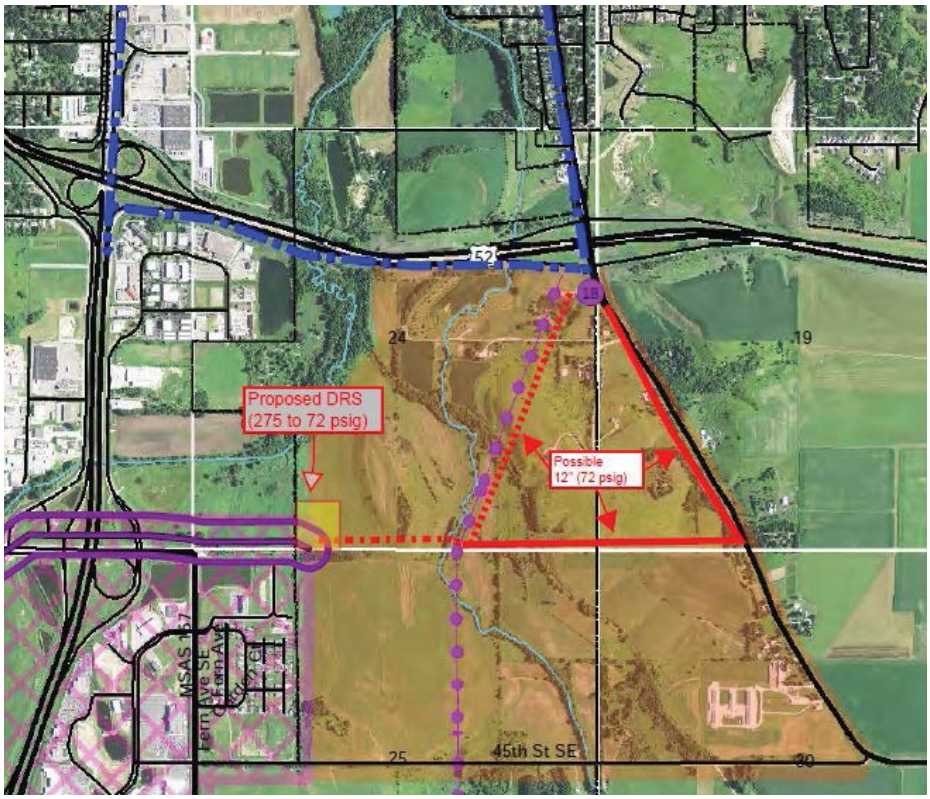
[16] *Id.* at p. 5.
[17] See eDockets, Document ID 20164-120644-01.

MERC's—Down Stream Low Pressure Distribution (under 275 psig) Facilities

In addition to upstream facilities from NNG, MERC also needs to connect its proposed high pressure distribution facilities (the proposed project) to its existing low pressure distribution infrastructure near MERC's existing TBS 1B. At this time, MERC intends to install a new DRS at the west end of the DRS buffer (see Figure 2, page 4). From there, MERC intends to install 12-inch pipe designed to be capable of operating at not more than 250 psig (to be operated) at 72 psig) from the new DRS to interconnect with the existing low pressure distribution infrastructure located south of Highway 52 at the location of MERC's TBS 1B. When the low pressure distribution facilities are completed, MERC will decommission TBS 1B.

MERC has identified two possible alignments for these low pressure distribution facilities as shown on the accompanying insert. MERC has not done detailed routing for these low pressure distribution facilities at this time but will install them within the District Regulator Station Buffer identified in the following illustration.

Potential alignments for low pressure distribution facilities



Rochester Public Utilities (RPU)

Rochester Public Utilities (RPU), a division of the city of Rochester, proposes to construct and operate a new 48 megawatt (MW) natural gas fired generating station, comprised of five natural gas reciprocating engines for electrical power generation. The proposed facility will be next to their existing Westside substation in Cascade Township, in the same quarter section as NNG's existing TBS 1D (see Figure 2, page 1). Power generated by the proposed generating station will serve RPU's customers and serve as a backup to intermittent resources such as wind and solar power generation during peak demand periods.

Regulatory Process and Procedures

The following regulatory process applies to the proposed project.

Certificate of Need

A certificate of need is not required for the proposed project because the project is not classified as a large energy facility under Minnesota Statutes § 216B.2421, or under Minnesota Rules, Chapter 7851 (Certificate of Need; Gas Storage, Pipeline).

Pipeline Route Permit

In Minnesota, no person may construct a high pressure pipeline without a pipeline routing permit issued by the Commission unless the pipeline is exempted from the Commission's routing authority (Minnesota Statute 216G.02 Subd.2.). A high pressure pipeline is a pipeline with a nominal diameter of six inches or more that is designed to transport hazardous liquids or a pipeline designed to be operated at a pressure of more than 275 pounds per square inch and to carry natural gas. The proposed project will be approximately 13 miles in length and be designed with a maximum operating pressure of 500 psig; therefore, the project requires a route permit from the Commission.

Commission review of the proposed project is taking place pursuant to the requirements of Minnesota Statute 216G.02 and the pipeline route selection procedures in Minnesota Rules, 7852.0800 to 7852.1900. These procedures are illustrated in Attachment 1.[18] The Minnesota Environmental Quality Board (EQB) developed and approved of the pipeline routing rules (Chapter 7852) as an alternative form of environmental review pursuant to the requirements of Minnesota Rules 4410.3600 [Alternative Review] on February 16, 1989.

The environmental review process requires the following procedural steps:

1) Application filing requirements and completeness review;
2) Application acceptance;
3) Notice requirements;
4) Public information/scoping meetings;

[18] See Attachment 1 or eDockets, Document ID 20146-100299-01.

5) A 70 day comment period that includes opportunities to propose additional routes and route segments;
6) Commission acceptance and authorization of routes and route segments to be considered at the public hearing;
7) Preparation of a comparative environmental analysis (CEA), which examines and evaluates all of the topics and issues identified during the comment/scoping period, as well as the routes and route segments authorized by the Commission for consideration at public hearing;
8) Submittal of the CEA as pre-filed testimony by the Department;
9) A second information meeting prior to the hearing; and
10) A public hearing.

In its Order issued on February 3, 2016, the Commission supplemented these requirements by requesting "that the Department issue the comparative environmental analysis in draft form for public comment and reply to substantive comments received as pre-filed testimony at least 14 days prior to the public hearing." [19]

Permitting Requirements for Non-Jurisdictional Facilities

The following identifies the Responsible Governmental Unit (RGU) with primary permitting authority for the proposed project's upstream and downstream facilities and the proposed Rochester Public Utilities (RPU) gas generating station.

Federal Energy Regulatory Commission (FERC)

With regard to NNG's proposed facilities to support the proposed project, NNG staff notes that "All proposed facilities are under Federal Energy Regulatory Commission (FERC) jurisdiction. While NNG has not finalized its regulatory approval plan, NNG expects to file any necessary Section 7(c) application and/or prior-notice filing under the Natural Gas Act with FERC after Commission approval of the applicant's' pipeline and cost recovery application."[20] The "Prior Notice" filing requirements may be done under a blanket certificate issued pursuant to Section 7 (c) of the Natural Gas Act. This provision allows a natural gas company to undertake a restricted array of routine activities without the need to obtain a case-specific certificate for each project, provided each activity complies with constraints on costs and environmental impacts set forth in FERC's regulations.

NNG is an interstate pipeline operator and under Minnesota Statute § 216G.06 [Interstate Gas Pipeline Exempt Under Federal Law]: "Any person that proposes to construct or operate an interstate natural gas pipeline and that has power to acquire an easement or right-of-way agreement for that pipeline by an action in eminent domain under the authority of the federal Natural Gas Act, United States Code, title 15, chapter 15B, shall not be required to comply with the provisions of sections 216G.02 to 216G.05 as a condition of acquiring the easement, right-of-way, or route."

[19] Order Finding Application Complete, February 3, 2016. See eDockets, Document ID 20162-117966-01, p. 9.
[20] See eDockets, Document ID 20164-120644-01.

City of Rochester

Pursuant to Minnesota Statute chapter 216G proposed pipelines designed to be operated at a pressure of more than 90 pounds per square inch, but less than 275 psig, require preparation of an "Information Book" that must be approved of by the Commission, unless specifically exempted in Minnesota Statute 216G.01 Subd. 3. However, because MERC is a public utility, it is not subject to the "Information Book" requirements prescribed by Minn. Stat 216G.04 through 21G.05. Therefore, location of the downstream proposed low-pressure distribution system is not subject to Commission jurisdiction.

As a result, the City of Rochester and adjacent townships are the appropriate RGU's for location of MERC's low pressure distribution system pursuant to Minnesota Statute 216B.02 Subd. 4. [Public utility] and 216B.361 [Township Agreement with Natural Gas Utility]. The terms and conditions of a franchise agreement between MERC and a franchisee would govern the location of low pressure distribution facilities within the franchisee's jurisdictional boundaries.

Minnesota Pollution Control Agency (MPCA)

The proposed RPU generating project meets the threshold for two Environmental Assessment Worksheet (EAW) categories. The first is Minn. R. 4410.4300 Subp. 3 – Electric Generating Facilities, for which the EQB is designated as the Responsible Governmental Unit (RGU); the second is Minn. R. 4410.4300Subp. 15(B) – Greenhouse Gas Emissions, for which the Minnesota Pollution Control Agency (MPCA) is designated as the RGU. There is an agreement between the EQB and MPCA that makes MPCA the RGU for the Project. MPCA is in the process of preparing an EAW for the generating project. RPU anticipates that construction will begin in the fall of 2016.

Environmental Review

Procedural steps completed to date include:

On February 3, 2016, a Commission Order accepted the application as complete. The Order also authorized the EERA staff to:

1) Hold public information meetings;
2) Collect and analyze all route alternatives proposals; and
3) Provide a summary, analysis and recommendation for the Commission's review and determination of routes to be considered at hearing.

As noted earlier, the Order also requested that the DOC issue the CEA in draft form for public comment and reply to substantive comments received as pre-filed testimony at least 14-days prior to the public hearing.[21]

On February 4, 2016, the Commission issued a "Notice of Application Acceptance – Public

[21] Order Finding Application Complete, February 3, 2016. See eDockets, Document ID 20162-117966-01.

Information and Comparative Environmental Analysis Scoping Meeting".[22] It was distributed electronically and by paper in the following manner:

- The Commission's service list and units of government (federal, state and local).[23]
- Directly mailed to all landowners along the preferred and alternate route identified by MERC in its application.[24]
- Published Notice of Application Acceptance appeared in the Rochester *Post-Bulletin* on February 11, 2016,[25] and in the *EQB Monitor,* Volume 40, Number 7 on February 15, 2016.[26]
- Directly mailed to all landowners along the preferred and alternate routes identified by MERC in its application.[27]
- Posted to eDockets[28] and the Department's EERA website.[29]

Public Information (Scoping) Meetings

Minnesota Rule 7852.1300 requires that public information/scoping meeting be held in each county crossed by the applicant's preferred pipeline route, unless a variance is granted by the Commission. The purpose of these meetings is to explain the route designation process, to respond to questions raised by the public, and to solicit comments on route and route segment proposals and other issues that should to be examined in greater detail in the CEA prepared for the project.

On February 29, 2016, Commission and EERA staff held two public information/scoping meetings in Olmsted County.

[22] "Notice of Application Acceptance – Public Information and Comparative Environmental Analysis Scoping Meeting", See eDockets, Document ID 20162-117991-01.
[23] Commission Service list, See eDockets, Document ID 20162-117966-02.
[24] See eDockets, Document ID 20162-117991-02.
[25] Affidavit of Publication *Post-Bulletin*, See eDockets, Document ID 20163-119141-01.
[26] *EQB Monitor*, Publication Date: February 15, 2016, Vol. 40, No.7., See eDockets, Document ID 20164-119984-01.
[27] See eDockets, Document ID: 20161-117418-01 & 20161-117779-01.
[28] See eDockets, Document ID: 20162-117966-02.
[29] http://www.mn.gov/commerce/energyfacilities/Docket.html?Id=34318.

Information/Scoping Meetings
for the
Rochester Natural Gas Pipeline Project

COUNTY	CITY	DATE AND TIME	ATTENDANCE
Olmsted	Rochester	Monday, February 29, 2016 2:00-4:00 p.m.	Approximately 25 to 30 persons
Olmsted	Rochester	Monday, February 29, 2016 6:00-8:00 p.m.	Approximately 15 to 20 persons

The format of the meetings was the same. All meetings started with an overview presentation provided by Commission staff, followed by a brief MERC overview of the proposed project, and then EERA staff provided an overview of the Commission's route permitting process.[30] These presentations were followed by questions and comments from the public and responses from Commission, MERC and EERA staff as appropriate.[31]

EERA staff handouts at the information/scoping meeting included:

- A Draft Scoping Document, dated February 29, 2016 (see Attachment 2)
- A comment form (see Attachment 3).
- A guidance document titled "*How to Suggest an Alternative Pipeline Route*" (see Attachment 4)

In addition to the information/scoping meetings, the Rochester Township Board requested that MERC representatives and EERA staff attend their monthly meeting on May 12, 2016, to provide information on the proposed project, an overview of the Commission's regulatory review process for pipelines, and to respond to questions from the Board and the public. On June 3, 2016, EERA staff spoke with the chair of Rochester Township Board, who indicated that while they did not send any written comments, they nonetheless wanted to be kept informed of project related activities.

The initial comment period, as provided for in the published notice, closed April 13, 2016; however, some landowners were inadvertently omitted and did not receive the notice. To correct this, a second notice was distributed providing these landowners with the opportunity to provide comment. Following the close of the comment/scoping period (April 13, 2016) and supplemental comment/scoping period (May 30, 2016) EERA staff posted all comments received to eDockets.

[30] Commission, MERC and DOC EERA Power Point Presentation, See eDockets ID # 20162-118358-01.
[31] Oral Record of Information/Scoping Meeting, See eDockets, Document ID 20164-119800-01.

Scoping Comments and Route Proposals

As with previous pipeline route permit proceedings under the full review process, the Commission, in its February 3, 2016, "Order Finding Application Substantially Complete and Granting Variance: Notice of Hearing" authorized "the Department to administer the route development process and the development of the comparative environmental analysis." [32]

Twenty-eight (28) separate comments were provided by the close of the April 13, 2016, and May 30, 2016, comment periods through various methods, including oral comments provided at the public meetings and documents submitted to DOC EERA staff by mail and email. The following summarizes all comments received, including route segment proposals.

In some instances EERA provides a comment in an attempt to provide clarity to the reader, in so much that the reader does not need to move between sections of this document.

Oral Comments Received on February 29, 2016

At the February 29, 2016, public information/scoping meetings oral comments were provided by: Louis Siefert, Daniel DeCook, Carol Overland, Thomas Roetzler, John Donovan, Mark Darnell, Stan Dee, Frances Passe, Dennis Dore, Douglas Cranston, Bruce Ryan, Gary Vasdev, Bud Hanson, and Robert Pyfferoen. A record of the oral comments is available on the Commission's website (see eDockets, Document ID 20164-119800-01).

Afternoon Oral Comments

- Mr. Louis Siefert wanted to know if residents along the proposed pipeline could tap the proposed pipeline for gas service to their homes or farms (see Document ID 20164-119800-01, pages 24-27).

- Daniel DeCook's asked questions about the location of the new proposed TBS and depth of burial for the proposed pipeline (see Document ID 20164-119800-01, pages 27- 32).

- Carol Overland's questions focused on whether "phased and connected actions" would be addressed in the environmental review including the need for NNG to run a gas line into the area to provide MERC with natural gas for their proposed project, and suggested that NNG's project(s) be included in the scope for environmental review. Ms. Overland also had questions about a gas plant proposed by RPU and suggested that the environmental review document also address that proposal. With regard to "socioeconomic impacts and safety impacts," Ms. Overland questioned how "this project relates to the city and county comp plans and the zoning" and "safe separation distances from natural gas transmission pipelines" (see Document ID 20164-119800-01, pages 33 – 39).

[32] See eDockets, Document ID 20162-117966-01

EERA Comment: See previous discussion of "Non-jurisdictional Facilities" and "Permitting Requirements for Non-Jurisdictional Facilities."

Ms. Overland also submitted to DOC EERA staff at the meeting the following documents identified as:

1. "2012 Infrastructure Update to Electric Utility Baseline Strategy for 2005-2030 Electric Infrastructure", prepared for Rochester Public Utilities, by Burns & McDonnell (August 2012).[33]
2. "2015 Update of the RPU Infrastructure Study", prepared for RPU by Burns & McDonnell (June 2015).[34]
3. Court of Appeals Decision (A15-0016), filed September 14, 2015 regarding the Sandpiper Pipeline Project.[35]
4. "Safe Separation Distances from Natural Gas Transmission Pipelines" by James S. Haklar and Robert Dresnack, Journal of Pipeline Safety (Autumn 1999).[36]
5. "A Model for Sizing High Consequence Areas Associated with Natural Gas Pipelines", by Mark J. Stephens, prepared for Gas Research Institute (October 2000).[37]
6. Miscellaneous documents (press releases, news stories, meeting minutes from Rochester Public Utilities, resolutions) regarding proposed generation infrastructure plans for Rochester Public Utilities.[38]

- Thomas Roetzler questioned how close buildings could be from pipelines, whether you could plant trees on the pipeline right-of-way, and how compensation is handled under eminent domain proceedings. (see Document ID 20164-119800-01, pages 39 – 42).

- John Donovan inquiries addressed pipeline safety, whether the safety standards are set by the federal or state government, and depth of burial. Mr. Donovan also wanted to know if the pipeline was going to be located on private land or located in public road right-of-way (see Document ID 20164-119800-01, pages 42 – 47).

- Mark Darnell and Stan Dee expressed concern about the location of MERC's preferred route on their property (Section 29 Rochester Township), approximately 200 acres, and indicated they would prefer the alternate route which would not split their property down the middle. Mr. Darnell suggested that the preferred route be moved south approximately 300 yards in order to follow their property lines and a natural tree line, which meets up with 48th Street. By doing this, Mr. Darnell stated:

[33] See eDockets, Document ID 20164-120802-01.
[34] See eDockets, Document ID 20166-122015-01.
[35] See eDockets, Document ID 20164-120838-01.
[36] See eDockets, Document ID 20164-120797-01.
[37] See eDockets, Document ID 20164-120800-01.
[38] See eDockets, Document ID 20164-120796-01.

"you'd go right across our fence and you would not disrupt our farming operations or our business in there" (see Document ID 20164-119800-01, pages 47 – 52).

EERA Comment: See proposed Route Segment 19, Figure 2, page 3.

- Frances Passe wanted to know why the proposed pipeline changes sizes, how it would cross the Zumbro River, and on what side of 60th Street the pipeline would be located. Ms. Passe suggested that MERC take the alternate route and not go kitty-corner across her field (see Document ID 20164-119800-01, pages 53 – 60).

  EERA Comment: Ms. Passe's comments were in reference to the existing BP pipeline location. The proposed location is on the west side of 60th Street.

- Dennis Dore pointed out that in the vicinity of where the preferred route ends (40th Street and Highway 63) is a protected wetland and that there is a transfer station there, as well as two hotels and two new apartment buildings under construction. Mr. Dore also pointed out that the alternate route which goes south of 45th Street is on the south side of a new development. Mr. Dore also commented that "in the last twelve months we've had 80 townhomes and over 410 apartments and two new hotels go up in the southeast section and they're continuing to build down there." Given the restrictions mentioned by Mr. Dore he would like to be appraised of updates (see Document ID 20164-119800-01, pages 60 – 63).

- Douglas Cranston wanted to know what happens in the event of a leak or rupture of the natural gas pipeline and the operating pressure of the pipelines proposed by MERC and NNG (see Document ID 20164-119800-01, pages 63 – 67).

Evening Oral Comments

- Bruce Ryan indicated that he has some nice mature trees on his property and would like to see the pipeline moved approximately 50 feet to the west so as to be located in the farm field. Subsequently Mr. Ryan submitted in writing an alternative route proposal discussed elsewhere in this document (see Document ID 20164-119800-01, p. 89 – 91).

  EERA Comment: See proposed Route Segment 12, Figure 2, page 3.

- Gary Vasdev asked: 1) how pipe that large could be bent and whether bending would affect the longevity of the pipe; 2) why not just follow the existing road right-of-way because the easements are already there and 3) is there compensation from the company for going over farm fields in the summertime (see Document ID 20164-119800-01, pages 91 – 93, 97 - 98).

- Bud Hanson. Wanted to know where the pipeline would be in relation to buildings on his property and how close the pipeline can go to his house (see Document ID 20164-119800-01, pages 93 – 96).

- Robert Pyffeeroen wanted to know what the construction timeline is (see Document ID 20164-119800-01, pages 96 – 97).

EERA Comment: The CEA will address the oral comments provided at the public information meetings.

Written Comments Received by April 13, 2016

Minnesota Department of Transportation (MnDOT), (see eDockets Document ID 20164-120024-01.

In its April 13, 2016, letter MnDOT noted that pipelines may be placed across cross trunk highways as provided for in Minn. Stat. Section 222.37, subd.2. MnDOT requested that: "The environmental document address the permit requirements of MnDOT as well as all relevant permits or authorizations the Applicant must obtain from road authorities relating to any formal policy and procedures for accommodation of utilities, including pipelines, on the highway rights-of-way" and referenced their "Utility Accommodation Policy" available on their website (http://www.dot.state.mn.us/utility/policy/utilitypolicy.html).

MnDot's comments also noted that the proposed project crosses highways US 14 and US 63 and that permits to cross those "highways will need to address matters such as construction methods for boring under highways, impact on other utilities, traffic control in construction areas, authorized access points for construction activities, impact on highway drainage, impact on highway vegetation, and other similar concerns." Additionally, "Because the proposed US 63 crossing (40th St SE/SW may be within 75 feet of a MnDOT Bridge, the Applicant's Application for Utility Accommodation on Trunk Highway Right Of Way would also include a thorough review from our Bridges and Structure Office."

MnDOT's closing comments addressed Oversize/Overweight Permits for the hauling of pipe and equipment, including delivery or storage of materials or equipment that may affect MnDOT right-of- way and that MnDOT should be involved in planning and coordinating such activities.

EERA Comment: The CEA will address MnDot's comments.

Minnesota Department of Natural Resources (MNDNR), (see eDockets Document ID's 20164-120059-01, 20164-120059-02, 20164-120059-03 and 20164-120059-04.

The letter dated April 13, 2016, from the Minnesota Department of Natural Resources (DNR) offered several comments for consideration in the CEA for the proposed project. DNR's early coordination letter (August 2014) identified several sensitive, rare and valuable features within the project area (Sites of Biodiversity Significance, noted areas of high biological diversity, rare feature records, calcareous fens, karst features, DNR public waters, native plant communities ranked S3-vulnerable and Si–critically impaired) and suggested that potential impacts to these resources be fully explored and considered in the CEA and in route selection. DNR's letter also commented that calcareous fens (seepage meadows, wet seepage prairies) and impacts (direct or indirect) are regulated by the DNR in accordance

with the Minnesota Wetland Conservation Act, which prohibits any drainage unless the DNR, under an approved management plan, decides the alteration is necessary (Minnesota Statutes 103G.223).

DNR's letter also noted that several of the applicants proposed route segments involve the crossing of a DNR public water, wetland, or land and that crossing these features requires a DNR License to Cross. Other comments by the DNR suggested that portions of the preferred route, alternate routes and proposed DRS "polygon" have the potential to impact protected natural resource features and that a combination of routes and/or route segments that avoid these features may be warranted. In its letter the DNR encouraged the evaluation of a new route segment that would extend from the alternate route along 48th Street to the east and then north to the DRS "polygon" location.

DNR also suggested that the CEA should include an assessment of horizontal directional drilling as a mitigation measure for any impacts to native plant communities, Minnesota Biological Survey Sites of Biodiversity Significance, areas with rare plant species, or any other sensitive environmental feature found in surveys. DNR requested a description of where wildlife friendly erosion control will be used, and recommended it be used wherever possible, with a focus on areas used by amphibians, water crossings, near wetlands, and rare species habitat.

EERA Comment: The DNR's comments will be addressed in the CEA. DNR's route segment suggestion is identified as Route Segments 28 and 29 (See Figure 2, page 4).

Rochester-Olmsted Planning Department (see eDockets Document ID 20164-120596).

In its letter dated April 13, 2016, the Rochester-Olmsted Planning Department noted that MERC's preferred alignment, as originally proposed between County State Aid Highway (CSAH) 8 (Milepost (MP) 9.6) and 11th Ave SW (MP 11.6) bisects through developed, residentially planned land within the present Rochester urban growth area and that this alignment will affect the development potential of these properties. They also suggested that an alternative alignment further south along the 48th St. SW right-of-way would not have a negative effect on the growth of the area.

The planning department also commented that the "proposed pipeline cuts through the Decorah Edge in several locations, mostly on the southerly and easterly portion of the construction zone. The "Decorah Edge" is defined as the area in which the Decorah, Platteville, or Glenwood formation is the first encountered bedrock. To minimize impact on this sensitive feature it was suggested that the applicant: 1) minimize grading, 2) install seep collars or other mitigation strategies to control ground water movement along the pipe and 3) the use of vegetation to control erosion to mitigate potential changes to groundwater flows.

Their letter also questioned what construction mitigation strategies will be employed if subsurface excavation uncovers or exacerbates karst features, and if it is possible to replace tree cover within the pipeline right-of-way to minimize impact on wildlife habitat and visual appeal.

The planning department, in closing, requested that MERC share their Spill Prevention, Containment and Countermeasures Plan and other similar hazard mitigation documents with the Olmsted County Sheriff's Department, the City of Rochester Emergency Management Department, and the Rochester-Olmsted County Planning Department to ensure inclusion of these hazard/mitigation strategies into these public emergency management plans.

EERA Comment: The CEA will address the concerns identified by the Rochester-Olmsted Planning Department.

Irrold Hanson (see eDockets, Document ID 20164-120598-01)

Commented that "the proposed pipeline should be located in road rights-of-way."

EERA Comment: Nearly all route segments proposed and identified parallel existing road rights-of-way, rather than occupy rights-of-way because of existing right-of-way restrictions and safety related issues associated with longitudinal placement of linear infrastructure facilities within existing rights-of-way (roads, railroads, other types of pipelines, electric utility transmission lines, as well as any other type of right-of-way). There is also a difference in requirements depending on whether it is a perpendicular crossing or one that may parallel. This topic will be examined in the CEA.

Meyer Farms Inc. (see eDockets, Document ID 20164-120638-01)

Harry Meyer, president of Meyer Farms Inc., expressed opposition to MERC's preferred route along 70th Street between MP 4.1 and 4.5 because of the four farm tile lines crossing the road and the header tile running parallel with the road. Tiles are also located at 90 foot intervals for the entire one-half mile of road that the pipeline would parallel. The British Petroleum product pipeline also crosses Mr. Meyer's land. He expressed a preference for locating the proposed pipeline on the west side of that right-of-way.

Eugene Peters—Westridge Hills Corp (see eDockets, Document ID 20164-120640-01)

Mr. Peters provided comments via two emails and one attachment on April 11 and April 12, 2016. Mr. Peters is treasurer for the Westridge Hills Corporation (Westridge) and provided background on Westridge' s proposed development and addressed MERC's preferred route that crosses Section 27 in Rochester Township.

Mr. Peters indicated that the land owned by Westridge was acquired for development purposes more than 20 years ago and that they have 165 acres in Section 27. "The boundaries of the property are 48th St. SW on the South, 40th ST. SW on the North and 11 Ave SW on the East. We have created a general development plan for this property which is comprised of single family residential lots, a church site, commercial land, and regional retention pond and city parkland. The proposed route runs directly thru the back lots of our residential portion. These are the premium single family lots in this development with many 100 + year old trees in the direct path of this pipeline. Each of these lots is projected to sell for $250,000 per lot. Any removal of the trees within these lots will generally diminish each

lots value." In February 2007, Westridge filed a General Development Plan (06-275) to develop 79.31 acres of land for single family lots and a church located north of 48th Street SW.

Mr. Peters, who also contacted MERC, states: "After reviewing the new map the pipeline is shown crossing in the middle of the development planned by Westridge Hills Corp. This would effectively prevent the installation of city utilities north of the pipeline. Unless the line is very deep it will affect the placement of Sanitary Sewer, Water and Stormwater pipes in the middle of the development." Mr. Peters also stated a preference for locating the proposed preferred route along the 48th Street right-of-way and that if additional land along this route is needed Westridge would work with MERC. Mr. Peters also noted that along the original route proposed by MERC that rock will be encountered between two and three feet from the surface.

EERA Comment**:** MERC did submit a route alternative that follows 48th Street. See route segments 22 and 24, as illustrated on Figure 2, pages 3 and 4.

Jeff Broberg (WSB & Associates) on behalf of Mr. Franklin Kottschade (See eDockets, Document ID 20165-121015-01)

On April 13, 2016, Jeff Broberg (WSB & Associates) submitted comments objecting to the pipeline route proposed by MERC on behalf of Mr. Franklin Kottschade. Mr. Kottschade owns 14 parcels encompassing 190 acres located in the north half of the northwest one-quarter of the northwest corner of Section 26, Township 106N Range 14W, in the city of Rochester (see Figure 2, page 4). The comments note that "the proposed preferred route and route alternative buffer extending from station (Mile Post) 11.6 on the west, to 12.4 on the north, indirectly impacts his entire development and directly impacts 8 of Mr. Kottschade's 14 parcels."

The comments indicate that "the 14 Kottschade parcels located west of US 63, south of 40th St. SW, east of 11th Ave. SW and north of the platted lots to the south, encompassing a total of 190.5 acres, have been under various stages of development for more than 15 years. The Kottschade parcels, formerly known as the Cote Farm were subject to zoning changes and conditional use permits for mining and grading since the mid 1990's."

The comments point out that Mr. Kottschade "has sought and received permits, recorded plats and has entered into contractual Development Agreements with the City of Rochester and has outstanding option agreements for future commercial development." These "development plans accommodate sand and gravel extraction, site grading and infrastructure to serve 150 residential lots and 450,000 square feet of commercial buildings. These parcels have been substantially improved and received numerous permits and are not simply open agricultural lands as they might appear on air photos or on a quick site visit."

Closing comments note that "Mr. Kottschade objects to the proposed route for the Minnesota Energy pipeline through the 'SJC Parcels' as proposed. The alignment does not take into account the development history or the development plans and does not take into

account major disruptive impact that the pipeline would have to any plans and future development." Mr. Kottschade is requesting that the Commission "reject the proposed route and remand MERC's route proposal back to consider alternatives that do not have such a substantial impact on the growth of the southern corridor of the City of Rochester."

In a June 9, 2016, phone conservation Mr. Kottschade's representative informed EERA staff that sewers were installed on some of the commercial parcels during the winter of 2015-2016.

WSB, Mr. Kottschade's representative also filed 15 separate attachments related to various development plans for the parcels of land that will be developed within the city of Rochester. Attachment 5 provides an eDocket index and description of the documents submitted on behalf of Franklin Kottschade.

EERA Comment: MERC submitted a route segment alternative to minimize impact on the parcels Mr. Kottschade plans on developing. See route segments 8P (RS 8P) on Figure 2, pages 3 and 4.

Donna M. Anderson (See eDockets, Document ID (20164-120670-01)

Ms. Anderson suggested a route segment that would begin at the existing NNG TBS 1D in Section 30, just east of 60th Avenue and then proceed westward one-mile, adjacent to an existing NNG right-of-way that contains two natural gas pipelines, one operational and the other abandoned, to 70th Avenue. Ms. Anderson suggested this new route segment because it uses agricultural land (with lots of room) and only crosses 60th Avenue and not 19th Street, avoids crossing the lawns of two occupied homes on the north side of 19th Street and would be further away from the Olmsted County landfill.

EERA Comment: This suggestion is identified as proposed route segment 10 (RS 10) on Figure 2, page 1.

Bruce Ryan (See eDockets, Document ID (20164-120680-01)

Mr. Ryan suggested widening the route width along the British Petroleum Pipeline between MP 7.1 and 7.4 "in order to save the mature line of trees" as highlighted on the map he provided. To avoid the trees, Mr. Ryan suggested alternatives 1 and 2 on the map he provided. Mr. Ryan also commented that he believes the best place for the route would be to follow 60th Avenue immediately west of his property.

EERA Comment: Mr. Ryan's suggestion for increasing the route width is reflected in route segment 12 (RS 12), as illustrated on Figure 2, pages 2 and 3.

Ronald Jacobson (see eDockets, Document ID (20164-120688-01)

Mr. Jacobson stated a preference for the pipeline to be extended to 55th Avenue, follow 55th Avenue north and connect to the British Petroleum products pipeline right-of-way north of 40th Street. Mr. Jacobson provided two aerial photos depicting route proposals.

The first route proposal, would begin where the British Petroleum products pipeline right-of-way crosses 40th Street SW then extend southward approximately 0.5 miles the along the road right-of-way of 55 Avenue SW, then turn east to intersect the British Petroleum pipeline right-of-way (along MERC's original alternate route).

EERA Comment: This suggestion is identified as route segments 13 and 15 (RS 13 and RS 15) as illustrated on Figure 2, page 3.

Me. Jacobson's second route alternative, would begin where the British Petroleum products pipeline right-of-way crosses 40th Street SW then extend southward approximately 1.0 mile adjacent to the road right-of-way of 55 Avenue SW, then turn east and follow 50th Street SW east to the point where it intersects the British Petroleum pipeline right-of-way.

EERA Comment: This suggestion is identified as route segments 13 and 17 (RS 13 and RS 17) as illustrated on Figure 2, page 3.

Jerry Dee (see eDockets, Document ID (20164-120687-01)

Mr. Dee commented that "Our family owns the land between mile marker 9.3 and 9.6 in section 29 Rochester Township. We would prefer the gas line route to run on the preferred route along the north side of the farm." EERA staff spoke with Mr. Dee and he preferred that the route be widened so that the pipeline may be placed on the north side of the farm, rather than the south side as presently proposed by MERC. When asked about the trees along the property line, Mr. Dee indicated that they were "junk trees" and not important.

EERA Comment: Mr. Dee's suggested would widen out route segment 16 (RS 16) as illustrated on Figure 2, page 3, where it crosses his property, located just west of Highway 8.

Mark A. Darnell and Stanley Dee (see eDockets ID 20164-120689-01)

The comments by Mr. Darnell and Mr. Dee state:

> Our properties are located in Section 29 of Rochester Township. Mr. Dee and I stand united on our input and request. In general we do not oppose the natural gas line and understand the need for it to serve the growth of Rochester and Olmsted County. However, we do oppose the "**Proposed**" placement of the pipeline. Between the two of us we own approximately 200 acres. The "Proposed" gas line route will sever our properties in the middle. This would create hardship to Mr. Dee's farming and cattle operation and to my ranching operation.
>
> The most notable hardships for me would include, (depending the time of year the pipe is laid out and trenched), the inability to reach my hay field and grazing pasture, and the inability to contain my horses without significant work. The pipeline would sever two pastures in an East/West direction and my fence lines run in a North/South direction. Between the two pastures I have twenty six (26) head of horses. Also located in the East pasture is a

> horse arena. During the months of May through October we host several sanctioned saddle club horse shows and clinics. The line as proposed, would disrupt those shows. As for Mr. Dee the proposed route would sever his hay and corn field. Mr. Dee is dependent on his hay and crops to feed his cattle. The proposed route of the line crosses the wettest portion of my property, crossing three waterways and as it rises to Mr. Dee's property rock, shell rock and limestone are encountered making trenching a challenge.
>
> In lieu of accepting the proposed "Alternate" route as indicated on the map We would suggest yet another possible route that would not disrupt our operations. If the route were moved approximately 300 yards to the south (see attached Map-Option 2) it would follow the natural property lines and limit disruption to our properties. By following the natural property lines you would also gain the benefit of better ground for digging. The ground on our south fence lines is predominately dirt.

EERA Comment: Mr. Darnell's and Stan Lee's first suggestion (Option 2) is identified as (RS 19), as illustrated on Figure 2, page 3. Their second suggestion (Option 1) is identified as (RS 18 and RS 20) and requires a widening RS 18 on the east side of the BP products pipeline right-of-way, as well as on the north side of 50th Street SW, as illustrated on Figure 2, page 3.

Minnesota Energy Resources Corporation (see eDockets, Document ID 20164-120035-01)

In its April 13, 2016 filing, MERC, in response to landowner feedback, comments and concerns proposed two additional route segment alternatives for Commission consideration and inclusion in the CEA that will be prepared for this project.

MERC commented that landowner comments focused on issues associated with paralleling the existing BP products pipeline right-of-way (exposed pipeline, depth of burial product pipeline, constructability issues due to surface bedrock), and two proposed developments (Westridge Hills and Kottschade Mixed Use Development) that have received preliminary zoning approval (See discussion of Eugene Peters and Franklin Kottschade comments).

Because of these issues, MERC is proposing two alternative routes: 1) one as an alternate route to avoid the BP Pipeline and 2) a route alignment within the Route Alternative Buffer to avoid a potential development area.

Paralleling the BP Pipeline – 60th/40th Route Segment

> In its Route Permit Application (November 2015), MERC proposed its Preferred Route to parallel the existing BP Pipeline through Sections 19 and 30 of Rochester Township. MERC selected this as its Preferred Route because it was a route that minimized linear length and also allowed the Project to parallel existing linear infrastructure. MERC did not propose an alternative segment in its Route Permit Application in this area but had evaluated other routing options before selecting the Preferred Route and summarized its analysis of those options and the

reasons for not considering them further in its Route Permit Application (Pages 19, 20 and 50).

During the Scoping Meetings, we heard from several landowners regarding their concerns about the existing BP Pipeline in the area of our proposed Preferred Route. Of particular note were the comments some landowners made regarding the depth at which the BP Pipeline is buried on these properties. Comments at the Scoping Meetings and subsequent conversations with landowners indicate that the BP Pipeline in this area is buried at a shallow depth and perhaps may even be exposed in some areas. The construction of our Project near a crude oil pipeline located at a shallow depth poses significant constructability and right-of-way concerns related to the Project. If the BP Pipeline is located at a shallow depth, MERC would not be able to locate its Project directly adjacent to the existing pipeline right-of-way as was contemplated in the Route Permit Application because a shallow depth would necessitate additional space for construction equipment, construction safety, and access. Further, constructing parallel to a shallow depth pipeline would increase construction costs for the Project as additional construction protocol would need to be developed, including the potential need for additional ground matting and the purchase of additional land rights for construction access because construction equipment would not be able to cross the existing pipeline right-of-way.

Based on those concerns, MERC requests that the Comparative Environmental Analysis to be prepared by the Department of Commerce, Energy Environmental Review and Analysis (EERA) include the route segment (identified as the 60th/40th Route Segment) shown on Attachment 1 to this letter.

The 60th/40th Route Segment follows 60th Avenue SW south one mile from the intersection of 60th Avenue and Sections 18 and 19 of Rochester Township and Sections 13 and 24 of Salem Township. The 60th/40th Route Segment then turns east and follows 40th Street SW for approximately two miles to County Road 8. The 60th/40th Route Segment then turns south and follows County Road 8 for approximately one half mile until it rejoins the Preferred Route between Sections 28 and 29 of Rochester Township. The 60th/40th Route Segment is 500 feet in width, as is the Preferred Route. This route follows existing road rights-of-way for its entire length. A table comparing the 60th/40th Route Segment to the comparable segment of the Preferred Route alignment is included as Attachment 2 to this letter. The list of landowners within the proposed 60th/40th Route Segment 500-foot route width in this area is included as Attachment 3 to this letter.

EERA Comment: The 60th/40th proposal by MERC as described above, is illustrated on Figure 2, page 2 (RS 4P), that continues south 1.0 mile then turns east to parallel 40th Street for two miles until it intersects County 8 then turns south paralleling County Road 8 for 0.5 miles as illustrated on Figure 2, page 3 (RS 5P).

Development near Highway 63 – 11th/40th Route Segment

In our continuing discussions with stakeholders, a landowner recently notified MERC of a new mixed residential and commercial development within the Route Alternative Buffer proposed in its Route Permit Application. The Route Alternative Buffer was proposed because MERC identified this area as a high probability development area given the historical development in this area and its proximity to Highway 63. A General Development Plan has been approved by the City of Rochester and platted by Olmsted County in the north half of Section 26 of Rochester Township west of Highway 63. The same person also owns the property in the northwest quarter of this section and has a preliminary General Development Plan on file with the City of Rochester and has informed MERC he is in the process of preparing the filing for approval at this time. The Preferred Route alignment bisects both of these development plans. Because of this, MERC requests that the Comparative Environmental Analysis also include an alignment (with a 500-foot route width) within the Route Alternative Buffer that would follow 11th Avenue SW north for approximately a half mile from the Preferred Route, turn east on 40th Street and follow 40th Street SW for approximately a half mile until it rejoins the Preferred Route just west of Highway 63 (the 11th/40th Route Segment). The 11th/40th Route Segment follows existing road rights-of-way for its entire length within the Route Alternative Buffer. A map showing the 11th/40th Route Segment is included as Attachment 4 to this letter. A table comparing the 11th/40th Route Segment alignment to the comparable segment of the Preferred Route alignment is included as Attachment 5 to this letter. The property within the 11th/40th Route Segment 500-foot route width is entirely within the Route Alternative Buffer included in the Route Permit Application for the Project. In its review of the area, MERC did consider a route that would continue from the 60th/40th Route Segment along 40th Street SW east from 60th Avenue SW to rejoin the Preferred Route alignment instead of following County Road 8 south. MERC concluded, however, that the topography of the area along 40th Street SW and the proximity of homes to the 40th Street SW right-of-way would not allow for a route that was capable of being constructed along 40th Street SW in Section 27 of Rochester Township. MERC's Route Preference has compared the two route segments it proposes to be included in the Comparative Environmental Analysis with the comparable segments of the Preferred Route. Based on its review, MERC would prefer if the Project followed these two route

> segments instead of the Preferred Route in these areas. By following the 60th/40th Route Segment instead of the Preferred Route, the Project increases the total percentage of right-of-way paralleling by just over 10 percent, decreases the amount of forested area that would need to be cleared, and decreases total acres of wetland impacts for the Project. By following the 11th/40th Route Segment instead of the Preferred Route in this area, although the total Project length increases, the total percentage of right-of-way paralleling increases from zero to 100 percent. Also, fewer acres of wetland impacts are anticipated with the 11th/40th Route Segment. For these reasons, at this time, MERC prefers the Modified Preferred Route as shown on Attachment 6 to this letter for the Project.
>
> MERC requests that EERA include the 60th/40th Route Segment and the 11th/40th Route Segment in the Comparative Environmental Analysis that EERA is preparing.

EERA Comment: MERC's second route segment proposal (RS 8P) is illustrated on Figure 2, page 4.

Written Comments Received by May 30, 2016

Wayne and Earlen Laursen (see eDockets, Document ID 20166-122017-01)

The Laurens's comment stated: "The preferred route is, by far, our choice."

EERA Comment: The Laursen's, who live on 50 St SW, reference is to MERC's preferred route identified in its November 3, 2015, route permit application and now identified as route segment 16 (RS 16) as illustrated on Figure 2, page 3.

EERA Proposed Route Segments and Route Width Increases

EERA staff is proposing several route segments, as well as route width increases, as suggested by others and where EERA believes that an increase in the route width is warranted for consideration by the Commission.

Route Segment Proposals

The following EERA route segment proposals are intended to provide for cross-over points or links that connect one route segment to another, thereby increasing the routing options to be analyzed and evaluated in the record of this proceeding. Additionally, one route segment is proposed as an alternative to a proposed route segment that may not be viable for reasons identified in the following discussion.

RS 21 is a short segment connector that parallels County Road 8 between Sections 28 and 29 in Rochester Township. RS 21 increases the possible routing options by connecting

route segments 5P, 16, 19 and 20 to route segments 6P and 22, as illustrated on Figure 2, pages 3 or 4.

RS 23 is proposed as a connector between MERC's preferred route segment 6P in Section 27 in Rochester Township and the routes proposed to parallel 48 Street SW (RS 22 and RS 24), as illustrated on Figure 2, pages 3 or 4. This connector is proposed to increase the number of routing options for analysis and evaluation in the CEA.

RS 27, Figure 2, page 4, is proposed as an alternative to RS 28. EERA staff believes RS 28, as suggested by the DNR may not be viable because 48th Street crosses over Highway 63 rather than under the highway. EERA also has concerns about: 1) the length of the horizontal directional drill (HDD) crossing that would be required to cross the Highway 63 and 48th Street SE interchange at its widest part, 2) the presence or absence of other infrastructure-water, sewer or other utilities-that may be located in or associated with this highway interchange, 3) the separation distance (75 feet) MnDOT requires between a pipeline and bridge, 4) the extra temporary work space necessary for a HDD crossing, and 5) the existing commercial development in proximity to the interchange (Target, Lowes, Fleet Farm, and gas service stations).

RS 29 is located between 48th Street SE and 40th Street, and connects the route segment proposed by DNR (RS 28) and EERA (RS 27) to MERC's proposed endpoint for the high-pressure pipeline at the DRS Buffer, as illustrated on Figure 2, page 4.

Increased Route Width Proposals

In its route permit application, MERC requested a route width of 500-feet. In most cases, this proposed width provides adequate space for the selection of a centerline and right-of-way (permanent and temporary) for the proposed project. However, EERA staff supports increasing the width of several proposed route segments in order to:

- Provide for greater flexibility in the analysis and evaluation of route segments;
- Identify a right-of-way that minimizes potential impacts;
- Increase the potential to coordinate Phase 3 of the proposed project with the Rochester-Olmsted County Planning Department on road and other infrastructure requirements that may be necessary to support the growth anticipated in that area, as well as developers that have approved plans; and
- Allow for geological considerations associated with Decorah Edge and karst features.

RS 4P

The increased route width (approximately 200- feet) is proposed to avoid a line of trees in the northwest quarter of Section 19 in Rochester Township. See RS 4P as illustrated on Figure 2, page 3.

RS 12

The increased route width (865-feet) is proposed to accommodate safety concerns associated with construction and a scoping suggestion to increase the route width on the west and east side of the existing BP products pipeline right-of-way.

RS 18 and RS 20

The increased route width (800-feet) is proposed to accommodate an alignment that would locate the pipeline on the east side of the BP pipeline and the north side of 50 Street SW. The increased width provides for additional flexibility, if necessary.

RS 22 and RS 24

The increased route width (800-feet) along 48th Street SW would extend 250 feet to the south of the 48 Street SW centerline and the remaining 550-feet to the north of the 48th Street for increased route flexibility.

RS 27

The reasons for proposing RS 27 are discussed above. EERA also believes the highlighted south-half of the US Highway 63 and 48th Street SE interchange, as illustrated on Figure 2, page 4, should be considered by the Commission for further study and evaluation. If further study and analysis determines that RS 27 and RS 28 are not viable, the inclusion of this expanded study area may provide for other routing options. At this time we do not have design information for the US Highway 63 and 48th Street SE interchange. A review of the design information may assist in the identification of alternative routing options in this area.

DOC EERA Staff Analysis and Comments

Scoping

In Minnesota, the scoping process for environmental review is designed to identify and analyze "*only those potentially significant issue relevant to the proposed project*" and alternatives to the project.[39] Under Minnesota Rules, Chapter 7852 [Route Permit; Pipeline] a scoping decision is not required.

All of the oral comments at the public information meetings and the written comments received, including route proposals, were summarized and presented in the "*Scoping Comments and Route Proposals"* section of this document. In some instances commenters suggested topics and issues that should be examined in the CEA to be prepared for this project. As noted above, a "Draft Scoping Document" dated February 29, 2016, was available at the public information meetings (see Attachment 2); however, no comments on

[39] Minn. R. 4410.2100, subp. 1.

that document were received. EERA noted earlier that all issues and topics identified, as warranted, will be addressed in the environmental document.

Route and Route Segment Proposals

MERC identified a preferred route and an alternative route in its route permit application filed with the Commission on November 3, 2015.[40] Minnesota Rule 7852.1400 provides for a minimum of 70 days for the public, agencies and others to propose other routes and route segments for Commission consideration. When a route or route segment is proposed during the scoping process, EERA staff evaluates the proposal for compliance with part 7852.1400.

The route segment proposals received during the scoping period, as discussed above, present minor variations to MERC's preferred and alternate routes, rather than entirely new routes between the proposed projects identified endpoints. Several of the commenters recognized a need for the proposed project to support continued growth in the Rochester area.

EERA staff also evaluated the route and route segment proposals against the criteria for pipeline route selection in Minnesota Rule, part 7852.1900 to determine if any of the proposed route or route segments presented a major conflict with the criteria, prior to presenting them for the Commission's consideration. No significant conflicts were identified.

To facilitate analysis and evaluation, MERC's preferred and alternate routes and other route segment proposals submitted have been reduced into individual route segments and numbered (1 to 29). Route segments are designated as preferred (or modified preferred where MERC's scoping comments stated a preference for a segment over what was originally preferred in its Route Permit Application). These segments have a "P" extension, for example 1P. All of the proposed route segments are listed in Table 1, with a location reference to Figure 2 showing the location of each route segment.

Table 2, summarizes and presents the route segment width increases proposed during the scoping period and as identified by EERA staff in its evaluation of the proposed route segments.

Routes and Route Segments Not Proposed

Two other route segments (60th Avenue NW and 40th Street SW) were considered; however, based on additional review and evaluation these two route segments are not being recommend for Commission consideration based on the following:

[40] See eDockets, Document ID 201511-115408-01, Figure 1, p. 7.

60th Avenue NW

Over the years several short- and long-range documents have been completed that have provided planning direction for the future transportation system needs in Olmsted County and the city of Rochester in response to expected population and employment growth. The Rochester-Olmsted Council of Governments (ROCOG) 2035 and 2040 Long-Range Transportation Plan and the 60th Avenue/CSAH 14 Corridor Management Plan provide the planning direction for the CR 104/60th Avenue corridor, which is identified as the western portion of an outer arterial ring surrounding the Rochester urbanized area (see Figure 2, page 1). The ROCOG Long Range Transportation Plan outlines this corridor's role in terms of the larger transportation system within Olmsted County and the City of Rochester, and the 60th Avenue/CSAH 14 Corridor Management Plan provides a policy plan for preservation of this corridor as a future arterial roadway.

For additional information, see "Corridor Management Plan 60th Ave NW/CSAH 14 Expressway" and "Reaffirmation of 2040 Long Range Plan at:

- https://www.co.olmsted.mn.us/planning/trnsprtnplng/cr104study/documents/2003corridormgmtstudy.pdf
- https://www.co.olmsted.mn.us/planning/rocog/2040lrtp/Pages/default.aspx

TABLE 1			
ROCHESTER NATURAL GAS PIPELINE ROUTE SEGMENT PROPOSALS			
MERC MODIFIED PREFERRED ROUTE SEGMENTS	ROUTE SEGMENT LOCTION ON FIGURE 2 MAPS	OTHER PROPOSED ROUTE SEGMENTS	ROUTE SEGMENT LOCTION ON FIGURE 2 MAPS
1P	Fig 2. P. 1	10	Fig 2. P. 1
2P	Fig 2. P. 1 & 2	11	Fig 2. P. 1 & 2
3P	Fig 2. P. 2 & 3	12	Fig 2. P. 2 & 3
4P	Fig 2. P. 2 & 3	13	Fig 2. P. 3
5P	Fig 2. P. 3 & 4	14	Fig 2. P. 3
6P	Fig 2. P. 3 & 4	15	Fig 2. P. 3
7P	Fig 2. P.3 & 4	16	Fig 2. P. 3
8P	Fig 2. P. 3 & 4	17	Fig 2. P. 3
9P	Fig 2. P. 4	18	Fig 2. P. 3
		19	Fig 2. P.3
		20	Fig 2. P. 3
		21	Fig 2. P. 3 & 4
		22	Fig 2. P. 3 & 4
		23	Fig 2. P. 3 & 4
		24	Fig 2. P. 3 & 4

TABLE 1			
ROCHESTER NATURAL GAS PIPELINE ROUTE SEGMENT PROPOSALS			
MERC MODIFIED PREFERRED ROUTE SEGMENTS	ROUTE SEGMENT LOCTION ON FIGURE 2 MAPS	OTHER PROPOSED ROUTE SEGMENTS	ROUTE SEGMENT LOCTION ON FIGURE 2 MAPS
		25	Fig 2. P. 3 & 4
		26	Fig 2. P. 3 & 4
		27	Fig 2. P. 4
		28	Fig 2. P. 4
		29	Fig 2. P. 4

Table 2			
ROUTE SEGMENT WIDTH INCREASES			
Route Segment No.	Original Route Width	Proposed Route Width	Figure 2 Page No.
4P	500	700	3
12	500	865	2 & 3
16	500	700	3 & 4
18 & 20	500	800	3
20 & 22	500	800	3 & 4
27	500	2,000	4

40th Street SW

In its April 13, 2016, comment letter, MERC noted that they "Did consider a route that would continue from the 60th/40th Route Segment along 40th Street SW east from 60th Avenue SW to rejoin the Preferred Route alignment instead of following County Road 8 south. MERC concluded, however, that the topography of the area along 40th Street SW and the proximity of homes to the 40th Street SW right-of-way would not allow for a route that was capable of being constructed along 40th Street SW in Section 27 of Rochester Township."[41] Staff concurs with this analysis. See Figure 2, pages 3 and 4.

Route Proposal Acceptance

Commission consideration of "Route Proposal Acceptance," is addressed in Minnesota Rules 7852.1400, Subp 1 as follows:

[41] April 13, 2016, MERC comment letter, See eDockets, Document ID 20164-120035-01, p. 3.

> The Commission shall accept for consideration at the public hearing the routes and route segments proposed by the applicant and may accept for public hearing any other route or route segment it considers appropriate for further consideration. No route shall be considered at the public hearing unless accepted by the Commission before the notice of the hearing. Routes shall be identified by the Commission in accordance with part 7852.1600 [Published Notice of Routes Accepted]. A proposer of a route or route segment that the Commission has accepted for consideration at the hearing shall make an affirmative presentation of facts on the merits of the route proposal at the public hearing."

Commission staff may also propose routes or route segments directly to the commission as provided for by part 7852.1400, Subp. 2.

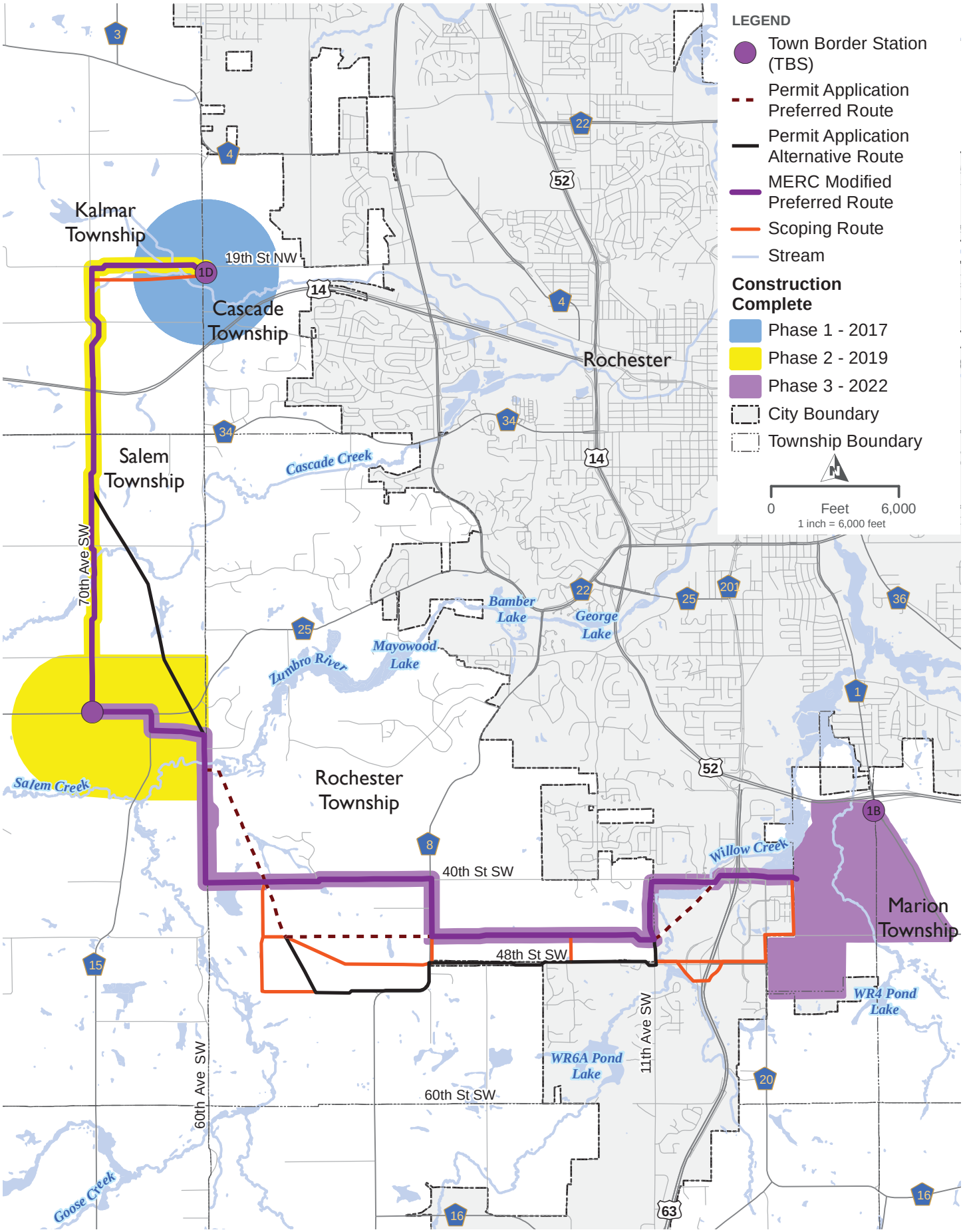
EERA Staff Recommendation

Based upon review of the route and route segments proposed, EERA believes the route segments, as identified in Table 1 and illustrated in Figure 2, are appropriate for consideration by the Commission and acceptance for consideration at the public hearing, including evaluation and analysis in the environmental review document prepared for the proposed project.

A similar evaluation was also undertaken for the "route width requests" presented above and as identified in Table 2 and illustrated in Figure 2. ERRA believes the requests are reasonable and recommend consideration by the Commission and acceptance for consideration at public hearings and analysis in the environmental review document prepared for the proposed project.

Figure 1

Project Overview Map



MINNESOTA DEPARTMENT OF COMMERCE

PROJECT OVERVIEW

ROCHESTER NATURAL GAS PIPELINE

FIGURE 1

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Figure 2

Route Alternatives

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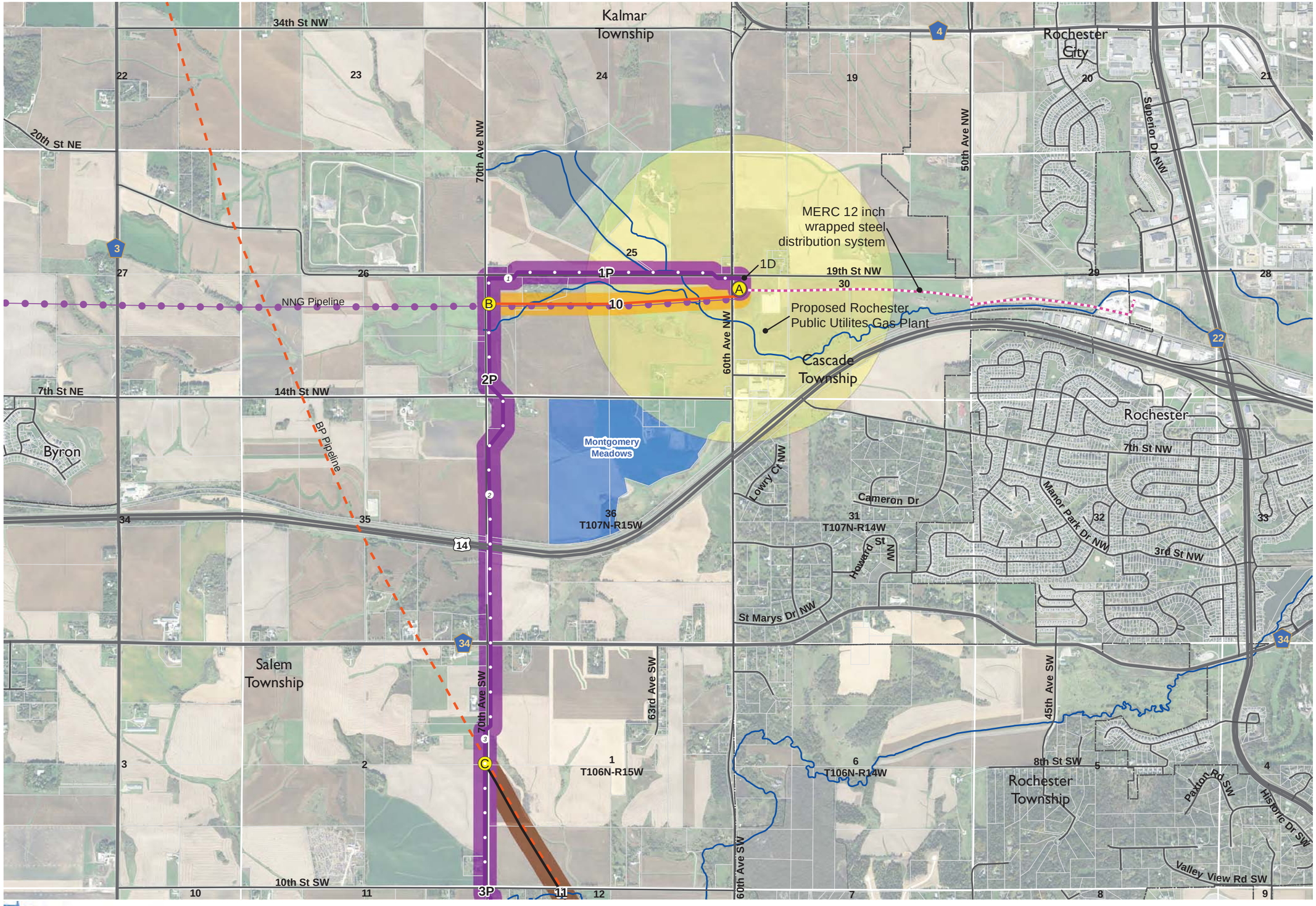

LEGEND

- Town Border Station (TBS)
- Permit Application Preferred Route
- Permit Application Alternate Route
- MERC Modified Preferred Route
- Scoping Route
- Proposed Town Border Station Buffer
- Proposed District Regulator Station Buffer
- Future Development

MBS Sites of Biodiversity Significance

- Outstanding
- High
- Moderate
- Below
- City Boundary
- Township Boundary
- PWI Stream
- Segment Endpoint
- Comparison Endpoint
- Milepost (1/10th mile)
- Milepost (1 mile)
- # Segment
- #P MERC Preferred Segment

0 Feet 2,000

1 inch = 2,000 feet

MINNESOTA DEPARTMENT OF COMMERCE

ROUTE ALTERNATIVES

ROCHESTER NATURAL GAS PIPELINE

FIGURE 2 (PAGE 1 OF 4)

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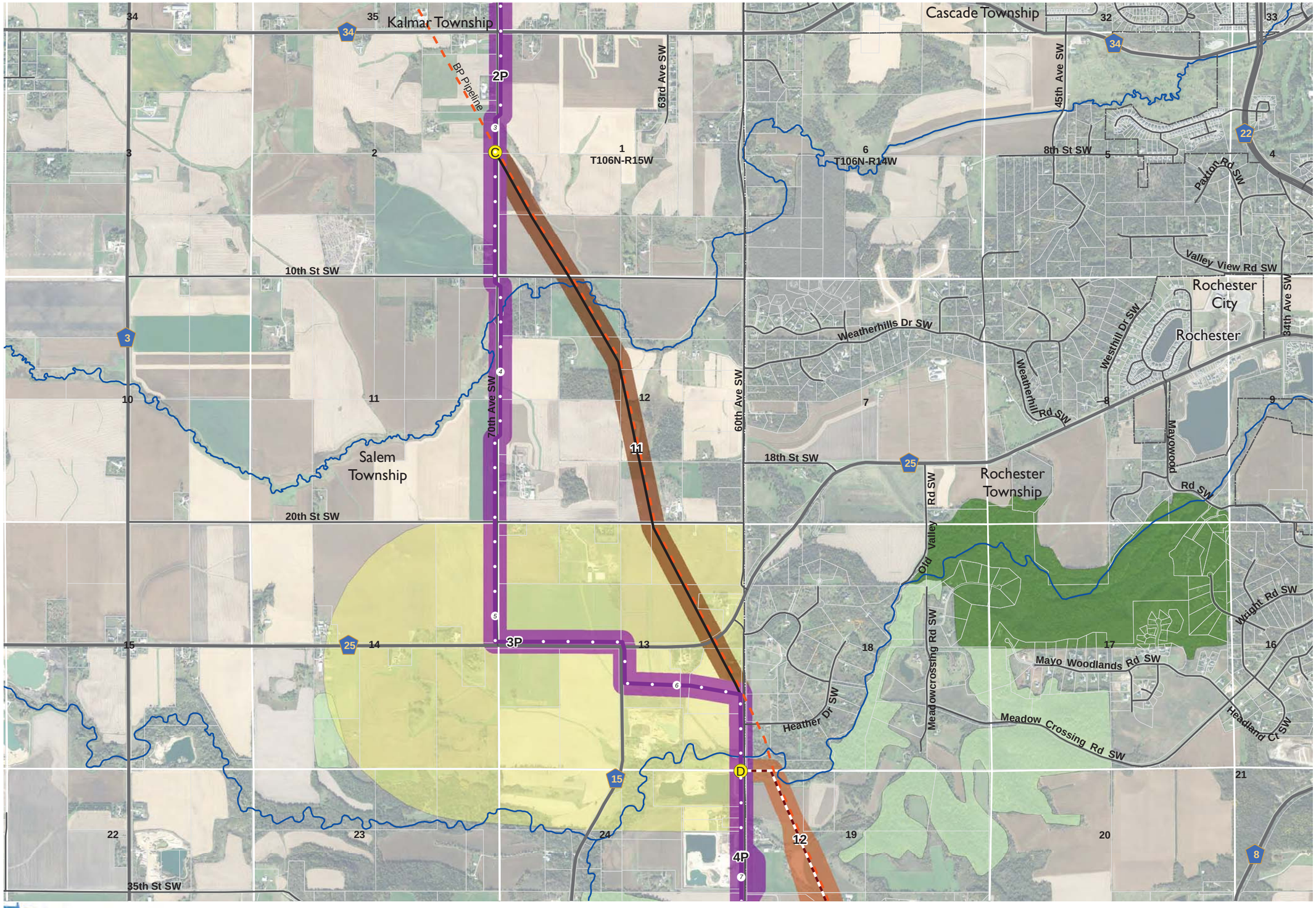

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MINNESOTA DEPARTMENT OF COMMERCE

ROUTE ALTERNATIVES

ROCHESTER NATURAL GAS PIPELINE

FIGURE 2 (PAGE 2 OF 4)

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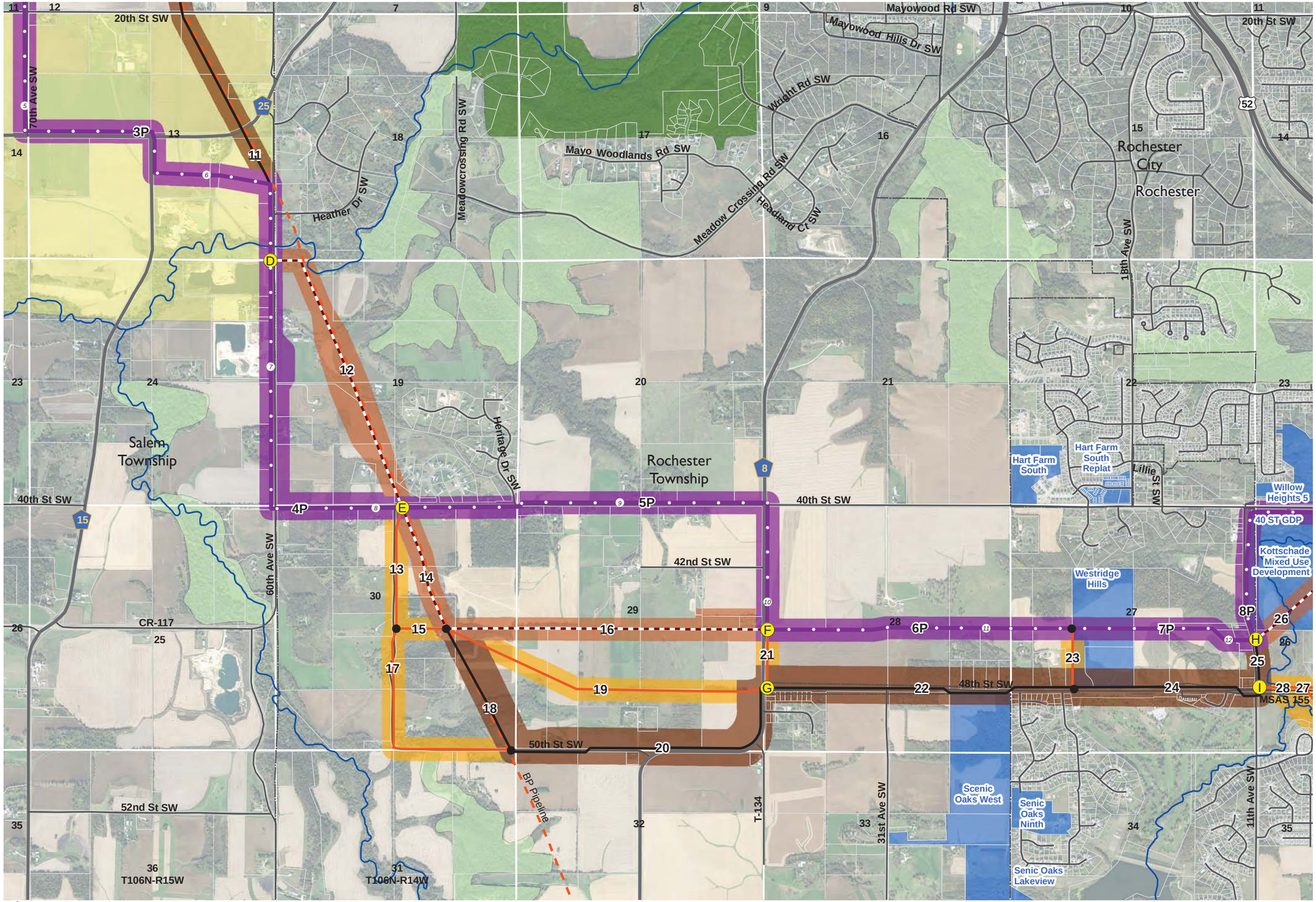

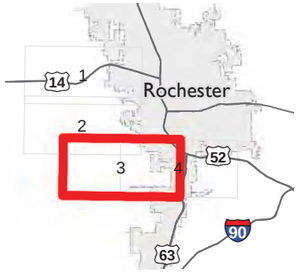

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MINNESOTA DEPARTMENT OF COMMERCE

ROUTE ALTERNATIVES

ROCHESTER NATURAL GAS PIPELINE

FIGURE 2 (PAGE 3 OF 4)

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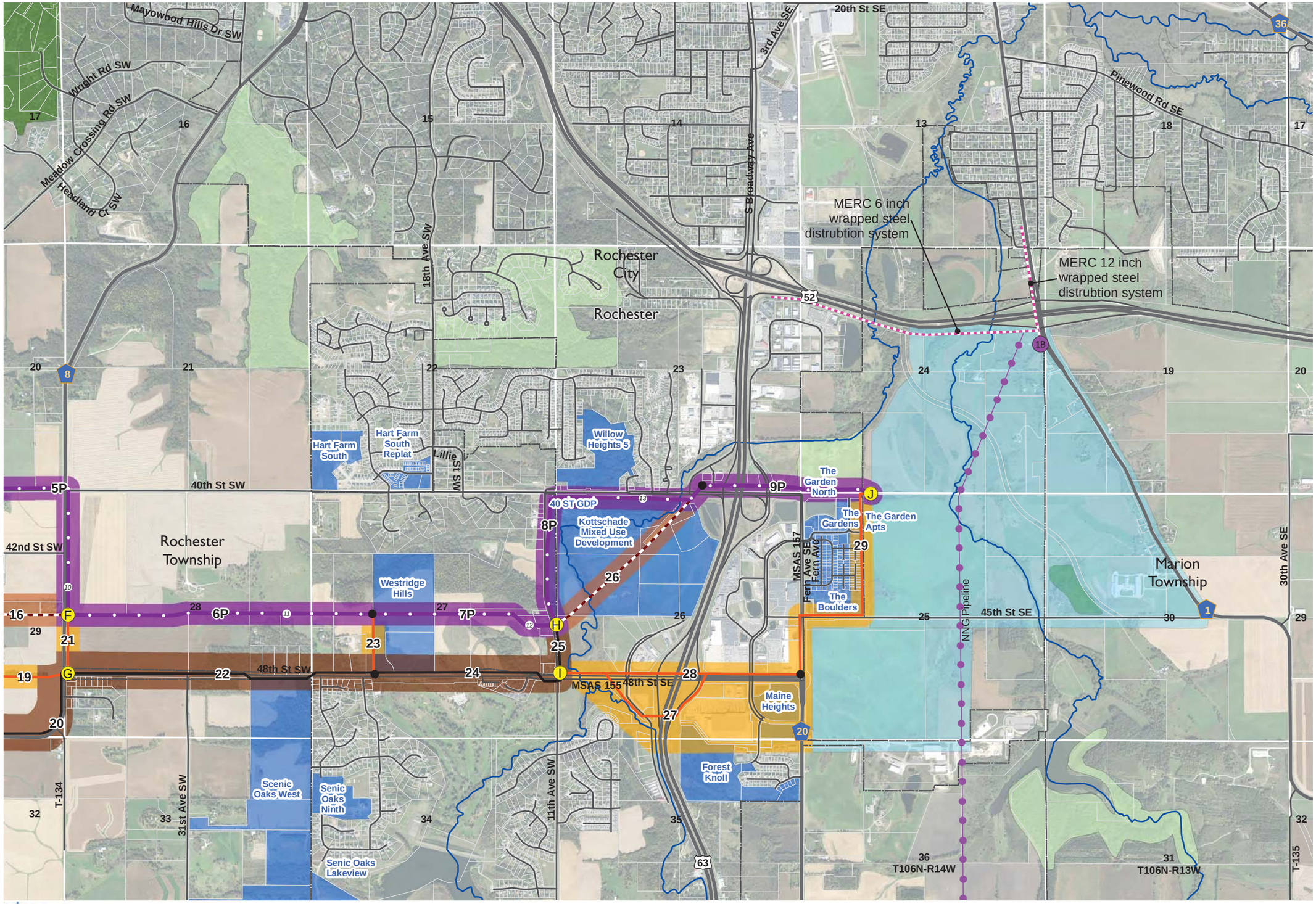

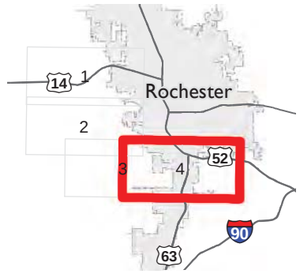

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N

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1 inch = 2,000 feet

MINNESOTA DEPARTMENT OF COMMERCE

ROUTE ALTERNATIVES

ROCHESTER NATURAL GAS PIPELINE

FIGURE 2 (PAGE 4 OF 4)

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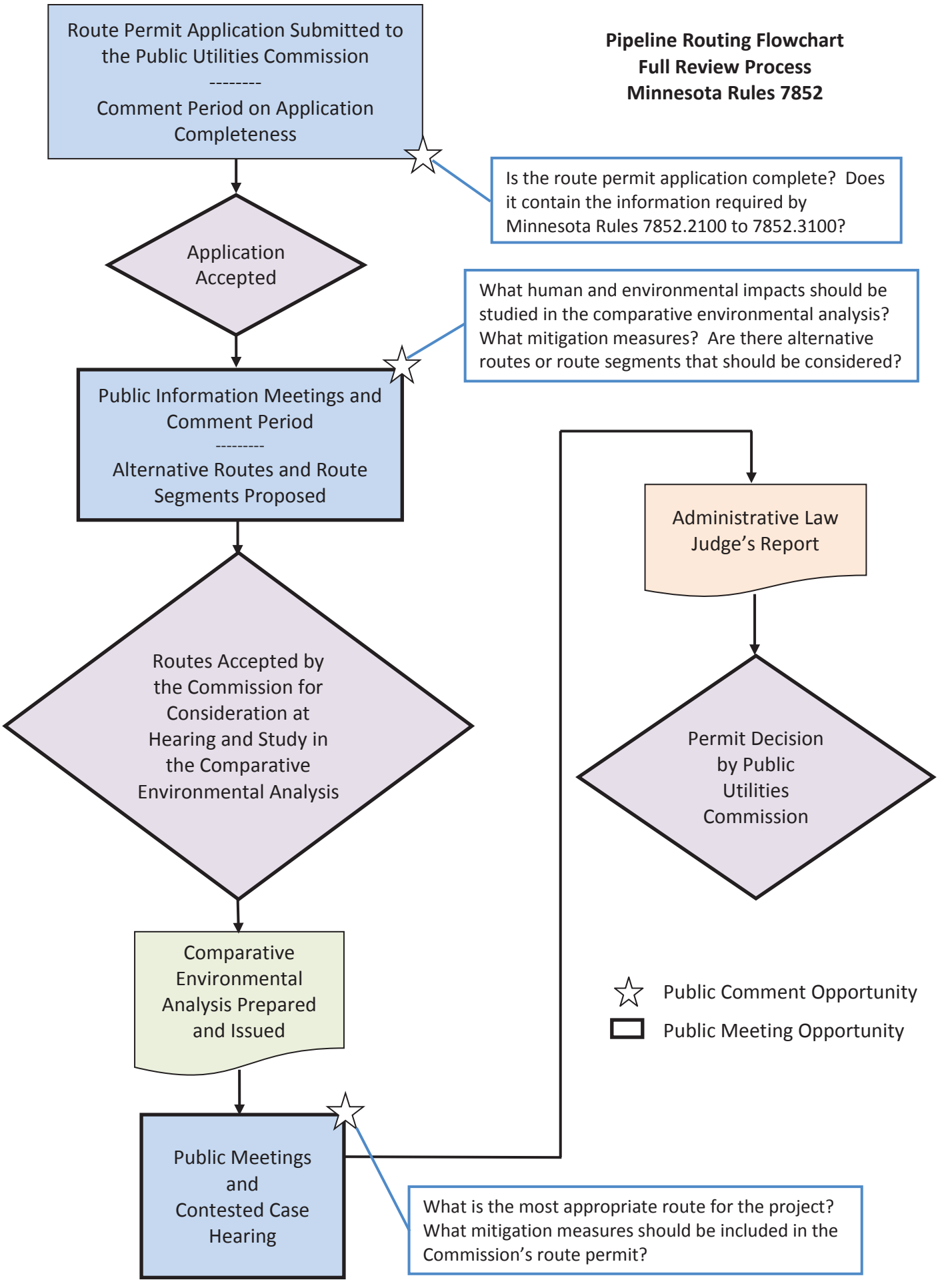
Attachment 1

Pipeline Permitting Flow Chart


Pipeline Routing Flowchart
Full Review Process
Minnesota Rules 7852
Route Permit Application Submitted to the Public Utilities Commission
---
Comment Period on Application Completeness
Is the route permit application complete? Does it contain the information required by Minnesota Rules 7852.2100 to 7852.3100?
Application Accepted
What human and environmental impacts should be studied in the comparative environmental analysis? What mitigation measures? Are there alternative routes or route segments that should be considered?
Public Information Meetings and Comment Period

Alternative Routes and Route Segments Proposed
Routes Accepted by the Commission for Consideration at Hearing and Study in the Comparative Environmental Analysis
Comparative Environmental Analysis Prepared and Issued
Public Meetings and Contested Case Hearing
What is the most appropriate route for the project? What mitigation measures should be included in the Commission's route permit?
Administrative Law Judge's Report
Permit Decision by Public Utilities Commission
Public Comment Opportunity
Public Meeting Opportunity

Attachment 2

Draft Scoping Document

COMPARATIVE ENVIRONMENTAL ANALYSIS

Draft Scoping Document

for

Rochester Natural Gas Pipeline Project
PUC Docket No. G-011/GPO-15-858

Prepared by Department of Commerce
Energy Environmental Review and Analysis

February 29, 2016

This document is intended to provide information about the scoping process as well as the process for preparing a Comparative Environmental Analysis (CEA). At the conclusion of the scoping process, a formal decision will identify the issues and alternatives that the Department of Commerce (Commerce) determines would be useful to the Minnesota Public Utilities Commission (Commission) in making a permit decision, and therefore appropriate for inclusion in the CEA.

Introduction

On November 3, 2015, Minnesota Energy Resources Corporation (MERC or applicant) filed an application with the Commission for a pipeline route permit to construct approximately 13.1 miles of high pressure natural gas distribution pipeline and associated facilities that link the northern and southern portions of MERC's existing distribution system on the west and south side of Rochester in Olmstead County, Minnesota. The Commission docket number for this project is G-011/GP-15-858. A copy of the application is available at: http://mn.gov/commerce/energyfacilities/Docket.html?Id=34318
.

Proposed Project

Project Purpose

The applicant's stated purpose is to expand the capacity of MERC's natural gas distribution system in and around the City of Rochester, which currently is at capacity. The Project will enable MERC to meet projected increases in demand from its existing Rochester area customers, as well as from new customers who will be added to MERC's system as the result of efforts to develop the Mayo Clinic as a Destination Medical Center.

Project Description

The applicant proposes to construct approximately 26,900 feet (5.1 miles) of 16-inch outside diameter steel pipe with a 0.375-inch wall thickness and approximately 42,500 feet (8.0 miles) of 12-inch outside diameter steel pipe with a 0.375 inch wall thickness for a total of approximately 13.1 miles of steel pipeline.

Planned operating pressure will be 400 to 475 pounds per square inch gauge (psig) for the 16-inch pipeline and 250 to 275 psig for the 12-inch steel pipeline. Maximum allowable operating pressure will be 500 psig for both pipelines.

Associated Facilities

The proposed project will also include construction of two town border stations and one district regulator station. Town border stations (TBS) receive high pressure natural gas from the natural gas transmission system (900 to 1,000 psig) and regulate it down for use on the local high pressure distribution system (400 to 500 psig). District regulator stations (DRS) take high pressure distribution natural gas (400 to 500 psig) and regulate it down further

(60 to 100 psig) for delivery to the low pressure distribution system. Other associated facilities include ball and or plug valves and flanges at the metering facilities of the TBS's and DRS. Other associated facilities include a cathodic protection system to prevent corrosion on the pipeline, a gas odorizing station using ethyl mercaptan to odorize the natural gas and natural gas pipeline markers at all road crossings.

Applicant's Preferred Route

The proposed project is located entirely in Olmstead County, Minnesota. See Figure 1 (attached) for MERC's preferred route originating close to its existing Town Border Station (TBS) near 19th St. NW and 60th Avenue SW in Section 30, of Cascade Township. The route then follows 19th Street NW to the west for one mile to 70th Avenue NW, then south along 70th Avenue SW for four miles to County State Aid Highway (CSAH) 25 and the new proposed TBS. The route then heads east for 0.5 miles along CSAH 25, then south along CSAH 15 for 890 feet, then east (cross country) for 0.5 mile to 60th Avenue SW. The route follows 60th Avenue SW for 1,635 feet, and then east to the existing British Petroleum (BP) refined oil products pipeline. The route follows the existing BP pipeline for 1.5 miles to southeast to about 0.5 mile past 40th Street SW. The route then heads east along the half section to 11th Avenue SW. The route continues to the northeast to 40th Street SW then crosses US Highway 63 at the 40th St SW interchange before terminating at the proposed district regulator station (DRS) on existing agricultural land in Section 24 or 25 of Rochester Township.

Right-Of-Way Requirements

The applicant is requesting a route permit for a 500-foot-wide-route. The applicant also requests a 1.25 mile buffer area along the proposed route in select locations to site the pipeline, TBS, and DRS. The proposed project will require a 50-foot-wide permanent right-of-way, encompassing approximately 80 acres and an additional 50-foot-wide temporary construction right-of-way also encompassing approximately 80 acres. The temporary construction right-of-way may need to be wider at road or water crossing to accommodate boring or horizontal directional drilling equipment.

Trench or Ditch Dimensions

The proposed pipeline will be installed using boring, horizontal directional drilling (HDD) and open cut trench construction techniques. HDD segments account for 0.4 miles of the Preferred Route. HDD will be used at road, wetland, and waterway crossings. The open cut trench segments account for approximately 12.7 miles of the Preferred Route. The trench will generally have a depth of 6.5 feet, a bottom width of 3.5 feet, and a variable top width greater than 7 feet (to be determined based on soil and slope characteristics). Depth of cover above the pipeline will generally be 4.5 feet or more, unless rock is encountered.

Regulatory Background

The pipeline route permit application was filed pursuant to the pipeline route selection procedure process outlined in Minnesota Statute 216G and Minnesota Rules 7852.0800–1900.

Pipeline Route Permit

A person may not construct a pipeline without a pipeline routing permit issued by the Commission unless the pipeline is exempted from the Commission's routing authority. A pipeline requiring a permit may only be constructed on a route designated by the Commission.

A pipeline is defined in Minn. Stat 21G.02 as:

(1) Pipe with a nominal diameter of six inches or more that is designed to transport hazardous liquids but does not include pipe designed to transport a hazardous liquid by gravity, and pipe designed to transport or store a hazardous liquid with a refining, storage, or manufacturing facility; or
(2) Pipe designed to be operated at a pressure of more than 275 pounds per square inch and to carry gas.

Certificate of Need

In addition, an applicant cannot construct a large energy facility in Minnesota without first receiving a Certificate of Need (CN) issued by the Commission. Pipelines designed to transport natural gas at a pressure greater than 200 pounds per square inch (psi) for a length of 50 miles or more in Minnesota are define as a large energy facility. While capable of transporting natural gas at pressures greater than 200 psi, the proposed project is only 13.1 miles in length; therefore, it does not meet the definition of large energy facility, and, as a result, a CN is not required.

Eminent Domain

If issued a Pipeline Route Permit by the Commission, the applicant may exercise the power of eminent domain to acquire the land necessary for the project pursuant to Minnesota Statute 216G.02 and Minnesota Statutes 117.

Environmental Review

Commerce Energy Environmental Review and Analysis (EERA) staff conducts environmental review on pipeline route permit applications before the Commission. The intent of the environmental review process is to inform the public, decision-makers, local governments, state agencies, and others of potential impacts and possible mitigation measures associated with the proposed project.

Environmental review under the pipeline permitting process includes public information and scoping meeting(s), and preparation of a Comparative Environmental Analysis (CEA). A CEA is a written document that describes the human and environmental impacts of the proposed pipeline project and any selected alternative routes, and methods to mitigate impacts. Upon completion of the CEA a public hearing will occur.

Scoping Process

The scoping process provides opportunities for the public to participate in the development of the "scope" or content of the CEA. It includes at least one public meeting, a public comment period, and an opportunity to propose additional routes and or route segments. The purpose of the meeting is to provide information about the proposed project and applicable regulatory requirements, to answer questions, and to gather input regarding the impacts, mitigative measures, and alternatives that should be studied in the CEA. The scoping process concludes with a decision that outlines the scope of the CEA to be written.

Public Comment Period

The public comment period closes Wednesday, **April 13, 2016**. Comments must be post-marked or received electronically by the comment deadline. There are several ways to submit comments:

- Complete and submit a comment form to EERA staff at the public meeting
- Complete and mail a comment form
- Mail written comments to:

  LARRY HARTMAN
  MN DEPARTMENT OF COMMERCE
  85 7TH PLACE EAST STE 500
  SAINT PAUL MN 55101-2198
- Fax comments to Larry Hartman, EERA staff, at: (651) 539-0109
- Email comments to EERA staff at: larry.hartman@state.mn.us
- Use the online comment form at: http://mn.gov/commerce/energyfacilities/#comment

If commenting by email or fax use "*Public Comment: Rochester Natural Gas Pipeline Project (GP-15-858)*" in the subject line.

Comparative Environmental Analysis

The CEA will include the following:

A. a general description of the proposed facilities;
B. a general description of the proposed routes accepted by the Commission;
C. a discussion of the potential impacts of the proposed project and each alternative site or route on the human and natural environment;
D. a discussion of mitigative measures that could reasonably be implemented to eliminate or minimize any adverse impacts identified for the proposed project and each alternative site or route analyzed;
E. an analysis of the feasibility of each alternative route considered;
F. a list of permits required for the project; and
G. a discussion of other matters identified in the scoping process.

Anticipated CEA Scope

EERA staff anticipates the CEA will address the following matters. (This section is not intended as a draft table of contents for the CEA.)

1.0 Background

- 1.1 Proposed Project
- 1.2 Project Purpose
- 1.3 Sources of Information
- 1.4 Issues Outside the Scope

2.0 Regulatory Framework

- 2.1 Certificate of Need
- 2.2 Route Permit
- 2.3 Environmental Review Process
- 2.4 Other Permits
- 2.5 Applicable Codes

3.0 Proposed Project

- 3.1 Project Detail/Design
- 3.2 Proposed Route
- 3.3 Alternative Routes Considered but Rejected
- 3.4 Right-of-Way Requirements and Acquisition
- 3.5 Construction
- 3.6 Operation and Maintenance
- 3.7 Cost

4.0 Alternative Routes and Route Segments (if applicable)

5.0 Potential Impacts

- 5.1 Archaeological and Historic Resources
- 5.2 Biological Resources
- 5.3 Cultural Resources
- 5.4 Environmental Setting
- 5.5 Human Settlement (for example, Aesthetics, Displacement and Property Values)
- 5.6 Land-based Economies
- 5.7 Land Use (for example, Zoning)
- 5.8 Natural Environment (for example, Air and Soils)

5.9 Public Health and Safety
5.10 Public Services
5.11 Rare and Unique Natural Resources
5.12 Socioeconomic Setting
5.13 Water Resources

6.0 Impact Comparison of Alternative Routes (if applicable)

7.0 Unavoidable Impacts

Schedule for Completion of the CEA

Depending on the outcome of the scoping process, EERA anticipates the CEA for the Rochester Natural Gas Pipeline Project will be completed in August 2016.

Upon completion of the CEA, EERA staff will notify those persons who have asked to be notified of its completion and the CEA be made available electronically on the EERA webpage at: http://mn.gov/commerce/energyfacilities/Docket.html?Id=34318, and the Minnesota eDockets webpage at: https://www.edockets.state.mn.us/EFiling/search.jsp by selecting "15" and "858". EERA will also publish notice of availability in the EQB Monitor.

EERA Contact Information

If you have questions or need additional information, please don't hesitate to contact EERA staff members:

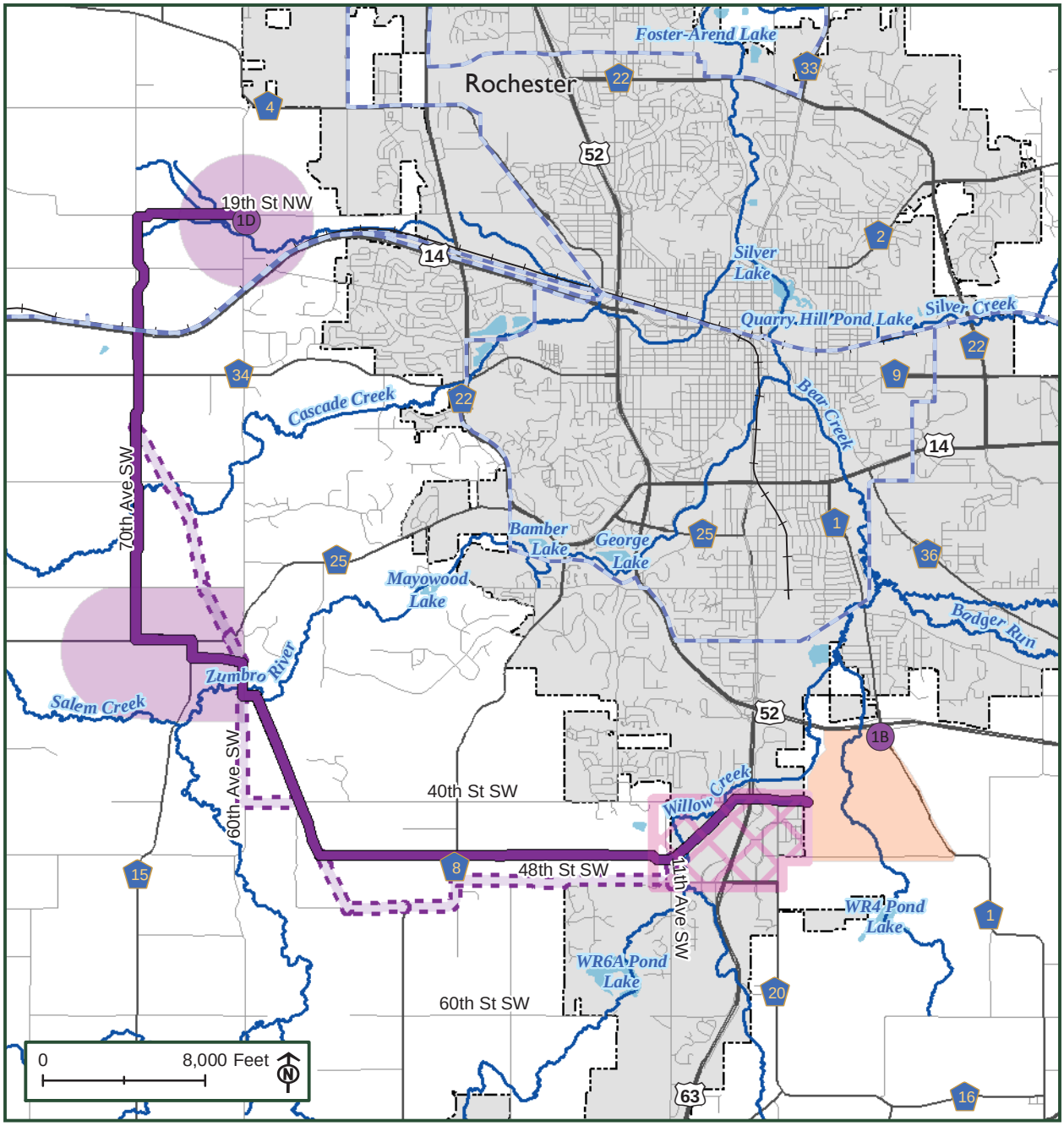
Larry Hartman
Environmental Review Manager
Larry.hartman@state.mn.us
(651) 539-1839

Andrew Levi
Environmental Review Specialist
Andrew.levi@state.mn.us
(651) 539-1840

MINNESOTA ENERGY RESOURCES

Project Area Overview

Figure 1



Legend

- Preferred Route
- Alternate Route
- Town Border Station (TBS)
- Route Alternative Buffer
- Proposed Town Border Station & Route Buffer
- Proposed District Regulator Station & Route Buffer
- PWI Stream
- Waterbody/NWI Wetland
- City / Township Boundary
- Railroad
- 161kV AC Transmission Line
- Road
- US / State / County Highway

*Buffer distance is 1.25 miles

Path: \\mspe-gis-file\gisproj\050_den\232026_MERC\map_docs\RoutePermit\Figure_01_Overview_8x11_P.mxd

Attachment 3

Scoping Comment Form

TAPE HERE (PLEASE DO NOT STAPLE)

Energy Environmental Review and Analysis
MN Department of Commerce
85 7th Place East, Suite 500
Saint Paul, MN 55101-2198

Affix Necessary Postage Here

LARRY HARTMAN
MN DEPARTMENT OF COMMERCE
85 7TH PLACE EAST STE 500
SAINT PAUL MN 55101-2198

FOLD HERE

Public Comment Period Closes Wednesday, April 13, 2016

Comments must be post-marked or received electronically by the comment deadline.

How to comment:

- Submit this form to the Environmental Review Manager at a public meeting
- Mail this form remembering to affix appropriate postage
- Mail comments in a separate envelope using the mailing address on this form
- Fax comments to the Environmental Review Manager: (651) 539-0109
- E-mail comments to the Environmental Review Manager: larry.hartman@state.mn.us
- Use the online comment form at: http://mn.gov/commerce/energyfacilities/#comment

Comments do not need to be on this form to be accepted. We encourage you to provide comments in whatever way is most convenient for you. If commenting by email or fax use "*Public Comment: Rochester Natural Gas Pipeline Project (G-011/GP-15-858)*" in the subject line.

THANK YOU for participating in the permitting process! By commenting you are helping inform the Minnesota Public Utility Commission's decision regarding this project.

FOLD HERE

Rochester Natural Gas Pipeline Project
Docket No. G-011/GP-15-858

Applicant's stated purpose: The Rochester Natural Gas Pipeline Project proposed by Minnesota Energy Resources Corporation (MERC) is designed to tie together the northern and southern portions of MERC's existing natural gas distribution system and to provide firm and reliable natural gas service to an expanding Rochester customer base.

Please share your comments on the proposed project. Comments will be used to help focus the environmental review on the potential human or environmental impacts and issues important to making an informed permit decision. Please be as detailed as possible. Use additional pages as needed. Contact the Environmental Review Manager, Larry Hartman, with any questions about commenting generally or submitting your comment(s). For help suggesting an alternative route, refer to the meeting handout: *How to Suggest an Alternative Pipeline Route* available through the project information weblink below.

For project information visit: http://mn.gov/commerce/energyfacilities/Docket.html?Id=34318 or contact the Environmental Review Manger at: larry.hartman@state.mn.us or (651) 539-1839.

MINNESOTA DEPARTMENT OF COMMERCE

Comment Form: Scoping

Energy Environmental Review and Analysis

Please provide your contact information. This information and your comments will be publicly available.

Name: _____ Phone: _____

Street Address: _____

City: _____ State: _____ ZIP: _____

Email: _____

Please share your comments on the proposed Rochester Natural Gas Pipeline Project

- What human and environmental impacts should be studied in the environmental analysis?
- Are there any specific methods to address these impacts that should be studied in the analysis?
- Are there any routes or route segments that should be considered? (Related to the *Route Permit*)

If including additional pages please number them and tell us how many you are providing: _____ pages

Attachment 4

Guidance Document: How to Suggest an Alternative Pipeline Route

MINNESOTA DEPARTMENT OF COMMERCE

How to Suggest an Alternative Pipeline Route

Minnesota Energy Resources Corporation (MERC) filed an application with the Minnesota Public Utilities Commission (Commission) for a pipeline routing permit for the Rochester Natural Gas Pipeline Project on November 3, 2015. The application includes a preferred route and an alternative route. The project is intended to provide firm and reliable natural gas service to an expanding Rochester customer base.

Pipelines requiring a route permit can only be built on a route designated by the Commission, and a route can only be selected if it is considered at a public hearing. The applicant's preferred and alternative routes are automatically accepted; however, other route alternatives can only be considered at the hearing if they are accepted by the Commission before the hearing is publicized. This insures the public is informed of all proposed route alternatives under consideration prior to the start of the hearing process.

Any person (meaning any individual, organization, government agency, and so on) can suggest an alternative route or route segment. An alternative route or route segment is a location other than the one proposed by the applicant, but it must accomplish the project's stated need and purpose. An *alternative route* may replace all or a portion of the applicant's preferred route, but must include the identified end points proposed by the applicant. An *alternative route segment* would leave the preferred route to avoid a specific impact and then return to it — substituting for only a portion of the preferred route.

Tips for Suggesting an Alternative

Information is provided on the back side of this sheet to help you propose an alternative route or route segment. If you have any questions, don't hesitate to contact the Environmental Review Manager. Suggestions must meet the requirements found in Minnesota Rule 7852.1400, be received by April 13, 2016, and specifically identify the project.

The Life of Your Alternative: Step-by-Step

1. An applicant applies for a routing permit to construct a pipeline. This application includes a preferred route and alternatives.

2. You suggest an alternative to all or a segment of the preferred route providing the required information within the appropriate timeframe.

3. The Commission determines if your alternative will be considered at the hearing.

4. The environmental impacts of your alternative — as well as the preferred route and other suggested alternatives — are analyzed and made publicly available prior to the hearing.

5. You are expected to present your alternative at the public hearing supporting your alternative.

6. The public, including the applicant, has the opportunity to comment on all alternatives.

7. An Administrative Law Judge prepares a report that includes recommendation on alternative routes.

8. If the routing permit is approved, the Commission's permit decision might include your suggested alternative.

9. If your alternative is included, the pipeline must be constructed in that location.

1. Provide a Map

Providing a map is not only helpful to highlight an anticipated impact or identify a suggested alternative — it is required (Minn. R. 7852.1400, subp. 3(A)). To be useful maps must be of proper scale. At the wrong scale, a map will not provide enough detail to assist in pinpointing an impact or alternative. For example, the line created by a felt tip marker on a state highway map can cover entire cities and highways.

Use a county, township or city map depending on your alternative. You can also use free online mapping resources such as Google Maps, Google Earth, or similar websites. These maps can be zoomed and printed to provide appropriate levels of detail. If you are having trouble locating a map at the proper scale, contact the Environmental Review Manager.

2. Suggest an Alternative Route or Route Segment

Explain the reasons for suggesting an alternative. You do not need to provide the same level of detail or analysis in your explanation(s) as the applicant provided; however, your explanation(s) must be able to stand independently so others do not need to "fill in the blanks" to understand it.

Your alternative must be accompanied by a description of the environmental conditions along it, and its anticipated environmental and human impact (Minn. R. 7852.1400, subp. 3(B)). Do your best. Your explanation must discuss: 1) an anticipated impact created by the preferred route; 2) your alternative route or route segment and its impacts; and 3) how your alternative route or route segment mitigates the anticipated impact you identified.

These individual parts, taken as a whole, generally provide the information needed to fully understand your suggestion, determine if the alternative meets the required criteria, and, ultimately, if it will be accepted by the Commission for inclusion in the public hearing. If more information is needed, you will be requested to provide that information and will have 10 days to respond that request (Minn. R. 7852.1400, subp. 4).

Remember, if accepted, you are expected to present support for your alternative at a public hearing (Minn. R. 7852.1400, subp. 1).

3. Submit the Suggestion on Time

Route Alternatives must be post-marked or received electronically by **4:30 p.m., on April 13, 2016** (Minn. R. 7852.1400, subp. 3(C)).

For help submitting an alternative route or route segment, or to ask questions, don't hesitate to contact the EERA Environmental Review Manager. This is the staff person most familiar with the project.

Larry Hartman, Environmental Review Manager
Energy Environmental Review and Analysis
Minnesota Department of Commerce
85 7th Place East, Suite 500 (651) 539-1839
Saint Paul, MN 55101-2198 larry.hartman@state.mn.us

*The complete text of Minnesota Rules can be found at: https://www.revisor.mn.gov/rules/?id=7852

Attachment 5

Index to eDocket Filings Submitted on Behalf of Franklin Kottschade

Index to PUC Docket 15-858 Documents Submitted on Behalf of Franklin Kottschade

PUC Docket 15-858 Document No. 20165-	Kottschade Property Document Title	Page Numbers
121015-01	**WSB Letter for Kottschade 4/13/16**	Page 1-5
121015-02	**Site Maps** A. Kottschade parcels, B. proposed pipeline route HDR, C. Kottschade Concept Plan	 Page 1 Page 2 Page 3
121015-03	**Request for Council Action 6/19/06 1 of 2** A. Request for Council Action 6/19/06 B. Staff report 5/5/06 C. Project narrative amended CUP 4/11/06	 Page 1-5 Page 6-10 Page 10-11
121015-04	**Request for Council Action 2 of 2** A. Continued Project narrative B. Project narrative fill in floodway C. Project narrative shore land impact D. City council minutes 5/24/06	 Page 1 Page 2-4 Page 5-6 Page 7-11
121015-05	**Request for Council Action 6/19/06** A. Land use plan Amendment with comments from Planning and zoning commission B. Staff Report on LUPA 04-06 and Zoning district Amendment 04-14	 Page 1-4 Page 5-10
121015 - 06	**Request for Council Action 6/19/06 1 of 3** A. Zoning District Amendment 04-14	 Page 1-2
121015-07	**Request for Council Action 6/19/06 2 of 3** A. General Development Plan B. Staff Report C. GDP referral comments	 Page 1-3 Page 4-11 Page 12-18
121015-08	**Request for council Action 3 of 3** A. Continued GDP referral comments B. Request for Council Action GDP 243, LUPA 04-14 and Zoning district Amendment #04-14 C. Request for Council action Cash Payment in-lieu of Parkland	 Page 1-6 Page 7-10 Page 11-14
121015-09	**Request for council Action 6/19/06 Preliminary Plat 1 of 2** A. Request for Council Action Preliminary plat Bonnie Vista B. Staff Report C. Revised Report narrative Preliminary Plat bonnie vista	 Page 1-7 Page 8-15 Page 16

121015-10	**Request for council Action 6/19/06 2 of 2** A. Continued. Revised report B. Variance report: reduction of lot width in shore land C. Staff comments and referral for variance	 Page 1-4 Page 5-8 Page 9-18
121016-01	**Council Minutes 6/19/06** A. Land use Plan Amendment item E-4 B. Zoning district Amendment item E-5 C. General Development Plan item E-7	 Page 5 Page 6 Page 7
121016-02	**Site Map**	Page 1
121016-03	**Official Plat Willow Creek Commons**	Page 1-4
101016-04	**Construction plans: Mass Grading and Stormwater**	Page 1-9
121016-05	**Construction plans 2: Stormwater, Streets, Storm Sewer, Sanitary Sewer and Water main**	Page 1-3
121016-06	**Drainage Report 1 of 3** A. Cover letter B. Preliminary Drainage report	 Page 1 Page 2-19
121016-07	**Drainage report 2 of 3** Continued Preliminary drainage report	 Page 1-17
121016-08	**Drainage Report 3 of 3** A. Continued preliminary drainage report B. Water Quality Pond Calculations	 Page 1-8 Page 9-10
121016-09	**Economic Analysis 1 of 5** A. An Economic analysis of the Reconstruction of US Trunk Hwy 63 in Rochester, by Thomas Hamilton 8/23/12 (cover – pg 21)	 Page 1-24
121016-10	**Economic Analysis 2 of 5** A. Continued Hamilton report (pages 22-29) B. NAHB Metro Are Impact of Willow commons Comparing Costs to Revenue for local government C. NAHB – Income, jobs and Taxes generated D. Detailed table on single family construction (cover)	 Page 1-8 Page 9-18 Page 19-23 Page 24

121019-01	**Economic Analysis 3 of 5** A. Continued Detailed Tables single family B. Detailed Tables Multi Family C. Background and a Brief description of the Model used for Evaluate Economic Benefits D. REMI: Economic Impact of shopping centers development final Report 10/20/06 (cover page 7)	 Page 1-4 Page 5-9 Page 10-17 Page 18-24
121019-02	**Economic analysis 4 of 5** Continued REMI (page 8-31)	 Page 1-24
121019-03	**Economic analysis 5 of 5** Continued REMI (pages 32-47)	 Page 1-16

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Appendix E

Commission Generic Route Permit Template

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STATE OF MINNESOTA PUBLIC UTILITIES COMMISSION

ROUTE PERMIT
FOR CONSTRUCTION OF A LARGE [*PIPELINE TYPE*] PIPELINE
AND ASSOCIATED FACILITIES

IN
[*COUNTY*]

ISSUED TO
[*PERMITTEE*]

PUC DOCKET NO. [*Docket Number*]

In accordance with the requirements of Minnesota Statutes Chapter 216G and Minnesota Rules Chapter 7852 this route permit is hereby issued to:

[*PERMITTEE*]

[*Permittee*] is authorized by this route permit to construct [*Provide a description of the project authorized by the Minnesota Public Utilities Commission*].

The pipeline and associated facilities shall be built within the route identified in this permit and as portrayed on the official route maps, and in compliance with the conditions specified in this permit.

Approved and adopted this ____ day of [*Month, Year*]

BY ORDER OF THE COMMISSION

_____

Daniel P. Wolf,
Executive Secretary

CONTENTS

FIGURES

Official Site Maps

ATTACHMENTS

Complaint Procedures for Permitted Energy Facilities

Compliance Filing Procedures for Permitted Energy Facilities

1.0 ROUTE PERMIT

The Minnesota Public Utilities Commission (Commission) hereby issues this route permit to [*Permittee Name*] (Permittee) pursuant to Minnesota Statutes Chapter 216G and Minnesota Rules Chapter 7852. This permit authorizes [*Permittee Name*] to construct [*Provide a brief description of the project as authorized by the Commission*], and as identified in the attached route permit maps, hereby incorporated into this document.

1.1 Pre-emption

Pursuant to Minn. Stat. § 216G.02, subd. 4, this permit shall be the sole approval required to be obtained by the Permittee for construction of the pipeline facilities and this permit shall supersede and preempt all zoning, building, or land use rules, regulations, or ordinances promulgated by regional, county, local and special purpose government.

2.0 PROJECT DESCRIPTION

[*Provide a description of the project as authorized by the Commission*]

2.1 Associated Facilities

[*Provide a detailed description of the associated facilities authorized by the Commission*]

2.2 Project Location

[*Describe the location of the project including details such as the county, state, city, and townships, as appropriate*]

County	Township Name	Township	Range	Section

3.0 DESIGNATED ROUTE

The route designated by the Commission in this permit is the route described below and shown on the route maps attached to this permit. The route is generally described as follows:

[*Provide detailed description of the authorized route including the route widths and any other specifics relevant to each segment. Also include a reference to the relevant route map to be attached to the permit.*]

The identified route widths will provide the Permittee with flexibility for minor adjustments of the specific alignment or right-of-way to accommodate landowner requests and unforeseen conditions. The final alignment (i.e., permanent and maintained rights-of-way) will be located within this designated route unless otherwise authorized by the Commission.

3.1 Permanent Right-of-Way

The approved right-of-way width for the project is up to [*X*] feet [*Describe any right-of-way width variations along the route, as necessary, including that needed for associated facilities*].

3.2 Temporary Right-of-Way

[*Describe temporary right-of-way widths authorized by permit*]

The Permittee shall limit temporary right-of-way to special construction access needs required outside of the authorized permanent rights-of-way. Temporary right-of-way shall be selected to limit the removal and impacts to vegetation.

3.3 Right-of-Way Conformance

This permit anticipates that the right-of-way will generally conform to the alignment identified on the attached route permit maps unless changes are requested by individual landowners and agreed to by the Permittee or for unforeseen conditions that are encountered or are otherwise provided for by this permit.

Any right-of-way modifications within the designated route shall be located so as to have comparable overall impacts relative to the factors in Minn. R. 7852.1900, as does the right-of-way identified in this permit, and shall be specifically identified and documented in and approved as part of the plan and profile submitted pursuant to Section 8.1 of this permit.

4.0 STATE AND FEDERAL MINIMUM DEPTH OF COVER REQUIREMENTS

Minn. Stat. § 216G.07, subd. 1, requires the pipeline trench to be excavated to a depth that sufficiently allows for at least 54 inches (4.5 feet) of backfill from ground surface to the top of pipeline in all areas where the pipeline crosses the right-of-way of any public drainage facility or any county, town, or municipal street or highway and where the pipeline crosses agricultural land. Where the pipeline crosses the right-of-way of any drainage ditch the pipeline shall be installed with a minimum level cover of not less than 54 inches (4.5 feet) below the authorized depth of the ditch, unless waived in the manner provided in Minn. Stat. § 216G.07, subd. 2 and

3. In agricultural land, the Permittee may seek a depth requirement waiver from the affected landowners to install the pipeline at the same depth as the existing pipelines.

In all cases, the pipeline trench shall be excavated to a depth that sufficiently allows for at least 36 inches (3 feet) of backfill from ground surface to the top of pipeline in accordance with U.S. Department of Transportation regulations (49 CFR 195.248). (49 C.F.R. Part 194)?

5.0 GENERAL CONDITIONS

The Permittee shall comply with the following conditions during pipeline right-of-way preparation, construction, cleanup, and restoration for the life of this permit.

5.1 Agricultural Protection Plan [*if applicable*]

The Permittee shall comply with the Agricultural Protection Plan (APP) that is attached to this permit (*Appendix XX*) and incorporated herein. The obligation to comply with the APP as a condition of this permit shall expire with the termination of Commission jurisdiction over this permit as prescribed by Minn. R. 7852.3900, unless otherwise specified in the APP. The Minnesota Department of Agriculture (MDA) must approve of any amendments to the APP. The Permittee shall file the amended APP with the Commission within 10 days of MDA approval.

5.2 Environmental Mitigation Plan [*if applicable*]

The Permittee shall comply with the Environmental Mitigation Plan that is attached to this permit (*Appendix XX*) and incorporated herein. The Permittee shall also comply with all additional conditions that may be added as a result of permits issued by other agencies or governmental units.

5.3 Permit Distribution

The Permittee shall within 10 days of receipt of this pipeline route permit from the Commission, send a copy of the permit to the office of each regional development commission of a development region, soil and water conservation district, watershed district, watershed management district, office of the auditor of each county, and the clerk of each city and township crossed by the designated route.

Within 30 days of permit issuance, the Permittee shall provide all affected landowners with a copy of this permit and the complaint procedures. In no case shall the landowner receive this route permit and complaint procedures less than five days prior to the start of construction on

their property. An affected landowner is any landowner or designee that is within or adjacent to the permitted route.

The Permittee shall provide all affected landowners with complete information about the project keeping them informed throughout the initial survey, right-of-way acquisition, right-of-way preparation, construction, restoration, and future operation and maintenance. As provided by applicable laws and regulations the Permittee shall provide educational materials about the project and any restrictions or dangers associated with the project to landowners within the route whose land is crossed by the pipeline and, upon request, to any interested persons.

5.4 Notification

The Permittee shall notify landowners or their designee at least 14 days in advance but not greater than 60 days in advance of entering the property~~, unless otherwise negotiated with the affected landowner~~.

5.5 Construction Practices

The Permittee shall follow those specific construction practices and material specifications described in [*Permittee Name*] Application to the Commission for a route permit for the [*Project Application Name and Environmental Information Report*], dated [*Date*], and the record of the proceedings unless this permit establishes a different requirement in which case this permit shall prevail. The Permittee shall comply with the conditions for right-of-way preparation, construction, cleanup, and restoration contained in Minn. R. 7852.3600.

5.5.1 Field Representative

The Permittee shall designate a field representative responsible for overseeing compliance with the conditions of this permit during construction of the project. This person shall be accessible by telephone or other means during normal business hours throughout site preparation, construction, cleanup, and restoration.

The Permittee shall file with the Commission the name, address, email, phone number, and emergency phone number of the field representative 14 days prior to commencing construction. The Permittee shall provide the field representative's contact information to affected landowners, residents, local government units and other interested persons. The Permittee may change the site manager at any time upon notice to the Commission, affected landowners, residents, local government units and other interested persons.

5.5.2 Agricultural Monitor and County Inspector Notification Requirements

The Permittee shall at least 14 days prior to the start of construction provide notice to all landowners affected by construction with the name, telephone number and email address of the Agricultural Monitor and County inspector designated by the County, if appointed.

5.5.3 Employee Training and Education of Permit Terms and Conditions

The Permittee shall inform all employees, contractors, and other persons involved in construction of the terms and conditions of this permit.

5.5.4 Public Services, Public Utilities, and Existing Easements

During construction, the Permittee shall minimize any disruption to public services or public utilities. To the extent disruptions to public services or public utilities occur these would be temporary and the Permittee will restore service promptly. Where any impacts to utilities have the potential to occur the Permittee will work with both landowners and local agencies to determine the most appropriate mitigation measures if not already considered as part of this permit. The Permittee shall cooperate with all entities that have existing easements or infrastructure within the pipeline route to ensure minimal disturbance to existing or planned developments.

5.5.5 Access to Property for Construction

The Permittee shall obtain all necessary permits authorizing access to public rights-of-way prior to any construction. The Permittee shall obtain approval of the landowners for access to private property prior to any construction. The Permittee shall consult with property owners to identify and address any special problems the landowners may have that are associated with the pipeline prior to any construction.

The Permittee shall work with landowners to provide access to their property, to locate the pipeline on their property to minimize the loss of agricultural land, forest, and wetlands, with due regard for proximity to homes and water supplies, even if the deviations will increase the cost of the pipeline, so long as the landowner's requested relocation does not adversely affect environmentally sensitive areas.

The Permittee shall negotiate agreements with landowners that will give the landowners access to their property; minimize the impact on planned future development of the property; and to assume any additional costs for such development that may be the result of installing roads, driveways and utilities that must cross the right-of-way. The Permittee shall not unreasonably deny a landowner's request to cross the easement to access the landowner's property.

5.5.6 Noise

The Permittee shall comply with noise standards established under Minn. R. 7030.0010 to 7030.0080~~, at all times at all appropriate locations during operation of the facility~~. Construction and maintenance activities shall be limited to daytime working hours to the extent practicable to ensure nighttime noise level standards will not be exceeded.

5.5.7 Site Sediment and Erosion Control

The Permittee shall implement those erosion prevention and sediment control practices recommended by the Minnesota Pollution Control Agency (MPCA) Construction Stormwater Program.

The Permittee shall minimize erosion and sedimentation during construction and shall employ perimeter sediment controls, protect exposed soil by promptly planting, seeding, using erosion control blankets and turf reinforcement mats, stabilizing slopes, protecting storm drain inlets, protecting soil stockpiles, and controlling vehicle tracking. Contours shall be graded as required so that all surfaces provide for proper drainage, blend with the natural terrain, and are left in a condition that will facilitate re-vegetation and prevent erosion. All areas disturbed during construction of the facilities shall be returned to pre-construction conditions.

In accordance with MPCA requirements, the Permittee shall obtain a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater permit from the MPCA.

5.5.8 Topsoil Protection

The Permittee shall take precautions to minimize mixing of topsoil and subsoil during excavation of the trench for the pipe unless otherwise negotiated with the affected landowner.

5.5.9 Soil Compaction

Compaction of agricultural lands by the Permittee must be kept to a minimum and mitigated in accordance with its agricultural protection plan [*if applicable*].

5.5.10 Landscape Preservation

Care shall be used to preserve the natural landscape, minimize tree removal and prevent any unnecessary destruction of the natural surroundings in the vicinity of all pipeline construction and restoration activities.

5.5.11 Sensitive Areas

The Permittee shall stabilize stream banks and other sensitive areas disturbed by pipeline construction in accordance with the requirements of applicable state or federal permits.

5.5.12 Wetlands and Water Resources

Wetlands and riparian areas shall be accessed using the shortest route possible in order to minimize travel through wetland areas and prevent unnecessary impacts. No temporary workspace areas shall be placed within or adjacent to wetlands or water resources, as practicable. To minimize impacts, construction in wetland areas shall occur during frozen ground conditions where practicable and shall be according to permit requirements by the applicable permitting authority. When construction during winter is not possible, wooden or composite mats shall be used to protect wetland vegetation. Soil excavated from the wetlands and riparian areas shall be contained and not placed back into the wetland or riparian area.

Dewatering during periods of excessive precipitation or in areas where the natural groundwater table intersects the pipeline trench will not be directed into wetlands or water bodies. Dewatering discharges will be directed toward well vegetated upland areas. Should discharge activities need to be directed off the right-of-way landowner consent will be obtained and locations will be chosen to minimize impacts. All discharge activities will comply with applicable agency permits or approvals.

Areas disturbed by construction activities shall be restored to pre-construction conditions. Restoration of the wetlands will be performed by Permittee in accordance with the requirements of applicable state and federal permits or laws and landowner agreements.

All requirements of the U.S. Army Corps of Engineers (wetlands under federal jurisdiction), Minnesota Department of Natural Resources (Public Waters/Wetlands), and County (wetlands under the jurisdiction of the Minnesota Wetland Conservation Act) shall be met.

5.5.13 Vegetation Removal and Protection

The Permittee shall clear the permanent right-of-way and temporary right-of-way preserving to the maximum extent practicable windbreaks, shelterbelts, living snow fences, and vegetation in areas such as trail and stream crossings where vegetative screening may minimize aesthetic

impacts, to the extent that such actions do not impact the safe operation, maintenance, and inspection of the pipeline and are in compliance with all applicable laws and regulations.

Tree stumps will be removed at the landowner's request or when necessitated due to trench location. The Permittee will dispose of all debris created by clearing at a licensed disposal facility.

5.5.14 Application of Pesticides

The Permittee shall restrict pesticide use to those pesticides and methods of application approved by the Minnesota Department of Agriculture, Minnesota Department of Natural Resources, and the U.S. Environmental Protection Agency. Selective foliage or basal application shall be used when practicable. The Permittee shall contact the landowner or his designee to obtain approval for the use of pesticide prior to any application on their property. The landowner may request that there be no application of pesticides on any part of the right-of-way within the landowner's property. All pesticides shall be applied in a safe and cautious manner so as not to damage crops, orchards, tree farms, or gardens. The Permittee shall provide notice of pesticide application to known beekeepers operating apiaries within three miles of the project site at least 14 days prior to such application.

5.5.15 Invasive Species

The Permittee shall employ best management practices to avoid the potential spread of invasive species on lands disturbed by project construction activities.

5.5.16 Noxious Weeds

The Permittee shall take all reasonable precautions against the spread of noxious weeds during all phases of pipeline construction. When utilizing seed to establish temporary and permanent vegetative cover on exposed soil the Permittee shall select site appropriate seed certified to be free of noxious weeds. To the extent possible, the Permittee shall use native seed mixes. The Permittee shall consult with landowners on the selection and use of seed for replanting.

5.5.17 Roads (Public and Private)

Equipment involved in pipeline construction shall be moved into the right-of-way using existing public or private roads unless a temporary road is negotiated with the landowner and approved by the [*Environmental Monitor and the Agricultural Monitor when on agricultural lands*].

Prior to commencement of construction, the Permittee shall identify all state, county or township roads that will be used for the project and shall notify the state, county or township governing body having jurisdiction over the roads to determine if the governmental body needs to inspect the roads prior to use of these roads. The Permittee is responsible for maintenance and repair of roads that will be subject to extra wear and tear due to transportation of equipment and project related materials. The Permittee shall cooperate with county and city road authorities to develop appropriate signage and traffic management during construction.

The Permittee shall promptly repair private roads or lanes damaged when moving equipment or when accessing construction workspace, unless otherwise negotiated with the affected landowner.

5.5.18 Archaeological and Historic Resources

The Permittee shall make every effort to avoid impacts to identified archaeological and historic resources when constructing the transmission facility. In the event that a resource is encountered, the Permittee shall contact and consult with SHPO and the State Archaeologist. Where feasible, avoidance of the resource is required. Where not feasible, mitigation must include an effort to minimize project impacts on the resource consistent with SHPO and State Archaeologist requirements.

Prior to construction, workers shall be trained about the need to avoid cultural properties, how to identify cultural properties, and procedures to follow if undocumented cultural properties, including gravesites, are found during construction. If human remains are encountered during construction, the Permittee shall immediately halt construction and promptly notify local law enforcement and the State Archaeologist. Construction at such location shall not proceed until authorized by local law enforcement or the State Archaeologist.

5.5.19 Livestock

Precautions to protect livestock must be taken by the Permittee unless otherwise negotiated with the affected landowner.

5.5.20 Security

The Permittee will install temporary gates or similar barriers, as needed, to prohibit public access to the right-of-way during construction.

5.5.21 Restoration

The Permittee shall restore the right-of-way, temporary work spaces, access roads, abandoned right-of-way, and other public or private lands affected by construction of the pipeline to the natural conditions that existed immediately before construction of the pipeline and as required by other federal and state agency permits. Restoration must be compatible with the safe operation, maintenance, and inspection of the pipeline. Within 60 days after completion of all restoration activities the Permittee shall advise the Commission in writing of the completion of such activities.

5.5.22 Cleanup

All waste and scrap that is the product of construction shall be removed from the right-of-way and all premises on which construction activities were conducted and properly disposed of upon completion of each task. Personal litter, including bottles, cans, and paper from construction activities shall be removed on a daily basis.

5.5.23 Pollution and Hazardous Wastes

All appropriate precautions to protect against pollution of the environment must be taken by the Permittee. The Permittee shall be responsible for compliance with all laws applicable to the generation, storage, transportation, clean up and disposal of all wastes generated during pipeline construction and restoration of the right-of-way.

5.5.24 Damages

The Permittee shall fairly restore or compensate landowners for damage to crops, fences, private roads and lanes, landscaping, drain tile, or other damages sustained during construction..

5.6 Other Requirements

5.6.1 Other Permits and Regulations

The Permittee shall comply with all applicable state rules and statutes. The Permittee shall obtain all required permits for the project and comply with the conditions of these permits. A list of the permits known to be required is included in the permit application. The Permittee shall submit a copy of such permits to the Commission upon request.

6.0 SPECIAL CONDITIONS

Special conditions shall take precedence over other conditions of this permit should there be a conflict.

[*Describe any special conditions*]

Special Conditions Example Language

Aquatic Invasive Species

As part of the preconstruction reports, the Permittee will include a section evaluating the potential for the occurrence of aquatic invasive species in the project area and describing, if any, the best management practices that apply. The Permittee should identify any infested waters or otherwise indicate that aquatic invasive species are not anticipated. The DNR must be provided an opportunity to review and comment on the plan. The DNR must be notified if any aquatic invasive species are identified in an area not previously identified as infested water.

Wildlife-Friendly Erosion Control Materials

The Permittee, in cooperation with the Minnesota Department of Natural Resources, shall use wildlife-friendly erosion control materials in areas known to be inhabited by wildlife species (birds, small mammals, reptiles, and amphibians) susceptible to entanglement in plastic netting.

Rare and Unique Resources

The Permittee shall follow measures and recommendations for avoiding and minimizing impacts to Blanding's turtle populations as outlined in the Minnesota Department of Natural Resources Environmental Review Fact Sheet Series for the Blanding's Turtle.

Construction and maintenance personnel will be made aware of rare resources and plant communities during pre-construction meetings to minimize potential disturbance. The Permittee shall avoid impacts to state-listed endangered, threatened, and special concern species in all areas of the project including temporary workspaces associated with the project.

Rare Species Surveys

Known locations of state-listed threatened/endangered species and their habitats have been identified within the project area. These species may occur within the proposed route where suitable habitat exists. The Permittee, in consultation with the DNR, will determine the need for rare species surveys (pre-construction) within the approved route. In the areas where these species are known to exist or where the right-of-way passes through habitats where these species are likely to exist, field surveys may be required. In the event that impacts cannot be avoided, the Permittee would be required to obtain a takings permit from DNR for impacts to the species. The Permittee shall submit results of these efforts to the Commission with the Plan and Profile.

Contamination Survey

The Permittee, in consultation with the MPCA, shall identify any contaminated sites as it performs its detailed survey and acquisition work prior to the submittal of the final plan and profile to the Commission.

7.0 DELAY IN CONSTRUCTION

If the Permittee has not commenced construction or improvement of the route within four years after the date of issuance of this permit the Commission shall suspend the permit in accordance with Minn. R. 7852.3300. If at the time of suspension, or at a later time, the Permittee decides to construct the pipeline, it shall certify to the Commission that there have been no significant changes in any material aspects of the conditions or circumstances existing when the permit was issued. If the Commission determines that there are no significant changes, it shall reinstate the permit. If the Commission determines that there is a significant change, it may order public information meetings or a new hearing and consider the matter further, or it may require the Permittee to submit a new application.

8.0 COMPLAINT PROCEDURES

Prior to the start of construction, the Permittee shall submit to the Commission the procedures that will be used to receive and respond to complaints. The procedures shall be in accordance with the requirements of Minn. R. 7852.3700, and as set forth in the complaint procedures attached to this permit [*Attachment Complaint Report Procedures*]. The Permittee shall advise the Commission when such procedure has been established.

The Permittee shall notify the Commission of any complaints received during the course of construction pertaining to Minn. R. 7852.3600 that are not resolved within 30 days of the complaint.

Upon request, the Permittee shall assist the Commission with the disposition of unresolved or longstanding complaints. This assistance shall include, but is not limited to, the submittal of complaint correspondence and complaint resolution efforts.

9.0 PIPELINE SAFETY

In an emergency situation, responders will take appropriate actions necessary to address the emergency. Pursuant to Minn. Stat. § 216G.02, subd. 3(a) the pipeline routing permit may not set safety standards for the construction of pipeline. This would also apply to operation and maintenance. Therefore, this Pipeline Routing Permit does not address pipeline safety related issues.

10.0 COMPLIANCE REQUIREMENTS

Failure to timely and properly make compliance filings required by this permit is a failure to comply with the conditions of this permit. Compliance filings must be electronically filed with the Commission.

10.1 Plan and Profile

At least ~~14 calendar~~30 days before right-of-way preparation for construction begins on any segment or portion of the project, the Permittee shall provide the Commission with a plan and profile of the right-of-way and the specifications and drawings for right-of-way preparation, construction, cleanup, and restoration for the segment of pipeline for which construction is scheduled. The documentation shall include maps depicting the plan and profile including the designated route, right-of-way, and pipeline alignment approved per this permit.

The Permittee may not commence construction until the ~~14~~ 30 days has expired or until the Commission has advised the Permittee in writing that it has completed its review of the plan and profile documents and determined that the planned construction is consistent with this permit. If the Permittee intends to make any significant changes in its plan and profile or the specifications and drawings after submission to the Commission the Permittee shall notify the Commission at least five days before implementing the changes. No changes shall be made that would be in violation of any of the terms of this permit.

The Permittee shall also provide the Minnesota Office of Pipeline Safety with the same information provided to the Commission. The Permittee's plan and profile and specifications and drawings, shall become a condition of this permit and shall be complied with by the Permittee in accordance with Minn. R. 7852.3500.

10.2 ~~Periodic~~ Status Reports

The Permittee shall report to the Commission on progress ~~regarding~~ during finalization of the route and construction of the pipeline. The Permittee shall report weekly ~~during construction to both the Commission and the Department of Commerce~~. Reports shall begin with the submittal of the plan and profile for the project and continue until completion of restoration.

10.3 Notification to Commission

At least three days before the pipeline is to be placed into service, the Permittee shall notify the Commission of the date on which the pipeline will be placed into service and the date on which construction was complete.

10.4 As-Builts

Within ~~60~~ 90 days after completion of construction, the Permittee shall submit copies of all final as-built plans and specifications developed during the project.

10.5 GPS Data

Within ~~60~~ 90 days after completion of construction, the Permittee shall submit to the Commission, in the format requested by the Commission, geo-spatial information (e.g., ArcGIS compatible map files, GPS coordinates, associated database of characteristics) for the pipeline and associated facilities.

11.0 RIGHT OF ENTRY

The Permittee shall allow Commission designated representatives to perform the following, upon reasonable notice, upon presentation of credentials and at all times in compliance with the Permittee's site safety standards:

a. To enter upon the facilities easement of the property for the purpose of obtaining information, examining records, and conducting surveys or investigations.

b. To bring such equipment upon the facilities easement of the property as is necessary to conduct such surveys and investigations.

c. To sample and monitor upon the facilities easement of the property.

d. To examine and copy any documents pertaining to compliance with the conditions of this Permit.

12.0 PERMIT AMENDMENT

The Permittee may apply to the Commission for an amendment of the route designation or to conditions specified in the permit in accordance with the requirements and procedures of Minn. R. 7852.3400.

13.0 PERMIT MODIFICATION OR SUSPENSION

If the Commission determines that substantial evidence supports a finding that a violation of the terms or conditions of this pipeline routing permit has occurred or is likely to occur, it may take

action to modify or suspend this permit in accordance with Minn. R. 7852.3800. The Commission may at any time re-consider modification or suspension of this permit if the Permittee has undertaken effective measures to correct the violations.

14.0 PIPELINE CONSTRUCTION COMPLETION CERTIFICATE

In accordance with Minn. R. 7852.3900, the Permittee shall file with the Commission a written certification that the construction and remediation of the permitted pipeline has been completed in compliance with all permit conditions and landowner agreements. The certification shall be considered by the Commission within 60 days of its filing. The Commission shall accept or reject the certification of completion and make a final determination regarding cost or reimbursements due. If the certification is rejected, the Commission shall inform the Permittee in writing which deficiencies, if corrected, will allow the certification to be accepted. When corrections to the deficiencies are completed, the Permittee shall notify the Commission, and the certification shall be reconsidered as soon as possible. After acceptance of the certification, the Commission's jurisdiction over the Permittee's pipeline routing permit shall be terminated.

MINNESOTA PUBLIC UTILITIES COMMISSION
COMPLAINT HANDLING PROCEDURES FOR
PERMITTED ENERGY FACILITIES

A. Purpose

To establish a uniform and timely method of reporting and resolving complaints received by the permittee concerning permit conditions for site preparation, construction, cleanup, restoration, operation, and maintenance.

B. Scope

This document describes complaint reporting procedures and frequency.

C. Applicability

The procedures shall be used for all complaints received by the permittee and all complaints received by the Minnesota Public Utilities Commission (Commission) under Minn. R. 7829.1500 or Minn. R. 7829.1700 relevant to this permit.

D. Definitions

Complaint: A verbal or written statement presented to the permittees by a person expressing dissatisfaction or concern regarding site preparation, cleanup or restoration or other route and associated facilities permit conditions. Complaints do not include requests, inquiries, questions or general comments.

Substantial Complaint: A written complaint alleging a violation of a specific permit condition that, if substantiated, could result in permit modification or suspension pursuant to the applicable regulations.

Unresolved Complaint: A complaint which, despite the good faith efforts of the permittee and a person, remains to both or one of the parties unresolved or unsatisfactorily resolved.

Person: An individual, partnership, joint venture, private or public corporation, association, firm, public service company, cooperative, political subdivision, municipal corporation, government agency, public utility district, or any other entity, public or private, however organized.

E. Complaint Documentation and Processing

1. The permittee shall designate an individual to summarize complaints for the Commission. This person's name, phone number and email address shall accompany all complaint submittals.

2. A person presenting the complaint should to the extent possible, include the following information in their communications:

    a. name, address, phone number, and email address;
    b. date of complaint;
    c. tract or parcel number; and
    d. whether the complaint relates to a permit matter or a compliance issue.

3. The permittee shall document all complaints by maintaining a record of all applicable information concerning the complaint, including the following:

    a. docket number and project name;
    b. name of complainant, address, phone number and email address;
    c. precise description of property or parcel number;
    d. name of permittee representative receiving complaint and date of receipt;
    e. nature of complaint and the applicable permit condition(s);
    f. activities undertaken to resolve the complaint; and
    g. final disposition of the complaint.

F. Reporting Requirements

The permittee shall commence complaint reporting at the beginning of project construction and continue through the term of the permit. The permittee shall report all complaints to the Commission according to the following schedule:

Immediate Reports: All substantial complaints shall be reported to the Commission the same day received, or on the following working day for complaints received after working hours. Such reports are to be directed to the Commission's Consumer Affairs Office at 1-800-657-3782 (voice messages are acceptable) or consumer.puc@state.mn.us. For e-mail reporting, the email subject line should read "PUC EFP Complaint" and include the appropriate project docket number.

Monthly Reports: During project construction and restoration, a summary of all complaints, including substantial complaints received or resolved during the preceding month, shall be filed by the 15th of each month to Daniel P. Wolf, Executive Secretary, Public Utilities Commission, using the eDockets system. The eDockets system is located at: https://www.edockets.state.mn.us/EFiling/home.jsp

If no complaints were received during the preceding month, the permittee shall file a summary indicating that no complaints were received.

G. Complaints Received by the Commission

Complaints received directly by the Commission from aggrieved persons regarding site preparation, construction, cleanup, restoration, operation and maintenance shall be promptly sent to the permittee.

H. Commission Process for Unresolved Complaints

Commission staff shall perform an initial evaluation of unresolved complaints submitted to the Commission. Complaints raising substantial permit issues shall be processed and resolved by the Commission. Staff shall notify the permittee and appropriate persons if it determines that the complaint is a substantial complaint. With respect to such complaints, each party shall submit a written summary of its position to the Commission no later than ten days after receipt of the staff notification. The complaint will be presented to the Commission for a decision as soon as practicable.

I. Permittee Contacts for Complaints and Complaint Reporting

Complaints may filed by mail or email to:

[*Name*]
[*Mailing Address*]
[*Phone*]
[*Email*]

This information shall be maintained current by informing the Commission of any changes as they become effective.

MINNESOTA PUBLIC UTILITIES COMMISSION
COMPLIANCE FILING PROCEDURE FOR
PERMITTED ENERGY FACILITIES

A. Purpose

To establish a uniform and timely method of submitting information required by the Commission energy facility permits.

B. Scope and Applicability

This procedure encompasses all compliance filings required by permit.

C. Definitions

Compliance Filing: A filing of information to the Commission, where the information is required by a Commission site or route permit.

D. Responsibilities

1. The permittee shall file all compliance filings with Daniel P. Wolf, Executive Secretary, Public Utilities Commission, through the eDockets system. The eDockets system is located at: https://www.edockets.state.mn.us/EFiling/home.jsp

General instructions are provided on the eDockets website. Permittees must register on the website to file documents.

2. All filings must have a cover sheet that includes:

    a. Date
    b. Name of submitter/permittee
    c. Type of permit (site or route)
    d. Project location
    e. Project docket number
    f. Permit section under which the filing is made
    g. Short description of the filing

3. Filings that are graphic intensive (e.g., maps, engineered drawings) must, in addition to being electronically filed, be submitted as paper copies and on CD. Paper copies and CDs should be sent to: 1) Daniel P. Wolf, Executive Secretary, Minnesota Public Utilities Commission, 121 7th Place East, Suite 350, St. Paul, MN 55101-2147, and 2) Department of Commerce, Energy Environmental Review and Analysis, 85 7th Place East, Suite 500, St. Paul, MN 55101-2198.

The Commission may request a paper copy of any electronically filed document.

PERMIT COMPLIANCE FILINGS[1]

PERMITTEE:
PERMIT TYPE:
PROJECT LOCATION:
PUC DOCKET NUMBER:

Filing Number	Permit Section	Description of Compliance Filing	Due Date

[1] This compilation of permit compliance filings is provided for the convenience of the permittee and the Commission. It is not a substitute for the permit; the language of the permit controls.

Filing Number	Permit Section	Description of Compliance Filing	Due Date

Appendix F

Agricultural Mitigation Plan

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MINNESOTA ENERGY RESOURCES CORPORATION

ROCHESTER NATURAL GAS PIPELINE PROJECT, OLMSTED COUNTY, MINNESOTA

AGRICULTURAL MITIGATION PLAN

Prepared For:

Minnesota Energy Resources Corporation
1995 Rahncliff Court, Suite 200
Eagan, MN 55122-3401

Prepared By:

701 Xenia Avenue South
Minneapolis, MN 55416

September 2016

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Contents

APPENDICES

Definitions

Agricultural Land	Land that is actively managed for agricultural purposes, including: cropland, hayland, or pasture; silvicultural activities (i.e., tree farms); and land in government set-aside programs such as Conservation Reserve Program and Conservation Reserve Enhancement Program. Agricultural Land may also include land that is otherwise fallow but would likely be cultivated within 5 years of Project completion.
Agricultural Monitor	On-site third-party monitor retained and funded by MERC, but providing direct reports to the Minnesota Department of Agriculture and/or Trade, and Consumer Protection and responsible for auditing MERC's compliance with provisions of this Plan.
ATWS	Additional Temporary Workspace.
BMP	Best Management Practices.
CFR	Code of Federal Regulations
Commission	Minnesota Public Utilities Commission
Cropland	Land actively managed for growing row crops, small grains, or hay.
Easement	The agreement(s) and/or interest in privately owned Agricultural Land held by MERC by virtue of which it has the right to construct and operate the Project together with such other rights and obligations as may be set forth in such agreement.
Environmental Inspector	On-site inspector retained by MERC to verify compliance with requirements of this Plan and other environmental requirements during construction of the Project.
Final Cleanup	Pipeline construction activity that occurs after backfill but before restoration of fences and required reseeding. Final Cleanup activities include: replacing Topsoil, removal of construction debris, removal of excess rock, decompaction of soil as required, final grading, and installation of permanent erosion control structures.
Landowner	Person(s) holding legal title to Agricultural Land on the Project route from whom MERC is seeking, or has obtained, a temporary or permanent Easement. The term Landowner shall include any person(s) authorized in writing by the actual Landowner to make decisions regarding the mitigation or restoration of agricultural impacts to such Landowner's property.

MDA	Minnesota Department of Agriculture
MERC	Minnesota Energy Resources Company
Non-Agricultural Land	Any land that is not Agricultural Land as defined above.
Person	An individual or entity, including any partnership, corporation, association, joint stock company, trust, joint venture, limited liability company, unincorporated organization, or governmental entity (or any department, agency, or political subdivision thereof).
Plan	Agricultural Mitigation Plan
Planned Tile	Locations where the proposed Tile installation is made known in writing to MERC by the Landowner either: 1) within 60 days after the signing of an Easement; or 2) before the issuance of a Route Permit to MERC; whichever is sooner.
Right-of-way	The land included in permanent and temporary Easements that MERC possess for the purpose of constructing and operating the Project.
Route Permit	Route permit issued by the Commission.
Spoil Storage Side	Non-working side of the construction Right-of-way where ditch spoil and temporary Topsoil are stored (as needed).
Tenant	Any person, other than the Landowner, lawfully residing on or in possession or control of the land that makes up the right-of-way as defined in this Plan.
Tile	Subsurface drainage systems and their aboveground appurtenances.
Topsoil	The uppermost horizon (layer) of the soil, typically with the darkest color and highest content of organic matter and nutrients.
Trench Crown	The placement of subsoil and Topsoil in the trench to a finished elevation somewhat above the surrounding ground surface to account for post-construction settling of soil returned to the trench.
TWS	Temporary Workspace
USC	United States Code
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation

Purpose and Applicability

This Agricultural Mitigation Plan (Plan) was developed by Minnesota Energy Resources Company (MERC) and is based on a recent agricultural mitigation plan template provided by the Minnesota Department of Agriculture (MDA). MERC has applied for a Pipeline Route Permit (PRP) from the Minnesota Public Utilities Commission (Commission) for the Project, and has included this Plan as supplemental information supporting the application. Through the Commission public notice and review processes associated with the applications, other agencies (including the MDA), local authorities, Landowners, Tenants, and other stakeholders are able to review and provide comments on the Plan. This Plan will be incorporated by reference into the Route Permit issued by the Commission for the Project. Once finalized, this Plan may also be incorporated by reference into other federal, state, and local permits issued for the Project.

The objective of the Plan is to identify measures that MERC will implement to avoid, mitigate, or provide compensation for negative agricultural impacts that may result from pipeline construction. The construction standards described in this document apply only to construction activities occurring partially or wholly on privately owned Agricultural Land.

General Provisions

All mitigation measures are subject to change by Landowners, provided such changes are negotiated in advance of construction and acceptable to MERC. If any provision of this Plan is held to be unenforceable, no other provision will be affected by that holding, and the remainder of the Plan will be interpreted as if it did not contain the unenforceable provision.

MERC will consider any federal, state, and local permit, including a Route Permit, issued for the Project to be the controlling authority. To the extent a mitigation measure contemplated by this Plan is determined to be unenforceable in the future due to requirements of other permits issued for the Project, MERC will inform the MDA and the regulatory authority that issued the permit that made a mitigation measure unenforceable of the conflict and will develop reasonable alternative measures.

MERC will provide the Commission with a Plan and Profile once final design is complete. If there are alignment changes that shift the location of the right-of-way, due to field conditions, landowner negotiations or other circumstances, then MERC would provide the Commission, MDA and other permitting agencies with the updated alignment along with appropriate permit revisions.

MERC will implement the mitigation measures and Best Management Practices (BMPs) described in this Plan to the extent they do not conflict with the requirements of federal and state rules and regulations, and permits and approvals obtained by MERC. Certain provisions of this Plan require MERC to consult and/or reach agreement with the Landowner of a property. MERC will engage in a good faith effort to secure the agreement. Tenants will not be consulted except where a Landowner has designated in writing that a Tenant has decision making authority on their behalf.

MERC will retain qualified contractors to implement mitigation measures; however, MERC may negotiate with Landowners to implement the mitigation measures that Landowners wish to perform themselves.

MERC will employ an Environmental Inspector whose role is to verify compliance with the requirements of this Plan and other environmental requirements during construction of the

pipeline. The Environmental Inspector will be employed by and report to MERC, and will be a part of MERC's environmental inspection team.

The Environmental Inspector will:

- Be a member of MERC's environmental inspection team during periods of active construction
- Provide construction personnel with training on provisions of this Plan before construction begins;
- Provide construction personnel with field training on specific topics, such as protocols for Topsoil stripping;
- Observe construction activities on Agricultural Land on a continual basis;
- Be responsible for verifying MERC's compliance with provisions of this Plan and other environmental requirements during construction;
- Work collaboratively with MERC inspectors, right-of-way agents, and the Agricultural Monitor in achieving compliance with this Plan;
- Document instances of noncompliance and work with construction personnel to identify and implement appropriate corrective actions as needed; and
- Have the authority to stop construction activities that are determined to be out of compliance with the provisions of this Plan.

In addition to the Environmental Inspector, an Agricultural Monitor will also inspect construction work on Agricultural Lands. The Agricultural Monitor will be retained and funded by MERC, but will function as an independent third-party inspector providing direct reports to the MDA, and will be responsible for auditing MERC's compliance with the provisions of this Plan. MERC will provide resumes of candidates who meet the qualifications of an Agricultural Monitor for review and final selection by the MDA.

The Agricultural Monitor will not be a member of MERC's environmental inspection team. The Agricultural Monitor will not have the authority to direct construction activities or manage MERC employees or contractors. The Agricultural Monitor will work through MERC's Environmental Inspector and MDA if compliance issues are identified. The Agricultural Monitor will have full access to Agricultural Land crossed by the Project and will have the option to attend meetings where construction on Agricultural Land is discussed. Specific duties of the Agricultural Monitor will include:

- Participate in preconstruction training activities sponsored by MERC;
- Monitor construction and restoration activities on Agricultural Land for compliance with provisions of this Plan;
- Report instances of noncompliance to MERC's Environmental Inspector and the MDA;
- Prepare regular compliance reports and submit them to the MDA;
- Act as a liaison between Landowners and the MDA when necessary and requested by the Landowner;
- Serve as a resource to investigate complaints or questions of compliance at the direction of the MDA; and

- Maintain a written log of communications from Landowners regarding compliance with this Plan as well as report Landowner complaints to MERC's Environmental Inspector or right-of-way representative.

Both the Environmental Inspector and Agricultural Monitor will have a bachelor's degree in agronomy, soil science, natural resources, or equivalent work experience. In addition, the Environmental Inspector and Agricultural Monitor will have demonstrated practical experience with pipeline construction and restoration on Agricultural Land.

MERC will provide each Landowner with a telephone number and address that can be used to contact MERC, during and following construction, regarding the agricultural mitigation work that is performed on their property or other construction-related matters. If the contact information changes following construction, MERC will provide the Landowner with updated contact information. MERC will respond to Landowner telephone calls and correspondence within a reasonable time.

Mitigation measures identified by MERC pursuant to this Plan, unless otherwise specified in this Plan or in an Easement or other agreement with an individual Landowner, will be initiated within forty-five (45) days following completion of Final Cleanup on an affected property, weather permitting or unless otherwise delayed at the request of the Landowner. If implementation of mitigation measures requires additional time, MERC will make temporary repairs, as needed, to minimize the risk of additional property damage or interference with the Landowner's access to or use of the property.

Mitigation Measures

1. Right-of-Way Width

   Prior to construction, MERC will establish the right-of-way width for construction and temporary workspace (TWS) on Agricultural Lands based on prior project experience, engineering and construction requirements or best practices, and safety needs. The construction limits will be shown on alignment sheet drawings provided to the construction contractor, Environmental Inspector, Agricultural Monitor, and regulatory authorities.

   A. The typical construction workspace will be governed by the Route Permit and other Project permits, but will typically consist of a 100-foot-temporary construction right-of-way which would include 50 feet of permanent right-of-way and 50 feet of temporary workspace. The TWS will be used during construction for soil storage and operation of equipment and vehicles along the entire length of the pipeline. At certain areas where the pipeline crosses natural geographic or larger man-made features such as roads, railroads, streams, or wetland crossings, where horizontal directional drilling may be necessary, a defined area of additional temporary workspace (ATWS) will be required on each side of the feature.

   B. The construction boundaries of ATWS will be staked prior to the work at each location.

   C. If the area of the ATWS is not sufficient to perform the work and implement BMPs, MERC will refrain from construction in that area until an adequate work area is available and approved. MERC will discuss the need for ATWS with the construction contractor, construction inspection team, Environmental Inspector, Agricultural Monitor, and the Landowner, and will not use any additional workspace until

approved by the Landowner, Agricultural Monitor, and regulatory authorities, as applicable.

2. Pipeline Depth of Cover

   A. Except for aboveground facilities, such as valves, and except as otherwise stated in this Plan, the pipeline will be buried with the following depths of cover on Agricultural Land:

      1) The pipeline will be constructed at a depth of at least 4.5 (54 inches) feet below the surface in accordance with the Olmsted County Zoning ordinance. This also meets the minimum depth of cover of 30 inches as required by U.S. Department of Transportation (DOT) regulations in 49 CFR Part 195.248. Section 216G.07 of the Minnesota Statutes further requires a minimum depth of cover of 54 inches unless waived by the Landowner. In certain circumstances, particularly where bedrock is shallow, the pipe depth may be less than 54 inches. MERC will attempt to bury the pipe to appropriate depth by mechanical means, such as ripping or shattering the rock, using a rock saw or boring.

      2) Where existing or planned Tile systems are present, the pipeline will be installed at a depth that will achieve at least a 12-inch-wide separation between the pipeline and overlying Tiles as described in Section 2.C. of this Plan.

   B. MERC will construct the pipeline under existing non-abandoned Tile and Planned Tile within six (6) feet of the surface, unless the Landowner determines otherwise in writing. MERC may install the pipeline over Tile buried deeper than six (6) feet. If the Landowner plans to install a new Tile system, the Landowner must provide to MERC plans drawn by a qualified professional with experience in Tile design and installation. In determining the proper depth of the pipeline, MERC will accommodate the depth and grade needed for both existing and Planned Tile to function properly. MERC will not change the grade of existing Tile to accommodate the pipeline without the Landowner's advance written consent.

   C. A minimum of twelve (12) inches of separation will be maintained between the pipeline and Tile unless the Landowner agrees in writing to a lesser separation. If unforeseen physical conditions are discovered during construction that prevents minimum separation, the Landowner will be informed of the situation prior to the installation of the pipeline over the Tile. If a good faith effort is made and the Landowner is unavailable, the Agricultural Monitor will be informed and construction will continue.

3. Winter Construction

   MERC intends on avoiding construction in Agricultural Lands in the winter season. However, to protect the productivity of Agricultural Lands in the event that winter construction is unavoidable as a result of weather, permit acquisition, or any other unforeseen delays, the following mitigation measures are proposed:

   A. *Minimize Topsoil Stripping in frozen conditions.* Frozen conditions can preclude effective Topsoil stripping. When soil is frozen to a depth greater than the depth of the Topsoil, Topsoil cannot be efficiently stripped from the subsoil. If Topsoil stripping must proceed under these conditions, it will only be removed from the area of the

trench. A ripper will be used to break up the frozen Topsoil over the trenchline and a backhoe will remove the Topsoil layer and store the material in a separate pile. The ripper will extend to the depth of Topsoil to twelve (12) inches.

B. *Minimize Final Clean-up activities in frozen conditions*. Frozen conditions can preclude effective Topsoil replacement, removal of construction debris, removal of excess rock, decompaction of soil as required, final grading, and installation of permanent erosion control structures. If seasonal or other weather conditions preclude Final Clean-up activities, the trench and temporary workspace areas will be backfilled, stabilized, and temporary erosion control measures will be installed until restoration can be completed. If Topsoil/spoil piles remain throughout the winter, the Topsoil/spoil piles will be stabilized by an application of mulch and a tackifier or other methods approved by the regulatory authority. To prevent subsidence, backfill operations will resume when the ground is thawed and the subsoil will be compacted (as needed) prior to Final Clean-up activities. The construction contractor must monitor these areas until final restoration is complete.

C. Topsoil Stripping and Final Clean-up activities proposed in Agricultural Lands in frozen conditions in Minnesota will be discussed with the MDA, respectively prior to commencement of these activities.

4. Temporary Erosion and Sediment Control

   Temporary erosion and sediment controls will be implemented as required.

5. Topsoil Stripping, Trenching, Soil Storage, and Replacement

   A. Full and partial Topsoil stripping methods are similar except for the area where the Topsoil is removed. With full Topsoil stripping, the Topsoil is removed from the entire working side (traffic lane, trench spoil storage, and trench area) of the right-of-way. Under partial Topsoil stripping, the Topsoil will not be removed from under the Topsoil storage piles. Topsoil will also be removed and segregated in other areas, such as bore pits at road and railroad crossings, where the footprint may be larger and/or irregularly shaped. Topsoil is typically stored on the outer most edge of the working side of the construction right-of-way, however, MERC may also store Topsoil on the spoil storage side of the construction workspace where there are workspace constraints.

      MERC will use the following Topsoil segregation method during construction of the Project on Agricultural lands. The method selected will be dependent on specific Landowner approvals or agreements, field conditions, regulatory authority or permit requirements and/or other factors.

      Full Right-of-Way Method – This method involves stripping Topsoil from the entire width of the construction right-of-way. This method typically results in less soil mixing between Topsoil and subsoil caused by equipment rutting over areas where Topsoil was not stripped. A larger volume of Topsoil will be generated using this method and, consequently, may warrant the need for Topsoil to also be stored on both sides of the construction right-of-way.

   B. The maximum depth of Topsoil stripping will be twelve (12) inches unless otherwise agreed to with MDA. The Environmental Inspector will observe Topsoil operations so that appropriate depths are removed.

C. Equipment operators will be trained to discriminate between Topsoil and subsoil based on obvious color changes. In locations where the Topsoil/subsoil color changes are not easily distinguishable or variable, the Agricultural Inspector will determine the depth.

D. MERC may also remove Topsoil from ATWS as dictated by site-specific conditions and Landowner agreements. Topsoil will be removed in all cut and fill areas prior to grading.

E. In specific areas of deep Topsoil and as determined in consultation between the Environmental Inspector and/or the Agricultural Monitor, the modified ditch-plus-spoil method will be used. However, the area requiring Topsoil stripping may be adjusted from the modified ditch-plus-spoil method where the Agricultural Monitor determines that such modification is necessary for safety or would be more protective of the soil resource. The adjusted method may include trenchline-only Topsoil segregation, such as in instances where Topsoil is removed under frozen conditions (i.e., winter construction). In all cases where modifications are proposed, approval from MERC, the MDA, or other regulatory authority may be required.

F. If the Agricultural Monitor and the Environmental Inspector cannot agree on the proposed adjustment in the Topsoil segregation method, the Agricultural Monitor will document the objection and provide documentation to the MDA and MERC.

G. Trench spoil will be placed in a stockpile that is separate from Topsoil. MERC will maintain a minimum one (1)-foot-wide separation or place a barrier between Topsoil and subsoil piles to avoid mixing. In areas where the Topsoil has not been stripped from the subsoil storage area, subsoil can be stored on a thick layer of mulch or another physical barrier that identifies and protects the unstripped Topsoil.

H. Backfilling will follow lowering the pipe into the trench. During trench backfilling, subsoil material will be replaced first, followed by Topsoil. To prevent subsidence, subsoil will be backfilled and compacted. Compaction by operating construction equipment along the trench is acceptable.

I. Rock excavated from the trench may be included with backfill provided the rock content of the pre-construction soils is not significantly increased. In the event excess rock cannot be returned to the trench without substantially increasing pre-existing rock content, rocks will be considered construction debris and removed (see Section 8 of this Plan).

J. Replacing Topsoil will be initiated within fourteen (14) days after backfilling the trench. If seasonal or other weather conditions prevent compliance with this timeframe, temporary erosion control measures must be implemented and maintained until conditions allow completion of cleanup. Topsoil will be replaced across the stripped area as near as practicable to its original depth. A Trench Crown over the trenchline is permissible to offset potential settling. Following placement of the subsoil crown, Topsoil would be uniformly returned across the stripped area. The height of the crown will generally be equal to, or less than, twelve (12) inches at the center. Breaks in the crown may be cut to accommodate overland water flow across the right-of-way.

6. Wet Soil Conditions

   A. Before removing Topsoil during wet soil conditions, the Environmental Inspector will assess whether the moisture content in the surface horizon is suitable for grading. If the soil is considered too wet to segregate, stripping may be postponed. Based on the Environmental Inspector's recommendation, MERC may allow Topsoil removal in areas where soils are persistently wet.

   B. If construction activities cause compaction in the subsoil, the contractor will be instructed to rip the subsoil prior to respreading and restoring the Topsoil.

7. Repair of Damaged and Adversely Affected Tile

   If Tile is damaged during installation of the pipeline, the Tile will be repaired in a manner that restores operating condition. If Tile lines immediately adjacent to the construction area are adversely affected by the pipeline installation, MERC will restore the Tile, including the relocation, reconfiguration, or replacement of the Tile. The affected Landowner may settle with MERC for payment to repair, relocate, reconfigure, or replace the damaged Tile. In the event the Landowner chooses to perform the repair, relocation, reconfiguration, or replacement of the damaged Tile, MERC will not be responsible for correcting Tile repairs after completion of the pipeline and the Landowner's repairs. MERC is only responsible for correcting Tile repairs if the repairs were made by MERC or its agents or designees.

   Prior to pipeline installation, MERC will contact Landowners to determine if Tile systems will be affected. Tile systems that will be damaged, cut, or removed during construction will be marked by placing a highly visible flag at the edge of the construction right-of-way directly over the Tile lines. These markers will not be removed until the Tile has been permanently repaired and approved and accepted by the Landowner, or the Agricultural Monitor.

   The pipeline trench shall provide a minimum of twelve (12) inches of clearance, where practicable, between the pipe and drainage Tiles. In most situations, the pipe will be installed under the drainage Tile; however, where drain Tiles are deeper than six (6) feet MERC may elect to install the pipe above the Tile lines.

   MERC will ensure that the construction contractor repairs damaged Tile in a manner consistent with industry-accepted methods. At the Landowner's request and with MERC's approval, local contractors may perform the repair, replacement, or reconfiguration of the Tiles damaged or cut during pipeline construction.

   Where damaged Tile is repaired by MERC, the following procedures will apply:

   A. Before completing permanent repairs, Tiles will be examined on both sides of the trench for their entire length within the work area to check for damage by construction equipment. If Tiles are found to be damaged, they will be repaired to preconstruction conditions.

   B. Tiles will be repaired with material of the same or better quality as that which was damaged.

   C. Filter-covered drain Tiles will be replaced with filter-covered drain Tiles.

D. If the Tile is clay, ceramic, or concrete, any connection made with new material must be made with commercially available connectors, wrapped in plastic, or sealed with Sakrete to prevent soil intrusion.

E. If water is flowing through a damaged Tile, temporary repairs will be promptly completed and maintained until permanent repairs can be made.

F. Where Tiles are damaged or severed by the pipeline trench, repairs will be made according to the following procedures:

1) Where Tiles are severed by the pipeline trench, double-walled drain Tile pipe, or its equivalent material, will be used for Tile repairs.

2) Within the trench, one and one-half (1.5) inch river gravel, four (4) inch crushed stone, sandbags, bags of Sakrete (or an equivalent), or poured concrete will be backfilled under Tiles, as needed, to provide support and prevent settling. Concrete blocks are also acceptable forms of support as are protective pads on the pipeline.

3) The support member will be of sufficient strength to support loads expected from normal farming practices (i.e., loads up to a ten (10) ton point load) on the surface directly above the repaired Tile.

4) The support member will extend a minimum of two (2) feet into the soil on both sides of the trench and will be installed in a manner that will prevent it from overturning. If the repairs involve clay Tile, the support member will extend to the first Tile joint beyond the minimum two (2) -foot-wide distance.

5) There will be a minimum clearance as required by Section 2.C. of this Plan.

6) The grade of the Tile will not be changed.

G. MERC will initiate efforts to complete permanent Tile repairs within a reasonable timeframe after Final Cleanup, weather and soil conditions permitting.

H. Following completion of the final cleanup, MERC will be responsible for correcting repairs to Tile that fail, but only if MERC or its agents or designees made the initial repairs. MERC will not be responsible for Tile repairs that MERC has paid the Landowner to perform.

I. Any necessary modifications to the configuration of existing Tile systems must be consistent with the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, and Minnesota Wetland Conservation Act restrictions, and other regulatory authorities on wetland drainage.

8. Agricultural Drainage Ditches

Where the pipeline route crosses agricultural drainage ditches that are operated by the Landowner, pipeline will be installed at a depth that is sufficient to allow for ongoing maintenance of the ditch. After the pipeline is installed, the ditch will be restored to its preconstruction contours with erosion controls as needed. Ditches that are operated and maintained by a public entity will be crossed in accordance with applicable permits.

9. Rock Removal

The following conditions will apply on Agricultural Land:

A. If trenching, blasting, or boring operations are required in bedrock, suitable precautions will be taken to minimize the potential for rocks to become mixed with the backfill.

B. After the construction right-of-way has been decompacted as required in Section 10 of this Plan and the Topsoil replaced, MERC will remove rocks from the surface of the entire construction area so that the size, density, and distribution of rock on the right-of-way is similar to that on adjacent off-right-of-way areas. MERC will consult with the Landowner to identify suitable rock disposal locations on the construction right-of-way, or the rocks will be removed for disposal at another approved disposal location. Written authorization from the Landowner is required for disposal on the Landowner's property. Rock disposal will comply with any federal, state, or local regulations involving fill and disposal of construction debris.

10. Removal of Construction Debris

    Construction-related debris, material, and litter will be removed from the Landowner's property at MERC's expense. The Landowner or land-managing agency may approve leaving specific materials onsite that may provide for beneficial uses for stabilization or habitat restoration.

11. Compaction, Rutting, and Soil Restoration

    A. In an effort to minimize soil compaction prior to trenching activities, MERC will, where practical, transport pipe joints (i.e., stringing trucks) as closely as possible along the pipeline centerline.

    B. After construction, compaction of the subsoil will be alleviated on cropland using deep-tillage equipment, as needed. Decompaction of the topsoil, if necessary, will be performed during favorable soil conditions. If the Environmental Inspector and/or Agricultural Monitor determine that the soil is too wet, decompaction will be delayed until the subsoil is friable/tillable in the top eighteen (18) inches.

    C. Deep subsoil ripping in cropland will occur in all traffic and work areas of the pipeline right-of-way where there was full right-of-way Topsoil stripping, unless the Environmental Inspector determines compaction has not occurred. This includes ATWS.

    D. Subsoil ripping equipment may include v-rippers, chisel plows, or equivalents.

    E. If the Landowner makes a written claim for damages related to soil compaction greater than that of immediately adjacent Agricultural Land owned by the Landowner but unaffected by pipeline construction, MERC will retain a Professional Licensed Soil Scientist, or an appropriately qualified professional engineer. The Professional Soil Scientist or engineer will perform a survey of the construction right-of-way, ATWS, and adjacent unaffected land owned by the Landowner for soil compaction using field equipment such as a soil penetrometer. In addition, where there are row crops, samples will be taken in the middle of the row, but not in rows where the drive wheels of farm equipment normally travel. Copies of the results of the survey will be provided to the Landowners making such claim within thirty (30) days of completion of the soil survey. These surveys for soil compaction will be completed at MERC's expense.

    F. MERC will restore rutted land as near as practical to its preconstruction condition.

G. MERC will compensate Landowners, as appropriate, for damages caused by MERC during Project construction. Damages will be paid for the cost of soil restoration on the construction right-of-way and ATWS to the extent such restoration work is not performed by MERC.

H. In the event of a dispute between the Landowner and MERC regarding what areas need to be deep tilled (i.e., ripped) or chiseled, or the depth at which compacted areas should be ripped or chiseled, MERC will determine the appropriate actions based on the Agricultural Monitor's opinion.

12. Fertilization and Liming

    Fertilizers and lime will be applied based on Landowner requirements.

13. Land Leveling

    Following completion of the Project, MERC will restore the construction work areas as practicable to the original preconstruction contours. If uneven settling occurs or surface drainage problems develop as a result of pipeline construction, MERC will provide additional land leveling services within forty-five (45) days of receiving a Landowner's written notice, weather and soil conditions permitting. Alternatively, MERC will negotiate with the Landowner for reasonable compensation in lieu of restoration.

14. Prevention of Soil Erosion

    MERC will install permanent erosion control devices during restoration to prevent erosion.

15. Repair of Damaged Soil Conservation Practices

    Soil conservation practices (e.g., terraces, grassed waterways) that are damaged by pipeline construction will be restored to their preconstruction condition.

16. Interference with Irrigation Systems

    A. If it is feasible and mutually acceptable to MERC and the Landowner, temporary measures will be implemented to allow an irrigation system to continue to operate across land on which the pipeline is being constructed.

    B. If the pipeline right-of-way and/or ATWS interfere with an operational (or soon-to-be operational) spray irrigation system, MERC will inform the Landowner of the need to take the Irrigation system out of service. MERC and the Landowner will agree upon an acceptable amount of time the irrigation system may be out of service. If MERC and the Landowner are unable to agree on the amount of time within ten (10) days of MERC informing the Landowner of the need to take the irrigation system out of service, construction will proceed and the Landowner will be asked to take the irrigation system out of service.

    C. If, as a result of pipeline construction, interruption of an irrigation system results in crop damages, either on the right-of-way or off-right-of-way, compensation of Landowners will be determined as described in Section 21 of this Plan.

17. Ingress and Egress

    Prior to pipeline construction, MERC will identify the means of entering and exiting the right-of-way should access to the right-of-way not be practical or feasible from adjacent tracts or from public highway or railroad rights-of-way, consistent with MERC's Easement rights. Temporary access ramps may be constructed using locally obtained Topsoil as

needed to facilitate the movement of equipment between public highways and the right-of-way.

18. Temporary Roads

    A. If public roads do not provide sufficient access, MERC will attempt to use existing farms roads for access to and from the right-of-way, subject to approval from the Landowner or MERC's Easement rights. If MERC needs to construct a new temporary access road across Agricultural Land, the location will be made in collaboration with the Landowner. Temporary roads that are needed during construction will be located to minimize impacts on the landowner's or tenant's use of the agricultural land. If temporary roads in Agricultural Lands require gravel stabilization, geotextile construction fabric will be placed beneath the rock to add stability and to provide a distinctive barrier between the rock and soil surface. During restoration of the right-of-way, temporary access roads will be removed or restored to preconstruction conditions, except as described in Section 17.C of this Plan.

    B. Temporary roads will be designed so as not to impede drainage and will be constructed to minimize soil erosion.

    C. Following construction, new temporary roads may be left intact through mutual agreement of the Landowner and MERC unless otherwise restricted by federal, state, or local regulations.

    D. If the temporary roads are to be removed, the Agricultural Land on which the temporary roads are constructed will be returned to its previous use and restored to a condition equivalent to what existed prior to construction. Restoration techniques for temporary roads will be similar to those used in restoring the Project right-of-way (e.g., decompaction).

19. Weed Control

    MERC will provide weed control at its aboveground facility sites (i.e.valve sites, pump stations) to avoid the spread of weeds onto adjacent Agricultural Land during operation of the Project. Weed control spraying, will be conducted in accordance with applicable regulatory authorities.

20. Pumping of Water from Open Trenches

    A. MERC will follow the steps outlined in Section 7852.2800 Subparts 1C and 1D of the Route Permit Application submitted to the Commission.

    B. When dewatering trenches, MERC will discharge the water in a manner that will minimize damaging adjacent Agricultural Land, crops, and/or pasture. Such damages may include, but are not limited to, inundation of crops for more than twenty-four (24) hours and deposition of sediment in cropland and drainage ditches. If water-related damage during discharge from trenches results in a loss of yield, compensation of Landowners will be determined as described in Section 21 of this Plan.

    C. Discharge of water will be conducted in accordance federal and state regulations, and permit conditions.

21. Construction in Wet Conditions

    Should the Agricultural Monitor determine that continued construction in wet conditions could result in damage to soil structure and compromise future cropland productivity, the Agricultural Monitor may request MERC's Environmental Inspector to temporarily halt the activity on a Landowner's property until the Agricultural Monitor and Environmental Inspector consult with MERC's Construction Manager. Should MERC elect to continue construction activities over the objection of the Agricultural Monitor, MERC will retain a Professional Licensed Soil Scientist or an appropriately qualified Professional Engineer licensed by the State of Minnesota, at its own expense, to perform a survey of the construction right-of-way, ATWS, and adjacent unaffected land owned by the Landowner for soil compaction, prior to final restoration and using the procedures described above.

22. Procedures for Determining Construction-Related Damages

    A. MERC will negotiate in good faith with Landowners who assert claims for construction related damages. The procedure for resolution of these claims will be in accordance with the terms of the Easements.

    B. Negotiations between MERC and any affected Landowner will be voluntary in nature and no party is obligated to follow a specific procedure or method for computing the amount of loss for which compensation is sought or paid, except as otherwise specifically provided in the Easements. In the event a Landowner should decide not to accept compensation offered by MERC, the compensation offered is only an offer to settle, and the offer shall not be introduced in any proceeding brought by the Landowner to establish the amount of damages MERC must pay. In the event that MERC and a Landowner are unable to reach an agreement on the amount of compensation, any such Landowner may seek further recourse as provided in the Easement.

23. Advance Notice of Access to Private Property

    A. MERC or its agents will provide the Landowner with a minimum of twenty-four (24) hours' notice before accessing his/her property for construction, in addition to any regulatory notifications.

    B. Prior notice will consist of personal or telephone contact, whereby the Landowner is informed of MERC's intent to access the land. If the Landowner cannot be reached in person or by telephone, MERC will mail or hand-deliver to the Landowner's home a dated, written notice of MERC's intent. The Landowner need not acknowledge receipt of the written notice before MERC enters the property.

24. Indemnification

    Indemnification obligations relating to the pipeline installation covered by this Plan shall be determined in accordance with the terms of the Easements and applicable law.

25. Tile Repair Following Pipeline Installation

    If, after pipeline installation, the Landowner must make repairs to the Tile system within the right-of-way, or plans to install a new Tile system, the Landowner must obtain Applicant approval of the work plan prior to commencing any activities within the right-of-way. MERC may impose such requirements and limitations on the work as necessary to protect the safety and integrity of MERC's facilities. The Landowner will be responsible for contacting 811 or the local one call center prior to any excavation near the pipeline and

complying with all necessary requirements imposed by MERC to protect the safety and integrity of MERC's facilities.

MERC will, at its own expense, follow the procedures below.

An Applicant representative will be present while the excavation work is being performed, but will not perform the excavation work. If the pipeline is above the Tile system, MERC will be responsible for reasonable extra costs incurred by the Landowner to excavate and expose the pipeline in accordance with MERC's requirements for protection of the pipeline.

Appendix A
Mitigation Measures for Organic Agricultural Land

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Introduction

This appendix identifies mitigation measures that apply specifically to farms that are Certified Organic or farms in Minnesota that are in active transition to become Certified Organic, and is intended to address the unique management and certification requirements of these operations. All protections provided in the Plan must also be applied to Organic Agricultural Land in addition to the provisions of this appendix.

The provisions of this appendix will apply to Organic Agricultural Land for which the Landowner has provided to MERC a true, correct, and current version of the Organic System Plan within sixty (60) days after the signing of the Easement for such land or sixty (60) days after the issuance of a PRP to MERC by the Commission, whichever is sooner. In the event the Easement is signed later than sixty (60) days after the issuance of the PRP, the provisions of this appendix are applicable when the Organic System Plan is provided to MERC at the time of the signing of the Easement. In instances where MERC is in possession of the Easement prior to submitting its Route Permit application to the Commission, the Landowner must provide the Organic System Plan to MERC no later than sixty days after the issuance of the PRP. MERC recognizes that Organic Agricultural Land is a unique feature of the landscape and will treat this land with the same level of care as other sensitive environmental features.

Definitions

Unless otherwise provided to the contrary in this appendix, capitalized terms used in this appendix shall have the meanings provided below and in the Plan. In the event of a conflict between this appendix and the Plan with respect to definitions, the definition provided in this appendix will prevail but only to the extent such conflicting terms are used in this appendix. The definition provided for the defined words used herein shall apply to all forms of the words.

Apply	To intentionally or inadvertently spread or distribute any substance onto the exposed surface of the soil.
Certified Organic	As defined by the National Organic Program Standards, 7 C.F.R. Part 205.100 and 7 C.F.R. Part 205.101.
Certifying Agent	As defined by the National Organic Program Standards, 7 C.F.R. Part 205.2.
Decertified	Loss of Organic Certification. Decertification
Organic Agricultural Land	Farms or portions thereof described in 7 C.F.R. Parts 205.100, 205.101, and 205.202.
Organic System Plan	As defined by the National Organic Program Standards, 7 C.F.R. Part 205.2.
Prohibited Substance	As defined by the National Organic Program Standards, 7 C.F.R. Parts 205.600 through 205.605 using the criteria provided in 7 United States Code (U.S.C.) 6517 and 7 USC 6518.

Organic System Plan

MERC recognizes the importance of the individualized Organic System Plan to the Organic Certification process. MERC will work with the Landowner, the Landowner's Certifying Agent, and/or a USDA-approved organic consultant to identify site-specific construction practices and develop an organic construction plan that will minimize the potential for Decertification as a result of construction activities. MERC also recognizes that Organic System Plans are proprietary in nature and confidentiality will be respected.

Prohibited Substances

MERC will avoid the application of Prohibited Substances onto Organic Agricultural Land. No herbicides, pesticides, fertilizers, or seed will be applied unless requested and approved by the Landowner. Likewise, no refueling, fuel, or lubricant storage or routine equipment maintenance will be allowed on Organic Agricultural Land. Equipment will be checked prior to entry to make sure that fuel, hydraulic, and lubrication systems are in good working order before working on Organic Agricultural Land. If Prohibited Substances are used on land adjacent to Organic Agricultural Land, these substances will be used in such a way as to prevent them from entering Organic Agricultural Land.

Soil Handling

Topsoil and subsoil layers that are removed during construction will be stored separately and replaced in the proper sequence after the pipeline is installed. Unless otherwise specified in the site-specific plan described above, MERC will not use this soil for other purposes, including creating access ramps at road crossings. No Topsoil or subsoil (other than incidental amounts) may be removed from Organic Agricultural Land. Likewise, Organic Agricultural Land will not be used for storage of soil from non-Organic Agricultural Land.

Erosion Control

On Organic Agricultural Land, MERC will, to the extent feasible, implement erosion control methods consistent with the Landowner's Organic System Plan. On land adjacent to Organic Agricultural Land, MERC's erosion control procedures will be designed so that sediment from adjacent non-Organic Agricultural Land will not flow along the right-of-way and be deposited on Organic Agricultural Land. Treated lumber will not be used in erosion control measures on Organic Agricultural Land.

Water in Trenches

During construction, MERC will leave an earthen plug in the trench at the boundary of Organic Agricultural Land to prevent trench water from adjacent land from flowing into the trench on Organic Agricultural Land. Likewise, MERC will not allow trench water from adjacent land to be pumped onto Organic Agricultural Land.

Weed Control

On Organic Agricultural Land, MERC will, to the extent feasible, implement weed control methods consistent with the Landowner's Organic System Plan. Prohibited Substances will not be used for weed control on Organic Agricultural Land. In addition, MERC will not use Prohibited

Substances for weed control on land adjacent to Organic Agricultural Land in such a way as to allow these materials to drift onto Organic Agricultural Land.

Mitigation of Natural Resources Impacts

MERC will not use Organic Agricultural Land for the purpose of required compensatory mitigation of impacts on natural resources such as wetlands or woodlands unless approved by the Landowner.

Monitoring

In addition to the responsibilities of the Agricultural Monitor described in the Plan, the following will apply:

- The Agricultural Monitor or a trained Organic Inspector (trained through a USDA-approved Organic Inspection Program and retained by MERC) will routinely monitor construction and restoration activities on Organic Agricultural Land for compliance with the provisions of this appendix and will document activities that could result in decertification. A trained Organic Inspector will be used if the Agricultural Monitor has not already been trained through a USDA-approved Organic Inspection Program; and
- Instances of noncompliance will be documented according to USDA-approved protocol consistent with the Landowner's Organic System Plan, and will be made available to the MDA, the Landowner, the Landowner's Certifying Agent, and to MERC.

If the Agricultural Monitor is responsible for routinely monitoring activities on Organic Agricultural Land, he or she will have been trained in such activities by the International Organic Inspectors Association, at MERC's expense if necessary.

Compensation for Construction Damages

The settlement of damages will be based on crop yield and/or crop quality determination and the need for additional restoration measures, and will proceed in accordance with the terms of the Easement. Unless the Landowner of Organic Agricultural Land and MERC agree otherwise, at MERC's expense, a mutually agreed upon professional agronomist will make crop yield determinations, and the MDA Fruit and Vegetable Inspection Unit will make crop quality determinations. If the crop yield and/or crop quality determinations indicate the need for soil testing, the testing will be conducted by a commercial laboratory that is properly certified to conduct the necessary tests and is mutually agreeable to MERC and the Landowner. Fieldwork for soil testing will be conducted by a Professional Soil Scientist or Professional Engineer licensed by the State of Minnesota. MERC will be responsible for the cost of sampling, testing, and additional restoration activities, if needed. Landowners may elect to settle damages with MERC in advance of construction on a mutually acceptable basis or to settle after construction based on a mutually agreeable determination of actual damages.

Compensation for Damages Due to Decertification

Should any portion of Organic Agricultural Land be Decertified as a result of construction activities, the settlement of damages will be based on the difference between revenue generated from the land affected before Decertification and after Decertification, for the entire period of time the land is Decertified, so long as a good faith effort is made by the Landowner to regain certification.

Appendix G

Minnesota Energy Resources Corporation Best Management Practices

Includes the following examples:

G-1 Dewatering

G-2 Erosion Mats

G-3 Sediment Control

G-4 Restoration - Mulching, Seeding and Sod

G-5 Frac Out Response plan and Report Form

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Appendix G-1

Example Dewatering

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Gas Work Practice

WP 1365-WPS: Dewatering

Revision 1.0
4/29/2016

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List of Appendices

1.0 PURPOSE

The purpose of this work practice is to determine appropriate methods and means to remove sediment from water generated during dewatering activities prior to discharging off-site or to waters of the state.

2.0 SCOPE AND APPLICABILITY

If the project is over one (1) acre and has a WPDES Storm Water permit, then dewatering methods will be identified in the site specific erosion control plan and the discharge is covered under that permit. Practices identified in this work practice shall be deemed to meet the dewatering performance standard to prevent the discharge of sediment to the maximum extent practicable (MEP) as defined in NR 151.11(6)(c) for storm water runoff management from construction sites. Additional information can be found in Section 5.2.

For all other projects, WPS obtains a general WDNR permit to cover pit/trench dewatering operations. Construction site performance standard for non-permitted sites (i.e., less than 1 acre of disturbance) can be found in NR 151.105. Note that the Pit/Trench Dewatering permit contains effluent limitations that are more restrictive than the performance standards in NR 151.11. Guidance on complying with the General WPDES permit for pit/trench dewatering can be found in Section 5.1.

The permit usage shall follow these guidelines and limitations:

1. Proper erosion and sediment control measures must be used.
2. Individual authorization must be given by WDNR for the discharge into a wetland prior to discharge.
3. A completed Pit/Trench Dewatering Form must be sent to WPS Lab, Green Bay, A1, every time a dewatering event occurs and the project is not covered under a site specific construction site stormwater permit. This form will be used regardless if a separate wetland permit has been issued for the project.
4. WPS must sample all discharges that flow directly into a lake, stream or wetland. This includes discharges to storm sewers that discharge to surface water.
5. Environmental Services must be contacted if dewatering is expected to last longer than two (2) days.

As used in this work practice, these words are defined as follows:[1]

1. Shall, will and must are used interchangeably and are used to express an action that is mandatory,
2. Should is used to express an action that is a preferred practice,
3. May and can are used to express an action that is optional.

3.0 GENERAL NOTES AND PRECAUTIONS

There are no general notes and precautions that apply to this work practice.

[1] Definitions are common to AGA and other similar sources

4.0 DEFINITIONS

1. WPDES: Wisconsin Pollution Discharge Elimination System
2. WPS Lab: WPS central environmental lab located in A-1, Green Bay

5.0 PROCEDURE

5.1 Guidance for Pit/Trench Dewatering Permit Compliance

This guidance is intended for controlling the discharge of contaminated water when necessary to pump from utility manholes or valves, regulating pits, bell holes and excavation sites *not* covered under a construction site storm water permit. It gives direction on use of available discharge controls and contracted services as needed to prevent discharge of oil or sediment to surface waters or storm drain systems during dewatering. For dewatering activities, the preferred option is to direct the discharge to an area where the water can infiltrate the ground.

1. Inspection and Assessment
    A. When necessary to remove accumulated water from utility manholes, etc., water must be observed for the presence of contamination prior to dewatering.
    B. Visually observe either in sufficient daylight, with aid of portable lighting, or by bringing a sample to the surface for presence of:
        i. Oil sheen (rainbow coloration)
        ii. Sediment/suspended solids contamination (cloudy appearance)
    C. If an oil sheen is present, determine whether source is mineral insulating transformer oil (MIO), or if other material, such as gasoline or diesel (note any diesel or gasoline odor). Collect a sample for lab analyses if not known.
    D. If MIO is the oil source, PCB concentrations must be determined either from definitive information available on the leaking equipment (year, mfr., etc.) or an oil sample taken.
    E. PCB Sampling for Lab Analyses – If possible, an oil sample should be delivered to WPS Lab for analysis. Oil samples for lab analysis can be collected from surface of water.
    F. PCB Field Screening – Field ChlorN Oil tests can be used to screen for PCB > 50 ppm to aid with initial response and handling determinations. They are not definitive results to determine for certain if no PCB present. In addition, the ChlorN Oil test requires essentially pure oil not mixed with water and should be collected directly from the equipment at the source.
2. Discharge
    A. Discharge to Upland Areas for Ground Infiltration:
        i. Sediment laden water (without oil) may be discharged direct to the ground without filtering if the total volume, in fact, soaks (infiltrates) into the ground without discharge to storm drain, wetland, or surface water.
            a. For this activity, you will need to verify compliance with the oil & grease limitation for discharges to groundwater. Observe and document whether there was an oil sheen/oil film present in the water to be discharged. If an oil sheen is present, the sheen will need to be removed using oil absorbent pads or similar material

before the water is pumped to an area where it can infiltrate. If the oil sheen cannot be removed, a contracted environmental service will need to remove and dispose of the water off-site. Document the discharge using a Pit/Trench Dewatering Form.

B. Discharge To Surface Water, Wetlands or Separate Storm Sewer Systems:
    i. All discharges to surface waters, wetlands, or storm sewer systems must be directed through a filtration device. Water visibly contaminated with suspended solids (cloudy) or any oil sheen may not be discharged directly to surface water, wetland, or storm sewer.
        a. Depending on the site and soil conditions, compliance with the total suspended solids effluent limitation may be attainable by the use of one sediment control, such as a straw bale barrier, sediment trap, or a filter sock/filter bag. However, a combination of sediment controls may be necessary (construct a dewatering structure, use silt fence, etc.).
            (a) Submersible pumps used for dewatering should be suspended off the bottom or positioned in a manner to minimize uptake of sediment from bottom of the area to be dewatered. This should be done to reduce load on filtering controls.
        b. If an oil sheen is present, attempt to remove the oil sheen with absorbent pads prior to pumping. If the sheen cannot be removed, a contracted environmental service will need to remove and dispose of the water off-site.
    ii. Water with no visible oil sheen or apparent sediment contamination may be discharged as long as water remains clear. If in the process of pumping out however, contamination becomes evident, discharge must be ceased and reassessed.
    iii. A sample of the discharge will need to be collected to demonstrate compliance with the discharge limitations for suspended solids. For oil and grease, if a sheen or film is not present on the water to be pumped, then document the absence of a sheen on the Pit/Trench Dewatering Form.

C. Sediment Control Devices
    i. Filtration - Visibly cloudy water may be filtered through a sediment filter device or other controls as necessary prior to discharging to surface or storm water drain. Filtration devices include (See 6.0 Associated Tools and Equipment):
        a. 16” x 8’ Dewatering sock (6 micron opening)
        b. 8” x 60”’ Dewatering sock (5 micron opening)
        c. Non-woven filter fabric for storm sewer inlet protection

D. Sample Collection
    i. A sample for total suspended solids must be collected in a 1-liter plastic bottle. All samples collected to demonstrate compliance with the permit

limitations must be collected by placing the bottle in the discharge stream after being treated (i.e., after passing through the filter bag, sock, etc.).

a. Contact the WPS Lab (433-1391 or 433-1833) to obtain sample bottles.
   NOTE: For contractors working on WPS projects, an outside lab should be contracted for the sampling materials and analysis.

ii. After sample collection, write the date and location the sample was collected on the sample bottle.

iii. Place the sample bottle in a cooler. Fill the cooler with a sufficient quantity of ice so that the sample will remain cold until received in the WPS Lab.

iv. Ship the cooler to the WPS Lab (GB – A1).

E. Sample Frequency

i. As a general guideline, when discharging to a surface water or storm sewer, a sample needs to be collected within the first 24 hours of discharge to verify compliance with the permit limitation.

ii. If multiple, continuous days of discharge are required for your project, sampling will need to be conducted weekly.

F. Recordkeeping

i. Regardless of where the discharge is directed, a condition of the Pit/Trench Dewatering permit is that WPS reports each instance of discharge to the Wisconsin Department of Natural Resources. As a result, the following information must be documented:

a. The date and location of the discharge,

b. Approximate the volume of water discharged (either measured or estimated based upon pump operating time and capacity),

c. Whether an oil sheen is present on the surface of the water discharged, and

d. The best management practices used to prevent the transport of suspended solids from the site to a surface water.

ii. Please refer to the Pit/Trench Dewatering Form to document the discharge activity. A copy of the dewatering log can be found in Appendix I and on the Powernet under WPS Forms, Pit/Trench Dewatering Form. Note that all dewatering logs must be forwarded to the WPS Lab so that the event can be reported to WDNR.

5.2 Guidance for WPDES Construction Site Storm Water Permit Compliance

This guidance is intended for controlling the discharge of contaminated water when necessary to pump from utility manholes or valves, regulating pits, bell holes and excavation sites covered under a construction site storm water permit. It gives direction on use of available discharge controls and contracted services as needed to prevent discharge of oil or sediment to surface waters or storm drain systems during dewatering. For dewatering activities, the preferred option is to direct the discharge to an area where the water can infiltrate the ground.

1. Inspection and Assessment

A. When necessary to remove accumulated water from utility manholes, etc., water must be observed for the presence of contamination prior to dewatering.
    i. Follow the procedure listed above in Section 5.1(1)(B) thru (F)

2. Discharge
    A. Discharge to Upland Areas for Ground Infiltration:
        i. Sediment laden water (without oil) may be discharged direct to the ground without filtering if the total volume, in fact, soaks (infiltrates) into the ground without discharge to storm drain or surface water.
            a. If an oil sheen is present, the sheen will need to be removed using oil absorbent pads or similar material before the water is pumped to an area where it can infiltrate. If the oil sheen cannot be removed, a contracted environmental service will need to remove and dispose of the water off-site.
    B. Discharge To Surface Water, Wetlands or Separate Storm Sewer Systems:
        i. All discharges to surface waters, wetlands, or storm sewer systems must be directed through a filtration device. Water visibly contaminated with suspended solids (cloudy) or any oil sheen may not be discharged directly to surface water or storm sewer.
            a. Depending on the site and soil conditions, compliance with the total suspended solids effluent limitation may be attainable by the use of one sediment control, such as a straw bale barrier, sediment trap, or a filter sock/filter bag. However, a combination of sediment controls may be necessary (construct a dewatering structure, use silt fence, etc.).
                (a) Submersible pumps used for dewatering should be suspended off the bottom or positioned in a manner to minimize uptake of sediment from bottom of the area to be dewatered. This should be done to reduce load on filtering controls.
            b. If an oil sheen is present, attempt to remove the oil sheen with absorbent pads prior to pumping. If the sheen cannot be removed, a contracted environmental service will need to remove and dispose of the water off-site.
    C. Sediment Control Devices
        i. Filtration - Visibly cloudy water may be filtered through a sediment filter device or other controls as necessary prior to discharging to surface or storm water drain. Filtration devices include (See 6.0 Associated Tools and Equipment):
            a. Silt Fence, 100’
            b. 6’ x 6’ geotextile dewatering bag
            c. 10’ x 15’ geotextile dewatering bag
            d. 60” dewatering sock (for excavation sites, 150 micron opening)
            e. Non-woven filter fabric for storm sewer inlet protection

6.0 ASSOCIATED TOOLS AND EQUIPMENT

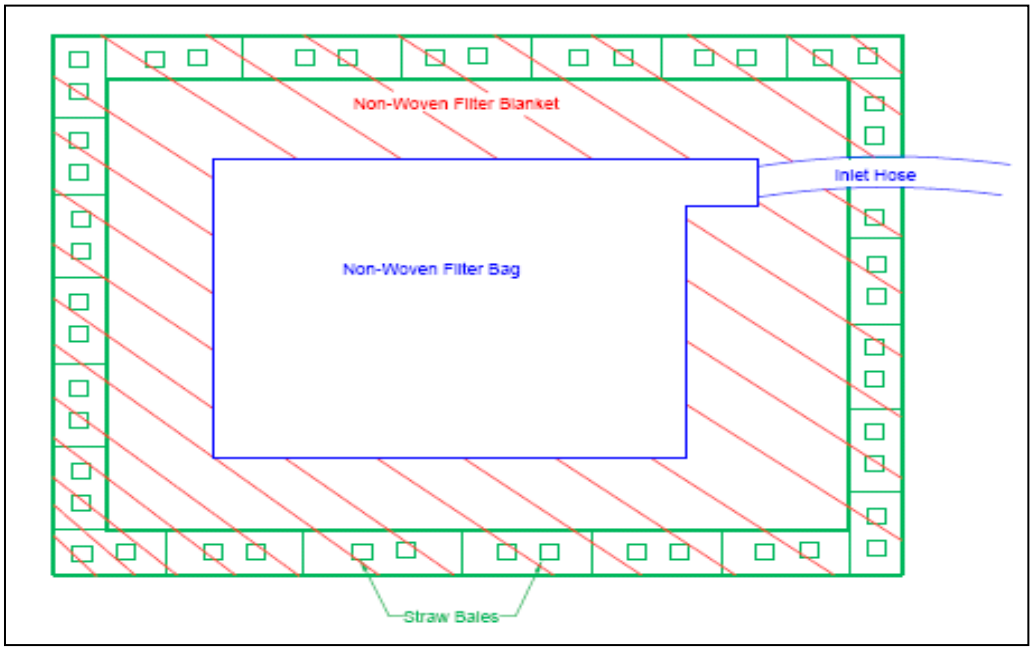
1. 16” x 8’ Dewatering sock (6 micron opening) – Pure Filter Solutions, Stock Code #1512204
2. 8” x 60”’ Dewatering sock (5 micron opening) – Pure Filter Solutions, Stock Code #1512203
3. Non-woven filter fabric for storm sewer inlet protection, Stock Code #1510239
4. Silt Fence, 100’, Stock Code #1512600
5. 6’ x 6’ geotextile dewatering bag, Stock Code #1512200
6. 10’ x 15’ geotextile dewatering bag, Stock Code #1512201
7. 60” dewatering sock (for excavation sites, 150 micron opening), Stock Code #1512202

The following are examples of best management practices that can be used to remove sediment from a pit or trench that needs to be dewatered:

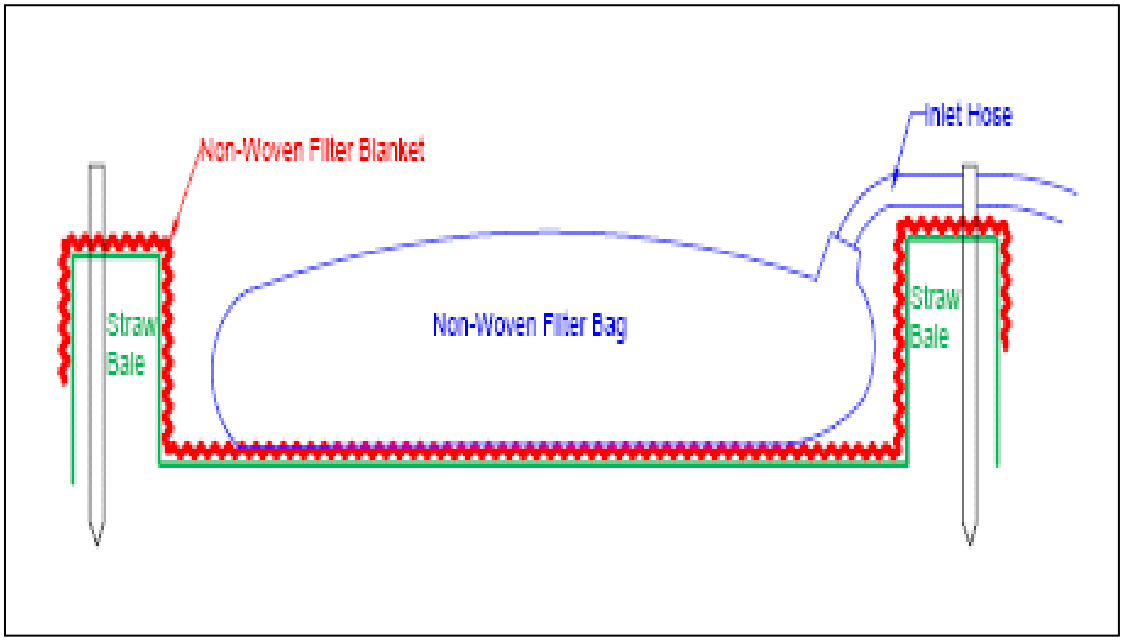
1. Filter Bag

2. Filter Sock

3. Dewatering Structure – Top view



4. Dewatering Structure - Side view



5. Sediment Trap

Appendix 1 Pit Trench Dewatering Form

Return to Environmental Services – Central Lab (GB – A1) within 5 days of the end of the month after the dewatering event occurred.

Wisconsin Public Service

Pit/Trench Dewatering Log

Name:_____

Date: _____ **District Name or No.:**_____

Location:_____

Amount of Discharge (select one): Volume: _____ gallons

OR Pump time: _____ Hours _____ Minutes @ _____ Rate (gpm / gph)

Where was the water discharged? □ Ground/Infiltration □ Storm Sewer □ Surface Water

Best Management Practice Used: □ Ponding □ Grassy Area □ Gravel □ Filter Fabric (filter bag/sock) □ Absorbent Pad □ Straw Bale □ Other

Oil Sheen Present? □ Yes □ No

Note: All discharges to a storm sewer or surface water require sampling and analysis of the discharge to verify permit compliance.

Return to Environmental Services – Central Lab (GB – A1) within 5 days of the end of the month after the dewatering event occurred.

Wisconsin Public Service

Pit/Trench Dewatering Log

Name:_____

Date: _____ **District Name or No.:**_____

Location:_____

Amount of Discharge (select one): Volume: _____ gallons

OR Pump time: _____ Hours _____ Minutes @ _____ Rate (gpm / gph)

Where was the water discharged? □ Ground/Infiltration □ Storm Sewer □ Surface Water

Best Management Practice Used: □ Ponding □ Grassy Area □ Gravel □ Filter Fabric (filter bag/sock) □ Absorbent Pad □ Straw Bale □ Other

Oil Sheen Present? □ Yes □ No

Note: All discharges to a storm sewer or surface water require sampling and analysis of the discharge to verify permit compliance.

Appendix G-2

Example

Erosion Mats

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Gas Work Practice

WP 1371-WPS: Erosion Mats

Revision 1.0
4/29/2016

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1.0 PURPOSE

The purpose of this practice is to protect the soil surface from the erosive effect of rainfall and prevent sheet erosion during the establishment of grass or other vegetation, to reduce soil moisture loss due to evaporation, and to protect the channel from erosion or act as turf reinforcement during and after the establishment of grass or other vegetation in a channel.

This practice applies to both Erosion Control Revegative Mats (ECRM) and Turf-Reinforcement Mats (TRM).

2.0 SCOPE AND APPLICABILITY

This work practice establishes the minimum standards for design, installation, and performance requirements. Only those mats listed in this work practice shall be used. Additional mats listed on the Wisconsin Department of Transportation (WisDOT) Erosion Control Product Acceptability List (PAL) may be considered for use upon approval by the Environmental Department.

This work practice applies to erosion mat selection for use on erodible slopes.

For channels, this work practice applies where runoff channelizes in intermittent flow and vegetation is to be established. Some products may have limited applicability in projects adjacent to navigable waters.

As used in this work practice, these words are defined as follows:[1]

1. Shall, will and must are used interchangeably and are used to express an action that is mandatory,
2. Should is used to express an action that is a preferred practice,
3. May and can are used to express an action that is optional.

3.0 GENERAL NOTES AND PRECAUTIONS

There are no general notes and precautions that apply to this work practice.

4.0 DEFINITIONS

1. Erosion Mat: A protective soil cover of straw, wood, coconut fiber or other suitable plant residue, or plastic fibers formed into a mat, usually with a plastic or biodegradable mesh on one or both sides. Erosion mats are rolled products available in many varieties and combination of materials and with varying life spans.

5.0 PROCEDURE

5.1 Non-Channel Erosion Mats

1. Criteria
    A. Design
        i. Non-Channel Erosion Mat is a weather independent practice and may be specified during growing or non-growing seasons.

[1] Definitions are common to AGA and other similar sources

ii. Slope and slope length shall be taken into consideration. This information can be found in the Slope Erosion Control Matrix located in the PAL.
iii. To differentiate applications, Erosion mats are organized into three Classes of mats, which are further broken down into various Types:
    a. Class I: A short-term duration (minimum of 6 months), light duty, organic mat with photodegradable plastic or biodegradable netting.
        (a) Type A – Use on erodible slopes 2.5:1 or flatter.
        (b) Type B – Double netted product for use on erodible slopes 2:1 or flatter. Double netted product is not mower friendly.
    b. Class I, Urban: A short-term duration (minimum of 6 months), light duty, organic erosion control mat which can be placed in environmentally sensitive areas or areas where foot traffic is anticipated and mowing may be accomplished within two weeks after installation.
        (a) Urban, Type A – Use on erodible soils with slopes 4:1 or flatter.
        (b) Urban, Type B – A double netted product for use on slopes 2.5:1 or flatter. **Recommended for use in environmentally sensitive areas that have a high probability of entrapping animals in plastic netting.**
    c. Class II: A long-term duration (three years or greater), organic erosion control revegetative mat.
        (a) Type A – Jute fiber only for use on slopes 2:1 or flatter for sod reinforcement.
        (b) Type B – For use on slopes 2:1 or greater made with plastic or biodegradable net.
        (c) Type C – A woven mat of 100% organic fibers for use on slopes 2:1 or flatter and in environmentally and biologically sensitive areas where plastic netting is inappropriate. **Recommended for use in environmentally sensitive areas that have a high probability of entrapping animals in plastic netting.**
    d. Class III: A permanent 100% synthetic ECRM or TRM. Either a soild stabilizer Type A or Class I, Type A or B erosion mat must be placed over the soil filled TRM.
        (a) Type A – An ECRM for use on slopes 2:1 or flatter.
        (b) Type B or C – A TRM for use on slopes 2:1 or flatter.
        (c) Type D – A TRM for use on slopes 1:1 or flatter.

B. Inspection/Installation
    i. Install Non-Channel Erosion Mat per manufacturer specifications at locations shown on plans and as the engineer/inspector directs.
    ii. For mats that utilize netting, the netting shall be bonded to the parent material to prevent separation of the net for the life of the product.

iii. For urban class mats the following material requirements shall be adhered to:
   a. Only 100% organic biodegradable netted products are allowed, including parent material, stitching, and netting.
   b. The netting shall be stitched with biodegradable thread/yarn to prevent separation of the net from parent material.
   c. All materials and additive components used to manufacture the anchoring devices shall be completely biodegradable as determined by ASTM D 5338.
   d. Mats with photodegradable netting shall not be installed after September 1st.

iv. ECRMs shall be installed after all topsoiling, fertilizing, liming and seeding are complete.

v. The mat shall be in firm and intimate contact with the soil. It shall be installed and anchored per the manufacturer's recommendation.

vi. TRM shall be installed in conjunction with the topsoiling operation and shall be followed by ECRM installation.

vii. At time of installation, document the manufacturer and mat type by retention of material labels and manufacturer's installation instructions. Retain this documentation until the site has been stabilized.

2. Considerations
   A. Consider using Class 2, Type C mats adjacent to waterways where trapping small animals is to be avoided – Urban mats can also be used in these areas and are more economical.
   B. Urban mats may be used in lieu of sod in mowable areas. Urban mat is not required in mowed areas, but is available for use if owner requests a 'mower friendly' mat.
   C. Documentation of materials used, monitoring logs, project diary and weekly inspection forms, including erosion and storm water management plans, should be turned over to the authority charged with long term maintenance of the site.
3. Operation and Maintenance
   A. Erosion mats shall at a minimum be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period until disturbed area is stabilized and permit terminated (if applicable).
   B. If there are signs of rilling under the mat, install more staples or more frequent anchoring trenches. If rilling becomes severe enough to prevent establishment of vegetation, remove the section of mat where the damage has occurred. Fill the eroded area with topsoil, compact, reseed and replace the section of mat, trenching and overlapping ends per manufacturer's recommendations. Additional staking is recommended near where rilling was filled.
   C. If the reinforcing plastic netting has separated from the mat, remove the plastic and if necessary replace the mat.
   D. Maintenance shall be completed as soon as possible with consideration to site conditions.

5.2 Channel Erosion Mats

1. Criteria
    A. Design
        i. Channel Erosion Mat is a weather independent practice and may be specified during growing or non-growing seasons.
        ii. Channel Erosion Mat shall be specified when the disturbed area contains a channel or portion thereof.
        iii. To differentiate applications, erosion mats are broken into three classes of mats, which are further broken down into various Types.
            a. Class I: A short-term duration (minimum of 6 months), light duty, organic ECRM with plastic or biodegradable netting.
                (a) Type A – NOT allowed to be used for channel protection.
                (b) Type B – Double netted product for use in channels where the calculated (design) shear stress is 1.5 lbs/ft² or less.
            b. Class II: A long-term duration (three years or greater), organic ECRM.
                (a) Type A – Jute fiber only for use in channels to reinforce sod.
                (b) Type B – For use in channels where the calculated (design) shear stress is 2.0 lbs/ft² or less. Made with plastic or biodegradable mat.
                (c) Type C – A woven mat of 100% organic material for use in channels where the calculated (design) shear stress is 2.0 lbs/ft² or less. Applicable for use in environmentally sensitive areas where plastic netting is inappropriate.
            c. Class III: A permanent 100% synthetic ECRM or TRM. Class I, Type B erosion mat or Class II, Type B or C erosion mat must be placed over a soil filled TRM.
                (a) Type A – An ECRM for use in channels where the calculated (design) shear stress of 2.0 lbs/ft² or less.
                (b) Type B – A TRM for use in channels where the calculated (design) shear stress of 2.0 lbs/ft² or less.
                (c) Type C – A TRM for use in channels where the calculated (design) shear stress of 3.5 lbs./ft² or less.
                (d) Type D – A TRM for use in channels where the calculated (design) shear stress of 5.0 lbs/ft² or less
    B. Inspection/Installation
        i. Install Channel Erosion Mat as the plans show and as the engineer/inspector directs.
        ii. ECRM shall be installed after all topsoiling, fertilizing, and seeding is complete.
        iii. Erosion mats shall extend for whichever is greater: upslope one-foot minimum vertically from the ditch bottom or 6 inches higher than the Design Channel Flow Depth.

iv. The mat shall be in firm and continuous contact with the soil. It shall be anchored, overlapped, staked and entrenched per the manufacturer's recommendations.
v. TRM shall be installed in conjunction with the topsoiling operation and shall be followed by ECRM installation.
vi. At time of installation, document the manufacturer and mat type by saving material labels and manufacturer's installation instructions. Retain this documentation until the site is stabilized.

2. Considerations
   A. Consider using Class 2, Type C mats adjacent to waterways where trapping small animals is to be avoided – Urban matting is not allowable in channels.
   B. Class 3 TRM may be appropriate as a replacement for riprap as a channel liner. Check the shear stress criteria for the channel to determine mat applicability.
   C. Once a gully has formed in a channel, it is difficult to stabilize due to loss of soil structure. Even when the gully is filled with topsoil and reseeded, the soil has a tendency to dislodge in the same pattern. If gully formation continues to be a problem the design should be reevaluated, including other mat classes, ditch checks or riprap.
   D. It may be difficult to establish permanent vegetation and adequate erosion protection in a channel with continuous flow. Consider riprap or planting wetland species with an ECRM.
   E. Documentation of materials used, monitoring logs, project diary, and weekly inspection forms including erosion and storm water management plans, should be provided to the authority charged with long term maintenance of the site.
   F. Channel cross sections may be parabolic, v-shaped or trapezoidal. The use of "V" channels is generally discouraged due to erosion problems experienced.
3. Operation and Maintenance
   A. Erosion mats shall at a minimum be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period until disturbed area is stabilized and permit terminated (if applicable).
   B. If there are signs of rilling under the mat, install more staples or more frequent anchoring trenches. If rilling becomes severe enough to prevent establishment of vegetation, remove the section of mat where the damage has occurred. Fill the eroded area with topsoil, compact, reseed and replace the section of mat, trenching and overlapping ends per manufacturer's recommendations. Additional staking is recommended near where rilling was filled.
   C. If the reinforcing plastic netting has separated from the mat, remove the plastic and if necessary replace the mat.
   D. Maintenance shall be completed as soon as possible with consideration to site conditions.

6.0 ASSOCIATED TOOLS AND EQUIPMENT

1. Erosion mat (Blanket ,Grass, Erosion Control, 4' X 180', Curlex 1), Stock Code #1519309

Appendix G-3

Example

Sediment Control

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Gas Work Practice

WP 1372-WPS: Sediment Control

Storm Drain Inlet, Silt Fence, Bale Barrier, Wattles, Sand Bags and Ditch Check

Revision 1.0
4/29/2016

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List of Appendices

1.0 PURPOSE

The purpose of this work practice is to keep eroded soil on a construction site, so that it does not wash off and cause water pollution to a nearby stream, river, lake, or wetland. Sediment controls are generally designed to be temporary measures installed during construction until the site has been stabilized.

2.0 SCOPE AND APPLICABILITY

This work practice applies to all WPS construction sites. Construction sites that impact over one (1) acre and are covered under a Wisconsin Pollution Discharge Elimination System (WPDES) storm water construction permit shall follow the project specific erosion and sediment control plan. All other projects regardless of size shall install and maintain the appropriate erosion and sediment control Best Management Practices (BMPs) needed to prevent erosion and sedimentation into nearby waterways, wetlands, or storm sewer inlets.

As used in this work practice, these words are defined as follows:[1]

1. Shall, will and must are used interchangeably and are used to express an action that is mandatory,
2. Should is used to express an action that is a preferred practice,
3. May and can are used to express an action that is optional.

3.0 GENERAL NOTES AND PRECAUTIONS

Sediment controls are usually employed together with erosion controls, which are designed to prevent or minimize erosion and thus reduce the need for sediment controls.

4.0 DEFINITIONS

1. BMP: Best Management Practice
2. Log-Type Products: Sediment control products constructed of an outer sock of geotextile or other type of netting or permeable containment media surrounding an inner filtering media.
3. Silt Fence: Temporary sediment barrier of entrenched permeable geotextile fabric designed to intercept and slow the flow of sediment-laden sheet flow runoff from small areas of disturbed soil.
4. Manufactured perimeter control and slope interruption products: Variety of products designed to detain the flow of sediment-laden sheet flow runoff from small areas of disturbed soil.
5. Sediment Bale Barrier: Temporary sediment barrier consisting of a row of entrenched and anchored straw bales, hay bales, or equivalent material used to intercept sediment-laden sheet flow from small drainage areas of disturbed soil.
6. Storm Drain Inlet Protection: Temporary barrier installed in or around a storm drain inlet, drop inlet, or curb inlet.
7. WPDES: Wisconsin Pollution Discharge Elimination System

[1] Definitions are common to AGA and other similar sources

5.0 PROCEDURE

5.1 Storm Drain Inlet Protection

1. Applies where runoff from construction sites enters conveyance system structures such as drain inlets, drop inlets, and curb inlets.
    A. Inlet protection devices are for drainage areas of one acre or less.
    B. Runoff from areas larger than one acre shall be routed through a properly designed sediment trapping or settling practice upstream of the inlet.
2. The appropriate type of inlet protection barrier shall be installed once the drain, drop, or curb inlet can receive runoff. The device shall remain in place and be maintained until the disturbed area is stabilized.
3. Design Requirements:
    A. Specify installation of Storm Drain Inlet Protection at any existing or proposed inlet within the disturbed area or where the potential exists for disturbed area to flow to an inlet. This includes inlets not immediately adjacent to the construction site. Down gradient inlets outside of the project area shall be evaluated if inlet protection is required.
    B. Must be designed to Section 5.1. 1.(A) and (B).
    C. All fabrics used for inlet protection devices must be approved fabrics for inlet protection as specified WDNR Technicial Standard - Storm Drain Inlet Protection for Construction Sites (1060), or in the current addition of the WisDOT Product Acceptability List (PAL).
2. Inspection and Installation Requirements:
    A. Ponding water to settle sediment is encouraged; however ponding shall not interfere with the flow of traffic, create a safety hazard, or cause property damage. All devices shall have provisions such as weep holes or “emergency spillways” to safely pass water if the device becomes clogged.
    B. Other than Type D inlet protection devices, no gaps shall be left in the material used that would allow the flow of water to bypass the inlet protection device.
    C. Criteria Applicable to Unpaved areas or the Pre-Paving Phase of Construction
        i. Inlet Protection Barriers include, but are not limited to, straw bales, sandbags, other material filled bags and socks, and stone weepers. These devices can be used to either settle sediments or divert flows.
            a. Manufactured bags, when used, shall conform to the standards in Table 5.1.1.

Table 5.1.1.	
Minimum Size	14 x 26 inches
Grab Tensile strength of fabric, ASTM D-4632	95 lb. min.
UV stability, ASTM D-4355	70% min.
Note: To provide sufficient strength, fabric shall be sewn together with double stitching.	

            b. Straw Bale installation shall conform to the criteria outlined in the section 5.6 Ditch Check.

c. Stone weeper installation shall conform to the criteria in WDNR Technical Standard (1063) Sediment Trap.

ii. Filter Fabric Barrier Criteria – Catch Basin Inlet Protection (Appendix 1)

a. Type A devices shall be utilized around inlets and unpaved areas until permanent stabilization methods have been established. Type A devices shall be utilized on inlets prior to installation of curb and gutter or pavement, and where safety considerations are not compromised on the site.

b. Types B &C shall be utilized after the casting and grate are in place.

c. Type D shall be utilized in areas where other types of inlet protection are identified as incompatible with roadway and traffic conditions, causing possible safety hazards when ponding occurs at the inlet. Type D shall only be used after castings are in place on top of the inlet boxes. Type D inlet protection shall conform to the standard drawing as shown in the plans. There shall be a three-inch space between the bag and the sides of the inlet to prevent the inlet sides from blocking the overflow; and shall only be used in inlets deeper than 30 inches from the top of grate to bottom of the inlet. If such clearance is not available, cinch or tie the sides of the bag (with rope or ties) to provide clearance.

D. Criteria Applicable to the Post-Paving / Curbing Phase of Construction

i. Inlet protection Types B, C, and D are applicable to post paving construction. (See Appendix 1 Catch Basin Inlet Protection.)

ii. Type B shall be utilized on inlets without curb box.

iii. Type C shall be utilized on street inlets with curb heads. A 2-inch by 4-inch (nominal) piece of wood shall be wrapped and secured in the fabric and placed in front of the curb head as shown in the figures. The wood shall not block the entire opening of the curb box and be secured to the grate with wire or plastic ties.

iv. Type D shall be utilized in areas where other types of inlet protection are identified as incompatible with roadway and traffic conditions causing possible safety hazards when ponding occurs at the inlet. The inlet protection shall conform to the standard detail drawing as shown in the plans.

3. Considerations

A. When site conditions allow, inlets should be temporarily closed or sealed to prevent entrance of runoff and sediment.

B. The best way to prevent sediment from entering the storm sewer system is to stabilize the disturbed area of the site as quickly as possible, preventing erosion and stopping sediment transport at its source.

C. Storm drain inlet protection consists of several types of inlet filters and traps and should be considered as only one element in an overall erosion control plan. Each type differs in application with selection dependent upon site conditions and inlet

type. Not all designs are appropriate in all cases. The user must carefully select a design suitable for the needs and site conditions.

D. Inlet protection is only as effective as the filter or barrier used around the inlet. Effectiveness decreases rapidly if the inlet protection is not properly maintained. In general, inlet protection provides relatively good removal of coarse and medium-sized soil particles from runoff however, most fine silt and clay particles will pass through the filtering mechanisms.

E. Properly maintaining inlet protection can be difficult and often inlets can become clogged. Field experience has shown that inlet protection that causes excessive ponding in an area of high construction activity may become so inconvenient that it is simply removed or bypassed, thus transmitting sediment-laden flows unchecked. In such situations, a structure with an adequate overflow mechanism should be utilized instead of simply removing the inlet protection device.

F. Inlet protection devices can be enhanced by additional excavation to increase the storage capacity around the inlet.

G. Good construction site housekeeping measures, such as keeping the gutters clean, and street sweeping are important.

4. Operation and Maintenance

A. Remove inlet protection devices once the contributing drainage area is stabilized with appropriate vegetation or impervious area.

B. Inlet protection shall at a minimum be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period until disturbed area is stabilized and permit terminated (if applicable).

C. Sediment deposits shall be removed and the inlet protection device restored to its original dimensions when the sediment has accumulated between 1/3 to 1/2 the design depth of the device, or when the device is no longer functioning as designed. Removed sediment shall be deposited in a suitable area and stabilized.

D. Due care shall be taken to ensure sediment does not fall into the inlet and impede the intended function of the device. Any material falling into the inlet shall be removed.

5.2 Silt Fence

1. Conditions Where This Practice Applies

A. This practice applies to the following applications:

i. Erosion occurs in the form of sheet and rill erosion. There is no concentration of water flowing to the barrier (channel erosion).

ii. Where adjacent areas need protection from sediment-laden runoff.

iii. Where effectiveness is required for one year or less.

iv. Where conditions allow products to be properly installed as outlined in the Section 5.2(2).

B. Under no circumstance shall silt fence be used in the following applications:

i. Below the ordinary high watermark or placed perpendicular to flow in streams, swales, ditches, or any place where flow is concentrated.

ii. Where the maximum gradient upslope of the product is greater than 50% (2:1).

2. Installation Requirements (See Appendix 2 Silt Fence):
   A. Placement
      i. When installed as a stand-alone practice on a slope, silt fence shall be placed on the contour. The parallel spacing shall not exceed the maximum slope lengths for the appropriate slope as specified in Table 5.2.1.

Table 5.2.1.	
Slope	**Fence Spacing**
< 2%	100 feet
2 to 5%	75 feet
5 to 10%	50 feet
10 to 33%	25 feet
> 33%	20 feet

      ii. Silt fences shall not be placed perpendicular to the contour.
      iii. The ends of the fence shall be extended upslope to prevent water from flowing around the ends of the fence.
   B. Height
      i. Installed silt fences shall be a minimum 14 inches high and shall not exceed 28 inches in height measured from the installed ground elevation.
   C. Support
      i. Silt fences shall be supported by either steel or wood supports as specified below:
         a. Wood Supports
            (a) The full height of the silt fence shall be supported by 1 1/8 inches by 1 1/8 inches air or kiln dried posts of hickory or oak.
            (b) The silt fence fabric shall be stapled, using at least 0.5-inch staples, to the upslope side of the posts in at least 3 places.
            (c) The posts shall be a minimum of 3 feet long for 24-inch silt fence and a minimum of 4 feet for 36-inch silt fence fabric.
         b. Steel Supports
            (a) The full height of the silt fence shall be supported by steel posts at least 5 feet long with a strength of 1.33 pounds per foot and have projections for the attachment of fasteners.
            (b) The silt fence fabric shall be attached in at least three places on the upslope side with 50 pound plastic tie straps or wire fasteners. To prevent damage to the fabric from fastener, the protruding ends shall be pointed away from the fabric.
      ii. Maximum spacing between posts
         a. 3 feet for nonwoven silt fence
         b. 8 feet for woven fabric

iii. Silt fence shall have a support cord.
iv. Where joints are necessary, each end of the fabric shall be securely fastened to a post. The posts shall then be wrapped around each other to produce a stable, secure joint or shall be overlapped the distance between two posts. (See Appendix 3 Silt Fence Tie Back and Joining Methods)
v. A minimum of 20 inches of the post shall extend into the ground after installation.

D. Anchoring
i. Silt fence shall be anchored by spreading at least 8 inches of the fabric in a 4 inch wide by 6 inch deep trench, or 6 inch deep V-trench on the upslope side of the fence. The trench shall be backfilled and compacted. Trenches shall not be excavated wider and deeper than necessary for proper installation.
ii. On the terminal ends of silt fence, the fabric shall be wrapped around the post such that the staples are not visible.

E. Geotextile Fabric Specifications
i. The geotextile fabric consists of either woven or non-woven polyester, polypropylene, stabilized nylon, polyethylene, or polyvinylidene chloride. Non-woven fabric may be needle punched, heat bonded, resin bonded, or combinations thereof. All fabric shall meet the following requirements as specified in Table 5.2.2.

Table 5.2.2.

Test Requirement	Method	Value[1]
Minimum grab tensile strength in the machine direction	ASTM D 4632	120 lbs. (550 N)
Minimum grab tensile strength in the cross machine direction	ASTM D 4632	100 lbs. (450 N)
Maximum apparent opening size equivalent standard sieve	ASTM D 4751	No. 30 (600 µm)
Minimum permittivity	ASTM D 4491	0.05 scc^{-1}
Minimum ultraviolet stability percent of strength retained after 500 hours of exposure	ASTM D 4355	70%

(WisDOT Standard Specifications for Road and Bridge Construction, 2001)

[1] All numerical values represent minimum / maximum average roll values. (For example, the average minimum test results on any roll in a lot should meet or exceed the minimum specified values.)

ii. Silt fence shall have a maximum flow rate of 10-gallons/minute/square foot at 50mm constant head as determined by multiplying permittivity in 1/second as determined by ASTM D-4491 by a conversion factor of 74.

F. Removal
   i. Silt fences shall be removed once the disturbed area is permanently stabilized and no longer susceptible to erosion.

3. Considerations
   A. Improper placement as well as improper installation and maintenance of silt fences will significantly decrease the effectiveness of this practice.
   B. Silt fences should be considered for trapping sediment where sheet and rill erosion may be expected to occur in small drainage areas.
   C. Silt fences should not be placed in areas of concentrated flow.
   D. Silt fences should be installed prior to disturbing the upslope area.
   E. Silt fences should not be used to define the boundaries of the entire project. Silt fence should be placed only in areas where it is applicable due to its cost and the fact that it is not biodegradable. For example, silt fence should not be placed in locations where the natural overland flow is from an undisturbed area into disturbed areas of the project. It should also not be used as a diversion.
   F. Silt fence should not be used in areas where the silt fence is at a higher elevation than the disturbed area.
   G. When placing silt fence near trees, care should be taken to minimize damage to the root system. Avoid compaction and root cutting within 1.5 feet multiplied by the inch diameter of the tree (example: for 10 inch trees, keep out a 15-foot radius from the trunk). Refer to UWEX publication Preserving Trees During Construction for more information.
   H. To protect silt fence from damage in areas of active construction or heavy traffic, silt fence should be flagged, marked, or highlighted to improve visibility.
   I. Silt fence effectiveness is generally increased when used in conjunction with other upslope erosion control practices. To further strengthen the silt fence, straw/hay bales can be placed on the down slope side.
   J. To help ensure effectiveness, silt fence should be inspected and repaired as necessary prior to forecasted rain events.
   K. Where installation with wood posts is difficult, such as when hard or frozen ground is encountered, the use of steel posts is recommended.
   L. Silt fence can be mechanically installed with a plow-type device, provided the silt fence is trenched in a manner such that appropriate anchoring is achieved as stated within this practice.

4. Operation and Maintenance
   A. Silt fences shall at a minimum be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24 hour period.
   B. Damaged or decomposed fences, undercutting, or flow channels around the end of barriers shall be repaired or corrected.

C. Sediment shall be properly disposed of once the deposits reach ½ the height of the fence.

5.3 Bale Barrier (Non-channel) – WDNR Conservation Practice Standard 1055

1. Conditions Where This Practice Applies
   A. This practice applies to the following applications where:
      i. Erosion occurs in the form of sheet and rill erosion. There is no concentration of water flowing to the barrier (channel erosion).
      ii. Where adjacent areas need protection from sediment-laden runoff.
      iii. Effectiveness is required for less than 3 months.
      iv. Conditions allow for the bales to be properly entrenched and staked as outlined in the Section 5.3(2)(A).
   B. Under no circumstance shall sediment bale barriers be used in the following applications:
      i. Below the ordinary high watermark or placed perpendicular to flow in streams, swales, ditches or any place where flow is concentrated.
      ii. Where the maximum gradient upslope of the sediment bale barriers is greater than 50% (2:1).
2. Criteria
   A. This section establishes the minimum standards for design, installation, and performance requirements.
      i. Placement
         a. At a minimum, sediment bale barriers shall be placed in a single row, lengthwise on the contour, with the ends of adjacent sediment bale barriers tightly abutting one another. The holes between bales shall be chinked (filled by wedging) with straw, hay, or equivalent material to prevent water from escaping between the bales.
         b. The maximum allowable slope lengths contributing runoff to a sediment bale barrier are specified in Table 5.3.1.

Table 5.3.1.	
Slope	**Barrier Row Spacing**
< 2%	100 feet
2 to 5%	75 feet
5 to 10%	50 feet
10 to 33%	25 feet
33 to 50%	20 feet
> 50%	Not Permitted

         c. Sediment bale barriers shall not be placed perpendicular to the contour.
         d. The end of the sediment bale barrier shall be extended upslope to prevent water from flowing around the barrier ends.
      ii. Height

a. Installed sediment bale barrier shall be a minimum of 10 inches high and shall not exceed a maximum height of 20 inches from ground level.

iii. Anchoring and Support

a. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a sediment bale barrier and the length of the proposed barrier to a minimum depth of 4 inches. After bales are staked and chinked, the excavated soil shall be backfilled and compacted against the barrier. Backfill to ground level on the down slope side. On the upslope side of the sediment bale barrier backfill to 4 inches above ground level.

b. At least two wood stakes, "T" or "U" steel posts, or ½ inch rebar driven through at equidistance along the centerline of the barrier shall securely anchor each bale. The minimum cross sectional area for wood stakes shall be 2.0 by 2.0 inches nominal. The first stake in each bale shall be driven toward the previously laid bale to force the bales together. Stakes shall be driven a minimum 12 inches into the ground to securely anchor the sediment bale barriers.

c. Bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings

3. Considerations

A. Improper placement as well as improper installation and maintenance of sediment bale barriers will significantly decrease the effectiveness of this practice.

B. Sediment bale barriers should not be used upslope of the disturbed area.

C. A double row of sediment bale barriers may be installed in areas where additional protection is needed.

D. For safety, place all anchoring flush with the sediment bale barrier or cap any exposed anchoring device.

4. Operation and Maintenance

A. Sediment bale barriers shall, at a minimum, be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.

B. Damaged or decomposed sediment bale barriers, any undercutting, or flow channels around the end of the sediment bale barriers, shall be repaired.

C. Sediment shall be properly disposed of once the deposits reach 1/2 the height of the sediment bale barrier.

D. Sediment bale barriers and anchoring devices shall be removed and properly disposed of when they have served their usefulness, but not before the upslope areas have been permanently stabilized.

E. Any sediment deposits remaining in place after the sediment bale barrier is no longer required shall be dressed to conform to the existing grade, prepared and seeded.

5.4 Wattle

1. The purpose of the installation of these products is to reduce uninterrupted slope length to slow the velocity of runoff so as to retain transported sediment from disturbed areas.
2. Conditions Where This Practice Applies
    A. This practice applies to the following conditions:
        i. Where only sheet and rill erosion occurs unless the product is listed as approved for use in concentrated flow areas (channel erosion) as a ditch check on the Wisconsin Department of Transportation (WisDOT) Erosion Control Product Acceptability List (PAL) and is designed and installed in accordance with Section 5.6 of this work practice. All products that are not approved for use in concentrated flow areas and are to be installed on a slope that terminates in a channel shall be installed at an elevation no lower than 6 inches above the design flow depth of the channel.
        ii. Where usage is limited to 12 consecutive months.
        iii. Where conditions allow for proper installation as outlined in the Criteria Section 5.4(3).
    B. Under no circumstance should products be used in the following applications:
        i. Below the ordinary high watermark or placed perpendicular to flow in streams.
        ii. Where the maximum gradient upslope of the product is steeper than 50% (2:1).
3. Criteria
    A. Product Classes
        i. Product classes are based on the installed product height as illustrated in Appendix 4 Straw Wattle Product classes are specified in Table 5.4.1.

Table 5.4.1

Product Height Class	Installed Height Above Grade (inches)
Class I	Mat Products
Class II	6-9
Class III	10-15
Class IV	16-20
Class V	>20

    B. Placement
        i. Products should be placed on the contour whenever possible. See Appendix 4 (Straw Wattle) for installation illustrations for log-type products.
        ii. Products should not be placed perpendicular to the contour.
        iii. The ends of product installations should be extended upslope to prevent water from flowing around the ends of the product.
        iv. Products that are placed on a curved alignment shall be installed at a large enough radius of curvature to prevent kinking.
    C. Entrenchment

i. Disturbed Ground
   a. Log-type products installed on disturbed ground shall be entrenched a minimum of 2 inches to ensure continuous ground contact.

ii. Vegetated Ground
   a. Log-type products installed on vegetated ground may be installed without entrenchment. All gaps and ruts creating an undercutting situation shall be filled with soil or log-type product filter media.

iii. Frozen Ground
   a. No entrenchment required.
   b. Only products approved for installation on frozen ground under the Commerce product approval process or listed in the WisDOT PAL for installation on frozen ground may be installed on frozen ground.
   c. Products installed on frozen ground shall be assessed for effectiveness upon ground thaw and staked or replaced as needed.

D. Overlap
   i. Minimum 24 inches or as required by the manufacturer if more restrictive. Overlap should be shingled in the direction of flow.

E. Support
   i. Stake or anchor as needed to maintain constant ground contact along the entire length of product at all times and to prevent lateral movement and/or floatation. Staking or anchoring shall be performed per manufacturer's recommendations or as specified under Commerce or WisDOT product approval stipulations.

F. Product Stacking
   i. Product Stacking – Products shall not be stacked individually on top of one another. Products may be stacked in a "pyramid" manner (i.e., one on top of two) or for operation and maintenance purposes as stipulated in Section 5.4(3)(1.)(iii).

G. Maximum Spacing
   i. The spacing in direction of slope shall not exceed the maximum slope lengths for the appropriate slope as specified in Table 5.4.2.

Table 5.4.2

	Max. Spacing (ft) per Product Class				
Slope	**I**	**II**	**III**	**IV**	**V**
0-2%	30	30	55	75	100
2.1-5%	25	25	40	55	75
5.1-10%	15	15	30	40	50

Notes:
1. NA = Not Allowed
2. Products from a higher class are suitable for applications in a lower class.
3. Manufacturer's recommendations for maximum slope and maximum spacing should be used if more restrictive than the guidelines established above.

ii. Products should be installed prior to disturbing the upslope area and/or when changes in disturbed slope or slope length require the installation of additional products.
iii. The width of mat type products used for perimeter control/slope interruption shall be as specified in the product approval from Commerce or as specified in the WisDOT PAL.

H. Considerations
i. To help ensure effectiveness, products should be inspected and repaired as necessary prior to forecasted rain events.
ii. Vehicular traffic should be diverted around the product unless allowed under the manufacturer's specifications.
iii. When products are used to divert runoff, discharge should be made to a stabilized area or sediment control practice.
iv. Products may be used in conjunction with other practices such as WP 1375-WPS Restoration and WP 1371-WPS Erosion Mats to enhance performance.

I. Operation and Maintenance
i. Products shall be inspected at least weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.
ii. If the product becomes undermined, the voids shall be backfilled with soil and compacted to establish continuous contact between the ground and product.
iii. If sediment reaches ½ of the log-type product height, the sediment shall be removed or a second log-type product may be positioned immediately upslope and in contact with the original log-type product.
iv. If a product rolls out of position, the product shall be repositioned and secured with additional stakes.
v. Holes, rips, or tears in the fabric of a log-type product less than 12 inches in any direction and located within the top 1/3 of the product may be repaired by stitching or wrapping a new piece of fabric around the product and securing. Sections of log-type product with holes, rips, or tears greater than or equal to 12 inches in any direction or located within the bottom 2/3 of the product shall be removed and replaced with new product or a second log-type product may be placed immediately upslope with a minimum 24 inches of overlap beyond the hole, rip, or tear.
vi. Pinched, settled, or deformed log-type products may be re-contoured to their original diameter by hand if possible or a second log-type product shall be placed immediately upslope with a minimum 24-inch overlap beyond the deformation.
vii. Destroyed or irreparable sections of log- type product shall be removed and replaced with new log-type product or a second log-type product may be placed immediately upslope with a minimum 24-inch overlap beyond the deformation.

5.5 Sand Bags

1. Conditions Where This Practice Applies
    A. This practice is applicable to the location of all culvert pipes draining runoff from disturbed areas.
4. Criteria
    A. Design
        i. Specify installation of sand/rock bag culvert pipe checks at any existing or proposed culvert pipe (inlet end) within disturbed area or where potential exists for disturbed area to flow through culvert.
        ii. Sand/rock bags are weather independent practice and may be specified during growing or non-growing seasons.
    B. Inspection/Installation
        i. Install sand/rock bag culvert pipe checks as the plans show and as the engineer/inspector directs. Place bags immediately after installing new culverts and before beginning earth disturbing activities in areas drained by existing culverts. Place bags on the inlet end of the culvert only. Leave bags in place until slopes and ditches are stable and turf develops enough to make future erosion unlikely. Periodically remove sediment to maintain effective function. Remove and dispose of the bags and rock filler when they are no longer needed to control erosion. Dispose of accumulated sediment and restore the site. The contractor may spread accumulated sediment to a surface suitable for seeding.
        ii. Materials
            a. Sand Bags:
                (a) Furnish bags made of canvas, burlap, nylon, or other engineer-approved material filled with concrete sand or other engineer-approved granular material.
            b. Rock Bags:
                (a) Furnish rock bags made of a porous, ultraviolet resistant, high-density polyethylene or geotextile fabric that will retain 70% of its original strength after 500 hours of exposure according to ASTM D 4355 and a minimum in-place filled size of 24-inches long by 12-inches wide by 6-inches high.
                (b) Fill the bags with a clean, sound, hard, durable, engineer-approved coarse aggregate conforming by visual inspection to the gradation specified for No. 2 coarse aggregate.
    C. Considerations
        i. The best way to prevent sediment from entering the culvert is to stabilize the disturbed area as quickly as possible, preventing erosion and stopping sediment transport at its source.
        ii. Sand/rock bag culvert pipe checks are only as effective so long as they are properly maintained. Periodic sediment removal is key in allowing the checks to remain effective.

iii. Documentation of materials used, monitoring logs, project diary and weekly inspection forms, including erosion and storm water management plans, should be turned over to the authority charged with long term maintenance of the site.

D. Operation and Maintenance
   i. Remove rock/sand bags once the contributing drainage area is stabilized with appropriate vegetation or impervious area.
   ii. Rock/sand bags shall be at a minimum inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24 hour period.
   iii. Sediment deposits shall be removed and the rock/sand bags restored to original dimensions when the sediment has accumulated between 1/3 to ½ the design depth of the rock/sand bags, or when the device is no longer functioning as designed. Removed sediment shall be deposited in a suitable area and stabilized.
   iv. Due care shall be taken to ensure sediment does not impede the intended function of the culvert. Any material accumulating into the culvert shall be removed and deposited in a suitable area and stabilized.

5.6 Ditch Check

1. Conditions Where this Practice Applies
   A. This practice applies where grading activity occurs in areas of channelized flows and a temporary measure is needed to control erosion of the channel until permanent stabilization practices can be applied. Under no circumstance shall ditch checks be placed in intermittent or perennial stream without permission from WDNR. This practice may not be substituted for major perimeter trapping measures.
2. Criteria
   A. Design
      i. Ditch check is a weather independent procedure and may be specified during growing or non-growing seasons.
      NOTE: Specification of ditch checks that are required to be entrenched during frozen soil conditions may prove ineffective. Designers shall use discretion to ensure the item specified will serve the intended purpose in frozen soils.
      ii. Specify installation of ditch check in a channel within the following:
         a. Disturbed area where soil will not be stabilized for a long period of time (a week or more), or,
         b. Where disturbed area may be conveyed to or through, or,
         c. With erosion matting near natural resources such as a wetland or waterway for extra protection of potential erosion runoff.
         d. At a minimum, install one ditch check for every two feet of drop in the channel.
   B. Inspection/Installation
      i. Height

a. Installed, the minimum height of ditch checks shall be 10 inches and shall not exceed a maximum height of 16 inches for manufactured or biodegradable materials, and 36 inches for stone (or other inorganic materials).
b. Ditch checks must be installed with the center lower than the sides forming a weir. If this is not done, storm water flows are forced to the edge of the ditch check thus promoting scour, or, out of the channel causing excessive erosion. (See Appendix 5 Temporary Ditch Checks)
c. Stone ditch checks shall have a minimum top width of 2 feet measured in the direction of flow with maximum slopes of 2:1 (2 horizontal to 1 vertical) on the upslope side and 2:1 on the down slope side. (See Appendix 6 Stone Ditch Check)

ii. Placement
a. Install ditch check as the plans show and as the engineer/inspector directs.
b. At a minimum, install one ditch check for every two feet of drop in the channel.
c. Ditch checks shall be placed such that the resultant ponding will not cause inconvenience or damage to adjacent areas.

iii. Material Specification
a. Stone ditch checks shall be constructed of a well-graded angular stone, a D50 of 3 inch or greater, sometimes referred to as breaker run or shot rock.
b. Ditch checks may be constructed of other approved materials, but must be capable of withstanding the flow velocities in the channel. Additional products listed in WisDOT's PAL are also acceptable for temporary ditch checks upon approval of the Environmental Department.
c. Silt fence and single rows of straw bales are ineffective as ditch checks and are not permitted.

iv. Installation – Refer to Appendices 5 & 6 at the end of this work practice.
a. Ditch checks shall be utilized during rough grading and shall be removed once the final grading and channel stabilization is applied, unless intended to be part of a permanent storm water management plan.
b. Channel erosion mat or other non-erodible materials shall be placed at the base of a ditch check, and extended a minimum of 6 feet, to prevent scour and washing out the toe of the ditch check. WP 1371-WPS Erosion Mats contains criteria for the placement of erosion mat in this location.
c. Chink or seal stone and rock ditch checks to minimize the flow through the ditch check.

C. Considerations

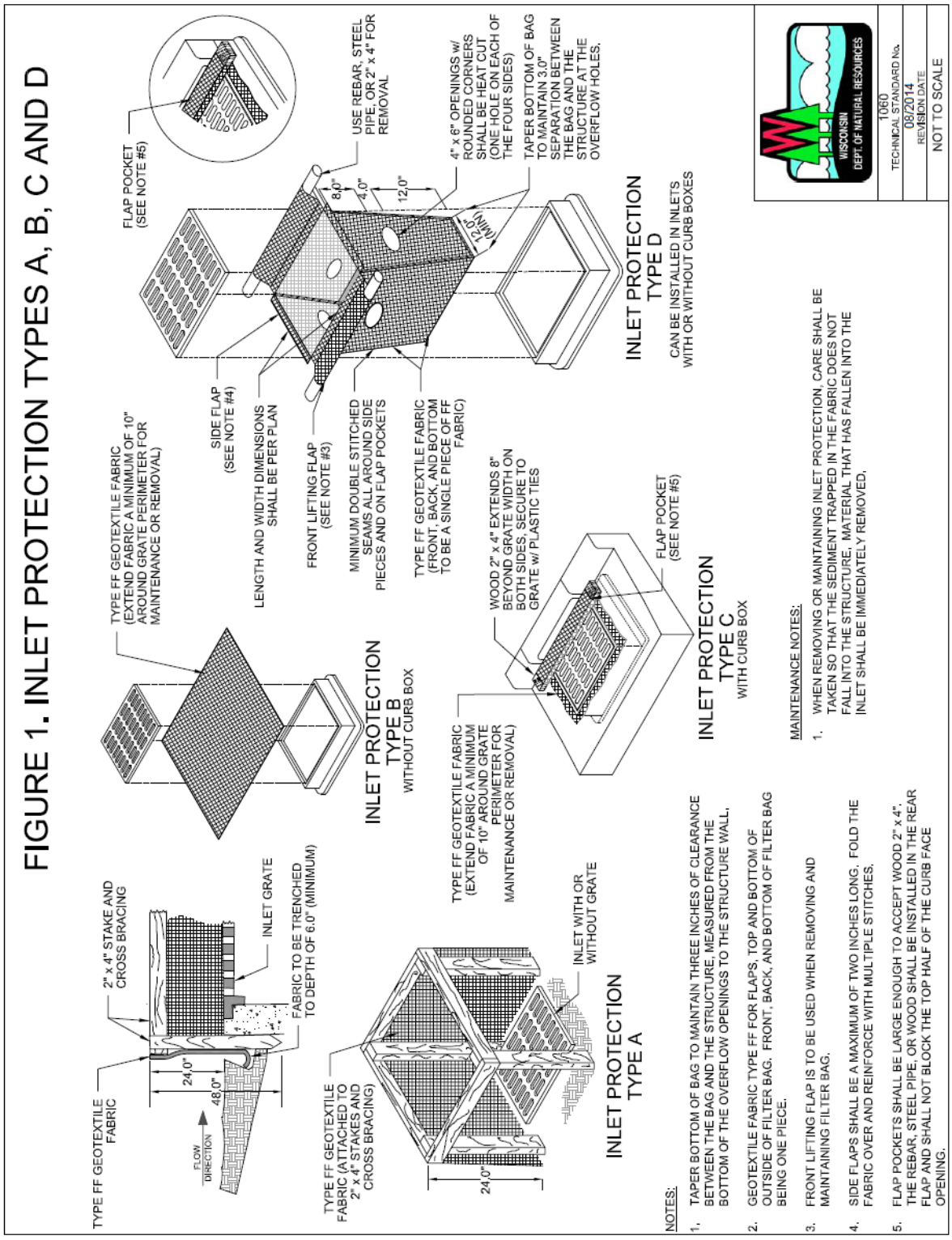
i. For added stability, the base of a stone or rock ditch check should be keyed into the soil to a depth of 6-inches.
ii. Stone ditch checks may be underlain by a nonwoven geotextile fabric to ease installation and removal. If the geotextile fabric is extended, it can serve purpose specified in section 5.6(2)(B)(iv)(b).
iii. Ditch checks installed in grass lined channels may kill the vegetation if water is ponded for extended periods or excessive siltation occurs. Proper maintenance is required to keep areas above and below the ditch check stabilized.
iv. The best way to prevent sediment from entering the storm sewer system is to stabilize the disturbed area of the site as quickly as possible, preventing erosion and stopping sediment transport at its source.
v. When placing ditch checks in swales adjacent to roadways, consider designating a 'clear zone' free of obstacles posing a threat to out of control vehicles.
vi. Mowing operations may throw stones from ditch checks causing a potential safety hazard.

D. Operation and Maintenance
i. Ditch checks shall at a minimum be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period until disturbed area is stabilized and permit terminated (if applicable).
ii. Unless incorporated into a permanent storm water management system, ditch checks shall be removed once the final grading and channel stabilization is applied.
iii. Sediment deposits shall be removed when deposits reach ½ the height of the barrier. Removal of sediment may require replacement of stone. Maintenance shall be completed as soon as possible with consideration to site conditions.

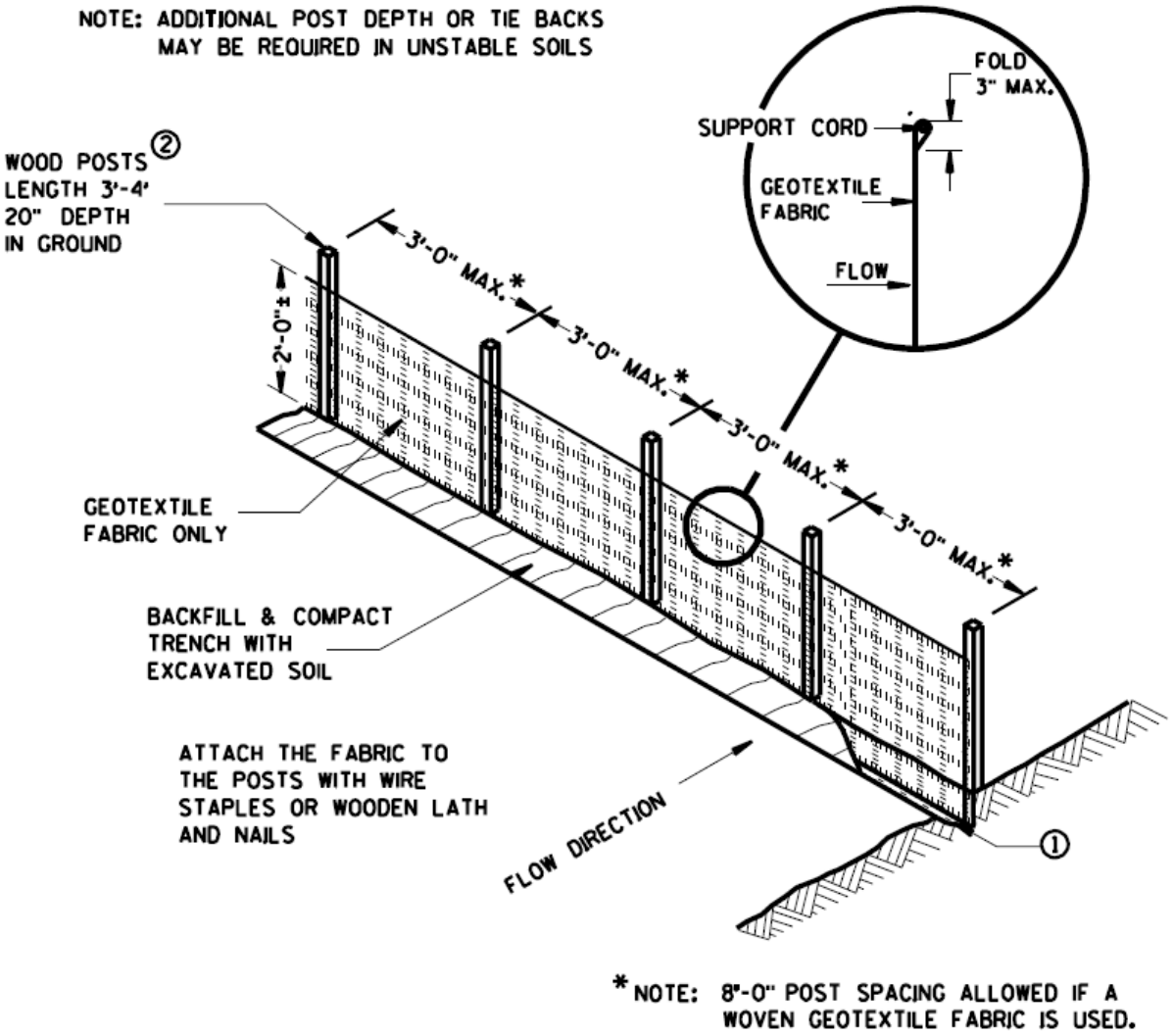
6.0 ASSOCIATED TOOLS AND EQUIPMENT

1. Silt Fence, 100 ft. roll w/stakes, Stock Code #1512600
2. Straw Bales are Non-Stock
3. Stakes
   A. 3' long, Stock Code #1347302
   B. 4' long, Stock Code #1347304

Appendix 1 Catch Basin Inlet Protection

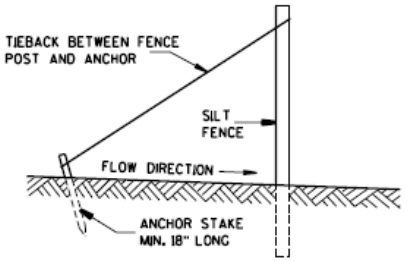


Appendix 2 Silt Fence

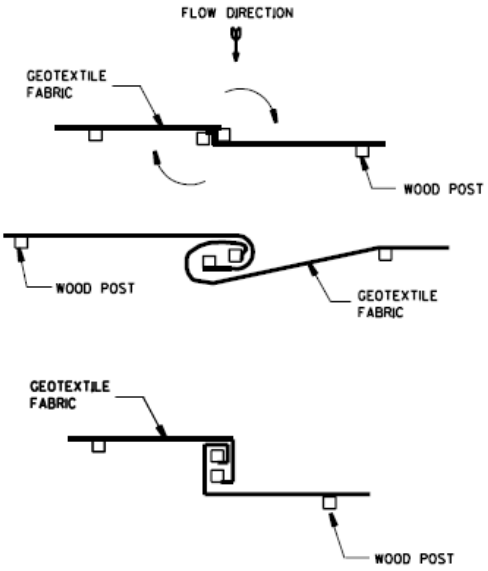


SILT FENCE

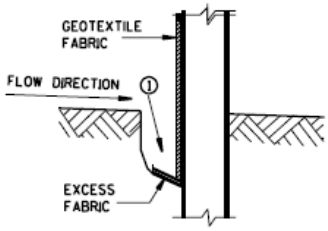
Appendix 3 Silt Fence Tie Back and Joining Methods



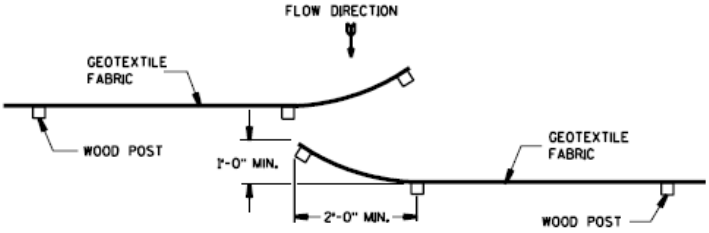
SILT FENCE TIE BACK
(WHEN ADDITIONAL SUPPORT REQUIRED)



TWIST METHOD



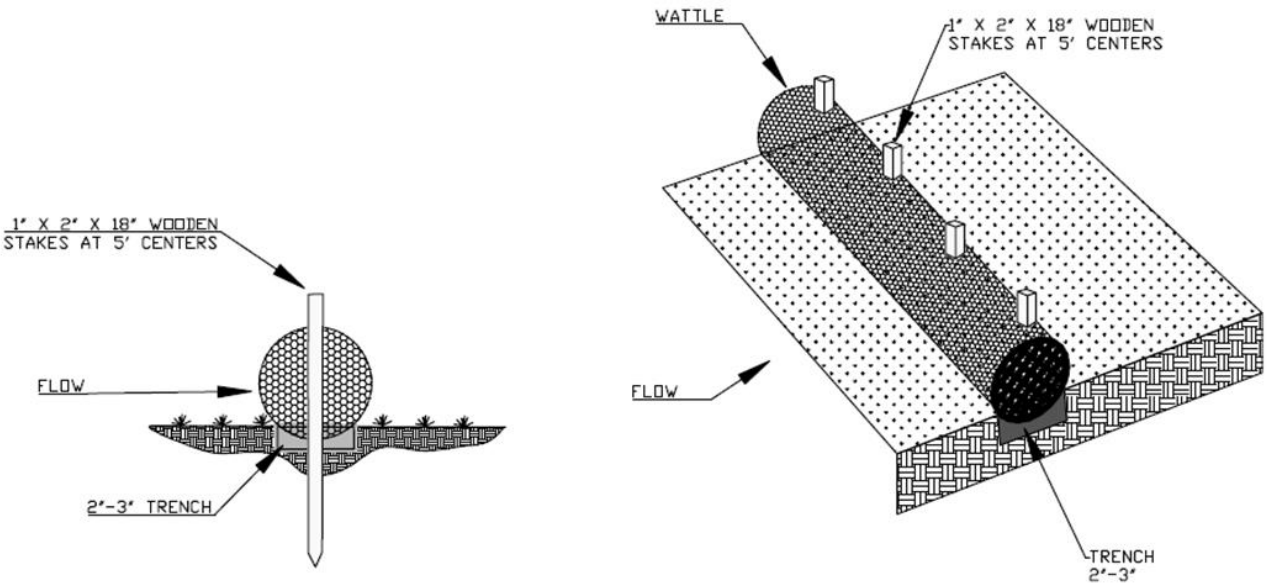
TRENCH DETAIL



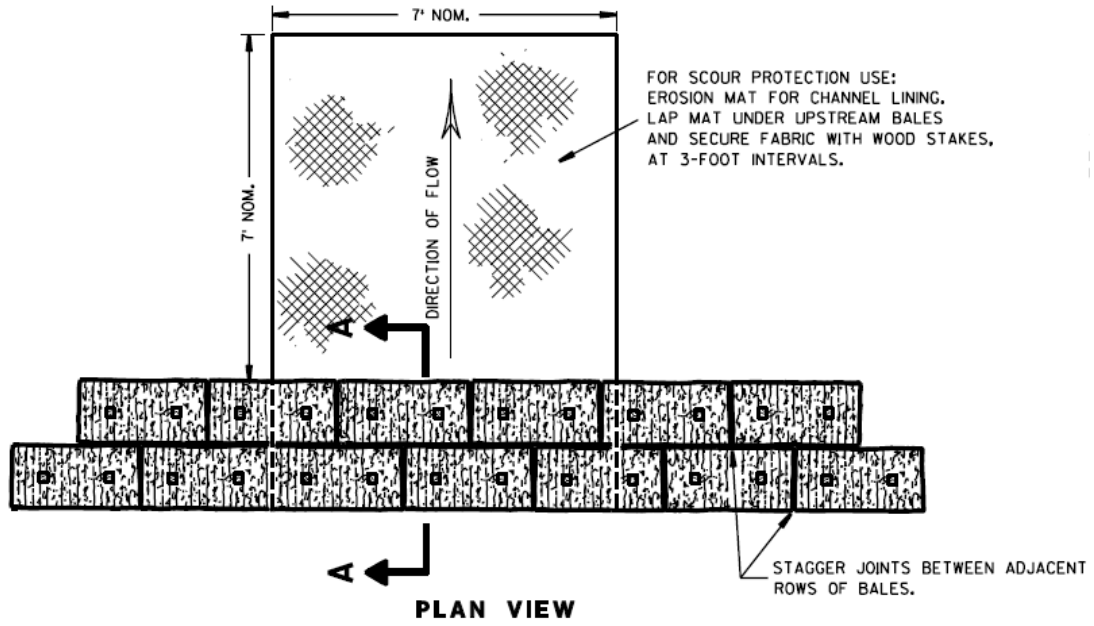
HOOK METHOD

JOINING TWO LENGTHS OF SILT FENCE ④

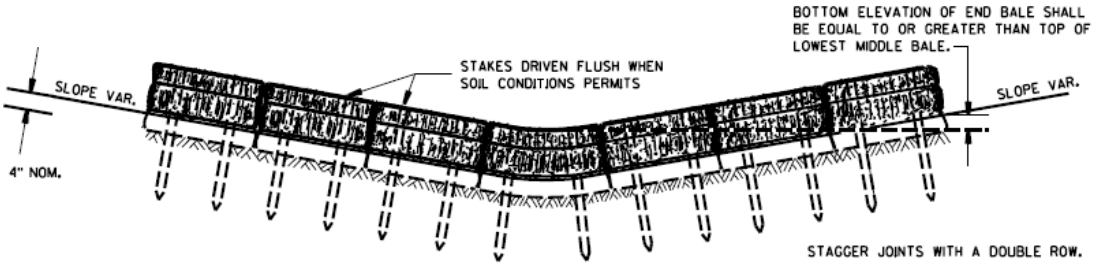
Appendix 4 Straw Wattle Typical



Appendix 5 Temporary Ditch Check Using Erosion Bales

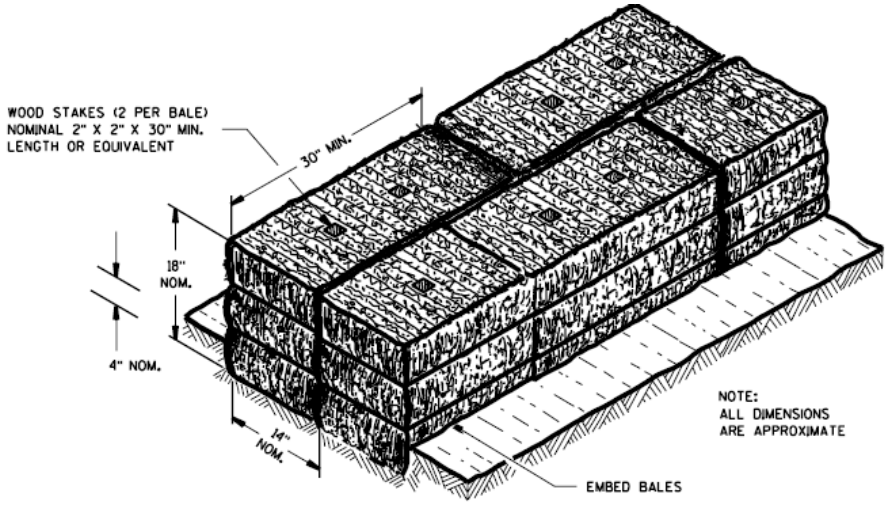


PLAN VIEW



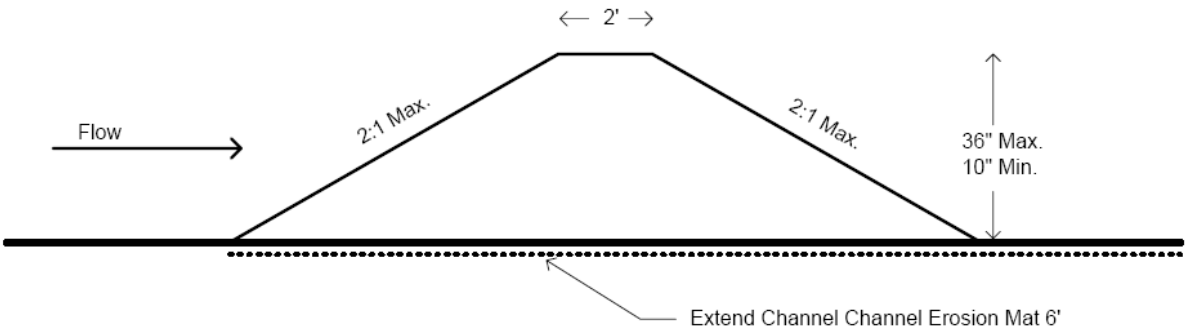
FRONT ELEVATION

TEMPORARY DITCH CHECK USING EROSION BALES ①

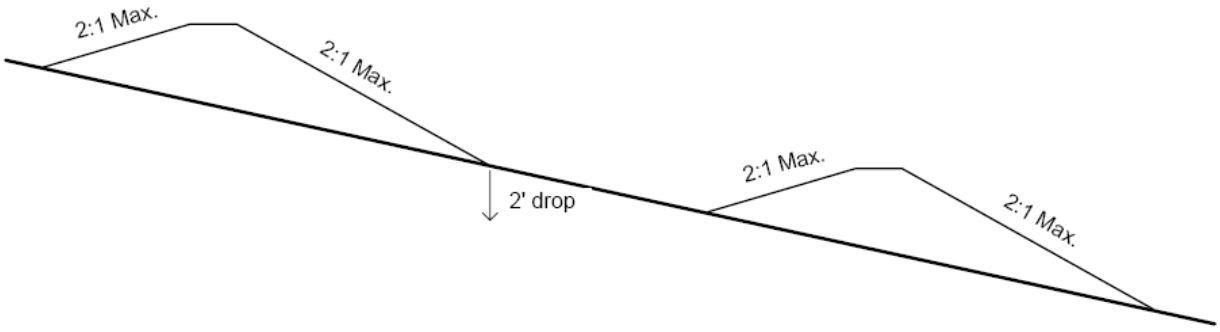


SECTION A-A

Appendix 6 Stone Ditch Check



Side View



Side View

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Appendix G-4

Example

Restoration - Mulching, Seeding and Sod

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Gas Work Practice

WP 1375-WPS: Restoration – Mulching, Seeding and Sod

Revision 1.0
4/29/2016

Table of Contents

1.0 PURPOSE

The purpose of this work practice is to reduce erosion and stabilize disturbed areas both temporarily and permanently.

2.0 SCOPE AND APPLICABILITY

WPS may disturb existing vegetation, which when unprotected, may result in unnecessary erosion to the existing features and potentially discharge sediment from the construction area. Implementation of the following is to reduce erosion and stabilize disturbed areas both temporarily and permanently.

As used in this work practice, these words are defined as follows:[1]

1. Shall, will and must are used interchangeably and are used to express an action that is mandatory,
2. Should is used to express an action that is a preferred practice,
3. May and can are used to express an action that is optional.

3.0 GENERAL NOTES AND PRECAUTIONS

This work practice has been derived from the Wisconsin Department of Natural Resources Technical Standards.

4.0 DEFINITIONS

1. Mulching: The application of organic material to the soil surface to protect it from raindrop impact and overland flow. Mulch covers the soil and absorbs the erosive impact of rainfall and reduces the flow velocity of runoff.
2. Permanent Seeding: Seeding which produces perennial vegetation. Permanent Seeding is used in areas where permenant vegetation is desired.
3. Seeding: Planting seed to establish temporary or permanent vegetation for erosion control.
4. Temporary Seeding: Seeding which produces annual vegetation. Temporary Seeding is used in areas where temporary vegetation is desired.

5.0 PROCEDURE

5.1 Mulching

1. This practice may be applied on exposed soils as a temporary control where soil grading or landscaping has taken place or in conjunction with temporary or permanent seeding. Mulching is generally not appropriate in areas of concentrated flow.
2. Installation
    A. Mulching may be installed after each work day for temporary purposes as appropriate and in sequence with permanent seeding within 7 days of final grading. Mulch shall be applied at a uniform rate of 1½ to 2 tons per acre for sites that are seeded, and 2 to 3 tons per acre for sites that are not seeded and in accordance with WDNR Technical Standard 1058 Mulching for Construction Sites.

[1] Definitions are common to AGA and other similar sources

B. Mulch shall be anchored at the time of application or immediately after application using mechanical or chemical means specicified in WDNR Technical Standard 1058.

3. Maintenance
   A. Mulch shall, at a minimum, be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24 hour period.
   B. Additional mulch shall be applied immediately when necessary to maintain suitable coverage. Inspections shall be made until vegetative cover is well established.

5.2 Seeding

1. Seeding applies to areas of exposed soil where the establishment of vegetation is desired. Temporary seeding applies to disturbed areas that will not be brought to final grade or on which land-disturbing activities will not be performed for a period greater than 30 days, and requires vegetative cover for less than one year. Permanent seeding applies to areas where perennial vegetative cover is needed.
2. Seeding should be done in accordance with WDNR Technicial Standard 1059 Seeding for Construction Site Erosion Control.
3. Installation
   A. Seed shall be installed within 7 days of final grading and in conjunction with other practices.
   B. Other appropriate and essential practices such as fertilizer, inoculum, soil amendments, and cover crop shall also be done in conjunction with the planting.
   C. The planting shall consist of seeding and may include cuttings, plugs, stems, ball and burlap, willow mattresses, fascines, or other commonly accepted plant materials. At a minimum, perennial seed mixture shall be utilized.
   D. Seeding may not be considered acceptable vegetative cover until the vegetative cover is well established.
4. Maintenance
   A. Seeded areas shall at a minimum be inspected weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period until disturbed area is stabilized and permit terminated (if applicable).
   B. Repair and reseed areas that have erosion damage as necessary.

5.3 Sod

1. Sod should be used to immediately stabilize high risk or high priority areas. Sodding may be used in place of seeding and as a filter strip along the shoreline. The sod protects the soil surface from erosion by reducing velocities and raindrop impact and also traps sediments. This practice applies in stabilization area where cut banks, grading, excavations and other disturbances have laid bare the soil, or where special needs arise, as in the case of aesthetics.
2. Installation
   A. The sod shall be installed within 7 days of final grading.
   B. The sod shall be moist and should be placed within 2 days of cutting.

C. The sod shall be placed at right angles to the direction of flow. Placement shall progress from downslope to upslope. Joints shall be staggered as in laying bricks. The upper edge of sod shall be turned down slightly to conduct water onto the sod, edges may be overlapped, and all sod shall be staked to hold it in place.

3. Maintenance
   A. Sodded areas shall be inspected within 24 hours after a rainfall event or daily during periods of prolonged rainfall until the sod is well rooted. Repair or replacement shall be made immediately.

6.0 ASSOCIATED TOOLS AND EQUIPMENT

1. Seed, Lawn Premium Mixtures, Stock Code #151-3400
2. Seed, Mulch Cover, Stock Code #151-3402

Appendix G-5

Example

Frac Out Response plan and Report Form

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Gas Work Practice

WP 1376-WPS: Frac-Out Response Plan and Report Form

Revision 1.0
4/29/2016

Table of Contents

List of Appendices

1.0 PURPOSE

The purpose of this work practice is to outline the required frac-out response plan for boring activities.

2.0 SCOPE AND APPLICABILITY

Procedure for implementing a response plan for the inadvertent release of drilling mud during boring activities.

As used in this work practice, these words are defined as follows:[1]

1. Shall, will and must are used interchangeably and are used to express an action that is mandatory,
2. Should is used to express an action that is a preferred practice,
3. May and can are used to express an action that is optional.

3.0 GENERAL NOTES AND PRECAUTIONS

There are no general notes and precautions that apply to this work practice.

4.0 DEFINITIONS

1. Frac-out: The inadvertent or un-controlled escape of drilling lubricant to the environment during any point of directional drilling operations.

5.0 PROCEDURE

5.1 Frac-Out Response Plan

1. Monitoring Requirements
   The installation crew will constantly monitor for any signs of a frac-out whenever there is boring, reaming, or pipe pulling activities. Monitoring should include walking and observing the bore route for indications of drilling fluid and monitoring the drilling pressures on the boring rig itself.
2. Immediate Response Required
   When a frac-out is identified, the bore crew must halt the bore immediately and begin containment efforts. Boring activities may not continue until it is verified that the frac-out is contained.
3. Containment Basics
   A. The boring installation crew will be expected to have containment materials and/or equipment onsite whenever directional boring is being conducted. This includes silt fence, sediment logs, straw bales, sand bags, and/or other temporary containment structures.
   B. When boring a waterway or wetland, vacuum excavation equipment must be readily available.
   C. When frac-outs occur in uplands they shall be contained so the drilling mud does not reach waterways, wetlands, or storm sewer inlets.

[1] Definitions are common to AGA and other similar sources

D. Crew members should review individual responsibilities for frac-out response as part of daily pre-job discussions and preparations.

4. Required Contacts
   A. The Environmental Department should be contacted if a frac-out is identified within a waterway, wetland, or storm sewer inlet.
   B. Federal, state, and local regulatory agencies may need to be contacted depending on the frac-out location. These contacts will be made by the Environmental Department.
5. Required Documentation
   A. All frac-outs must have the following information regarding the frac-out incident properly documented:
      i. An estimate of the amount of drilling mud released,
      ii. The method of containment used to control the frac-out,
      iii. The remediation methods used to clean-up the frac-out,
      iv. Other information regarding the frac-out (time, location, crew, etc).
6. Clean Up
   All frac outs will be cleaned up by removing as much of the drilling mud as practical while minimizing collateral impacts. In most cases, this will require a vacuum excavation truck.

6.0 ASSOCIATED TOOLS AND EQUIPMENT

1. Silt Fence, 100 ft. roll w/stakes, Stock Code #1512600
2. Straw Bales (non-stock)
3. Stakes:
   A. Stock Code #1347302, 3’ long
   B. Stock Code #1347304, 4’ long
4. Vacuum Excavation Truck

Appendix 1 Frac-Out Report

Model Frac-Out Report

General Information:

Address: _____ City / State / Zip Code: _____

Township: _____ County: _____

Date: _____ Time: _____ Foreman: _____ Operator: _____

Facility /Location Information:

☐ Steel ☐ Plastic Diameter/Size: _____

☐ Hard Surface ☐ Lawn/Parkway ☐ Water Crossing Impacted Quantity of Release: _____

Environmental Group Notification:

☐ None Required

☐ Required

Contact Name: _____ Time of Contact: _____

Containment Actions Taken:

☐ Vacuum Excavation ☐ Sand Bags ☐ Bales / Straw ☐ Other: _____

Comments:

_____

_____

_____

_____

Foreman: _____ Date: _____

Appendix H

Material Safety Data Sheets

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SAFETY DATA SHEET

1400, 332 6TH AVE. SW. Calgary, Alberta, t2p0b2 PHONE: (403) 290-2900 FAX: (403) 263-8915

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFIER:	Natural Gas (Pipeline Quality)	**PRODUCT CODE:**	W247
PRODUCT USE:	Use as fuel or as process feedstock for industrial, residential and commercial purposes.		
SYNONYMS:	Natural Gas (sales gas), primarily methane; Liquified Natural Gas; Dry Natural Gas.		
MANUFACTURER:	TRILOGY ENERGY	**SUPPLIER:**	TRILOGY ENERGY
ADDRESS:	1400, 332 6th Avenue SW, Calgary, Alberta, Canada, T2P 0B2 Telephone: (403) 290-2900 Fax: (403) 263-8915	**ADDRESS:**	1400, 332 6th Avenue SW, Calgary, Alberta, Canada, T2P 0B2 Telephone: (403) 290-2900 Fax: (403) 263-8915
24-HOUR EMERGENCY CONTACT:	Trilogy Energy (403) 290-2900 CANUTEC (613) 996-6666		

GHS Product Identifier

NAV	NAV

SECTION 2 – HAZARD IDENTIFICATION

Emergency Overview

APPEARANCE AND ODOR:	Gas exists under various pressures depending on pipeline systems. Odorless gas in natural state at any concentration. Natural gas sold for fuel purposes under pressure usually has an odorant added to it. This odorant is usually a mercaptan, which has an odor similar to "rotten eggs" or "skunk". The odorant level is such that it is noticeable below the Lower Explosive Limit (LEL) of the natural gas.
HEALTH HAZARDS:	Avoid breathing gas. Avoid contact with skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. The health effects caused by exposure to Natural Gas (pipeline quality) are minimal in concentrations less than the lower explosive limit. At high concentrations, it can displace oxygen and cause asphyxiation. A minimal requirement of 19.5% of oxygen at sea level (148 torr O2, dry air) is recommended.
FIRE AND EXPLOSION HAZARDS:	CAUTION! EXTREMELY FLAMMABLE GAS. MAY CAUSE FLASH FIRE. HIGH PRESSURE GAS. Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst or explode. Keep away from heat, sparks and flame. Do not puncture or incinerate container.

GHS Classification

Health	Environmental	Physical
NAV	NAV	NAV

GHS Label

Symbols:	NAV
Signal Word:	NAV
Hazard Statement: NAV	**Precautionary Statements:** NAV

SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS	CAS No.	% (w or v)
Natural Gas	8006-14-2	100

May Contain small amounts of benzene, carbon dioxide, nitrogen and other inert gases, depending on pipeline specifications.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

SECTION 4 – FIRST AID MEASURES

INHALATION:	Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
SKIN CONTACT:	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. To avoid risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately
EYE CONTACT:	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention Immediately
INGESTION:	As this product is a gas, refer to the inhalation section.
NOTE TO THE PHYSICIAN:	No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. Protection of first-aiders: No action shall be taken involving an personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

SECTION 5 - FIRE FIGHTING MEASURES

FIRE OR EXPLOSION HAZARDS:	Class I – Flammable Gas (NFPA). Extremely flammable in presence of open flames, sparks, and heat. Rapid escape of vapor may generate static charge causing ignition. May accumulate in confined spaces. Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Ruptured cylinders may rocket. Evacuate area if pressure relief valves activate, or if containers are discolored due to flames on tanks. Vapors may form explosive mixtures with air.
SUITABLE EXTINGUISHING MEDIA:	Use an extinguishing agent suitable for surrounding fire.
UNSUITABLE EXTINGUISHING MEDIA:	None known.
SPECIAL PROTECTION ACTIONS/EQUIPMENT FOR FIREFIGHTERS:	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Fire-fighters should wear appropriate protective equipment and self –contained breathing apparatus (SCBA) with a full-face piece operated in positive pressure mode.
HAZARDOUS COMBUSTION PRODUCTS:	Carbon oxides (CO, CO_2), sulphur oxides (SO_x), sulphur compounds (H2S), smoke and irritating vapors as products of incomplete combustion.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

SMALL SPILL:	Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.	
LARGE SPILL:	Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see section 1 for emergency contact information and section 13 for waste disposal.	
PERSONAL PRECAUTIONS:	**For non-emergency personnel:**	**For emergency responders:** Accidental releases pose a serious fire or explosion hazard. Immediately contact emergency personnel. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear protective respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
ENVIRONMENTAL PRECAUTIONS:	Ensure emergency procedures to deal with accidental gas release are in place to avoid contamination of the environment. Inform the relevant authorities if this product has caused environmental pollution (sewers, waterways, soil or air).	
METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP:	NAV	

SECTION 7 – HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING:	Put on appropriate personal protective equipment (see section 8). Eating, drinking, and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking, and smoking. Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-spark tools. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container.
CONDITIONS FOR SAFE STORAGE:	Store in accordance with local regulations. Store in a segregated and approved area. Store in a dry, cool and well-ventilated area, away from incompatible materials (see section 10). Eliminate all ignition sources. Keep container tightly closed and sealed until ready for use. Ensure the storage containers are grounded/bonded.
INCOMPATIBILITIES:	NAV
SENSITIVITY TO IMPACT:	NAV
SENSITIVITY TO STATIC DISCHARGE:	NAV

SECTION 8 – EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits

Component Name (CAS No.)	**Reference**	**8-HR TWA**		**15-MIN STEL/C**		**Notation/Comments**
		ppm	mg/m^3	ppm	mg/m^3	
Methane	ACGIH TLV (United States).	1000	NAV	NAV	NAV	NAV
Consult local authorities for acceptable exposure limits.						

Exposure Controls

ENGINEERING CONTROLS:	Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.	
ADMINISTRATIVE CONTROLS:	Recommended monitoring procedures: If this product contains ingredients with exposure limits, personal, workspace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or necessity to use respiratory protective equipment. Hygiene measure: wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to workstation location.	
PERSONAL PROTECTIVE EQUIPMENT:	**Respiratory:**	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator section must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: A NIOSH-approved positive-pressure, air-supplied respirator or self-contained breathing apparatus may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits.
	Skin (hands, etc.):	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all time when handling chemical products if a risk assessment indicates this is necessary. Recommended: wear insulated gloves to prevent frostbite.
	Eyes:	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
	Body:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
	Feet:	NAV
	Other:	NAV
OTHER CONSIDERATIONS:	Environmental exposure controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.	

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Gas exists under various pressures depending on pipeline systems.	**ODOR & APPEARANCE:**	Odorless gas in natural state at any concentration. Natural Gas sold for fuel purposes under pressure usually had an odorant added to it. This odorant is usually a mercaptan, which had an odor similar to " rotten eggs" or "skunk". The odorant level is such that it is noticeable below the Lower Explosive Limit (LEL) of the natural gas. Colorless.

ODOR THRESHOLD (ppm):	WARNING: Studies have shown that not all persons are sensitive to this skunky smell and may not be able to detect this warning device!	**pH:**	NAV
MELTING POINT/ FREEZING POINT (˚C):	NAV	**INITIAL BOILING POINT (˚C):**	NAV
FLASHPOINT (°C) & METHOD:	Open cup: -188˚C (-306.4˚F) (NFPA) varies with crude sources	**EVAPORATION RATE:**	NAV
FLAMMABILITY (SOLID, GAS):	Class I - Flammable gas (NFPA)	**IF YES, UNDER WHAT CONDITIONS?**	
LOWER FLAMMABLE LIMIT (%):	5% (NFPA)	**UPPER FLAMMABLE LIMIT (%):**	15% (NFPA)
VAPOR PRESSURE (mmHg):	552 kPa @68˚F (4140 mm Hg @ 20˚C	**VAPOR DENSITY (air=1):**	0.554 @ 0˚C (32˚F)
PERCENT VOLATILITY:	100%	**SPECIFIC GRAVITY:**	NAV
SOLUBILITY (in water):	Soluble in water, methanol, diethyl ether, n-octanol, acetone.	**PARTITION COEFFICIENT (N-OCTANOL/WATER):**	NAV
AUTO-IGNITION TEMPERATURE (˚C):	540˚C (1004˚F) (NFPA)	**DECOMPOSITION TEMPERATURE (˚C):**	NAV
VISCOSITY	NAV	**OTHER:**	Pour point: NAV

SECTION 10 – STABILITY AND REACTIVITY

REACTIVITY AND UNDER WHAT CONDITIONS:	NAV
CHEMICAL STABILITY:	This product is stable.
HAZARDOUS REACTIONS:	Hazardous polymerization: Under normal conditions of storage and use, hazardous polymerization will not occur.
CONDITIONS TO AVOID:	NAV
INCOMPATIBLE MATERIALS:	Reactive with oxidizing agents, combustible materials and halogen compounds.
HAZARDOUS DECOMPOSITION PRODUCTS:	May release CO_x, SO_x, H2S, smoke and irritating vapors when heated to decomposition.

SECTION 11 – TOXICOLOGICAL INFORMATION

HAZARDOUS INGREDIENT (CAS No.)	**LD_{50} (SPECIES & ROUTE)**	**LC_{50} (SPECIFY SPECIES)**	**COMMENTS**
NAV	NAV	NAV	NAV

ROUTE OF ENTRY:									
SKIN CONTACT:	YES	**SKIN ABSORPTION:**	NAV	**EYE CONTACT:**	YES	**INHALATION:**	YES	**INGESTION:**	NAV

EFFECTS OF ACUTE EXPOSURE TO PRODUCT	
ACUTE TOXICITY:	NAV

NAP: Not applicable NAV: Not available

INGESTION:	As this product is a gas, refer to the inhalation section.
INHALATION:	Inhalation of vapors can cause irritation of the respiratory tract and CNS depression with symptoms of nausea, headaches, vomiting, dizziness, fatigue, light-headedness, reduced coordination, unconsciousness and possibly death.
EYE CONTACT:	Contact with rapidly expanding gas may cause burns or frostbite.
SKIN CONTACT:	Contact with rapidly expanding gas may cause burns or frostbite.

EFFECTS OF CHRONIC EXPOSURE

TARGET ORGANS:	NAV		
SUSCEPTIBLE POPULATIONS:	Medical conditions aggravated by over-exposure: Overexposure may lead to cardiac sensitization.		
CARCINOGENICITY:	Not listed as carcinogenic by OSHA, NTP or IARC.	**MUTAGENICITY:**	No known significant effects or critical hazards.
REPRODUCTIVE HAZARD:	No known significant effects or critical hazards.	**TERATOGENICITY:**	No known significant effects or critical hazards.
IRRITANCY:	NAV	**SENSITIZATION:**	
SYNERGISTIC PRODUCTS:	NAV		
DEVELOPMENTAL EFFECTS:	No known significant effects or critical hazards.		
CHRONIC EFFECTS:	No known significant effects or critical hazards.		

SECTION 12 – ECOLOGICAL INFORMATION

HAZARDOUS INGREDIENT	**LD_{50} (SPECIES & ROUTE)**	**LC_{50} (SPECIFY SPECIES)**
NAV	NAV	NAV

PERSISTENCE & DEGRADABILITY:	This product itself and its products of degration are not toxic.
BIO-ACCUMULATIVE POTENTIAL:	NAV
MOBILITY IN SOIL:	NAV
OTHER ADVERSE EFFECTS:	**Environmental effects:** No known significant effects or critical hazards. Aquatic ecotoxicity Conclusion/Summary: Not Available. Biodegradability Conclusion/Summary: Not Available.

SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Disposal: The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licence waste disposal contractor. Disposal of this product, solutions and the by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Empty pressure vessels should be returned to the supplier.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION for additional handling information and protection of employees.

SECTION 14 – TRANSPORTATION INFORMATION

	UN PROPER SHIPPING NAME	HAZARD CLASS	UN/NA	PACKING GROUP	LABELS REQUIRED
US DOT:	Compressed Gas Flammable, N.O.S.	2.1	UN1954	NAV	NAV
CANADIAN TDG:	Compressed Gas Flammable, N.O.S. (Methane)	2.1	UN1954	NAV	NAV
INTERNATIONAL:	NAV	NAV	NAV	NAV	NAV
ENVIRONMENTAL HAZARDS:	NAV				
SPECIAL PRECAUTIONS FOR USER:	NAV				

SECTION 15 – REGULATORY INFORMATION

CANADA REGULATIONS:	**WHMIS Classification:**	Class A: Compressed Gas. Class B-1: Flammable Gas. **This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.**
	Canada Inventory	All components are listed or exempted.
U.S. FEDERAL REGULATIONS:	**OSHA/HCS Classification:**	Compressed Gas. Flammable Gas. This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910. 1200).
	TSCA 8B:	All components are listed or exempted.
OTHER:	**Europe Inventory:**	All components are listed or exempted.
	EU Regulations: Risk Phrases	This product is not classified according to EU legislation.

SECTION 16 – OTHER INFORMATION

SDS TRANSCRIBED FROM THE ORIGINAL BY: Golder Associates, Ltd. (#300, 10525 – 170 Street, Edmonton, AB T5P 4W2. Phone: 780-483-3499).	**SDS VERSION No.:** 1.0 **SDS PREPARATION DATE:** December 14, 2013.

LIST OF ABBREVIATIONS & ACRONYMS: NA

DISCLAIMER:

The information contained herein is based on the information available at the indicated date of preparation, and is believed to be accurate. The company makes no warranties, guarantees, or conditions expressed or implied, in respect to the data contained herein; and shall not be liable for any damages, or injury, either direct or consequential, however caused, arising out of the use of information contained on the data sheet. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

LABEL REQUIREMENTS: EXTREMELY FLAMMABLE GAS.MAY CAUSE FLASH FIRE. HIGH PRESSURE GAS.

Hazardous Material Information System (USA):

Health: 1 Flammability: 4 Physical hazard: 0 Personal Protection: K

National Fire Protection association:

Health: 1 Flammability: 4 Instability: 0 Special: NAV

Ethyl Mercaptan

Version 2.0 Revision Date 2013-09-13

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product information

Trade name : Ethyl Mercaptan
Material : 1111485, 1024772, 1086422, 1086423, 1021429, 1021431, 1021426, 1021430, 1021425, 1021424, 1024773, 1024771, 1024770, 1021427, 1026776, 1021428, 1104918

Company : Chevron Phillips Chemical Company LP
10001 Six Pines Drive
The Woodlands, TX 77380

Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)
Transport:
North America: CHEMTREC 800.424.9300 or 703.527.3887
Asia: +800 CHEMCALL (+800 2436 2255)
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600

Responsible Department : Product Safety and Toxicology Group
E-mail address : MSDS@CPChem.com
Website : www.CPChem.com

SECTION 2: Hazards identification

Emergency Overview

Danger

Form: Liquid **Physical state**: Liquid **Color**: Colorless **Odor**: Repulsive

OSHA Hazards : Combustible liquid and vapor., Skin sensitizer

GHS Classification

: Flammable liquids, Category 1
Acute toxicity, Category 4, Oral
Acute toxicity, Category 4, Inhalation
Aspiration hazard, Category 2
Skin sensitization, Sub-category 1B
Acute aquatic toxicity, Category 1
Chronic aquatic toxicity, Category 1

GHS-Labeling

Symbol(s) :

Signal Word : Danger

Hazard Statements : H224: Extremely flammable liquid and vapor.
H302: Harmful if swallowed.
H305: May be harmful if swallowed and enters airways.
H317: May cause an allergic skin reaction.
H332: Harmful if inhaled.
H410: Very toxic to aquatic life with long lasting effects.

Precautionary Statements : **Prevention:**
P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233: Keep container tightly closed.
P240: Ground/bond container and receiving equipment.
P243: Take precautionary measures against static discharge.
P273: Avoid release to the environment.
P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P303 + P361 + P353: IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P331: Do NOT induce vomiting.
P312: Call a POISON CENTER or doctor/ physician if you feel unwell.
Storage:
P403 + P235: Store in a well-ventilated place. Keep cool.
Disposal:
P501: Dispose of contents/ container to an approved waste disposal plant.

Carcinogenicity:

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

ACGIH No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

SECTION 3: Composition/information on ingredients

Synonyms : Scentinel® A Gas Odorant
ETSH
Ethanethiol
Ethyl Mercaptan

Molecular formula : C2H6S

Component	CAS-No.	Weight %
Ethyl Mercaptan	75-08-1	99

SECTION 4: First aid measures

General advice : Move out of dangerous area. Consult a physician. Show this material safety data sheet to the doctor in attendance. Symptoms of poisoning may appear several hours later. Do not leave the victim unattended.

If inhaled : Call a physician or poison control center immediately. If unconscious place in recovery position and seek medical advice.

In case of skin contact : If on skin, rinse well with water. If on clothes, remove clothes.

In case of eye contact : Immediately flush eye(s) with plenty of water. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

If swallowed : Keep respiratory tract clear. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

SECTION 5: Firefighting measures

Flash point : -48 °C (-54 °F)

Autoignition temperature : 295 °C (563 °F)

Suitable extinguishing media : Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.

Unsuitable extinguishing media : High volume water jet.

Specific hazards during fire fighting : Do not allow run-off from fire fighting to enter drains or water courses.

Special protective equipment for fire-fighters : Wear self contained breathing apparatus for fire fighting if necessary.

Further information : Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed containers.

Fire and explosion : Do not spray on an open flame or any other incandescent

protection		material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.
Hazardous decomposition products	:	Carbon oxides. Sulfur oxides.

SECTION 6: Accidental release measures

Personal precautions	:	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods for cleaning up	:	Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

SECTION 7: Handling and storage

Handling

Advice on safe handling	:	Avoid formation of aerosol. Do not breathe vapors/dust. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Take precautionary measures against static discharges. Provide sufficient air exchange and/or exhaust in work rooms. Open drum carefully as content may be under pressure. Dispose of rinse water in accordance with local and national regulations.
Advice on protection against fire and explosion	:	Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.

Storage

Requirements for storage areas and containers	:	Prevent unauthorized access. No smoking. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

SECTION 8: Exposure controls/personal protection

Ingredients with workplace control parameters

US

Ingredients	Basis	Value	Control parameters	Note
Ethyl Mercaptan	ACGIH	TWA	0.5 ppm,	
	OSHA Z-1	C	10 ppm, 25 mg/m3	(b), (C),
	OSHA Z-1-A	TWA	0.5 ppm, 1 mg/m3	

(b) The value in mg/m3 is approximate.
(C) Ceiling limit is to be determined from breathing-zone air samples.

Immediately Dangerous to Life or Health Concentrations (IDLH)

Substance name	CAS-No.	Control parameters	Update
Ethyl Mercaptan	75-08-1	Immediately Dangerous to Life or Health Concentration Value 500 parts per million	1995-03-01

Engineering measures

Adequate ventilation to control airborned concentrations below the exposure guidelines/limits.

Personal protective equipment

Respiratory protection : Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as:. Air-Purifying Respirator for Organic Vapors. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

Hand protection : The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Eye protection : Eye wash bottle with pure water. Tightly fitting safety goggles. Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate:. Remove and wash contaminated clothing before re-use. Skin should be washed after contact. Flame retardant protective clothing. Workers should wear antistatic footwear.

Hygiene measures : Avoid contact with skin, eyes and clothing. When using do not eat or drink. When using do not smoke. Wash hands before breaks and immediately after handling the product.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance

Form	:	Liquid
Physical state	:	Liquid
Color	:	Colorless
Odor	:	Repulsive

Safety data

Flash point	:	-48 °C (-54 °F)
Lower explosion limit	:	2.8 %(V)
Upper explosion limit	:	18 %(V)
Oxidizing properties	:	No
Autoignition temperature	:	295 °C (563 °F)
Molecular formula	:	C2H6S
Molecular Weight	:	62.14 g/mol
pH	:	Not applicable
Pour point	:	No data available
Boiling point/boiling range	:	35 °C (95 °F)
Vapor pressure	:	16.20 PSI at 37.8 °C (100.0 °F)
Relative density	:	0.84, 15.6 °C(60.1 °F)
Water solubility	:	Negligible
Partition coefficient: n-octanol/water	:	No data available
Viscosity, kinematic	:	No data available
Relative vapor density	:	2.1 (Air = 1.0)
Evaporation rate	:	1
Percent volatile	:	> 99 %

SECTION 10: Stability and reactivity

Chemical stability	:	This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Possibility of hazardous reactions

Conditions to avoid	:	Heat, flames and sparks.
Materials to avoid	:	May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Other data	:	No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

Acute oral toxicity

Ethyl Mercaptan : LD50: 682 mg/kg
Species: rat
Sex: male
Method: Fixed Dose Method

Acute inhalation toxicity

Ethyl Mercaptan : LC50: > 2.52 mg/l
Exposure time: 4 h
Species: rat
Sex: male and female
Test atmosphere: vapor
Method: OECD Test Guideline 403

Acute dermal toxicity

Ethyl Mercaptan : LD50: > 2,000 mg/kg
Species: rat
Sex: male
Method: OECD Test Guideline 402

Ethyl Mercaptan
Skin irritation : Mild skin irritation

Ethyl Mercaptan
Eye irritation : Mild eye irritation

Sensitization

Ethyl Mercaptan : Causes sensitization.
Information given is based on data obtained from similar substances.

Repeated dose toxicity

Ethyl Mercaptan : Species: rat, Male and female
Sex: Male and female
Application Route: Inhalation
Dose: 0, 25, 100, 400 ppm
Exposure time: 13 wks
Number of exposures: 6 hr/d, 5 d/wk
NOEL: 100 ppm

Lowest observable effect level: 400 ppm
Method: OECD Guideline 413
Information given is based on data obtained from similar substances.

Species: rat, Male and female
Sex: Male and female
Application Route: Oral
Dose: 0, 10, 50, 200 mg/kg
Exposure time: 42-53 days
NOEL: 50 mg/kg
Method: OECD Guideline 422
Information given is based on data obtained from similar substances.

Reproductive toxicity

Ethyl Mercaptan : Species: rat
Sex: male and female
Application Route: Oral diet
Dose: 0, 10, 50, 200 mg/kg
Exposure time: 42-53 days
Number of exposures: once daily
Method: OECD Guideline 422
NOAEL Parent: 200 mg/kg
NOAEL F1: 50 mg/kg
Information given is based on data obtained from similar substances.

Developmental Toxicity

Ethyl Mercaptan : Species: rat
Application Route: Inhalation
Dose: 0, 0.037, 0.28, or 0.56 mg/L
Number of exposures: 6 hrs/d
Test period: GD 6-19
Method: OECD Guideline 414
NOAEL Teratogenicity: > 0.56 mg/l
Information given is based on data obtained from similar substances.

Species: rat
Application Route: Inhalation
Dose: 0, 10, 100, 200 ppm
Number of exposures: 6 hrs/d
Test period: GD 6-19
Method: OECD Guideline 414
NOAEL Teratogenicity: > 200 ppm
NOAEL Maternal: > 200 ppm
Information given is based on data obtained from similar substances.

Aspiration toxicity

Ethyl Mercaptan : May be harmful if swallowed and enters airways.

CMR effects

Ethyl Mercaptan : Carcinogenicity: Not available

Mutagenicity: Not mutagenic in Ames Test.
Teratogenicity: Animal testing did not show any effects on fetal development.
Reproductive toxicity: Animal testing did not show any effects on fertility.

Ethyl Mercaptan
Further information : Solvents may degrease the skin.

SECTION 12: Ecological information

Toxicity to fish

Ethyl Mercaptan : 2.4 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates

Ethyl Mercaptan : EC50: < 0.1 mg/l
Exposure time: 48 h
Species: Daphnia magna (Water flea)
static test Method: OECD Test Guideline 202

Toxicity to algae

Ethyl Mercaptan : EC50: 3 mg/l
Exposure time: 72 h
Species: Pseudokirchneriella subcapitata (green algae)
Method: OECD Test Guideline 201

Elimination information (persistence and degradability)

Bioaccumulation : This material is not expected to bioaccumulate.

Biodegradability : This material is not expected to be readily biodegradable.

Results of PBT assessment

Ethyl Mercaptan : Non-classified PBT substance, Non-classified vPvB substance

Additional ecological information : An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

The information in this MSDS pertains only to the product as shipped.

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Product	:	The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum.

SECTION 14: Transport information

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the MSDS and the bill of lading.

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)
UN2363, ETHYL MERCAPTAN, 3, I, MARINE POLLUTANT, (ETHYL MERCAPTAN)

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
UN2363, ETHYL MERCAPTAN, 3, I, (-48 °C), MARINE POLLUTANT, (ETHYL MERCAPTAN)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
UN2363, ETHYL MERCAPTAN, 3, I

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
UN2363, ETHYL MERCAPTAN, 3, I, (D/E), ENVIRONMENTALLY HAZARDOUS

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))
UN2363, ETHYL MERCAPTAN, 3, I, ENVIRONMENTALLY HAZARDOUS

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)
UN2363, ETHYL MERCAPTAN, 3, I, ENVIRONMENTALLY HAZARDOUS

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15: Regulatory information

National legislation

SARA 311/312 Hazards	:	Acute Health Hazard Fire Hazard
CERCLA Reportable Quantity	:	This material does not contain any components with a CERCLA RQ.
SARA 302 Reportable Quantity	:	This material does not contain any components with a SARA 302 RQ.
SARA 302 Threshold Planning Quantity	:	SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 304 Reportable Quantity	:	This material does not contain any components with a section 304 EHS RQ.
SARA 313 Ingredients	:	SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

Ozone-Depletion Potential	:	This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 12 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

US State Regulations

Pennsylvania Right To Know
: Ethyl Mercaptan - 75-08-1

New Jersey Right To Know
: Ethyl Mercaptan - 75-08-1

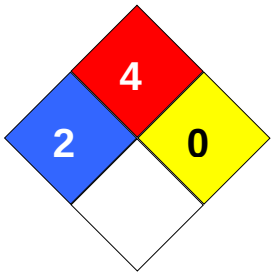
California Prop. 65 Ingredients : This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

Notification status

Europe REACH	:	On the inventory, or in compliance with the inventory
United States of America TSCA	:	On the inventory, or in compliance with the inventory
Canada DSL	:	On the inventory, or in compliance with the inventory
Australia AICS	:	On the inventory, or in compliance with the inventory
New Zealand NZIoC	:	On the inventory, or in compliance with the inventory
Japan ENCS	:	On the inventory, or in compliance with the inventory
Korea KECI	:	On the inventory, or in compliance with the inventory
Philippines PICCS	:	On the inventory, or in compliance with the inventory
China IECSC	:	On the inventory, or in compliance with the inventory

SECTION 16: Other information

NFPA Classification : Health Hazard: 2
Fire Hazard: 4
Reactivity Hazard: 0



Further information

Legacy MSDS Number : 10555

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this MSDS pertains only to the product as shipped.

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%

AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

Appendix I

Phase Ia Cultural Resources Literature Search Report

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Phase Ia Literature Search

Rochester Natural Gas Pipeline Project
Olmsted County, Minnesota

Erika Eigenberger, M.A.

September 2016

Prepared For:

Minnesota Energy Resources Corporation

1995 Rahncliff Court, Suite 200

Eagan, Minnesota 55122

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Abstract

In June and July 2014 and June 2016, HDR, on behalf of Minnesota Energy Resources Corporation (MERC), completed a Phase Ia Literature Search (Phase Ia) for the proposed Rochester Natural Gas Pipeline Project (Project) near the City of Rochester in Olmsted County, Minnesota. The Project consists of an approximately 13- to 14-mile-long pipeline that would extend between three identified interconnection points on the west and south sides of the City of Rochester. MERC contracted HDR to complete a Phase Ia and provide assistance drafting a Route Permit application that was submitted to and is under review by the Minnesota Public Utilities Commission (PUC) and the Minnesota Department of Commerce (DOC).

Project components include three pipeline route options (Application Preferred Route, Application Alternative Route, and Modified Preferred Route), the Route Segments, and three facilities (Town Border Station [TBS] 1D, Proposed TBS, and Proposed District Regulator Station [DRS]). The construction area for each pipeline route option is approximately 100 feet wide. HDR used the approximate 500-foot wide route buffers and the three facility buffers to determine if previously identified resources intersect Project components. Each facility buffer (buffer size dependent on individual facility) is larger than the actual construction area to provide flexibility during the Project planning stage. A Cultural Resources Study Area (Study Area), consisting of a 1-mile buffer surrounding each pipeline route option, the Route Segments, and the three facilities, was created to address cultural resources that Project components may affect. HDR conducted the Phase Ia to determine the location of previously recorded historic properties and surveys (archaeological surveys, archaeological sites, and architectural structures), and to assess the potential for the presence of unrecorded archaeological resources in the Study Area.

The Phase Ia identified two archaeological site leads (21OLw and 21OLab) and three previously identified archaeological sites (21OL0012, 21OL0019, and 21OL0023) in the Study Area. None of the previously identified site leads or sites has been evaluated for National Register of Historic Places (NRHP) eligibility and none intersect Project components. The Phase Ia identified 19 previously recorded architectural structures in the Study Area. Of the 19 previously recorded architectural structures, 6 are within the TBS 1D facility buffer. One of the 19 previously recorded architectural structures, the St. Mary's Hospital Dairy Farmstead (OL-CAS-003), is listed on the NRHP; however, this property does not intersect Project components. The remaining 18 previously recorded architectural structures have not been evaluated for NRHP eligibility. Based on the data presented in this Phase Ia, the Study Area contains a moderate to high potential for additional cultural resources. In addition, the Study Area transects several streams with alluvial settings conducive to burying and preserving archaeological deposits, which indicates that there is potential for encountering buried archaeological sites at these locations. As such, HDR recommends a geomorphological assessment of the Area of Potential Effects (APE) to identify portions of the Project with potential for deeply buried archaeological deposits.

Because the Project is being permitted by a state agency, it falls under the purview of the Minnesota Field Archaeology Act and the Minnesota Historic Sites Act (Minnesota Statutes, Chapter 138). Prior to construction, MERC will conduct appropriate cultural resource surveys in consultation with the State

Historic Preservation Office. These surveys will likely include archaeological inventories and consideration of impacts to recorded historic properties.

Contents

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List of Appendices

Introduction

Minnesota Energy Resources Corporation (MERC) proposes to construct an approximately 13- to 14-mile-long pipeline near the City of Rochester in Olmsted County, Minnesota. The Rochester Natural Gas Pipeline Project (Project) would extend between three identified interconnection points on the west and south sides of the City of Rochester. MERC contracted HDR to complete a Phase Ia Literature Search (Phase Ia) and provide assistance with drafting a Route Permit application that was submitted to and is under review by the Minnesota Public Utilities Commission (PUC) and the Minnesota Department of Commerce (DOC).

At this time, federal funding is not anticipated. However, it is likely that federal permits may be required for portions of the Project. These portions could therefore be considered by a federal agency as an undertaking, which requires consultation under Section 106 of the National Historic Preservation Act of 1966 (Section 106), and the implementing regulations (36 CFR Part 800). Section 106 requires federal agencies to consider the potential effects of undertakings in their jurisdictions on properties listed or eligible for listing on the National Register of Historic Places (NRHP). The Project would also require consideration of cultural resources under Section 101(b) of the National Environmental Policy Act (NEPA).

On June 17, 2014, HDR, on behalf of MERC, contacted the Minnesota State Historic Preservation Office (SHPO) to inform SHPO of the proposed Project and request comments. SHPO is responsible for the review of state agency projects that may affect state archaeological sites (Minnesota Field Archaeology Act of 1963 [Minnesota Statutes 138.40]) and the review of state agency projects that may affect sites listed on the state or National Register of Historic Places (Minnesota Historic Sites Act [Minnesota Statues 138.665, Subd.2]). In a response dated July 1, 2014, SHPO recommended the completion of a Phase Ia Literature Search.

In June and July 2014, HDR, on behalf of MERC, completed the Phase Ia for the proposed Project (attached as Appendix D to the Route Permit Application). The Phase Ia at that time included the review of a Preferred Route and an Alternate Route as well as the review of a study area that included a 1-mile buffer off each route (Eigenberger and Kurth 2014). As Project planning progressed, an additional route and Route Segments were added for consideration. Therefore, in June 2016, HDR completed additional research and compiled this updated Phase Ia.

Project components covered by this updated Phase Ia report include three pipeline route options (Application Preferred Route, Application Alternative Route, and Modified Preferred Route), the Route Segments, and three facilities (Town Border Station [TBS] 1D, Proposed TBS, and Proposed District Regulator Station [DRS]). The construction area for each pipeline route option is approximately 100 feet wide. HDR used the approximate 500-foot wide route buffers and the three facility buffers to determine if previously identified resources intersect Project components. Each facility buffer (buffer size dependent on individual facility) is larger than the actual construction area to provide flexibility during the Project planning stage. A Cultural Resources Study Area (Study Area), consisting of a 1-mile buffer surrounding each pipeline route option, Route Segments, and the three facilities, was created to address

cultural resources that Project components may affect (Table 1 and Appendix A; Figure 1). HDR conducted the Phase Ia to determine the location of previously recorded historic properties and surveys (archaeological surveys, archaeological sites, and architectural structures), and to assess the potential for the presence of unrecorded archaeological resources in the Study Area.

This Phase Ia is divided into four sections. The first section provides a general overview of the environmental and cultural contexts in the Study Area. The second section describes the resources identified during the file search and map review. The third section provides both precontact and historic site potential and site types that may be encountered in the Study Area. The fourth section presents a summary and survey recommendations. The author of this Phase Ia, Erika Eigenberger, meets the Secretary of the Interior's Professional Qualification Standards for Archaeology as published in 36 Code of Federal Regulations (CFR) 61.

Table 1. Project Study Area

Township	Range	Sections
105N	13W	6
105N	13W	1-2 and 4-6
106N	13W	18-20 and 29-32
106N	14W	6-8 and 13-36
106N	15W	1-3, 10-15, 22-26, and 36
107N	14W	18-20 and 29-32
107N	15W	13, 23-27, and 34-36

General Background

Environment

The following environmental history of the region is based on information contained in *Minnesota's Environment and Native American Culture History* (Gibbon et al. 2002), the Minnesota Department of Natural Resources, Ecological Classification System (Minnesota Department of Natural Resources 2014), and the United States Environmental Protection Agency (EPA) Minnesota Level III and IV Ecoregions (EPA 2014).

The Project is located in the Rochester/Paleozoic Plateau Upland Level IV ecoregion of the Driftless Area Level III ecoregion. The Rochester/Paleozoic Plateau Upland Level IV ecoregion is characterized by rolling older loess covered plains, predominately used for row crops with some pasture land intermixed. In general, soils the Study Area are a mix of fine textured forest and prairie soils formed in loess over Palezoic and Cambrian aged bedrock. The average annual precipitation ranges from 28 to 30 inches. The average January high temperature is 23 degrees Fahrenheit (°F) and the average July high temperature is 85°F. The frost-free season lasts at least 160 days per year, making it the mildest climate in the state. Prior to Euro-American settlement, vegetation in the region consisted of tallgrass prairie and bur oak savanna and barrens. Today, most of the region is heavily farmed with areas of urban development near the center and along the northern boundary of the Study Area.

Minnesota Archaeological Regions

The Project falls within the western portion of the Southeast Riverine Archaeological Region of Minnesota. The following discussion of the archaeological region is summarized from *A Predictive Model of Precontact Archaeological Site Location for the State of Minnesota* (Gibbon et al. 2002).

Southeast Riverine Archaeological Region

The Southeast Riverine Archaeological Region covers the southeast portion of Minnesota and extends into adjacent corners of Wisconsin and Iowa. This region was not glaciated during the Wisconsin Glacial Period and the area is characterized by stream-dissected, level to gently rolling loess covered Pre-Wisconsinan till plains, with a notable absence of natural lakes. The major river systems in the region extend west from the Mississippi River and include the Cannon, Cedar, Root, and Zumbro rivers.

The Southeast Riverine Archaeological Region contains extensive rock outcroppings of high quality flaking materials. Chert concentrations are found along the Mississippi River Valley and just below the surface of less-dissected areas in the western part of the region. During the Late Holocene, elm, ash, and cottonwood forests lined the river lowlands and maple, elm, and basswood occupied the uplands near the Mississippi River. Oak barrens and patches of oak groves were scattered across the western portion of the region. The middle of the region was open prairie. Subsistence resources during the Late Holocene would have included deer, elk, and bison in the uplands and mussels, fish, and waterfowl in the rich bottom lands. Edible plants would have included water lilies and other aquatic flora as well as plants such as prairie turnips in the uplands. The Southeast Riverine Archaeological Region would have provided a favorable climate and extensive bottomlands for Woodland Tradition horticulture.

Cultural Contexts

The following summaries of cultural contexts relevant to the proposed Project are based on information found in a series of statewide historic contexts developed by SHPO (Dobbs 1990a; 1990b; and SHPO 1993); *2010 Archaeological Reconnaissance Survey of Olmsted County, Minnesota* (Arzigian and Kolb 2011); *Investigating the Earliest Human Occupation of Minnesota: A Multidisciplinary Approach to Modeling Landform Suitability & Site Distribution Probability for the State's Early Paleoindian Resources* (Buhta et al. 2011); Mn/Model Final Report Phases 1-3, 2002: A Predictive Model of Precontact Archaeological Site Location for the State of Minnesota (Hudak et al. 2002); and *Archaeology of Minnesota: The Prehistory of the Upper Mississippi River Region* (Gibbon 2012).

Paleoindian Tradition (12,000–8,000 B.P.)

The earliest human inhabitants of what is now Minnesota entered the area approximately 12,000 years ago as the glacial front of the Late-Wisconsin Glacial Period receded. These peoples, comprising the Paleoindian Tradition, were migratory groups of mobile hunter-gatherers who followed herds of large game animals such as bison, woodland caribou, and mastodon into the tundra, open pine, and oak forests that characterized Minnesota at the end of the Pleistocene.

Archaeological evidence from this period is limited in Minnesota. Paleoindian Tradition sites in the state consist mostly of isolated discoveries of large, distinct projectile points that are characteristic of the tradition. These points are divided into the Early Paleoindian–Fluted Point Pattern (Clovis, Gainey, and

Folsom points), and the Late Paleoindian–non-fluted Lanceolate Point Pattern (Plano and Cody complex points). Other lithic tool types associated with the patterns of the Paleoindian Tradition in Minnesota include bifacially flaked knives, simple choppers, adzes, and large scrapers.

Archaic Tradition (8,000–2,500 B.P.)

As Minnesota became warmer and drier, expanses of prairie began to displace the forests that established following the glacial retreat. The retreating glaciers exposed new land surfaces with expansive lakes and large, swift rivers, fed by glacial runoff, unlike any in present-day Minnesota. As the Pleistocene megafauna died out, the human inhabitants of the state had to adapt to the ever-changing landscape. This led to the development of new tool types and subsistence practices.

The Archaic Tradition is distinguished from the Paleoindian Tradition by an increased diversity in tool types, a broader range of raw material utilization, and an increase in the exploitation of a variety of local animal and plant communities. This diversity is attributed to the adaptation of Archaic Tradition peoples to local resources and a relative abundance of animal and plant resources. The archaeological record of the Archaic Tradition shows evidence of the beginnings of cultural variation in the state. Notched and stemmed projectile points, along with groundstone tools and chipped-stone scrapers, knives, punches, and drills, are found in the Archaic Tradition toolkit. Copper implements appear in archaeological assemblages from approximately 7,000 years ago and continued until approximately 3,500 years ago.

Four distinct Archaic Tradition contexts have been identified in Minnesota: the Shield Archaic, Lake-Forest Archaic, Prairie Archaic, and Eastern Archaic. Site locations from this period tend to be located near water. These sites appear to have been occupied for longer periods and tend to produce larger amounts of artifacts than small encampments, which have been found scattered throughout the environment. Small encampments often represent specific resource extraction or use of a location that takes advantage of a seasonal event, such as a bison kill site, a floral resource gathering site, or a waterfowl-breeding site. Artifact deposition at these locations is generally very minimal.

Woodland Tradition (2,500 B.P.–A.D. 1650)

Beginning approximately 3,000 years ago, Minnesota's climate began to stabilize and resembled the climate that exists in the state today. Expanses of prairie were found in the western portion of the state. A swath of oak savanna, stretching from the northwest to the southeast, separated these prairies from the pine forests of the northeast.

Woodland Tradition cultures exhibit evidence of an increasingly sedentary lifestyle. The domestication of plants, adoption of ceramic technology, re-occurring occupation of long-term seasonal village sites, and construction of mounds emerge in the Woodland Tradition. These innovations were not all adopted in all areas of the state at the same time or necessarily together. Woodland Tradition sites are often identified more than Paleoindian Tradition or Archaic Tradition sites, because they are not as deeply buried. As a result, more is known about the groups of the Woodland Tradition than of the Paleoindian or Archaic traditions.

Woodland Tradition sites can often be associated with a particular group based on distinct ceramic and lithic tool types. In the United States, the Woodland Tradition has been divided into an Early, Middle,

and Late chronological framework based on ceramic traditions. In Minnesota, the tradition has also been divided into an earlier Initial Woodland period (including the Early and Middle periods, ca. 2,500 B.P.–1,500 B.P.) and a later Terminal Woodland period (including the Late Woodland period, 1,500 B.P.–A.D. 1650).

Regional differences in the Woodland Tradition resulted in the identification of distinct regional complexes. The Southeast Riverine Archaeological Region is associated with pottery types such as Marion Thick-like, Havanoid, and Effigy Mound.

Mississippian/Plains Village Tradition

Approximately 1,000 years ago, a new tradition developed in southern Minnesota. In the western part of the state, this tradition is known as the Plains Village Tradition, and in the eastern part of the state, it is known as the Mississippian Tradition. These traditions are distinguished from the Woodland Tradition by an intensification of agriculture, including cultivation of corn, and larger, more complex societies. These traditions spread into southwestern Minnesota from the Missouri River and into southeastern Minnesota from the Mississippi River, with possible ties to cultures of the southern United States and Mexico.

Distinct ceramic styles, large village complexes, greater density of artifacts and community vegetable storage pits distinguish Mississippian/Plains Village Tradition sites. Effigy mounds in the shape of animals such as birds and snakes, as well as flat-topped mounds and villages encircled by protective palisades, were constructed during this period.

Oneota Tradition (A.D. 1200–1650)

The Oneota Tradition emerged approximately 800 years ago and existed until around the time of European contact in southern Minnesota. It is unknown whether the groups of the Oneota Tradition developed out of the Terminal Woodland Traditions of the state or if they migrated to the area from southern parts of the Midwest.

Oneota Tradition sites are widely distributed throughout the prairie and forest regions of southern Minnesota. Like the Mississippian/Plains Village Tradition, the Oneota Tradition is distinguished from the Woodland Tradition by an intensification of agriculture, the establishment of larger village sites, and an increase in social complexity. Sites from the Oneota Tradition are identifiable by their distinct globular shaped shell tempered pottery. Regional and temporal variation in Oneota Tradition pottery has lead to the dissection of two phases, the Blue Earth Phase, and the later, southwestern, Orr Phase. The most common site types found in Minnesota for the Oneota Tradition are village sites and burial mound sites.

Fur Trade/Contact (1630s–1858)

By the 1620s, the first European goods may have reached the upper Midwest through trade with the Ottawa and Huron. The first fur trade contact in this state occurred between 1659 and 1660, when two French explorers named Sieur des Groseilliers and Sieur de Radisson entered present-day Minnesota. Increasing numbers of explorers and fur tradesmen would reach the area in the years to follow. During the time of initial contact, the Ioway, Santee Dakota, and possibly the Oto occupied the southeastern portion of Minnesota. This period is recognized by the establishment, operation, and adaptation of

gathering fur-bearing mammals in exchange for other goods and materials. This exchange linked the Northern Plains to a worldwide economic and political system.

By the late 1670s, a trade agreement had been established between the Dakota and merchants in Quebec and Montreal, Canada. This relationship initiated the French period of exploration and occupation in Minnesota, which lasted into the early 1760s. During this period of French influence, much of the state and the surrounding region was occupied with an extensive network of forts and fur trading posts.

The 1760s (after the Treaty of Paris) brought a half-century of British activity in Minnesota. This period brought further development of the fur trade industry, with more trading posts and consequently major changes in the distribution of Native American people in the region. By 1800, the Ojibwa took control of the lakes and forests of northern Minnesota, and the Dakota moved south along the Minnesota River Valley.

The United States exerted control of Minnesota after Zebulon Pike's 1805 to 1807 expedition and with the establishment of Fort Snelling at the junction of the Minnesota and Mississippi rivers in 1819. The changes in Native American life brought about by the French and British presence in Minnesota included migrations of Native American populations from the east, depopulation of native peoples in certain areas because of introduced diseases and warfare, and gradual movement of the Ojibwa into northern Minnesota and of the Dakota into southern Minnesota. The Native American populations in Minnesota began to switch from hunting for subsistence to hunting for trade, and Native American manufacturing materials began to be replaced by European materials.

Travel and settlement of the state were mostly restricted to corridors along larger bodies of water. In 1837, the Dakota, Winnebago, and Ojibwa signed treaties that opened up east-central Minnesota to logging and settlement, and by 1849, Minnesota had become organized as a Territory. When Minnesota gained statehood in 1858, Euro-American settlement increased, bringing a wave of new towns, cities, and non-fur trade related enterprises.

Early Minnesota Military Activity (1800–1890)

Beginning in the mid-nineteenth century, Minnesota Territory representatives appealed to the United States Congress to appropriate funds to build and maintain a series of five military roads in the state. Minnesota Territory representatives argued that these roads were justified on the grounds of frontier defense and would aid in territorial settlement and commercial development. In July 1850, the representatives secured funding for road development. Over the next decade, territorial representatives and the War Department's United States Army Corps of Engineers (USACE) of Topographical Engineers would oversee the creation of five original roads that would extend from Fort Snelling to government forts or Indian agencies. Not all of the roads were completed, but the local population used the segments that were completed.

Around 1862, growing tension between the Dakota and the United States government escalated into violence. Over a 6-week period, many lives were lost on both sides of the U.S.–Dakota Conflict, and the violence prompted a large-scale evacuation of settlement areas in southern Minnesota. On

December 26, 1862, the United States government rescinded all treaties signed with the Dakota of Minnesota and forcibly removed them from the state. The conflict of 1862 led to major military expeditions by the United States government in 1863, 1864, and 1865 in Minnesota and the adjacent states of North Dakota and South Dakota.

Early Agriculture and River Settlement (1840–1870)

Some of the earliest agricultural farming practices in the state occurred in southern Minnesota. Treaties with the Ojibwa and Eastern Dakota in the early and mid-nineteenth century allowed for European settlement in certain areas of the state west of the Mississippi River. Acts passed in the state in the mid-nineteenth century fostered an influx of settlers from the eastern states and Europe. These initial settlers came by steamboat and followed the major rivers and tributaries into the interior of the state. Town sites focused on rivers as a source of transportation and power and often developed according to resource need, company and industry need, or via social and ethnic boundaries. Many towns developed into agricultural processing and distribution centers. Industries such as milling and brewing became widespread throughout southern Minnesota. The initial farming practice of the time was subsistence, but farmers in the state were at the cusp of large-scale farming, and began to grow wheat as a cash crop.

Railroads and Agricultural Development (1870–1940)

After 1870, railroads were the single most important factor in the rapid growth of agriculture in southern Minnesota because their expansion onto the Great Plains increased the market for cash crops. New railroads in Minnesota opened tillable land to farmers, reduced dependence on risky water transportation, and allowed for the transportation of goods and services away from major river transportation corridors. Railroads had become the primary mover of crops by the late nineteenth century.

After 1870, an agricultural land boom began in Minnesota as railroads, chambers of commerce, land colonization companies, real estate companies, the State Bureau of Immigration, and other private and public agencies encouraged settlement of the large expanses of land in southern Minnesota. Good soil, a favorable climate, and the low cost of cultivating land made farming profitable. This solidified agriculture as the dominant industry in southern Minnesota. Two of the most important industrial centers for this time became the milling district in St. Anthony Falls and the meat packing operation in South St. Paul. Railroads were paramount in supplying unrefined resources from southern Minnesota to these locations.

Olmsted County History

The following history of Olmsted County is compiled from *2010 Archaeological Reconnaissance Survey of Olmsted County, Minnesota* (Arzigian and Kolb 2011); *Handbook of North American Indians* (DeMallie 2001); History of Olmsted County (County of Olmsted 2014); *History of Olmsted County* (Hill 1883); *Investigating the Earliest Human Occupation of Minnesota: A Multidisciplinary Approach to Modeling Landform Suitability & Site Distribution Probability for the State's Early Paleoindian Resources* (Buhta et al. 2011); Mn/Model Final Report Phases 1-3, 2002: A Predictive Model of Precontact Archaeological Site Location for the State of Minnesota (Hudak et al. 2002); *Minnesota Place Names: A*

Geographical Encyclopedia (Upham 2001); *Soil Survey of Olmsted County, Minnesota* (Elwell et al. 1928); and *Soil Survey of Olmsted County, Minnesota* (Poch 1980).

Olmsted County is located in the Driftless Area of southeastern Minnesota. The large sheets of glacial ice that dominated the rest of the region during the Wisconsin Glacial Period and preceding Illinoian Glacial Stage never covered this portion of the state. As a result, the topography of the county is characterized by loess-covered, level to gently rolling Pre-Wisconsinan till plains. The Zumbro and Root rivers, tributaries of the Mississippi River, dissect the county and no lakes are present. Prior to agricultural development, the county was a mix of oak savanna and barrens, tall grass prairie, and big woods vegetation.

Early Paleoindian Clovis sites identified in the county (21OL0039 and 21OL0044) indicate that the area was inhabited by approximately 12,000 B.P. Evidence of the Archaic Tradition and Early Woodland Tradition in the county is sparse, but sites identified along the Zumbro and Root rivers and their tributaries associated with these traditions demonstrate habitation of the county. People of the Oneota Complex inhabited southeastern Minnesota during the Late Woodland and Protohistoric Periods. The people of the Oneota are believed to have lived in large, permanent to semi-permanent village settlements. While, no village sites have been identified in Olmsted County, Oneota village sites identified in La Crosse, Wisconsin, show evidence of prairie resource exploitation into southeastern Minnesota.

Descendants of the Oneota as well as the Eastern Dakota occupied southeastern Minnesota at the time the first French explorers entered the state in the seventeenth century. By 1750, the Eastern Dakota were well established in the region with villages along the Mississippi River and its tributaries. Olmsted County was part of the Eastern Dakota lands until the treaty of 1851, when all lands occupied by the Eastern Dakota were ceded to the United States government.

The first European to settle in the area was Hiram Thompson in 1853. Thompson settled along the south fork of the Whitewater River near the Village of Dover, approximately 20 miles west of the City of Rochester. The county was established under the Minnesota territorial government in 1855, with Rochester as the County Seat. It was not officially organized into townships, however, until 1858. The county is named for David Olmsted, who served on the first Minnesota Territorial Council and was elected the first Mayor of St. Paul in 1854.

The county did not experience much population growth until the Chicago and North Western Railway constructed the first railroad in the county in 1865. The construction of the railroad signified a change in agricultural practices in the county. Farmers in the area shifted from subsistence farming to the commercial production of wheat and dairy. By the 1920s, 12 creameries, 3 ice cream factories, and 10 cheese factories were in operational in the county. Following the Great Tornado of 1883, the Sisters of St. Francis collaborated with Dr. William Worrall Mayo and his family to construct a hospital in the City of Rochester. This venture would result in the establishment of the Mayo Clinic, which today is one of the world's leading centers for medical care.

Literature Search

On June 20 and June 24, 2014, HDR archaeologists completed background research at the Minnesota SHPO and the Minnesota Historical Society (MHS). In June 2016, HDR completed an updated file pull to address Project updates. Research gathered for both visits included previous cultural resource surveys, previously identified archaeological sites, and previously identified historic properties. In addition, HDR reviewed General Land Office (GLO) maps from the nineteenth century, historic plat maps, and county histories.

This section includes a review of the Application Preferred Route, Application Alternative Route, Modified Preferred Route, the Route Segments, and the three facilities (TBS 1D, Proposed TBS, and Proposed DRS). The construction area for each pipeline route option is approximately 100 feet wide. HDR used the approximate 500-foot wide route buffers and the three facility buffers to determine if previously identified resources intersect Project components. To provide flexibility during Project planning, HDR developed a Study Area. The Study Area includes a 1-mile buffer surrounding the Project components, including the Route Segments and the three facilities.

The GLO map review and the plat map review present a summary of resources that cover the Study Area. A detailed description of individual resources in the Study Area can be found in Appendix B (Study Area - Plat Map Results).

Previous Cultural Resources Investigations – Study Area

The record search identified nine cultural resources surveys in the Study Area (Table 2 and Appendix A; Figure 1 and Figure 2). These surveys included investigations for natural gas pipelines, a rail line, highway and road projects, an energy cooperative, a watershed project, and disposal site projects.

Seven of the nine previously recorded cultural resources investigations intersect Project components (Table 2).

Table 2. Previous Cultural Resource Investigations – Study Area

Report Date	Report Number	Report Title	Author(s)
1976	MULT-76-02	Preconstruction Cultural Resource Survey of the South Zumbro Watershed Project, Olmsted and Dodge Counties, Minnesota	J.W. Olthoudt
1993	OL-93-01	Phase I Archaeological Survey of Two Proposed Disposal Sites (Furlow Farm and Pinewood) in Rochester, Minnesota	Constance Arzifian
1995	MULT-95-13*	A Phase I Archaeological Survey of Selected Portions of the Northern Natural Gas Company Rochester Rehab Project Corridor, Dodge, Olmsted, and Steele Counties, Minnesota	Kim C. Breakey and Clark A. Dobbs
1995	MULT-95-18*	A Phase I Archaeological Survey of Selected Route Variations on Portions of the Northern Natural Gas Company Rochester Rehab Project Corridor, Dodge and Olmsted Counties, Minnesota	John D. Carter and Clark A. Dobbs

Report Date	Report Number	Report Title	Author(s)
1998	OL-98-01*	Archaeological Investigations at the Proposed TH 63 South Corridor TH 52 to 48th Street SW, Olmsted County, Minnesota	Patrick R. Stewart
2001	OL-01-02*	Supplementary Phase I Cultural Resource Investigations of the Proposed TH63 South Corridor, TH 52 to 48th Street SW, Olmsted County, Minnesota	Vicki L. Twinde and Barbara Kooiman
2007	OL-07-04*	Phase I Cultural Resource Survey for the Olmsted County Road 104/60th Avenue NW Corridor Preservation Study, Olmsted County, Minnesota	Betsy H. Bradley, Laurie S. H. Ollila, Andrew J. Schmidt, and Andrea C. Vermeer
2009	MULT-09-08*	Phase I and II Archaeological Investigations of the Minnesota Rehabilitation Segment of the Power River Basin Expansion Project Volume II	Michelle M. Terrell and Andrea C. Vermeer
2012	MULT-13-16*	Phase I Archaeological Resources Survey for the People's Energy Cooperative 2013-2016 Work Plan, Olmsted and Wabasha Counties, Minnesota	Peer Halvorsen

*Previous investigation intersects Project components.

Previously Recorded Archaeological Sites – Study Area

Minnesota SHPO files revealed two archaeological site leads (21OLw and 21OLab) and three previously identified archaeological sites (21OL0012, 21OL0019, and 21OL0023) in the Study Area (Table 3 and Appendix A; Figure 1 and Figure 2).

Site leads include a reported historic structural ruin (21OLw) and a precontact artifact scatter (21OLab). Sites include two precontact lithic scatters (21OL0012 and 21OL0019) and a single Durst Stemmed projectile point associated with the Prairie Archaic Tradition (21OL0023). None of the previously identified site leads or sites have been evaluated for NRHP eligibility.

None of the site leads or sites intersect Project components (Table 3).

Table 3. Previously Identified Archaeological Sites – Study Area

Site Number	Site Type	Township	Range	Section	National Register of Historic Places Recommendations/ Comments
21OLw	Structural Ruin – Estimated Early 1850s	105N	14W	6	Unevaluated
21OLab	Artifact scatter – unknown precontact	106N	13W	32	Unevaluated
21OL0012	Lithic scatter – unknown precontact	106N	13W	30	Unevaluated
21OL0019	Lithic scatter – Archaic Tradition	105N	14W	6	Unevaluated
21OL0023	Precontact isolated find – prairie Archaic Tradition	106N	14W	35	Unevaluated

Previously Recorded Architectural Structures – Study Area

Minnesota SHPO files revealed 19 previously recorded architectural structures in the Study Area (Table 4 and Appendix A; Figure 2 A1-D5). Structures include farmsteads and individual buildings associated with farmsteads or homesteads, a school, a town hall, and a bridge. One of the 19 previously recorded architectural structures, the St. Mary's Hospital Dairy Farm (OL-CAS-003), is listed on the NRHP. St. Mary's Hospital Dairy Farmstead (OL-CAS-003) does not intersect Project components and the structure is approximately 0.60 mile south of the TBS 1D buffer. The remaining 18 previously recorded architectural structures have not been evaluated for listing on the NRHP.

Six of the 19 previously recorded architectural structures intersect Project components (TBS 1D buffer). Facility buffers are considerably larger than the actual construction impact area to provide flexibility during the Project planning stage. All six previously recorded architectural structures intersecting the TBS 1D buffer have not been evaluated for listing on the NRHP.

Table 4. Previously Recorded Architectural Structures – Study Area

SHPO No.	Property Name	Structure Type	Township	Range	Section	NRHP Status	Comments
OL-CAS-003	St. Mary's Hospital Dairy Farmstead	Farmstead	107N	14W	31	Listed	Dates from 1900
OL-CAS-023	Farmstead	Farmstead	107N	14W	19	Unevaluated	Dates from 1870-1940
OL-CAS-025*	Farmstead	Barn	107N 107N	14W 15W	19 24	Unevaluated	Dates from 1870-1940
OL-CAS-026*	Farmstead	Farmstead	107N	14W	30	Unevaluated	Dates from 1870-1940
OL-CAS-027*	Farmstead	Farmstead	107N	14W	31	Unevaluated	Dates from 1870-1940
OL-CAS-028	Farmstead	Farmstead	107N	15W	36	Unevaluated	Dates from 1870-1940
OL-KAL-014	Farmstead	Farmstead	107N	15W	24	Unevaluated	Dates from 1870-1940
OL-KAL-015	Farmstead	Farmstead	107N	15W	24	Unevaluated	Dates from 1870-1940
OL-KAL-016	Farmstead	Farmstead	107N	15W	24	Unevaluated	Dates from 1870-1940
OL-KAL-019*	Farmstead	Farmstead	107N	15W	25	Unevaluated	Dates from 1870-1940
OL-KAL-020*	Farmstead	Farmstead	107N	15W	25	Unevaluated	Dates from 1870-1940
OL-KAL-021*	Farmstead	Farmstead	107N	15W	36	Unevaluated	Dates from 1870-1940
OL-KAL-022	Farmstead	Farmstead	107N	15W	36	Unevaluated	Dates from 1870-1940
OL-MAR-005	Town hall/School	School	106N	13W	30	Unevaluated	Removed on aerial coverage

SHPO No.	Property Name	Structure Type	Township	Range	Section	NRHP Status	Comments
OL-ROT-004	Skunk Hollow Bridge	Bridge	106N	14W	36	Unevaluated	Dates to early 1800s
OL-ROT-013	House	Home	106N	14W	23	Unevaluated	Dates from 1950s Removed on aerial coverage
OL-ROT-018	Augusta Kemp Farms	Farmstead	106N	14W	22	Unevaluated	Dates from 1870-1940 Removed on aerial coverage
OL-SLM-004	Salem Town Hall	Town Hall	106N	15W	15	Unevaluated	Former school building
OL-SLM-009	Farmstead	Farmstead	106N	15W	1	Unevaluated	Dates from 1950s

*Previously recorded architectural structure intersects Project components.

Historic Map Review – General Land Office Research

HDR examined official GLO maps corresponding to the Study Area in July 2014 and June 2016. Maps were accessed online through the Bureau of Land Management (BLM) website.[1] These resources were examined to identify areas with potential for containing historical era cultural resources, because historic archaeological sites may be present in locations where resources have been documented on GLO maps. These maps revealed no evidence of Euro-American settlement at the time of survey (BLM 1854). The maps note natural features, including rivers, streams, and wetlands. A large area identified as swamp in Township 106 North, Range 14 West, Sections 27, 28, 32, 33, and 34 is no longer present on the landscape. The watercourses in the Study Area do not appear to have been significantly altered since the time of the survey.

Historic Map Review – Plat Map Research

HDR examined historic plat maps corresponding to the Study Area in July 2014 and June 2016. Maps were accessed online through the University of Minnesota Library website[2] and the MHS website[3] and include the years 1896 (Geo. A. Ogle & Co.) and 1914 (The Farmer). These maps portray features associated with the historic development of the Study Area and include the locations of schools, factories, homesteads, quarries, and railways.

The Chicago and Northwestern Railroad is presented on the maps by 1896 in Sections 35 and 36 Township 107 North, Range 15 West and Section 29, 30, and 31 Township 107 North, Range 14 West.

[1] http://www.glorecords.blm.gov
[2] https://www.lib.umn.edu/borchert/digitized-plat-maps-and-atlases
[3] http://greatriversnetwork.org

The 1896 maps identified one building, the Olmsted Railroad Station, in association with this railroad. An unnamed railroad is present on the 1914 maps in Sections 24 and 25 Township 106 North, Range 14 West and Section 30 Township 106 North, Range 13 West.

The maps note locations of numerous roadways, schoolhouses, and homesteads throughout the Study Area. Roads in the Study Area tend to follow section lines. A completed description of resources including the locations and descriptions of the structures and railroads can be found in Appendix B (Study Area - Plat Map Results).

Implications for Project Cultural Resource Activities

Precontact Site Potential

The Phase Ia revealed one previously identified precontact archaeological site lead (21OLab) and three previously identified precontact archaeological sites (21OL0012, 21OL0019, and 21OL0023) in the Study Area. The sites include two precontact lithic scatters (21OL0012 and 21OL0019) and a single Durst Stemmed projectile point associated with the Prairie Archaic Tradition (21OL0023). Site lead 21OLab includes a precontact artifact scatter. None of the previously identified sites or site leads have been evaluated for NRHP eligibility.

Although only two precontact sites leads and two precontact sites have been identified in the Study Area, the report *2010 Archaeological Reconnaissance Survey of Olmsted County*, *Minnesota* provides an overview of all precontact sites identified in the county (as of 2010), additional site types that may be encountered, and probable site locations (Arzigian and Kolb 2011). The report compiled information and predictive modeling using existing Olmsted County site files, pedestrian survey and shovel testing in specific locations throughout the county, the Minnesota Department of Transportation (MnDOT) Mn/Model, and a geomorphological study (Arzigian and Kolb 2011). Although field survey for the Olmsted County archaeological reconnaissance was not completed in the Study Area, the information presented in Arzigian and Kolb 2011 provides valuable information regarding potential precontact site types that may be encountered and their probable locations.

Previously recorded precontact archaeological sites in Olmsted County range from the Paleoindian Tradition to the Woodland Tradition. Paleoindian Tradition sites in Olmsted County include a single Clovis point with additional lithic materials (21OL0039), a cache of bifaces and flakes likely associated with Clovis (21OL0044), and an isolated lanceolate point (21OL0043). These three sites are situated on terraces along three different drainages and in proximity to waterway junctions. In addition, geomorphological testing suggests that archaeological deposits may be identified on low terraces, in vertical accretion alluvium on the floodplains, and in organic sediment in wetlands (Arzigian and Kolb 2011).

Previously identified Archaic Tradition sites in the county are also found along drainages and waterways. Available data suggests that in addition to being proximal to water, Archaic Tradition sites appear to lie in areas that may not have experienced regular prairie fires. These sheltered areas would have

supported trees, edible plants, and attracted wildlife; resources that would have provided raw materials and food sources, thereby attracting people. It is suggested that sheltered areas are situated to the east of landforms and waterways and as the wind typically blows from west to east, the landform and/or water would provide a natural firebreak, thereby protecting areas to the east (Arzigian and Kolb 2011).

The previously recorded Woodland Tradition sites in Olmsted County are also located adjacent to waterways. In similar fashion to the previously recorded Archaic Tradition sites, the previously identified Woodland Tradition sites are near junctions with another stream or creek. Mounds have been recorded in Olmsted County; however, none have been field verified by a qualified archaeologist (Arzigian and Kolb 2011).

Previously identified precontact sites are relatively small and many consist of single artifacts (Arzigian and Kolb 2011). Artifact counts appear generally low, with no site containing more than 200 artifacts and most having less than 20. This suggests that precontact sites in Olmsted County may be associated with resource procurement and temporary encampment as opposed to long-term habitation. Because the Southeast Riverine Archaeological Region contains outcrops of high quality flaking materials, it is not surprising that most raw materials identified at sites in Olmsted County are local. In counties adjacent to Olmsted, large village sites have been identified and recorded suggesting that precontact peoples may have entered the Olmsted County area to retrieve raw materials and resources, but did not necessarily stay to set up long-term habitation areas (Arzigian and Kolb 2011).

Based on the available data, Paleoindian, Archaic, and/or Woodland traditions sites may be encountered in the Study Area. Sites types may include lithic scatters and artifact scatters that may be associated with raw material procurement and short-term habitation. Sites in Olmsted County appear to be concentrated along drainages, and as Route Segments and facilities transect multiple drainages, streams, and rivers, there is a high probability of encountering precontact archeological sites in these areas. In addition, the alluvial settings of these stream and river crossings may be conducive to burying and preserving archaeological deposits, which indicates that there is potential for encountering deeply buried archaeological sites. Finally, precontact sites may be identified along uplands in areas with steep topography and deeply incised rivers.

Historic Site Potential

The Phase Ia revealed one previously recorded historic period archaeological site lead (21OLw), a reported historic structural ruin. The GLO map (1854) review revealed many natural features, but did not reveal any cultural resources. A review of early plat maps (1896 and 1914) identified trails, roads, rail lines, and multiple structures. Structures included individual residences and farmsteads as well as commercial properties, religious facilities, and educational facilities.

Historic archaeological properties tend not to follow the same patterns of distribution as other resources because environmental, engineering, and/or sociocultural values that restrict other properties do not apply to these properties. In general, these types of properties tend to be located along water, railroad, or road transportation routes. Their documented presence along existing railroad or transportation routes may be coincidental, because this is where most historic resource surveys have

been conducted. Historic archaeology properties mainly include abandoned farmsteads, abandoned homes, abandoned businesses, and facilities related to railroads. The time periods represented by these properties may run from the Contact period through the modern industrial development period of the 1940s, 1950s, and 1960s. Although only one previously recorded historic period archaeological site lead has been identified and the number of previously identified architectural properties is relatively low, there is a moderate to high potential to encounter historic resources.

Architectural Property Potential

The Phase Ia identified 19 previously recorded architectural structures in the Study Area. Structures include farmsteads and individual buildings associated with farmsteads or homesteads, a school, a town hall, and a bridge. One of the 19 previously recorded architectural structures, the St. Mary's Hospital Dairy Farmstead (OL-CAS-003), is listed on the NRHP. The remaining 18 previously recorded architectural structures have not been evaluated for listing on the NRHP.

Architectural properties, also known as historic standing buildings and built structures, can be found wherever conditions are suitable (as in the case of houses and homesteads on higher elevation sites and sites suitable for agriculture) or areas where structures were necessary (such as a bridge crossing a river or stream, or a road through a swamp). As such, the abundance of architectural properties can only be broadly described. In general, these types of properties tend to be located in areas that have a built environment and/or are located adjacent to road, railroad, and water transportation routes. Architectural properties mainly include farmsteads, homes, businesses, civic works, religious works, and industry works. The periods represented by these properties run from the early Euro-American settlement period through the modern industrial development period.

Recommendations

Resources of particular concern that may be encountered in the Study Area include:

- Archaeological sites on river terraces, the interfluve between major drainage systems, and near springs and spring fed streams
- Archaeological sites correlated with lithic resource procurement
- Archaeological sites on uplands in areas with steep topography and deeply incised rivers
- Deeply buried archaeological deposits
- Historic sites and/or structures associated with the railroad
- Historic sites and/or structures associated with early settlement of the area
- Historic and/or structures associated with the City of Rochester

Based on the data presented in this Phase Ia, the Study Area contains a moderate to high potential for additional cultural resources. In addition, the Study Area transects several streams with alluvial settings conducive to burying and preserving archaeological deposits, which indicates that there is potential for encountering buried archaeological sites at these locations. As such, HDR recommends a geomorphological assessment of the Area of Potential Effects (APE) to identify portions of the Project with potential for deeply buried archaeological deposits.

Because the Project is being permitted by a state agency, it falls under the purview of the Minnesota Field Archaeology Act and the Minnesota Historic Sites Act (Minnesota Statutes, Chapter 138). Prior to construction, MERC will conduct appropriate cultural resource surveys in consultation with SHPO. These surveys will likely include archaeological inventories and consideration of impacts to historic properties. All work should be conducted in accordance with the SHPO *Manual for Archaeological Projects in Minnesota* (Anfinson 2001) and the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (National Park Service 1983).

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Appendix A. Figures

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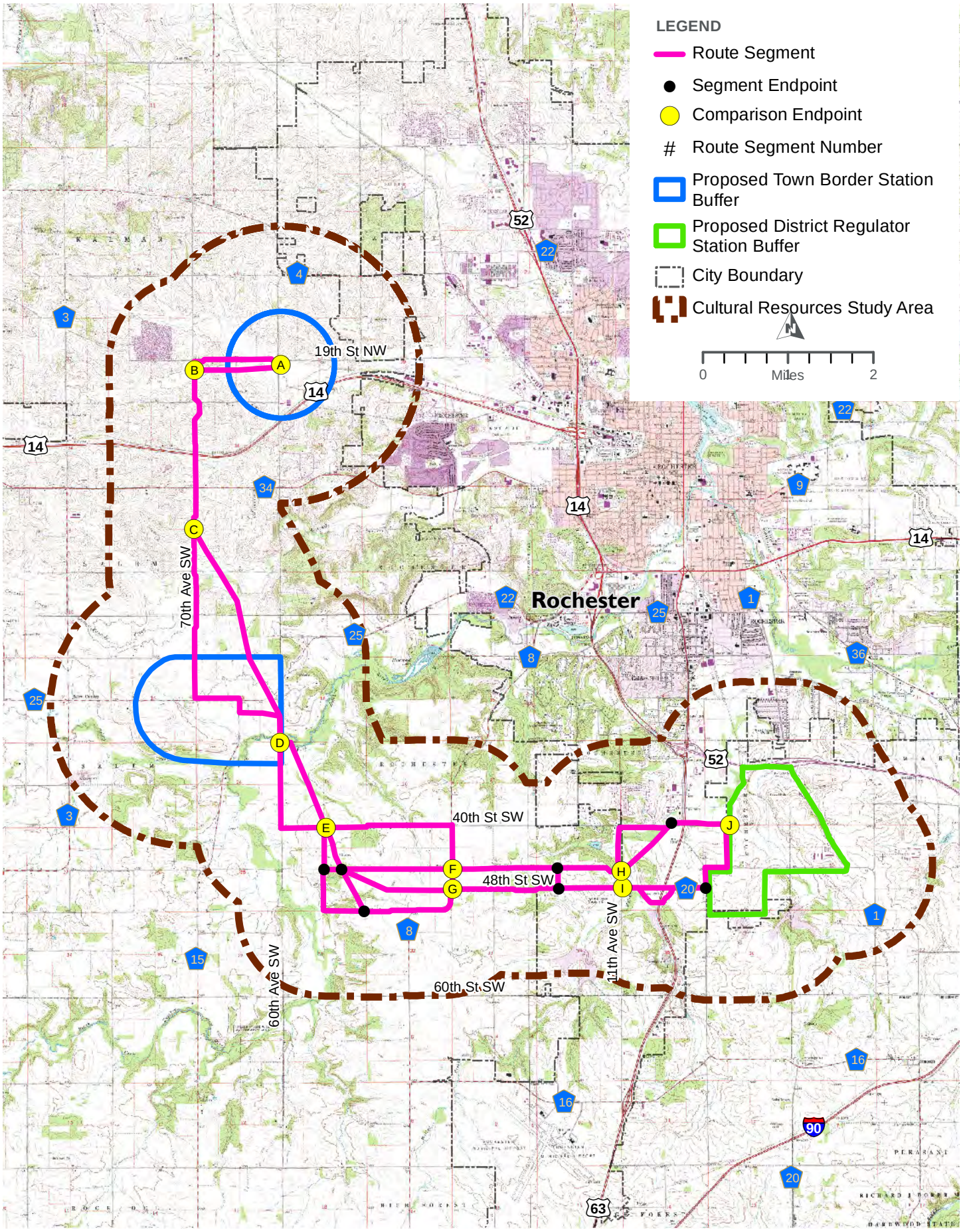

CULTURAL RESOURCES STUDY AREA

ROCHESTER NATURAL GAS PIPELINE

PHASE IA LITERATURE SEARCH

FIGURE 1

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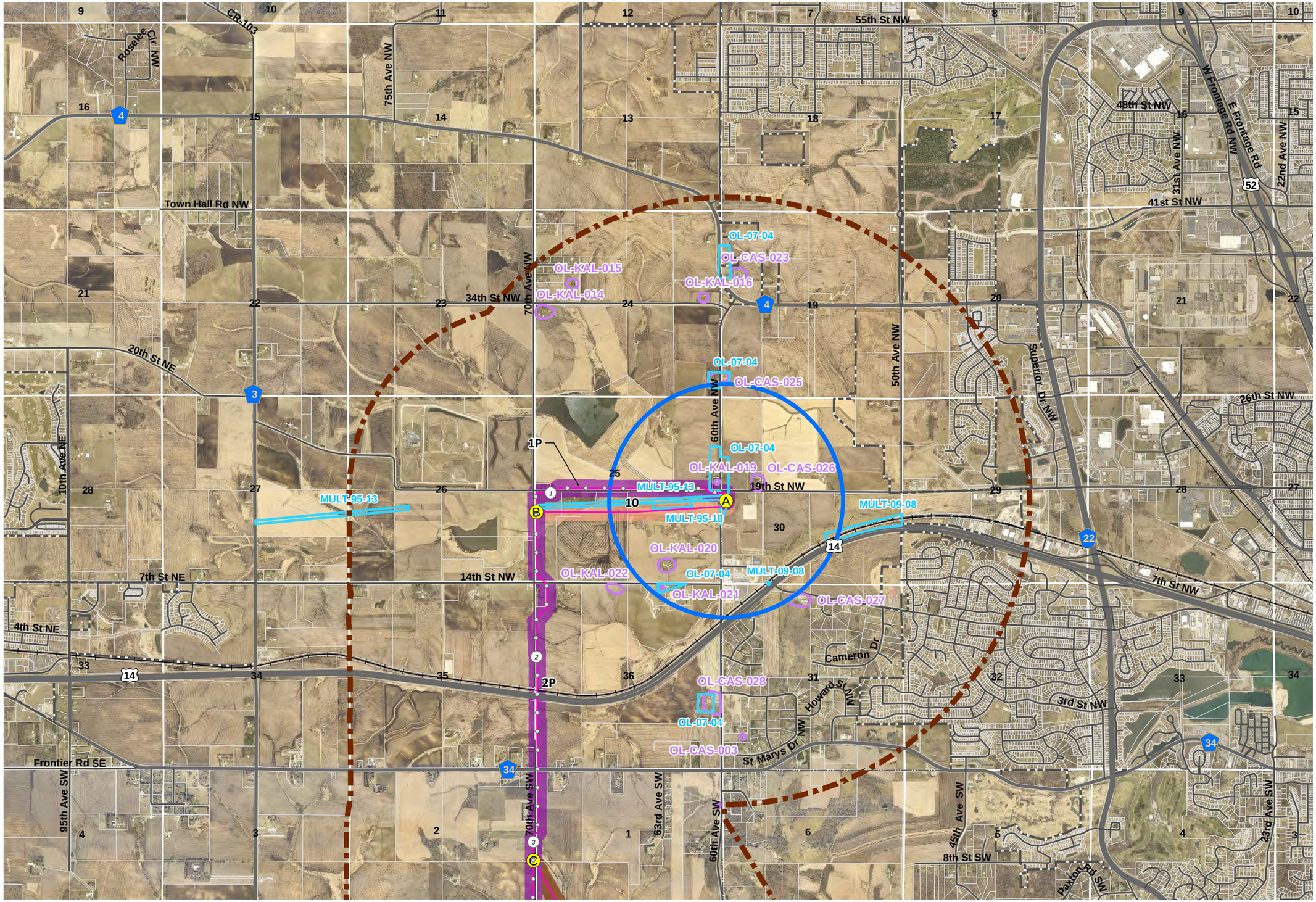

LEGEND

- Route Segment
- Segment Endpoint
- Comparison Endpoint
- # Route Segment Number
- Application Preferred Route
- Application Alternate Route
- MERC Modified Preferred Route
- Scoping Route
- Proposed Town Border Station Buffer
- Proposed District Regulator Station Buffer
- City Boundary
- Township Boundary
- Study Area Cultural Resource
- SHPO Archaeological Site and Site Lead
- SHPO Survey
- SHPO Architectural Property
- Milepost (1/10th mile)
- Milepost (1 mile)

0 Feet 2,000

1 inch = 2,640 feet

CULTURAL RESOURCES

ROCHESTER NATURAL GAS PIPELINE

FIGURE 2 (PAGE 1 OF 4)

PHASE IA LITERATURE SEARCH

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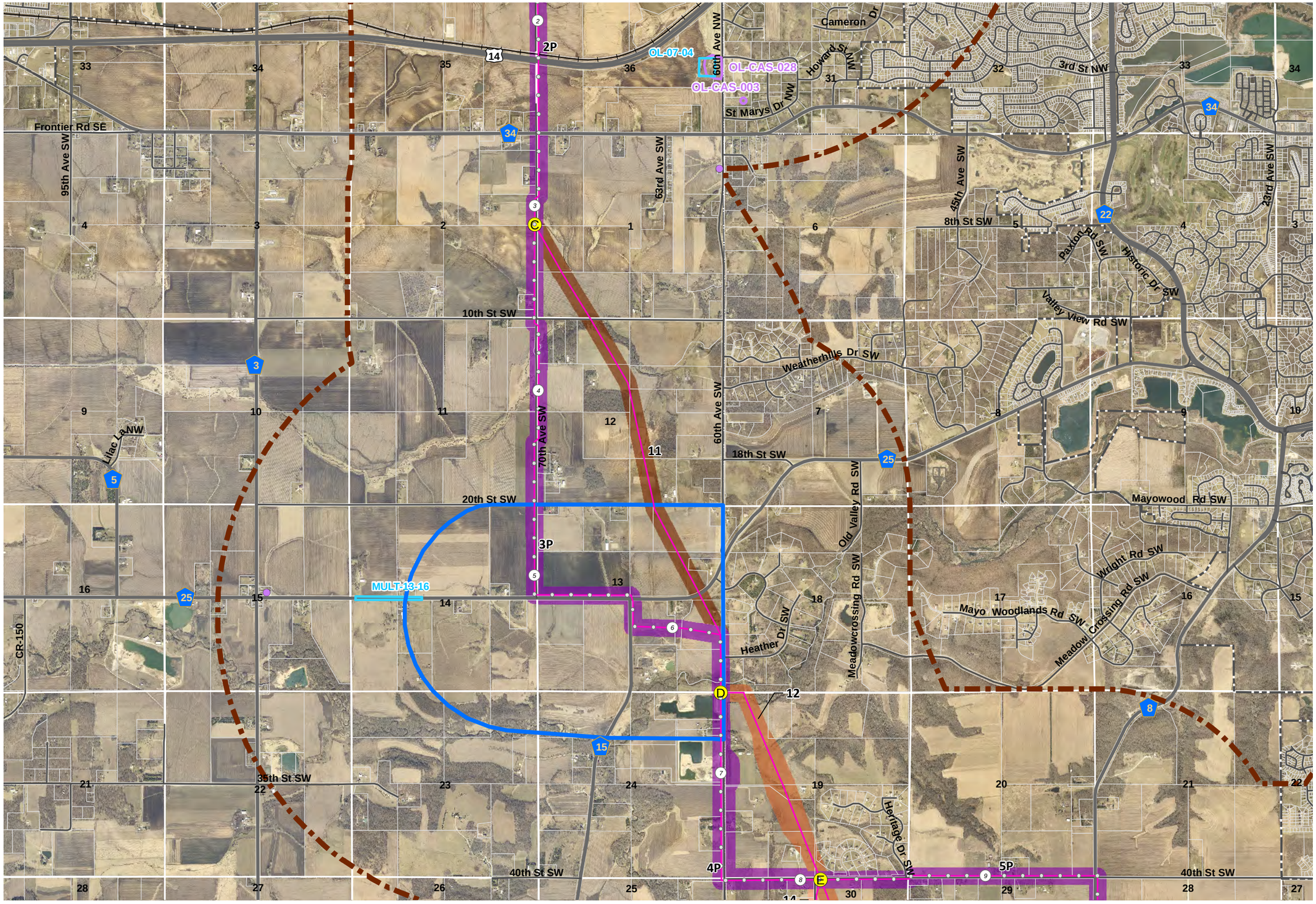

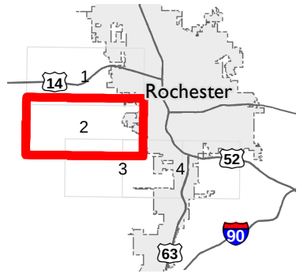

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- Milepost (1 mile)

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CULTURAL RESOURCES

ROCHESTER NATURAL GAS PIPELINE

FIGURE 2 (PAGE 2 OF 4)

PHASE IA LITERATURE SEARCH

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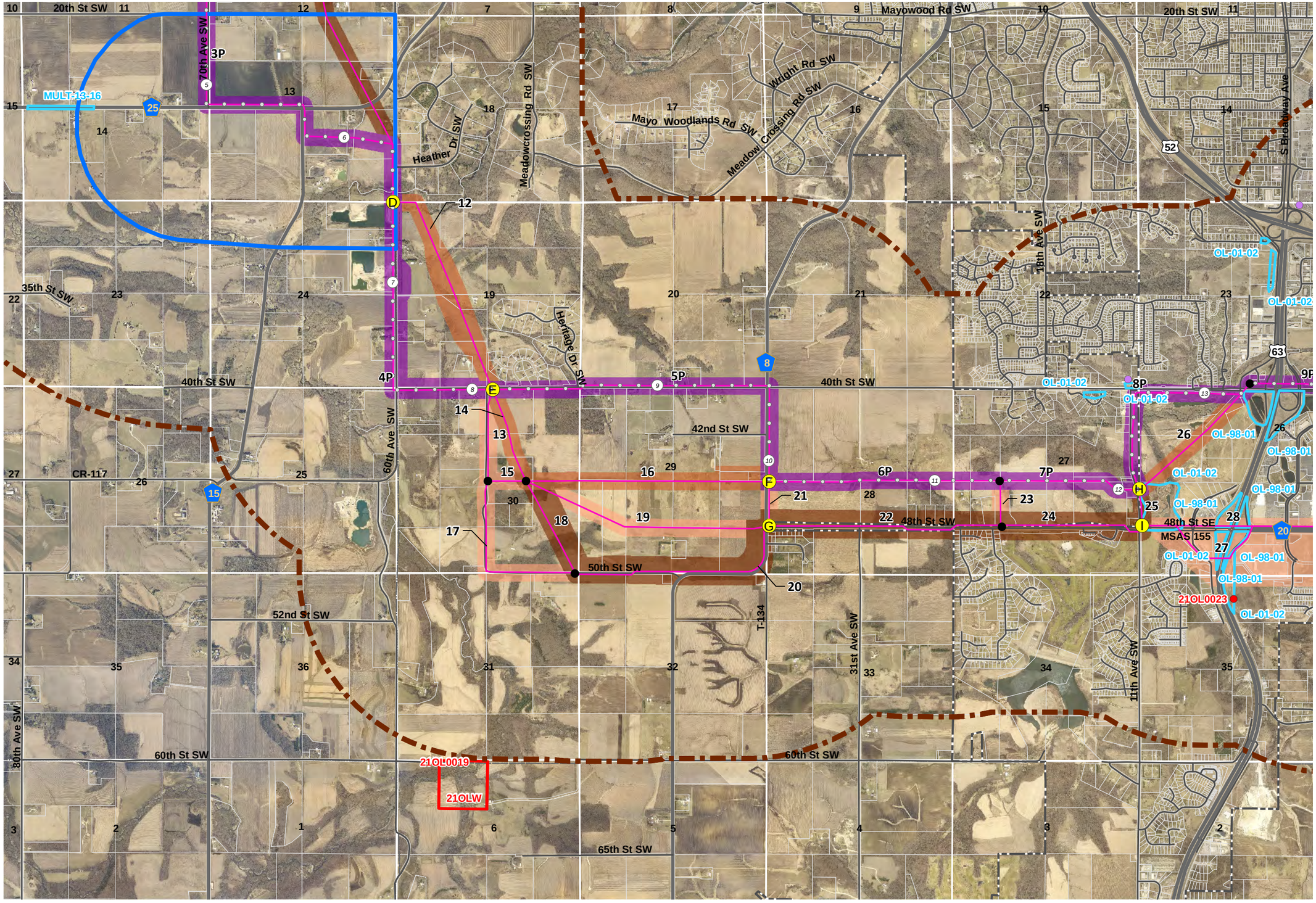

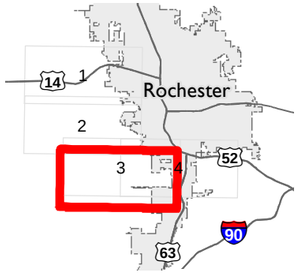

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- Milepost (1/10th mile)
- Milepost (1 mile)

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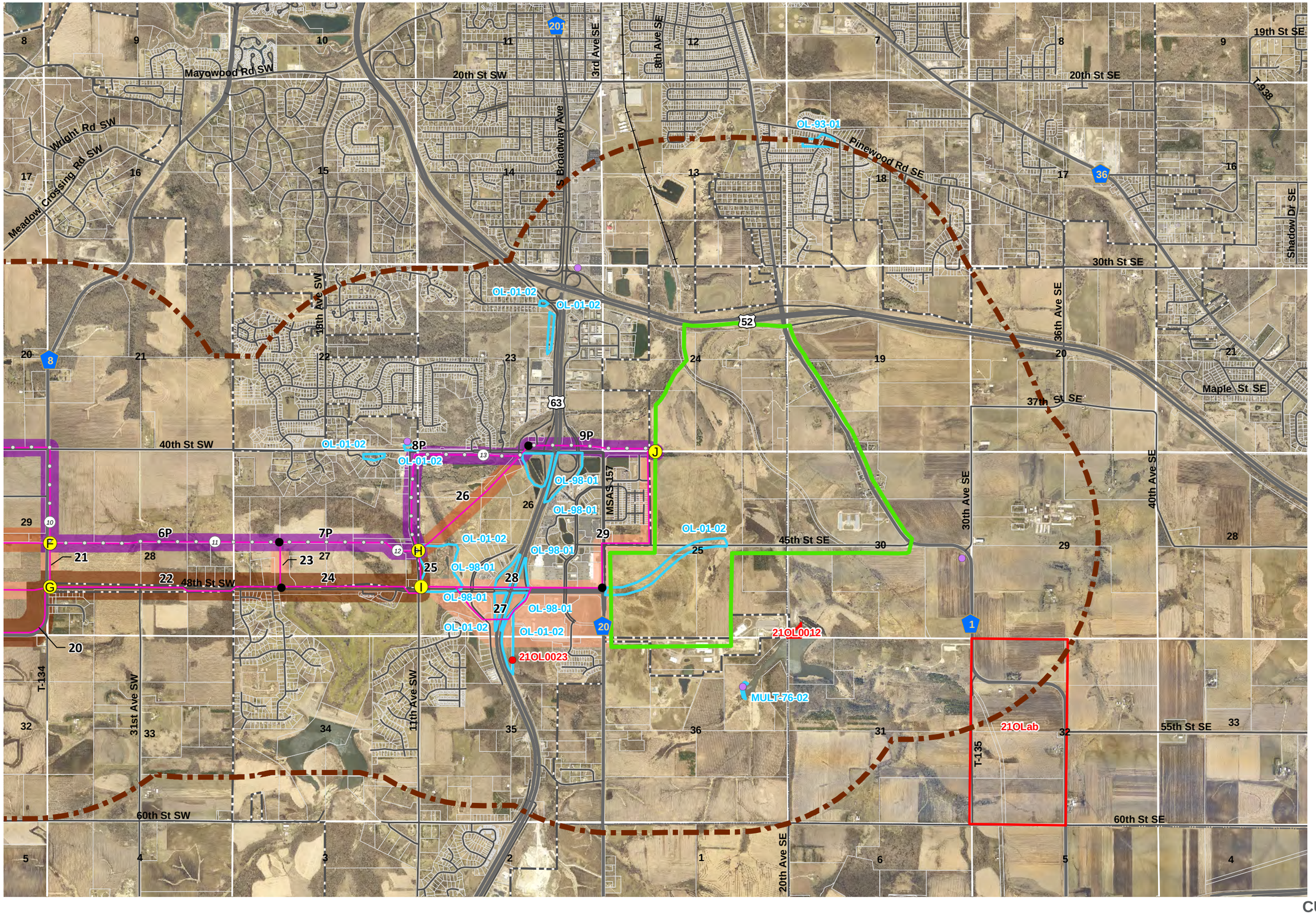
CULTURAL RESOURCES

ROCHESTER NATURAL GAS PIPELINE

FIGURE 2 (PAGE 3 OF 4)

PHASE IA LITERATURE SEARCH



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- Milepost (1 mile)

0 Feet 2,000

1 inch = 2,640 feet

CULTURAL RESOURCES

ROCHESTER NATURAL GAS PIPELINE

FIGURE 2 (PAGE 4 OF 4)

PHASE IA LITERATURE SEARCH

Appendix B. Study Area – Plat Map Results

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County	Township	Range	Section	QQQS	Survey Date	Feature/Location
Olmsted	107N	14W	19	NE¼, SW¼, NW¼	1896 and 1914	Carl A. Fenske Property
Olmsted	107N	14W	19	NE¼, NE¼, SW¼	1896 and 1914	F.G. Matthias Property
Olmsted	107N	14W	20	SE¼, SW¼, NW¼	1896 and 1914	Structure
Olmsted	107N	15W	24	SE¼, SW¼, NW¼	1896 and 1914	Structure, William H. Postier Property
Olmsted	107N	15W	24	SE¼, SE¼, NE¼	1896 and 1914	Structure, Chas Postier Estate
Olmsted	107N	15W	24	NW¼, NW¼, SW¼	1896 and 1914	Structure, Henry Postier Estate
Olmsted	107N	15W	24	SE¼, SE¼, SE¼	1896 and 1914	Structure, G.W. Waldron Property
Olmsted	107N	15W	25	SE¼, NW¼, NE¼	1896 and 1914	Structure, Joseph Grahm Sr. Property
Olmsted	107N	15W	25	NW¼, NW¼, SW¼	1914	Structure
Olmsted	107N	15W	25	NE¼,NW¼, SW¼	1896	Homestead, Mrs. C.A. Woodward
Olmsted	107N	15W	25	SE¼, SE¼, NE¼	1896 and 1914	Structure, John E. Finn Property
Olmsted	107N	15W	25	SE¼, SW¼, SE¼	1896 and 1914	Structure, G.A. Postier Property
Olmsted	107N	15W	25	SE¼, SE¼, SE¼	1896 and 1914	Schoolhouse No. 58
Olmsted	107N	15W	26	NW¼, SE¼, NW¼	1896	Structure, Isaac Johnson Property
Olmsted	107N	15W	26	NE¼, SE¼, NE¼	1896	Structure, Joseph Graham Sr. Property
Olmsted	107N	15W	26	SE¼, SE¼, SE¼	1896	Structure, Robert Pett Property
Olmsted	107N	15W	35	NW¼, NW¼, NW¼	1896 and 1914	Structure, Richard Dean Property
Olmsted	107N	15W	35	NE¼, NE¼, NW¼	1896 and 1914	Structure, H. Waldron Estate
Olmsted	107N	15W	35	NE¼, NW¼, NE¼	1896 and 1914	Structure, Robert Pett Property
Olmsted	107N	15W	35	SW¼, SW¼, SW¼,	1896 and 1914	Structure, Phoebe Parish
Olmsted	107N	15W	35	SE¼, SW¼, SW¼	1896 and 1914	Structure, Pal Conway Property
Olmsted	107N	15W	35	SE¼, SE¼, SE¼	1896 and 1914	Structure Robert Hall Property
Olmsted	107N	15W	36	NW¼, NW¼, NW¼	1896 and 1914	Structure, Robert Pett Property
Olmsted	107N	15W	36	NE¼, NE¼, NW¼	1896 and 1914	Homestead, Mary E. Waldron

County	Township	Range	Section	QQQS	Survey Date	Feature/Location
Olmsted	107N	15W	36	NE¼, NW¼, NE¼	1896 and 1914	Structure, Jas Bender Property
Olmsted	107N	15W	36	NE¼, SE¼, NE¼	1896	Olmsted Railroad Station
Olmsted	107N	15W	36	NE¼, NE¼, SE¼	1986,1914	Structure, John McGovern Property
Olmsted	107N	15W	36	SE¼, SW, SW¼	1896 and 1914	Structure, N.C. Christiansen Property
Olmsted	107N	15W	36	SE¼, SE¼, SW¼	1896 and 1914	Structure, Daniel Fallen
Olmsted	107N	15W	35-36	See Feature/Location Description	1896 and 1914	*Chicago & Northwestern Railroad, Extends east—west through the middle of Sections 35. The railroad continues west—northeast through Section 36
Olmsted	107N	14W	29	SE¼, SW¼, NW¼	1896 and 1914	Structure, Adelaide Brown Property
Olmsted	107N	14W	29-31	See Feature/Location Description	1896 and 1914	Chicago & Northwestern Railroad, Extends northeast—southwest through the NW¼ of Section 31 and continues through the SW¼ and SE¼ of Section 30 before running east through Section 29
Olmsted	107N	14W	30	SE¼, NE¼, NE¼	1896 and 1914	Homestead, L.W. Wright
Olmsted	107N	14W	30	SW¼, SW¼, NW¼	1896 and 1914	Cheese Factory
Olmsted	107N	14W	30	SE¼, SW¼, NW¼	1896 and 1914	Structure, A. Anderson Property
Olmsted	107N	14W	30	SW¼, SW¼, NE¼	1896 and 1914	Structure, John Wardlow Property
Olmsted	107N	14W	31	NW¼, SW¼, SW¼	1896 and 1914	Thos McGovern Property
Olmsted	107N	14W	31	SW¼, SW¼, SE¼	1896 and 1914	Residence, ANR? Property
Olmsted	107N	14W	31	NE¼, SE¼, SE¼	1896 and 1914	Structure, J. Pelzer Property
Olmsted	107N	14W	31	NE¼, NE¼, NW¼	1896 and 1914	Homestead, William Becker
Olmsted	107N	14W	31	SW¼, NE¼, NE¼	1896	Homestead, Mary Ewaldron
Olmsted	107N	14W	32	SE¼, NW¼, NW¼	1896 and 1914	Structure, Carl B. Rabehl Property
Olmsted	106N	15W	1	NE¼, NW¼, NW¼	1896 and 1914	Structure, Bernard Heaton Property
Olmsted	106N	15W	1	NE¼, NE¼, NW¼	1896 and 1914	Structure, Michael Dilworth Property

County	Township	Range	Section	QQQS	Survey Date	Feature/Location
Olmsted	106N	15W	1	SE¼, SE¼, NE¼	1896 and 1914	Structure, D. Keeler Property
Olmsted	106N	15W	1	SW¼, SW¼, NE¼	1896 and 1914	Structure, Joseph Heaton Property
Olmsted	106N	15W	1	SE¼, SE¼, SW¼	1896 and 1914	Homestead, Thomas McGovern
Olmsted	106N	15W	2	NE¼, NW¼, NW¼	1896	Structure John Conway Property
Olmsted	106N	15W	2	NE¼, NE¼, NW¼	1896 and 1914	Structure, David Fallen Property
Olmsted	106N	15W	2	SW¼, NE¼, NE¼	1896 and 1914	Structure, W&A Hennessy Property
Olmsted	106N	15W	2	SW¼, SE¼, NE¼	1896 and 1914	Structure, J.P. Adamson Property
Olmsted	106N	15W	2	SE¼, SE¼, SW¼	1896 and 1914	Structure, James Mahoney Property
Olmsted	106N	15W	2	SE¼, SE¼, SE¼	1896 and 1914	*Structure, James Montague Property
Olmsted	106N	15W	10	SE¼, SW¼, SE¼	1896 and 1914	Structure, D. Wilkins Property
Olmsted	106N	15W	11	SW¼, NW¼, NW¼	1896 and 1914	Structure, Thomas Donovan Property
Olmsted	106N	15W	11	NE¼, NW¼, NE¼	1896 and 1914	Structure, C. Connelly Property
Olmsted	106N	15W	11	NE¼, SW¼, SW¼	1896 and 1914	Structure, Anton Johnson Property
Olmsted	106N	15W	11	SW¼, SE¼, SW¼	1896 and 1914	Structure, James Bryan Property
Olmsted	106N	15W	12	NW¼, NW¼, NW¼	1896 and 1914	Schoolhouse No. 26
Olmsted	106N	15W	12	NE¼, SE¼, NW¼	1896 and 1914	Structure, James McGovern Property
Olmsted	106N	15W	12	SE¼, NE¼, NE¼	1896 and 1914	Structure, W.P. Brooks Property
Olmsted	106N	15W	12	NW¼, SE¼, NE¼	1896 and 1914	Hans P. Christianson
Olmsted	106N	15W	12	NW¼, SW¼, SW¼	1896 and 1914	Structure, Thomas Donovan Property
Olmsted	106N	15W	12	SE¼, SW¼, SE¼	1896 and 1914	Structure, John Lulzi Property
Olmsted	106N	15W	13	NE¼, SE¼, NW¼	1896, 1914	Structure, Mary Knusel Property
Olmsted	106N	15W	13	NW¼, NE¼, SE¼	1896 and 1914	Structure, Otto Zander Property
Olmsted	106N	15W	13	SW¼, SE¼, SE¼	1896 and 1914	Homestead, Fred Erike
Olmsted	106N	15W	14	NW¼, SW¼, NW¼	1914	Structure
Olmsted	106N	15W	14	SW¼, SE¼, NW¼	1914	Structure

County	Township	Range	Section	QQQS	Survey Date	Feature/Location
Olmsted	106N	15W	14	SW¼, SE¼, NE¼	1896 and 1914	Structure, Anton Lulzi Property
Olmsted	106N	15W	14	NW¼, NE¼, SW¼	1896	Homestead, Jens Hensen Property
Olmsted	106N	15W	14	NW¼, NW¼, SE¼	1896 and 1914	Structure, Sarah Smith Property
Olmsted	106N	15W	14	SE¼, NW¼, SW¼	1896 and 1914	Homestead, H.C. Nelson-1896; R.M. Fuller-1914
Olmsted	106N	15W	14	NE¼, NE¼, SE¼	1896 and 1914	Structure, Mary Knusel Property
Olmsted	106N	15W	15	NE¼, NE¼, NE¼	1896 and 1914	Structure, Fed Little Property
Olmsted	106N	15W	15	SW¼, SW¼, NE¼	1896 and 1914	School House, School No. 53
Olmsted	106N	15W	15	SW¼, SW¼, NE¼	1896 and 1914	Structure, D. Wilkins Property
Olmsted	106N	15W	15	NW¼, NE¼, SE¼	1896 and 1914	Town Hall
Olmsted	106N	15W	15	NW¼, NW¼, SE¼	1896 and 1914	Unknown, Separator
Olmsted	106N	15W	15	SW¼, SW¼, SE¼	1896 and 1914	Cemetery, R.M. Fuller Property
Olmsted	106N	15W	15	NE¼, NW, SE¼	1896 and 1914	Residence, R.M. Fuller Property
Olmsted	106N	15W	15	NE¼, NE¼, SW¼	1896 and 1914	Structure, Luther L. McCoy
Olmsted	106N	15W	15	NW¼, NE¼, SW¼	1896 and 1914	Structure, Luther L. McCoy Property
Olmsted	106N	15W	15	SE¼, SE¼, NW¼	1896 and 1914	Structure, Annette Little Property
Olmsted	106N	15W	22	SE¼, NE¼, NW¼	1896 and 1914	Structure, Hans J. Little Property
Olmsted	106N	15W	22	SW¼, NW¼, NE¼	1896 and 1914	Structure, Ole K. Aakre
Olmsted	106N	15W	23	SW¼, SW¼, NW¼	1896 and 1914	Structure, Ole E. Hottan Property
Olmsted	106N	15W	23	NE¼, SE¼, SW¼	1896 and 1914	Structure, Andrew P. Sorenson Property
Olmsted	106N	15W	23	NE¼, NE¼, SE¼	1896 and 1914	Structure, Andrew P. Sorenson Property
Olmsted	106N	15W	24	SE¼, SW¼, SW¼	1896 and 1914	Residence, Herman S. Evjen Property
Olmsted	106N	15W	24	NW¼, SE¼, NW¼	1896 and 1914	Structure, Z. Holt Estate
Olmsted	106N	15W	24	SE¼, SW¼, NE¼	1896 and 1914	Structure, James Lyons Property
Olmsted	106N	15W	24	SE¼, NE¼, SE¼	1896 and 1914	Structure, John Donovan Property

County	Township	Range	Section	QQQS	Survey Date	Feature/Location
Olmsted	106N	15W	24	SE¼, SE¼, SW¼	1914	Structure
Olmsted	106N	15W	25	SE ¼, NW ¼, NW ¼	1896 and 1914	Structure, S.A. Holt Property
Olmsted	106N	15W	36	SE ¼, SE ¼, NE ¼	1896 and 1914	Structure, Isabella Johnson Property
Olmsted	106N	14W	7	SW¼, SE¼, NE¼	1896 and 1914	Structure, J. Bourquin Property
Olmsted	106N	14W	7	NW¼, SE¼, SW¼	1896 and 1914	Structure, Michael Bannon Property
Olmsted	106N	14W	7	SE¼, SE¼, SW¼	1914	Structure
Olmsted	106N	14W	7	SE¼, NE¼, SW¼	1896 and 1914	Schoolhouse
Olmsted	106N	14W	18	SE¼, SE¼, NW¼	1896 and 1914	Structure, O. McCumber Property
Olmsted	106N	14W	18	SW¼, SE¼, NE¼	1896 and 1914	Structure, J.W.Langton Property
Olmsted	106N	14W	18	SW¼, SW¼, SE¼	1896 and 1914	Structure
Olmsted	106N	14W	19	NW¼, SW¼, NW¼	1896 and 1914	Structure, Hannah O'Maley Property
Olmsted	106N	14W	20	SE¼, SE¼, NE¼	1896 and 1914	Structure, John Garrey Property
Olmsted	106N	14W	20	NW¼, NW¼, SW¼	1896 and 1914	Structure, Michael Marren Property
Olmsted	106N	14W	20	SE¼, SE¼, SW¼	1896 and 1914	Structure, Michael Marren Property
Olmsted	106N	14W	20	SE¼, SW¼, SE¼	1914	Structure, John Coleman Property
Olmsted	106N	14W	21	NE¼, SE¼, SW¼	1896 and 1914	Structure, Bridget Dolan Property
Olmsted	106N	14W	22	SE¼, SE¼, NW¼	1896 and 1914	Structure, Alfred Mackey Property
Olmsted	106N	14W	22	SW¼, SW¼, NE¼	1896 and 1914	School House, D. Kennedy Property
Olmsted	106N	14W	22	SE¼, NW¼, NE¼	1896 and 1914	Structure, D. Kennedy Property
Olmsted	106N	14W	22	SE¼, NW¼, SW¼	1896 and 1914	Structure, Thos Kelly Property
Olmsted	106N	14W	22	SW¼, SW¼, SW¼	1914	Structure
Olmsted	106N	14W	22	SE¼, SE¼, SE¼	1896 and 1914	Structure, Augusta Kemp Property
Olmsted	106N	14W	23	NE¼, SE¼, SW¼ SE¼, SE¼, SW¼	1896 and 1914	Willow Quarry
Olmsted	106N	14W	23	SW¼, NE¼, SE¼	1896 and 1914	Homestead, A. Lovejoy
Olmsted	106N	14W	24	NE¼, NE¼, NE¼	1896 and 1914	Structure, Jane Robertson Property

County	Township	Range	Section	QQQS	Survey Date	Feature/Location
Olmsted	106N	14W	24	SE¼, NW¼, SW¼	1896 and 1914	Structure, Thos Feeney Property
Olmsted	106N	14W	24	NE¼, NE¼, SE¼	1896 and 1914	Structure, Martha Finch Property
Olmsted	106N	14W	25	SE¼, SE¼, NW¼	1896 and 1914	Structure, T. Mackey Property
Olmsted	106N	14W	25	NE¼, NW¼, SE¼	1896 and 1914	*Structure, Emil Theal Property
Olmsted	106N	14W	25	SW¼, NW¼, SW¼	1896 and 1914	*Structure, Susan C. Schmid Property
Olmsted	106N	14W	25	SW¼, SW¼, SW¼	1896 and 1914	Schoolhouse
Olmsted	106N	14W	26	NW¼, NE¼, NW¼	1896 and 1914	Homestead, B.E. Pickeit
Olmsted	106N	14W	26	NE¼, NE¼, SW¼	1896 and 1914	Structure, Patrick Convey
Olmsted	106N	14W	26	NW¼, SW¼, SW¼	1896 and 1914	Structure, Thomas Ryan
Olmsted	106N	14W	27	NE¼, NE¼, SE¼	1896 and 1914	Structure, P.M. Tolbart Estate
Olmsted	106N	14W	27	NE¼, SW¼, SW¼	1896 and 1914	Homestead, Irwin W. Tolbert
Olmsted	106N	14W	27	NW¼, SW¼, SE¼	1896 and 1914	Structure, Irwin W. Tolbert Property
Olmsted	106N	14W	28	SE¼, SE¼, NW¼	1896 and 1914	Homestead, Martin Purcell
Olmsted	106N	14W	28	NE¼, NE¼, SW¼	1896 and 1914	Structure, Jon Dee Property
Olmsted	106N	14W	28	NW¼, SE¼, SW¼	1896 and 1914	Homestead, Catharine Egan
Olmsted	106N	14W	28	NW¼, SW¼, SE¼	1896 and 1914	Structure, Michael Dee Property
Olmsted	106N	14W	29	NE¼, NW¼, NW¼	1896 and 1914	Structure, P. Hannaghan Property
Olmsted	106N	14W	29	NW¼, NE¼, NE¼	1896 and 1914	Structure, Barney Clark Property
Olmsted	106N	14W	29	SE¼, SE¼, NE¼	1896 and 1914	Schoolhouse
Olmsted	106N	14W	29	SE¼, NW¼, SE¼	1896 and 1914	Structure, Thos Coleman Property
Olmsted	106N	14W	29	SE¼, SW¼, SW¼	1896 and 1914	Structure, John C. Fogarty Property
Olmsted	106N	14W	29	SE¼, SE¼, SW¼	1896 and 1914	Structure, Jas Coleman Property
Olmsted	106N	14W	30	SW¼, NW¼, NW¼	1896 and 1914	Schoolhouse
Olmsted	106N	14W	30	NE¼, NW¼, NW¼	1896, 1914	Structure, Svend Hatton Property

County	Township	Range	Section	QQQS	Survey Date	Feature/Location
Olmsted	106N	14W	30	NE¼, NW¼, NE¼	1896 and 1914	Structure, Jas Lynaugh Property
Olmsted	106N	14W	30	SW¼, SW¼, NW¼	1896 and 1914	Structure, Emma Peck Property
Olmsted	106N	14W	30	NW¼, NE¼, SW¼	1896 and 1914	Structure, William Rose Property
Olmsted	106N	14W	30	NE¼, SW¼, SW¼	1896 and 1914	Structure, E. Fitzpatrick Property
Olmsted	106N	14W	30	SE¼, SW¼, SE¼	1896 and 1914	Structure, Geo H. Haven Property
Olmsted	106N	14W	31	NW¼, NW¼, NE¼	1896 and 1914	Structure, John Riley Property
Olmsted	106N	14W	31	NE¼, NE¼, NE¼	1896 and 1914	Structure, John T. Sheldon Property
Olmsted	106N	14W	31	SE ¼, SW ¼, SW ¼	1896 and 1914	Structure, C. Rasmussen Property
Olmsted	106N	14W	31	SE ¼, SW ¼, NW ¼	1896 and 1914	Structure, H. Schuster Property
Olmsted	106N	14W	32	NW¼, SE¼, NE¼	1896 and 1914	Structure, Patrick Norton Property
Olmsted	106N	14W	32	SE¼, SE¼, NE¼	1896 and 1914	Structure, Jas Tierney Property
Olmsted	106N	14W	32	SE ¼, SE ¼, SW ¼	1896 and 1914	Residence, J.P. Dibble Property
Olmsted	106N	14W	32	SE ¼, NE ¼, SW ¼	1896 and 1914	Structure, Hurtbut and Co Property
Olmsted	106N	14W	33	SE¼, SW¼, NW¼	1896 and 1914	Structure, T. Coleman Property
Olmsted	106N	14W	33	SW ¼, SW ¼, SW ¼	1896 and 1914	Structure, Jas Hannaghan Property
Olmsted	106N	14W	33	NW ¼, SW ¼, SE ¼	1896 and 1914	Residence, P.J. Shanahan Property
Olmsted	106N	14W	34	NW¼, NE¼, NE¼	1896 and 1914	Structure, James Carr Property
Olmsted	106N	14W	34	SE¼, SE¼, NW¼	1896 and 1914	Structure, J. Mahoney Property
Olmsted	106N	14W	35	SW¼, SE¼, NW¼	1896 and 1914	Structure, Margrat Ryan Property
Olmsted	106N	14W	35	SE ¼, NW ¼, SE ¼	1896 and 1914	Structure, James Purcell Property
Olmsted	106N	14W	36	SW ¼, NE ¼, NW ¼	1896 and 1914	Structure, Edward Cochran Property
Olmsted	106N	14W	36	SE ¼, NW ¼, NE ¼	1896 and 1914	Structure, Edward Cochran Property

County	Township	Range	Section	QQQS	Survey Date	Feature/Location
Olmsted	106N	14W	24-25	See Feature/Location Description	1914	An unnamed railroad, Extends northwest—southeast through the SE¼ of Section 24 and continues though the northeast corner of Section 25
Olmsted	106N	13W	30-32	See Feature/Location Description	1914	*An unnamed railroad, Extends northwest—southeast through the middle of Section 30 and continues through the northeast corner of Section 31 and the northwest corner of Section 32
Olmsted	106N	13W	19	SE¼, NW¼, SW¼	1896 and 1914	Homestead, J.A. Kennedy Property
Olmsted	106N	13W	19	SE¼, NW¼, SW¼	1896	Spring east of J.A. Kennedy Homestead
Olmsted	106N	13W	18	NW ¼, SW ¼, NW ¼	1896 and 1914	Unnamed School House
Olmsted	106N	13W	18	SE ¼, SW ¼, NW ¼	1896 and 1914	Structure, T.J. Hudson Property
Olmsted	106N	13W	19	NE¼, NE¼, NW¼	1896 and 1914	Structure, Julian B. Smith Property
Olmsted	106N	13W	20	NW¼, SW¼, SW¼	1896 and 1914	Structure, Thomas McCoy Property
Olmsted	106N	13W	20	SW¼, SW¼, SW¼	1896 and 1914	Structure
Olmsted	106N	13W	29	SW ¼, SE ¼, NW ¼	1896 and 1914	Structure, John Macken Property
Olmsted	106N	13W	29	NW ¼, SW ¼, SE ¼	1896 and 1914	Structure, James St. George Property
Olmsted	106N	13W	29	NW ¼, SW ¼, SW ¼	1896 and 1914	School House, School No. 12
Olmsted	106N	13W	30	NW ¼, SE ¼, SE ¼	1914	Structure
Olmsted	106N	13W	30	NW ¼, SW ¼, SE ¼	1896 and 1914	Structure, Philip Herber Property
Olmsted	106N	13W	30	SW ¼, SW ¼, NE ¼	1896 and 1914	Structure, E.M. Bannett Property
Olmsted	106N	13W	30	SW ¼, NW ¼, NE ¼	1896 and 1914	Structure, R.B. Hotchkiss Property
Olmsted	106N	13W	30	SW ¼, NE ¼, NE ¼	1914	Structure
Olmsted	106N	13W	30	NE ¼, SE ¼, NW ¼	1896 and 1914	Structure, Michael Baldwin Property
Olmsted	106N	13W	31	SE ¼, NE ¼, NW ¼	1896 and 1914	Structure, John Fogarty Property
Olmsted	106N	13W	32	NE ¼, SW ¼, NW ¼	1896 and 1914	Residence, William Lovan Property

MINNESOTA DEPARTMENT OF COMMERCE

85 7TH PLACE EAST, SUITE 500
SAINT PAUL, MINNESOTA 55101-2198
MN.GOV/COMMERCE
651.539.1500 FAX: 651.539.1547
AN EQUAL OPPORTUNITY EMPLOYER

Issued: September 16, 2016

NOTICE OF DRAFT COMPARATIVE ENVIRONMENTAL ANALYSIS AVAILABILITY AND PUBLIC COMMENT MEETING

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

PUC Docket Number: G-011/GP-15-858

Meeting Information

DATE: September 28, 2016

TIMES: 2:00pm & 6:00pm

LOCATION: Kahler Apache Hotel
1517 16th Street SW
Rochester, MN

Submit Comments

Comment Period: Comments on the Draft Comparative Environmental Analysis must be received electronically or postmarked by **4:30 p.m. on Friday, October 7, 2016**. Please include the PUC Docket Number (15-858) in all communications.

Online: http://mn.gov/commerce/energyfacilities/#comment

Email: larry.hartman@state.mn.us

U.S. Mail: Larry Hartman, Environmental Review Manager
Minnesota Department of Commerce
85 7th Place East, Suite 500, St. Paul MN, 55101

Fax: 651-539-0109

Comments will be made available to the public via the Department of Commerce's websites, except in limited circumstances, consistent with the Minnesota Government Data Practices Act. Personally identifying information is not edited or deleted from submissions.

Process Information

Minnesota Energy Resources Corporation (MERC) has applied to the Minnesota Public Utilities Commission for a route permit to construct approximately 13.1 miles of high pressure natural gas pipeline and associated facilities in and around Rochester, Minnesota. The Minnesota Department of Commerce (DOC) has issued a Comparative Environmental Analysis (CEA) in draft form that analyzes the potential human and environmental impacts of the proposed project, and methods to mitigate such impacts. This public meeting has been scheduled to receive comments on the document, as well to explain the route designation process, present major issues, and respond to questions raised by the public.

In order to construct the project, MERC must obtain a route permit from the Minnesota Public Utilities Commission. Prior to its decision, DOC and the Public Utilities Commission will hold a joint public and evidentiary hearing for the project in the area. A notice of the public and evidentiary hearing will be issued separately.

For More Information

An electronic version of the draft CEA and other documents relevant to this matter are available for viewing at:

- the DOC's website: http://mn.gov/commerce/energyfacilities/Docket.html?Id=34318
- the eDockets electronic filing system: https://www.edockets.state.mn.us/EFiling/search.jsp (Use search terms "15" for the year, and "858" for the docket number)

Printed copies of the draft CEA are available at the following locations:

- Rochester Township Hall, 4111 SW 11th Avenue, Rochester
- Rochester Public Library, 101 2nd Street SE, Rochester

Project Contacts

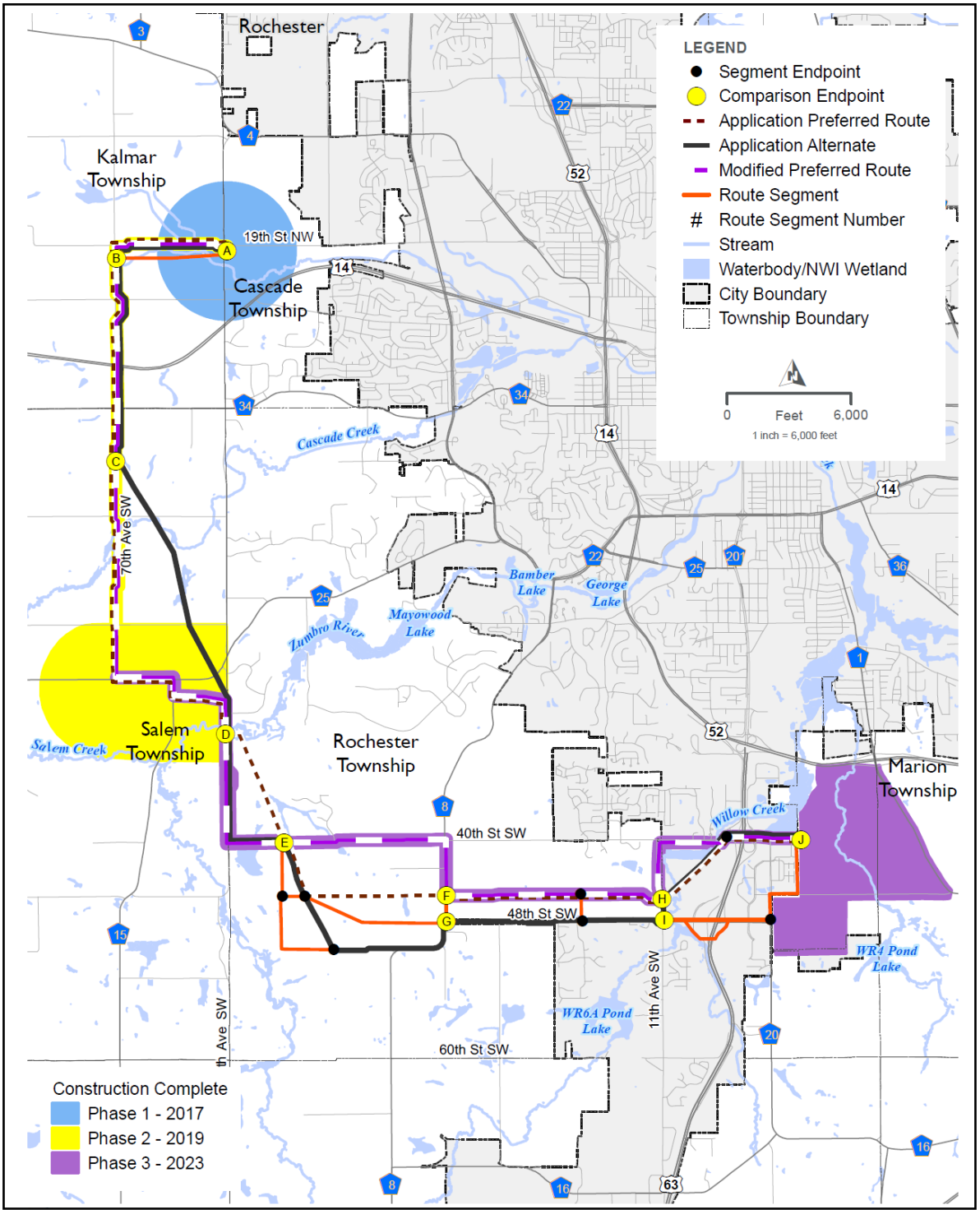
Department of Commerce for questions regarding the DCEA or for more information:

Larry Hartman – Larry.Hartman@state.mn.us or 651-539-1839
Andrew Levi – Andrew.Levi@state.mn.us or 651-539-1840

Minnesota Public Utilities Commission for questions regarding the permit approval process:

Kevin George – Kevin.George@state.mn.us or 651-201-2251
Michael Kaluzniak – Mike.Kaluzniak@state.mn.us or 651-201-2257

This document can be made available in alternative formats (i.e., large print or audio tape) by calling 651-539-1530.


LEGEND
Segment Endpoint
Comparison Endpoint
Application Preferred Route
Application Alternate
Modified Preferred Route
Route Segment
Route Segment Number
Stream
Waterbody/NWI Wetland
City Boundary
Township Boundary
0 Feet 6,000
1 inch = 6,000 feet
Rochester
Kalmar Township
Cascade Township
Salem Township
Rochester Township
Marion Township
19th St NW
40th St SW
48th St SW
60th St SW
70th Ave SW
11th Ave SW
Cascade Creek
Salem Creek
Zumbro River
Mayowood Lake
Bamber Lake
George Lake
Willow Creek
WR4 Pond Lake
WR6A Pond Lake
A
B
C
D
E
F
G
H
I
J
Construction Complete
Phase 1 - 2017
Phase 2 - 2019
Phase 3 - 2023

CERTIFICATE OF SERVICE

I, Sharon Ferguson, hereby certify that I have this day, served copies of the following document on the attached list of persons by electronic filing, certified mail, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

Minnesota Department of Commerce
Notice of Draft Comparative Environmental Analysis Availability and Public Comment Meeting

Docket No. G011/GP-15-858

Dated this 16th day of September 2016

/s/Sharon Ferguson

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Julia	Anderson	Julia.Anderson@ag.state.mn.us	Office of the Attorney General-DOC	1800 BRM Tower 445 Minnesota St St. Paul, MN 551012134	Electronic Service	Yes	OFF_SL_15-858_Official Service List
Laura	Demman	laura.demman@nngco.com	Northern Natural Gas Company	1111 S. 103rd Street Omaha, NE 68125	Electronic Service	No	OFF_SL_15-858_Official Service List
Sharon	Ferguson	sharon.ferguson@state.mn.us	Department of Commerce	85 7th Place E Ste 500 Saint Paul, MN 551012198	Electronic Service	No	OFF_SL_15-858_Official Service List
Mary	Holly	mholly@winthrop.com	Winthrop & Weinstine, P.A.	225 S Sixth St Ste 3500 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_15-858_Official Service List
Linda	Jensen	linda.s.jensen@ag.state.mn.us	Office of the Attorney General-DOC	1800 BRM Tower 445 Minnesota Street St. Paul, MN 551012134	Electronic Service	Yes	OFF_SL_15-858_Official Service List
Michael	Krikava	mkrikava@briggs.com	Briggs And Morgan, P.A.	2200 IDS Center 80 S 8th St Minneapolis, MN 55402	Electronic Service	No	OFF_SL_15-858_Official Service List
Amber	Lee	ASLee@minnesotaenergyresources.com	Minnesota Energy Resources Corporation	2665 145th St W Rosemount, MN 55068	Electronic Service	No	OFF_SL_15-858_Official Service List
John	Lindell	agorud.ecf@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012130	Electronic Service	Yes	OFF_SL_15-858_Official Service List
Eric	Lipman	eric.lipman@state.mn.us	Office of Administrative Hearings	PO Box 64620 St. Paul, MN 551640620	Electronic Service	No	OFF_SL_15-858_Official Service List
Rick	Moser	rjmoser@integrysgroup.com	MERC	700 N Adams Street Green Bay, WI 54307	Electronic Service	No	OFF_SL_15-858_Official Service List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Catherine	Phillips	catherine.phillips@we-energies.com	We Energies	231 West Michigan St Milwaukee, WI 53203	Electronic Service	No	OFF_SL_15-858_Official Service List
Janet	Shaddix Elling	jshaddix@janetshaddix.com	Shaddix And Associates	Ste 122 9100 W Bloomington Frwy Bloomington, MN 55431	Electronic Service	Yes	OFF_SL_15-858_Official Service List
Eric	Swanson	eswanson@winthrop.com	Winthrop Weinstine	225 S 6th St Ste 3500 Capella Tower Minneapolis, MN 554024629	Electronic Service	No	OFF_SL_15-858_Official Service List
Kodi	Verhalen	kverhalen@briggs.com	Briggs & Morgan	2200 IDS Center 80 South Eighth Street Minneapolis, Minnesota 55402	Electronic Service	No	OFF_SL_15-858_Official Service List
Daniel P	Wolf	dan.wolf@state.mn.us	Public Utilities Commission	121 7th Place East Suite 350 St. Paul, MN 551012147	Electronic Service	Yes	OFF_SL_15-858_Official Service List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Doug	Cranston	N/A		6906 20th St SW Byron, MN 55920	Paper Service	No	SPL_SL_15-858_MERC Rochester Gas Pipeline Project Contact List
Daniel	DeCook	N/A		3353 60th Ave SW Rochester, MN 55902	Paper Service	No	SPL_SL_15-858_MERC Rochester Gas Pipeline Project Contact List
Deputy Cassie	Deets 1013	deets.cassandra@CO.OLMSTED.MN.US	Emergency Management	151 Fourth St SE Rochester, MN 55904-3710	Electronic Service	No	SPL_SL_15-858_MERC Rochester Gas Pipeline Project Contact List
Dennis	Dore	dennisadore@aol.com		508 Geranium St SE Rochester, MN 55904	Electronic Service	No	SPL_SL_15-858_MERC Rochester Gas Pipeline Project Contact List
David	Dripps	N/A		3497 Simpson Rd SE Rochester, MN 55904	Paper Service	No	SPL_SL_15-858_MERC Rochester Gas Pipeline Project Contact List
Eric	Funk	karissafunk@hotmail.com		5440 Creekside Lane SW Rochester, MN 55902	Electronic Service	No	SPL_SL_15-858_MERC Rochester Gas Pipeline Project Contact List
Harry	Meyer	N/A		1814 70th Ave SW Byron, MN 55920	Paper Service	No	SPL_SL_15-858_MERC Rochester Gas Pipeline Project Contact List
Bill	Meyer	bsmeyer99@msn.com		1826 70th Ave SW Byron, MN 55920	Electronic Service	No	SPL_SL_15-858_MERC Rochester Gas Pipeline Project Contact List
Francis	Passe	francispasse@gmail.com		3242 60th Ave SW Rochester, MN 55902	Electronic Service	No	SPL_SL_15-858_MERC Rochester Gas Pipeline Project Contact List
Jerry and Carolyn	Pittelko	jerry_mn@yahoo.com		4901 Bamber Vly Rd SW Rochester, MN 55902	Electronic Service	No	SPL_SL_15-858_MERC Rochester Gas Pipeline Project Contact List
Leslie	Rosedahl	leslierosedahl@gmail.com		1765 Ashland Ave St Paul, MN 55105	Electronic Service	No	SPL_SL_15-858_MERC Rochester Gas Pipeline Project Contact List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Kenny	Scott	kps1767@msn.com		2245 48th St SW Rochester, MN 55902	Electronic Service	No	SPL_SL_15-858_MERC Rochester Gas Pipeline Project Contact List
Gary	Vasdev	gv16106@gmail.com		5581 40th St SW Rochester, MN 55902	Electronic Service	No	SPL_SL_15-858_MERC Rochester Gas Pipeline Project Contact List

Michael Brown
Cascade Township Clerk
6002 Buck Hill Ct. NE
Rochester, MN 55906

Mary Blair-Hoeft
City of Byron - Administrator
680 - Byron Main Court NE
P.O. Box 1137
Byron, MN 55920

Stevan Kvenvold
City of Rochester - Administrator
201 4th Street SE
Rochester, MN 55904

Bill Schimmel, Jr
City of Stewartville - Administrator
105 East 1st Street
Stewartville, MN 55976

Willie Dux
High Forest Township Clerk
2956 Co Rd 120 NE
Stewartville, MN 55976

Terry Behrens
Kalmar Township Clerk
6429 ValleyHigh Rd NW
Byron, MN 55920

Janet Hoffmann
Marion Township Clerk
2850 Oakview Ct SE
Rochester, MN 55904

Richard G. Devlin
Olmsted County - Administrator
151 4th St. SE
Rochester, MN 55904

Lori Collins
Olmsted County Public Works
2122 Campus Drive SE Suite 200
Rochester, MN 55904

Paul Uecker
Olmsted Soil and Water Conservation District, Chair
1485 Industrial Dr NW Room 102
Rochester, MN 55901

Bev Harris
Pleasant Grove Township Clerk
2033 80th St SE
Rochester, MN 55904

Gary Swenson
Rochester Township Clerk
4111 11th Avenue SW
Rochester, MN 55902

Mitzi Baker
Rochester-Olmsted Planning Department
2122 Campus Drive SE Suite 100
Rochester, MN 55904

Sandra Goslee
Rochester-Olmsted Planning Department
2122 Campus Drive SE Suite 100
Rochester, MN 55904

Betsy Kleinwort
Rock Dell Township Clerk
8075 Co Rd 126 SE
Byron, MN 55920

Sharon Petersen
Salem Township Clerk
3802 Co Rd 150 SW
Byron, MN 55920

Roger Irhke
Township Cooperative Planning Association
Rochester Township Hall, Room 10 4111 11 Ave SW

Cody Pogalz
Destination Medical Center

Travis Germundson
MN Board of Water and Soil Resources
520 Lafayette Road
St. Paul, MN 55155

Bob Patton
MN Department of Agriculture
625 North Robert Street
St. Paul, MN 55155

Larry Hartman
MN Department of Commerce
85 7th Place East Suite 500
St. Paul, MN 55101

Karl Howe
MN Department of Employment and Economic Development
332 Minnesota Street Suite E-200
St Paul, MN 55101

MN Department of Health
85 East 7th Place PO Box 64882
St Paul, MN 55164

Jamie Schrenzel
MN Department of Natural Resources
500 Lafayette Rd Box 25
St. Paul, MN 55155

Randall Doneen
MN Department of Natural Resources
500 Lafayette Rd Box 25
St. Paul, MN 55155-4025

Keith Parker
MN Department of Natural Resources
Central Region Office
1200 Warner Rd.
St. Paul, MN 55106

Jennie Ross
MN Department of Transportation
395 John Ireland Blvd Mail Stop 620
St. Paul, MN 55155

Stacy Kotch
MN Department of Transportation
395 John Ireland Blvd Mail Stop 678
St. Paul, MN 55155

Tom Streiff
MN Department of Transportation
2900 48th Street NW
Rochester, MN 55901

Kelly Gragg-Johnson
MN Historical Society State Historic Preservation Office
345 Kellogg Blvd. W. Level A
St. Paul, MN 55102-1906

Sarah J. Beimers
MN Historical Society State Historic Preservation Office
345 Kellogg Blvd. W. Level A
St. Paul, MN 55102-1906

Craig Affeldt
MN Pollution Control Agency
520 Lafayette Road North 4th Floor
St. Paul, MN 55155

Patice Jensen
MN Pollution Control Agency
520 Lafayette Road North
St Paul, MN 55155

Brooke Hayworth
MN DNR Division of Ecological and Water Resources
1200 Warner Road
St Paul, MN 55106

Johathan Wolfgram
MN Office of Pipeline Safety
445 Minnesota Street Suite 147
St Paul, MN 55101

Project Manager
US Army Corps of Engineers
1114 South Oak Street
La Crescent, MN 55947

Tony Sullins
US Fish and Wildlife Service –
TC Field Office
4101 East 80th Street
Bloomington, MN 55425

Note- does not include additional agencies/others (such as libraries) on the PUC mailing list.

JOHN R ADAMSON
331 70 SW AVE
BYRON, MN 55920

RANDALL J AND RENE ALEXANDER
4010 WINDSOR HILLS SW LN
ROCHESTER, MN 55902

JACOB C AND JOY M ALLEN
2333 TIMBERWOOD SW LN
ROCHESTER, MN 55902

CURTIS P AND MARY I AMIOT
2317 TIMBERWOOD SW LN
ROCHESTER, MN 55902

DONNA M AND TANIS J ANDERSON
1408 KINGS RUN NW DR
ROCHESTER, MN 55901

RALPH H AND SANDRA H ANDERSON
1921 60 NW AVE
ROCHESTER, MN 55901

PAT AND KEVIN ARNOLD
7350 SALEM SW RD
BYRON, MN 55920

PATRICIA AND SANDRA ARNOLD
7350 SALEM SW RD
BYRON, MN 55920

DALLAS D AND CAROL E AUSRUD
3510 48 SW ST
ROCHESTER, MN 55901

B&F PROPERTIES LLC
3800 52 N HWY
ROCHESTER, MN 55901

ALLWYN K BAKKEN
4121 SIMPSON SE RD
ROCHESTER, MN 55904

NATHAN P BAKKEN
4121 SIMPSON SE RD
ROCHESTER, MN 55904

BASCOM CAPITAL LLC
6219 BROADWAY
RICHMOND, IL 60071

SALLY A BATES
3616 48 SW ST
ROCHESTER, MN 55902

CINDY L BENIKE
56784 402 AVE
MAZEPPA, MN 55956

KATI A AND JEREMY E BERG
2765 COMMERCE NW DR
ROCHESTER, MN 55901

NANCY A BERGERSON
47 70 NW AVE
BYRON, MN 55920

RONALD J AND MARVEL A BETTS
3611 VISTA VIEW SW CT
ROCHESTER, MN 55902

MICHAEL F AND DELORES A BLOOM
2364 TIMBERWOOD SW LN
ROCHESTER, MN 55902

BOULDERS OF ROCHESTER LLC
47210 ROUTE 30
BIG ROCK, IL 60511

ROBERT S AND JOAN K BOWRON
605 GERANIUM SE ST
ROCHESTER, MN 55904

BROADWAY AT 48TH LLC
4900 52 N HWY
ROCHESTER, MN 55901

MARIA AND MATTHEW BROUILLARD
733 BASIL SE LN
ROCHESTER, MN 55904

CHAD L AND AMANDA L BUENGER
5131 40 SW ST
ROCHESTER, MN 55902

HRUSKA BUILDERS
3109 BRAEMORE SW LN
ROCHESTER, MN 55902

JASON ROBERT BUTRUM
2324 TIMBERWOOD SW LN
ROCHESTER, MN 55902

CAIRNBRAE HOME OWNERS ASSN INC
5720 GLENCROFT SW LN
ROCHESTER, MN 55902

CAIRNBRAE LLC
5732 GLENCROFT SW LN
ROCHESTER, MN 55902

KEITH F AND JANICE A CAPELLE
5000 BAMBER VALLEY SW RD
ROCHESTER, MN 55902

JASON G AND COURTNEY CARTNEY
6058 20 SW ST
ROCHESTER, MN 55902

CENTEX HOMES
12701 WHITEWATER DR ST 300
MINNETONKA, MN 55343

MELISSA K CHINNOW
4312 DAFFODIL SE AVE
ROCHESTER, MN 55904

BRUCE AND MICHAEL E CHRISTENSON
1791 60 SW AVE
ROCHESTER, MN 55902

MICHAEL E CHRISTENSON
1341 60 SW AVE
ROCHESTER, MN 55902

MILDRED AND M P CHRISTOPHERSON
24 8 NW ST
ROCHESTER, MN 55901

CLAIRE G CHURCHILL TRUSTEE
4801 BAMBER VALLEY SW RD
ROCHESTER, MN 55902

CITY OF ROCHESTER
201 4 SE ST
ROCHESTER, MN 55904

KEVIN J AND KATHERINE A CONNELLY
TRUSTEE
5508 40 SW ST
ROCHESTER, MN 55902

CRAIG ROBERT CONNELLY
1421 70 SW AVE
BYRON, MN 55920

MICHAEL CONNELLY
1771 COUNTY RD 3 SW
BYRON, MN 55920

WILLIAM J AND DIANE M CONNELLY
1512 RIDGE CLIFF NE LN
ROCHESTER, MN 55906

CONVENIENCE STORE INVESTMENTS
1626 OAK ST
LACROSSE, WI 54603

COUNTY OF OLMSTED
2122 CAMPUS SE DR
ROCHESTER, MN 55904

COUNTY OF OLMSTED PUBLIC WORKS
2122 CAMPUS SE DR
ROCHESTER, MN 55904

DOUGLAS M AND EDITH J CRANSTON
6906 20 SW ST
BYRON, MN 55920

CARL R AND TAMMY M DAHL
2503 48 SW ST
ROCHESTER, MN 55902

DAKOTA MN AND EASTERN RR CORP
120 6 S ST
MINNEAPOLIS, MN 55402

MARK A AND ROXANNE L DARNELL
4252 42 SW ST
ROCHESTER, MN 55902

ANGELA G DECOOK
1444 13 NW ST
BYRON, MN 55920

BRYCE D AND BRENDA J DECOOK
2734 90 SW AVE
BYRON, MN 55920

DANIEL AND MAGDLANA DONOVAN
DECOOK
3141 60 SW AVE
ROCHESTER, MN 55902

DANIEL PAUL DECOOK
3141 60 SW AVE
ROCHESTER, MN 55902

JESSUP DECOOK
1444 13 NW ST
BYRON, MN 55920

TRAVIS AND HEATHER DECOOK
11351 COUNTY RD 3 SW
STEWARTVILLE, MN 55976

BERNICE M DEE TRUSTEE
4230 40 SW ST
ROCHESTER, MN 55902

STANLEY JOHN DEE TRUSTEE
4525 42 SW ST
ROCHESTER, MN 55902

JOHN J AND HELEN M DEE
1626 10 SE AVE
ROCHESTER, MN 55904

RAYMOND J AND SHIRLEYANN DEE
4700 40 SW ST
ROCHESTER, MN 55902

DEER ACRES INC
3930 SIMPSON SE RD
ROCHESTER, MN 55904

DEPT OF NATURAL RESOURCES
500 LAFAYETTE RD
ST PAUL, MN 55155

LAUREL A AND GORDON W DEWALD
TRUSTEE
1486 WILLOW POINT SW LN
ROCHESTER, MN 55902

DILWORTH PROPERTIES LLP
6828 COUNTRY CLUB SW RD
ROCHESTER, MN 55902

DONOVAN FAMILY FARMS
4444 60 SW AVE
ROCHESTER, MN 55902

GARY DONOVAN
4444 60 SW AVE
ROCHESTER, MN 55902

JOHN M DONOVAN
3701 60 SW AVE
ROCHESTER, MN 55902

KENNETH J AND BERNARD L DONOVAN
5827 SALEM SW RD
ROCHESTER, MN 55902

LAUREN DONOVAN
3487 60 SW AVE
ROCHESTER, MN 55902

DOROTHY A ARMOUR INV LLC
2622 SALEM SW RD
ROCHESTER, MN 55902

DRIPPS FAMILY LLC
2715 PENNINGTON NW CT
ROCHESTER, MN 55901

DAVID S AND SUSAN K DRIPPS
3497 SIMPSON SE RD
ROCHESTER, MN 55904

DTD PROPERTIES LLC
1530 GREENVIEW SW DR
ROCHESTER, MN 55902

SHAWN K EBNET
1140 70 SW AVE
BYRON, MN 55920

GARY A AND KATHLEEN S EINCK
4113 WINDSOR HILLS SW LN
ROCHESTER, MN 55902

TRAVIS R AND MARLENE EINERTSON
1900 45 SE ST
ROCHESTER, MN 55904

DANIEL S AND ELISSA L ELLIOTT
4588 55 SW AVE
ROCHESTER, MN 55902

STEVEN J AND KRISTINE E ENGMAN
2225 48 SW ST
ROCHESTER, MN 55902

DALE L AND MARY L FAGERLIND
3730 SIMPSON SE RD
ROCHESTER, MN 55904

TODD FANNING
4364 CIMARRON NW CT
ROCHESTER, MN 55901

ERIC AND LISA FARNBERG
7572 SALEM SW RD
BYRON, MN 55920

DANIEL A FENSKE
4977 55 SW AVE
ROCHESTER, MN 55902

JEREMY E AND LARAE J FERRIE
5416 CREEK SIDE SW LN
ROCHESTER, MN 55904

RICHARD C AND MAXINE D FIECK
3677 SIMPSON SE RD
ROCHESTER, MN 55904

EDUARDO ANTPACK FILHO
1498 WILLOW POINT SW LN
ROCHESTER, MN 55902

FIRST ALLIANCE CREDIT UNION
320 ALLIANCE PL
ROCHESTER, MN 55906

CHRISTOPHER T AND TRACEY FOGARTY
4501 50 SW ST
ROCHESTER, MN 55902

FOREST KNOLL ASSOCIATION
7392 AIRPORT VIEW SW DR
ROCHESTER, MN 55902

EMILY AND LARRY FRANCK
901 70 SW AVE
BYRON, MN 55920

JASON R AND SARA J FREESE
229 70 SW AVE
BYRON, MN 55920

DONALD L AND DIANNE R FRERICHS
644 SOUTHERN WOOD SW CIR
ROCHESTER, MN 55902

RALPH A AND MARY A FRIEDT
1113 KNOLL NW CT
ROCHESTER, MN 55901

FULLER FARM LLC
1946 49 NW ST
ROCHESTER, MN 55901

ERIC A AND KARISSA L FUNK
5440 CREEK SIDE SW LN
ROCHESTER, MN 55902

STEVEN GANDEL
4816 BAMBER VALLEY SW RD
ROCHESTER, MN 55902

STEVEN L AND BECKY L GANDEL
3623 VISTA VIEW SW CT
ROCHESTER, MN 55902

MATTHEW T AND SARA B GETTMAN
1410 EPPERSTONE
BYRON, MN 55920

GILL PROPERTIES
511 NORTHERN HILLS NE DR
ROCHESTER, MN 55906

MARTIN R AND PATTI K GLOFF
3930 SIMPSON SE RD
ROCHESTER, MN 55904

MELISSA L GOETSCH
737 BASIL SE LN
ROCHESTER, MN 55904

WILLIAM H AND CAROL D GORDER
6751 COUNTRY CLUB RD
ROCHESTER, MN 55902

KAREN AND GALEN GOVIER
3455 VISTA VIEW SW CT
ROCHESTER, MN 55902

BART AND KARI GRAFSTROM
3559 SIMPSON SE RD
ROCHESTER, MN 55904

GRAHAM PROPERTIES LTD PARTNERS
14840 RASPBERRY DR
ROGERS, MN 55374

GRAND LUX STORAGE LLC
5803 15 NW ST
ROCHESTER, MN 55901

MAURICE AND ALICE GREENE
1147 ESSEX NW PKWY
ROCHESTER, MN 55901

JAMES W GREENING
4908 40 SW ST
ROCHESTER, MN 55902

JOHN R AND ELAINE D GRIFFITH TRUSTEE
535 LOWRY NW CT
ROCHESTER, MN 55901

PAUL N AND DEBRA A GROEHLER
2348 TIMEBRWOOD SW LN
ROCHESTER, MN 55902

KEVIN AND KRISTIN GUENTHER
6524 20 SW ST
ROCHESTER, MN 55902

JILL L HAGEDORN
606 GERANIUM SE ST
ROCHESTER, MN 55904

JOSEPHINE E AND MICHAEL D HAMILTON
1462 WILLOW POINT SW LN
ROCHESTER, MN 55902

HAMDIJA HAMZAGIC
539 LOWRY NW CT
ROCHESTER, MN 55901

WILLIAM JOHN HANF
4950 ST BRIDGET SE RD
ROCHESTER, MN 55904

IRROLD M HANSON
4635 11 SW AVE
ROCHESTER, MN 55902

KIBBY J AND SHERRY K HANSON
3600 48 ST SW
ROCHESTER, MN 55902

DELMAN H AND BEVERLY HART TRUSTEE
1805 HILLCREST DR
TRENTON, MO 64683

THOMAS J HELGET
3518 48 SW ST
ROCHESTER, MN 55902

PAUL J HENNESSEY
5220 7 NW ST
ROCHESTER, MN 55901

HERITAGE HILLS 2ND SUB HOA
1903 BROADWAY S
ROCHESTER, MN 55904

MARY K HERRING TRUSTEE
5500 HIGHWAY 63 S
ROCHESTER, MN 55904

KYLE V HERRING
3535 SIMPSON SE RD
ROCHESTER, MN 55904

CHARLES P AND ROSE MARIE HICKEY
TRUSTEE
4225 TRUMPETER SE DR
ROCHESTER, MN 55904

CHAD D AND KIMBERLY K HOCKENS
2303 48 SW ST
ROCHESTER, MN 55902

RONALD AND MARCIA HOFFMAN
4410 55 SW AVE
ROCHESTER, MN 55902

GREGORY J AND REBECCA B HOLMES
3741 SIMPSON SE RD
ROCHESTER, MN 55904

IRONWOOD HOMES INC
3900 55 NW ST
ROCHESTER, MN 55901

J B INVESTMENTS LLC
2904 COUNTY RD 15 SW
BYRON, MN 55920

RONALD D AND KAY M JACOBSON
TRUSTEE
5264 40 SW ST
ROCHESTER, MN 55902

JAMES V AND REBECCA L JAHR
4220 DAFFODIL SE AVE
ROCHESTER, MN 55904

EUGENE F AND KAREN M JENNINGS
1950 3 SE AVE
ROCHESTER, MN 55904

JOHN J AND BARBARA L JENSEN
3800 SIMPSON SE RD
ROCHESTER, MN 55904

JEROME FAIRBO FARMS INC
34 7 N ST
BARRON, WI 54812

HOWARD WARNER JOHNSON
1904 BAIHLY HILLS SW DR
ROCHESTER, MN 55902

BETH A JONES
2349 TIMBERWOOD SW LN
ROCHESTER, MN 55902

MARGARET A AND FRANK A JOST
TRUSTEE
5929 HEATHER SW DR
ROCHESTER, MN 55902

WILLIAM F AND SUSAN K JUDD
1474 WILLOW POINT SW LN
ROCHESTER, MN 55902

LORI JEAN KARI
3980 WILLOW HEIGHTS SW DR
ROCHESTER, MN 55902

R WYNN KEARNEY
133 IRONWOOD CT
MANKATO, MN 56001

HEATHER R KELLY
745 BASIL SE LN
ROCHESTER, MN 55904

CARRIE AND DAVID KENT
4850 40 SW ST
ROCHESTER, MN 55902

DANNY W S AND DEBRA L A KIRCHNER
3314 VISTA VIEW SW CT
ROCHESTER, MN 55902

MATTHEW AND SHEILA J KITZMANN
3620 VISTA VIEW SW CT
ROCHESTER, MN 55902

SCOTT A KNAUSS
4505 11 SW AVE
ROCHESTER, MN 55902

JEROME E AND MARLYCE L KOSKOVICH
3321 CTY RD 15 SW
BYRON, MN 55920

FRANKLIN P KOTTSCHADE
WILLOW CREEK COMMONS LLC
3800 HWY 52 N
ROCHESTER, MN 55901

JAMES D AND JANE R KRIER
7034 SALEM SW RD
BYRON, MN 55920

PAUL E AND MAUREEN KUEHN JR
4015 60 SW AVE
ROCHESTER, MN 55902

JERALD A AND LORI J KVASNICKA
TRUSTEE
3308 48 SW ST
ROCHESTER, MN 55902

LAND DEVELOPERS OF ROCHESTER L
3990 CREEK VIEW SW LN
ROCHESTER, MN 55902

EARLENE M LAURSEN TRUSTEE
5250 50 SW ST
ROCHESTER, MN 55902

WAYNE H AND EARLENE M LAURSEN
TRUSTEE
5250 50 SW ST
ROCHESTER, MN 55902

KELLY K AND TRACY LEE
3915 CREEK VIEW SW LN
STEWARTVILLE, MN 55976

LEITZEN SAND AND GRAVEL INC
4019 HWY 14 W
ROCHESTER, MN 55901

MARK AND GARY LEITZEN
4019 HWY 14 W
ROCHESTER, MN 55901

MARDEE A LOOMIS
3510 SIMPSON SE RD
ROCHESTER, MN 55904

LOWES HOME CENTERS INC
1000 LOWES BLVD
MOORESVILLE, NC 28115

DAVID A LUICK
3563 SIMPSON SE RD
ROCHESTER, MN 55904

JANET L LUICK
3563 SIMPSON SE RD
ROCHESTER, MN 55904

NATALIA LUICK
3563 SIMPSON SE RD
ROCHESTER, MN 55904

JOHN AND JESSICA LUTZI
7135 SALEM SW RD
BYRON, MN 55920

RICHARD AND CHARLENE A LUTZI
6031 20 SW ST
ROCHESTER, MN 55902

RICHARD AND CHARLENE A LUTZI
6031 20 SW ST
ROCHESTER, MN 55902

MAINE LAND LLC
3500 AMERICAN W BLVD
BLOOMINGTON, MN 55431

TERRANCE L AND KAREN L MARTIN
5811 19 NW ST
ROCHESTER, MN 55901

TRUDY AND MILO MATHISON
4801 SCENIC OAK SW DR
ROCHESTER, MN 55902

MICHAEL J AND ALLYSON MAURER
4817 SCENIC VIEW SW DR
ROCHESTER, MN 55902

MARY JANE MCGRATH
628 SOUTHERNWOODS SW CIR
ROCHESTER, MN 55902

DENNIS L MCNEILL TRUSTEE
634 SOUTHERN WOODS SW CIR
ROCHESTER, MN 55902

MEADOW PARK CHURCH OF CHRIST
1315 6 SE AVE
ROCHESTER, MN 55904

NEIL T AND JOYCE A MELQUIST
6241 14 NW ST
BYRON, MN 55920

DIANE L MEYER
1814 70 SW AVE
BYRON, MN 55920

HARRY E AND CAROL A MEYER
1814 70 SW AVE
BYRON, MN 55920

LOWELL R MEYER
7711 SALEM SW RD
BYRON, MN 55920

WILLIAM H MEYER
1826 70 NW AVE
BYRON, MN 55920

MACHELE D MICHELS
3965 WILLOW SW CT
ROCHESTER, MN 55902

JAMES H MILDE
39204 BOULDER VIEW DR
SCOTTSDALE, AZ 85262

W EUGENE AND KENTON MILLER
TRUSTEE
3200 VAN DORN ST
LINCOLN, NE 68502

NELLIE M AND JEROME C MITCHELL
3230 LAS FALDAS DR
FULLERTON, CA 92835

PAMELA MITTELSTADT
3975 WILLOW HEIGHTS SW DR
ROCHESTER, MN 55902

MMR LEASING LLC
3230 LAS FALDAS DR
FULLERTON, CA 92835

MOEHNKE KOEHLER PROPERTIES LLC
8124 TELEGRAPH RD
BLOOMINGTON, MN 55438

ROBERT CASEY MOILANEN
2301 TIMBERWOOD LN SW
ROCHESTER, MN 55902

EDWARD J MOLINE
4300 42 SW ST
ROCHESTER, MN 55902

LINDA KAYE MOON
3982 WILLOW SW CT
ROCHESTER, MN 55902

JAMES E AND EUGENIA MOORE
1534 WILLOW POINT SW LN
ROCHESTER, MN 55902

THOMAS J AND DONNIE L MOORE
3502 48 SW ST
ROCHESTER, MN 55902

MSIR 7 LLC
102 SOUTH BROADWAY 1ST F
ROCHESTER, MN 55904

KATHERINE H MUELLNER
6005 SALEM SW RD
ROCHESTER, MN 55902

GLENN E AND NANCY B S MULHOLLAND
TRUSTEE
1631 TETON NE CT
ROCHESTER, MN 55906

GARRY AND MARCIA MUSSMANN
652 SOUTHERN WOODS SW CIR
ROCHESTER, MN 55902

DENNIS L AND SANDRA K NIGON
650 SOUTHERN WOODS SW CIR
ROCHESTER, MN 55902

NORTHERN PROPERTIES LLC
47061 CHARLOTTE CT
SIOUX FALLS, SD 57108

BRIAN T AND KATHERINE NOWAK
6708 20 SW ST
BYRON, MN 55920

MARGARET A NUNEZ
1621 HOBBS ST
SAC CITY, IA 50583

BRUCE ALLEN AND MARCIA JEAN
ODENBACH
636 SOUTHERN WOODS SW CIR
ROCHESTER, MN 55902

WILLIAM L AND CAROL A OLDFIELD
2529 60 SW AVE
ROCHESTER, MN 55902

FRANCIS OLHEISER
5520 VIOLA RD
ROCHESTER, MN 55906

OLMSTED COUNTY
151 4 SE ST
ROCHESTER, MN 55904

OLMSTED COUNTY
2122 CAMPUS SE DR
ROCHESTER, MN 55904

JEREMY AND JAMIE OLSON
4804 BAMBER VALLEY SW RD
ROCHESTER, MN 55902

C MICHAEL O'NEILL
2308 45 SE ST
ROCHESTER, MN 55904

MIKE AND YVONNE O'NEILL
4320 DAFFODIL SE AVE
ROCHESTER, MN 55904

OPPORTUNITY SERVICES INC
1618 WEST THIRD ST
RED WING, MN 55066

JEFFERY D AND KATHY S ORTH
5414 HERITAGE SW LN
ROCHESTER, MN 55902

DALLAS W AND SERENA N OUDEKIRK
7706 SALEM SW RD
BYRON, MN 55920

WILLOW CREEK FARM PARTNERSHIP
1001 PLUMMER SW CIR
ROCHESTER, MN 55902

FRANCIS L AND CHARLES H PASSE
TRUSTEE
3242 60 SW AVE
ROCHESTER, MN 55902

SHERRY L AND JEFFREY R PEARSON
3987 CREEK VIEW SW LN
ROCHESTER, MN 55902

DANIEL AND TAMARA PENZ
1530 GREENVIEW SW DR
ROCHESTER, MN 55902

PEOPLES COOPERATIVE SERVICES
1775 LAKE SHADY S AVE
ORONOCO, MN 55960

GREGORY G PERRY
1230 70 SW AVE
BYRON, MN 55920

WESLEY O AND GLORIA M PETERSEN
4720 55 SW AVE
ROCHESTER, MN 55902

GERALD W AND CAROLYN S PITTELKO
4901 BAMBER VALLEY SW RD
ROCHESTER, MN 55902

POHOCOGO LLC
1244 60 NW AVE
ROCHESTER, MN 55901

DEBRA AND MICHELE C POIRE
6600 LYNDALE S AVE
MINNEAPOLIS, MN 55423

PROPERTIES OF D & D LLC
5937 15 NW ST
ROCHESTER, MN 55901

PROPERTIES OF D&D LLC
5937 15 NW ST
ROCHESTER, MN 55901

MARY DEE PYFFEROEN
4434 40 SW ST
ROCHESTER, MN 55902

KATHRYN A PYFFEROEN HUTCHINS
4434 40 SW ST
ROCHESTER, MN 55902

ROBERT C PYFFEROEN
4434 40 SW ST
ROCHESTER, MN 55902

NEIL A RABEHL TRUSTEE
7041 14 NW ST
BYRON, MN 55920

DEE ANN K RABEHL TRUSTEE
7041 14 NW ST
BYRON, MN 55920

RAVE PROPERTIES LLC
14000 VEIT PL
ROGERS, MN 55374

JAMES C AND MARY B REGENSCHEID
2365 TIMBERWOOD SW LN
ROCHESTER, MN 55902

GREGORY J AND LORA L REID TRUSTEE
5012 BAMBER VALLEY SW RD
ROCHESTER, MN 55902

MICHAEL W AND ROXANNE J ROBINSON
4705 11 SW AVE
ROCHESTER, MN 55902

ROCHESTER TOPSOIL INC
2047 CENTURY VIEW NE LN
ROCHESTER, MN 55906

ROCHESTER TOWNSHIP
4467 40 SW ST
ROCHESTER, MN 55902

ROBERT J AND RENEE A ROEDER
2306 TIMBERWOOD SW LN
ROCHESTER, MN 55902

MARGARET M ROETZER-SIMONSON
4993 50 SW ST
ROCHESTER, MN 55902

CATHERINE M ROETZLER
4815 50 SW ST
ROCHESTER, MN 55902

MARGARET M AND CATHERINE M
ROETZLER-SIMONSON
4993 50 SW ST
ROCHESTER, MN 55902

JOHN R AND DEBRA J ROWEKAMP
2332 TIMBERWOOD SW LN
ROCHESTER, MN 55902

SCOTT J AND LORI E RUSSELL
4805 SCENIC VIEW SW DR
ROCHESTER, MN 55902

CONSTANCE MARIE DRAKE SALAZAR
758 BASIL SE LN
ROCHESTER, MN 55904

SB1 ROCHESTER LLC
1255 23 NW ST
WASHINGTON, DC 20037

JOSH AND DANELLE SCHNEIDER
1408 1 NW ST
ROCHESTER, MN 55901

SCHOENFELDER FARMS
4314 30 SE AVE
ROCHESTER, MN 55904

KENNETH AND RANDALL R
SCHOENFELDER
2331 PINESTAR SE LN
ROCHESTER, MN 55904

DEBRA SCHROEDER
4304 DAFFODIL SE AVE
ROCHESTER, MN 55904

KENNETH P AND MARGARET S SCOTT
2245 48 SW ST
ROCHESTER, MN 55902

RICHARD M SEELING
4316 DAFFODIL SE AVE
ROCHESTER, MN 55904

LOUIS C AND DEBRA J SEIFERT
6990 19 NW ST
ROCHESTER, MN 55901

ENECA FOODS CORPORATION
1217 3 SE AVE
ROCHESTER, MN 55904

SAMIR SHAH
24138 N 76 PL
SCOTTSDALE, AZ 85255

GEORGE T AND MICHELLE J SIMMONS
4818 SCENIC OAK SW DR
ROCHESTER, MN 55902

SMB PROPERTY MANAGEMENT LLC
6635 ZUMBRO HYLANDS NW
ROCHESTER, MN 55901

NICKOLAS T AND LOIS J SMITH
3710 60 SW AVE
ROCHESTER, MN 55902

HERMAN JEROME SMUDE
1939 EAGLE LN
SPOONER, WI 54801

TERRY L AND VICKI S SORENSON
1510 WILLOW POINT SW LN
ROCHESTER, MN 55902

SOUTHERN WOODS 2ND ASSOC INC
706 COUNTY RD 3 NW
BYRON, MN 55920

STATE OF MINNESOTA
395 JOHN IRELAND BLVD
ST PAUL, MN 55155

SANDRA STENSLAND
4802 SCENIC OAK SW DR
ROCHESTER, MN 55902

VIRGINIA F AND GREGORY J STEVENS
607 PEONY SE ST
ROCHESTER, MN 55904

RONALD O AND BONNIE E STEVENSON
4505 50 SW ST
ROCHESTER, MN 55902

BRANDON AND MICKAEL STUVE
4817 SCENIC OAK SW DR
ROCHESTER, MN 55902

GARY A AND JUDITH A SWENSON
4467 40 SW ST
ROCHESTER, MN 55902

AARON T AND HOLLY A TEMPEL
5428 CREEK SIDE SW LN
ROCHESTER, MN 55902

THE GARDENS MANUF HOME COMM
102 BROADWAY S
ROCHESTER, MN 55904

THE GARDENS OWNERS ASSOCIATION
102 SOUTH BROADWAY 1ST F
ROCHESTER, MN 55904

PATTI KAE THEEL
3930 SIMPSON SE RD
ROCHESTER, MN 55904

TERRY M AND SANDRA A THEEL
2025 45 SE ST
ROCHESTER, MN 55904

HARLAN N AND ARLENE J THONE
1734 WALDEN SW LN
ROCHESTER, MN 55902

RICHARD W AND CAROL A TIEDE
1450 WILLOW POINT SW LN
ROCHESTER, MN 55902

MARLIN I TLOUGAN
6844 14 NW ST
BYRON, MN 55920

MARLIN I TLOUGAN
6940 14 NW ST
BYRON, MN 55920

RANDY P AND REBECCA A TOMFOHRDE
1413 60 NW AVE
BYRON, MN 55920

RICKY A TOWNSEND
3763 SIMPSON SE RD
ROCHESTER, MN 55904

ROBERT K AND CAROL J TWETEN
718 2 NW AVE
BYRON, MN 55920

VALLEY GOLF INC
1700 48 SW ST
ROCHESTER, MN 55902

GURINDER AND PARAHAJOT K VASDEV
5581 40 SW ST
ROCHESTER, MN 55902

LARRY L AND NANCY L VESTAL
608 PEONY SE ST
ROCHESTER, MN 55904

JOEY M AND LAURA M VOGEL
4833 SCENIC VIEW SW DR
ROCHESTER, MN 55902

WAYNE F AND KATHRYN E VOGT
4810 SCENIC OAK SW DR
ROCHESTER, MN 55902

ANTHONY L AND CORRIE E WAGNER
3310 COUNTY RD 15 SW
BYRON, MN 55920

LOUIS L AND ILA J WAGNER
3615 SIMPSON SE RD
ROCHESTER, MN 55904

MARK A AND MARY ELLEN WARNER
TRUSTEE
3535 BAMBER VALLEY SW RD
ROCHESTER, MN 55902

WATERFRONT BUSINESS PARK LLC
3725 ENTERPRISE SW DR
ROCHESTER, MN 55902

DENISE JEANNE WEDEL
5930 HEATHER SW DR
ROCHESTER, MN 55902

MICHAEL G AND ANNE WEEK
2381 TIMBERWOOD SW LN
ROCHESTER, MN 55902

GREGORY L AND GWEN D WELLIK
634 S POINTE SW LN
ROCHESTER, MN 55902

WESTRIDGE HILLS CORPORATION
1320 WICKLOW SW LN
ROCHESTER, MN 55902

WESTRIDGE HILLS INC
1320 WICKLOW SW LN
ROCHESTER, MN 55902

DENNIS A AND NEVENKA WIGLE
1277 WICKLOW SW LN
ROCHESTER, MN 55902

AUGUST A WILLAIMS
WILLIAMS HILLTOP PLD HEREFORDS
5248 SIMPSON SE RD
ROCHESTER, MN 55904

CURT WILLIAMS
757 BASIL SE LN
ROCHESTER, MN 55904

TAWNY WILLIAMS
746 BASIL SE LN
ROCHESTER, MN 55904

WILLOW CREEK COMMONS LLC
3800 HWY 52 N
ROCHESTER, MN 55901

SJC PROPERTIES LLC
3800 HWY 52 N
ROCHESTER, MN 55901

WILLOW POINT TOWNHOMES HOMEOWN
706 COUNTY ROAD 3 NW
BYRON, MN 55920

WILLOW POINT TWNHOMES ASSOC
1522 WILLOW POINT SW LN
ROCHESTER, MN 55902

WILLOW RIDGE MOBILE HOME PARK
3775 WILLOW RIDGE SW DR
ROCHESTER, MN 55902

RYAN AND JESSICA WILTGEN
4809 SCENIC OAKS SW DR
ROCHESTER, MN 55902

LELAND J AND CHARLOTTE B WISKOW
1522 WILLOW POINT SW LN
ROCHESTER, MN 55902

XW II LLC
3230 LAS FALDAS DR
FULLERTON, CA 92835

MARK D HANSON
YH DEE LLC
4100 BERKSHIRE SW RD
ROCHESTER, MN 55902

FOXFEATHER R AND ROMAN ZENKOVA
741 BASIL SE LN
ROCHESTER, MN 55904

KENNETH D AND ADELE ZIMMERMAN
2509 48 SW ST
ROCHESTER, MN 55902

JON AND MELANIE ZYCH
4212 DAFFODIL SE AVE
ROCHESTER, MN 55904