Farm Creek Trunk Sewer Replacement Project
Preliminary Engineering, Alternative Route Analysis, and Recommended Route Determination

December 11, 2023

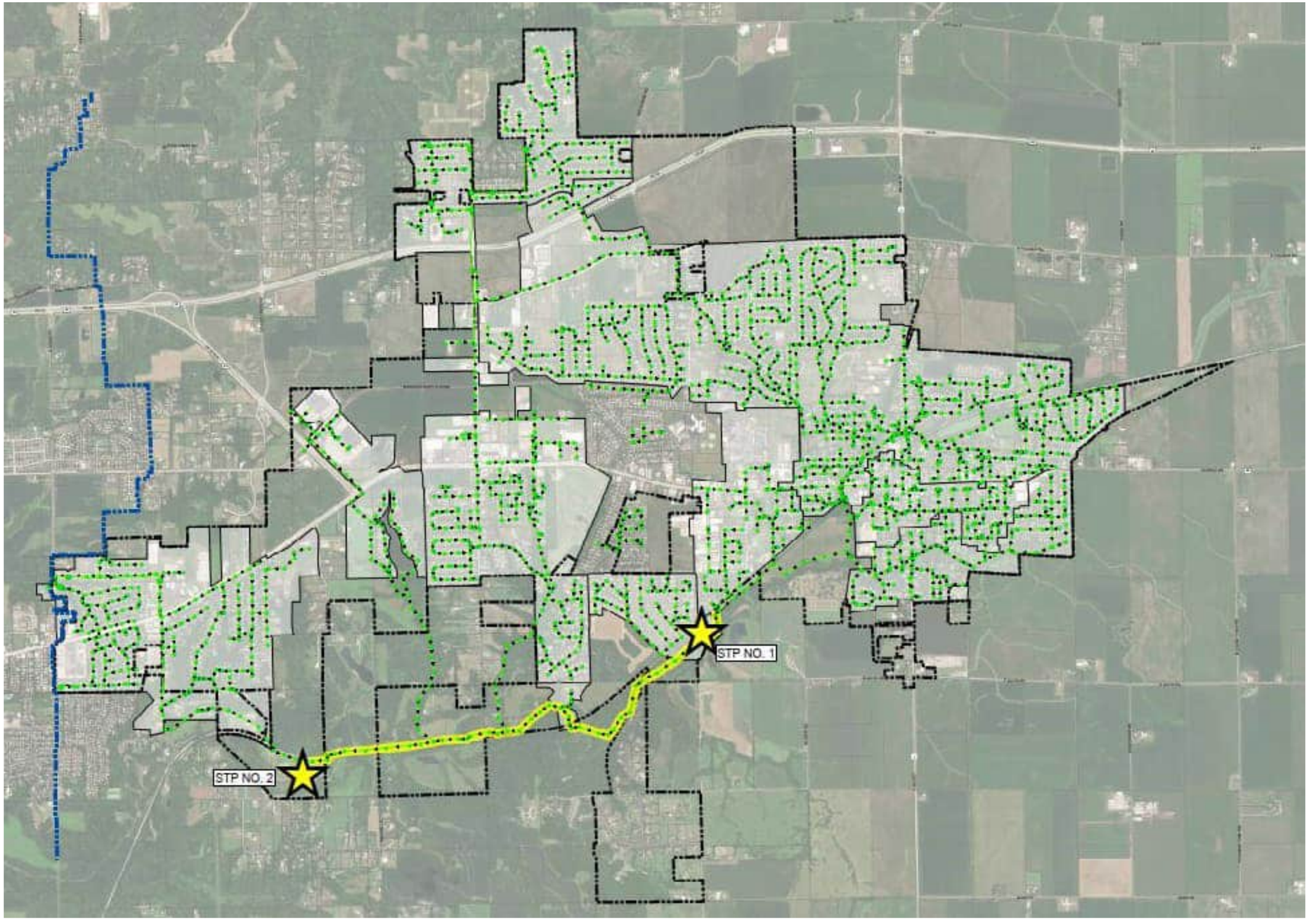
City of Washington, Illinois

STRAND ASSOCIATES®

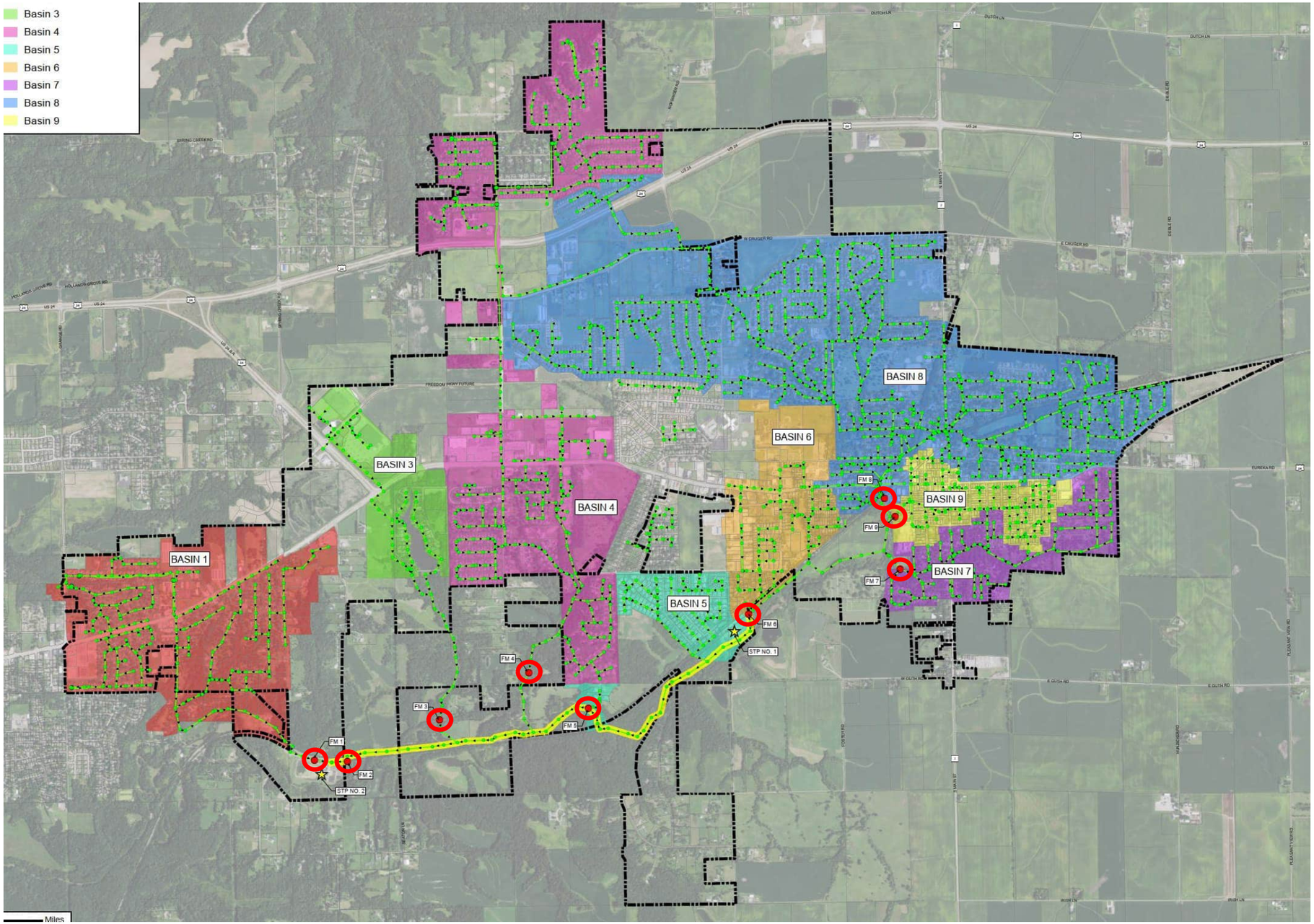
Presentation Overview

- Revisit Flow Monitoring Investigation Supporting Sanitary Sewer Conveyance Improvements
- Review of Alternative Route Analyses Performed for New Sewer Routing
- Explanation of Recommended Route Determination
- Feasibility of Excess Flow Lagoon and Focused Conveyance Improvements

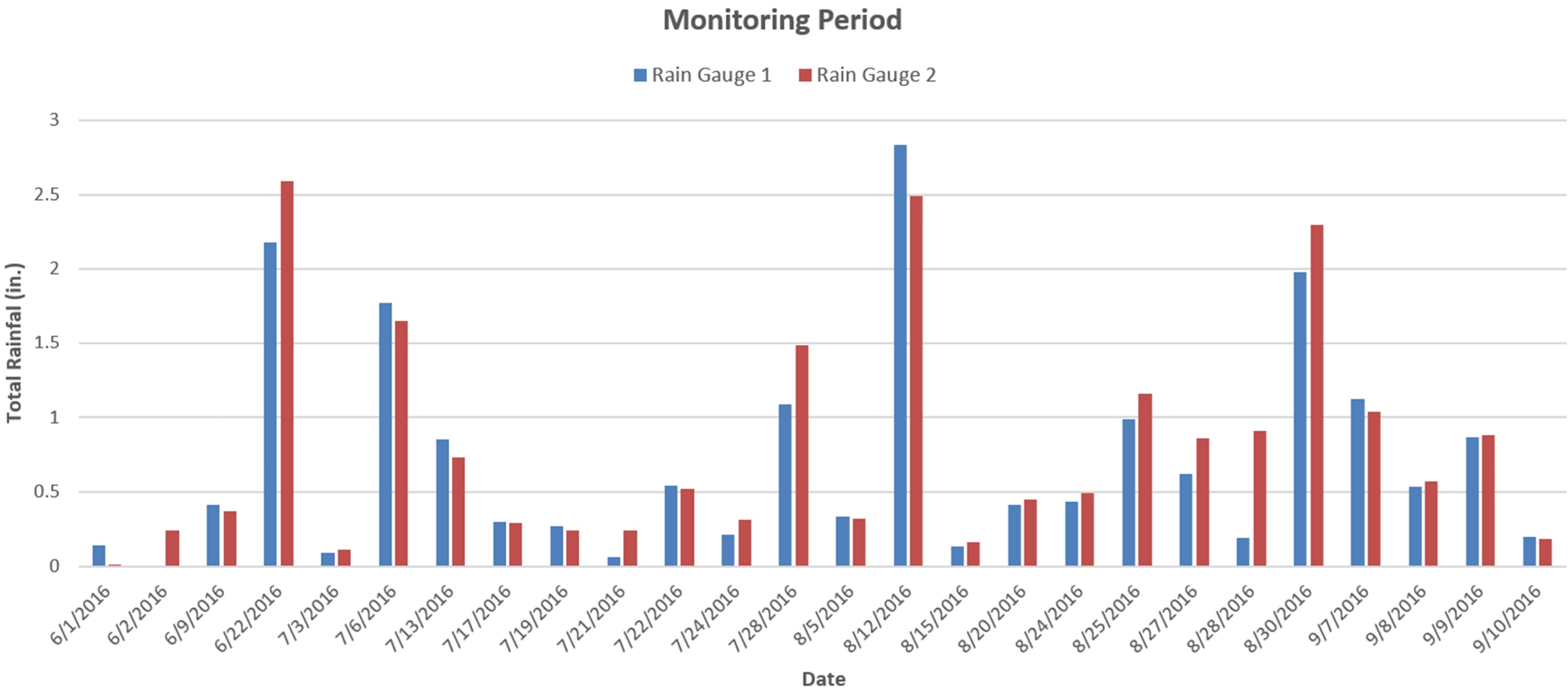
2016 Flow Monitoring Program – Sewer Service Area



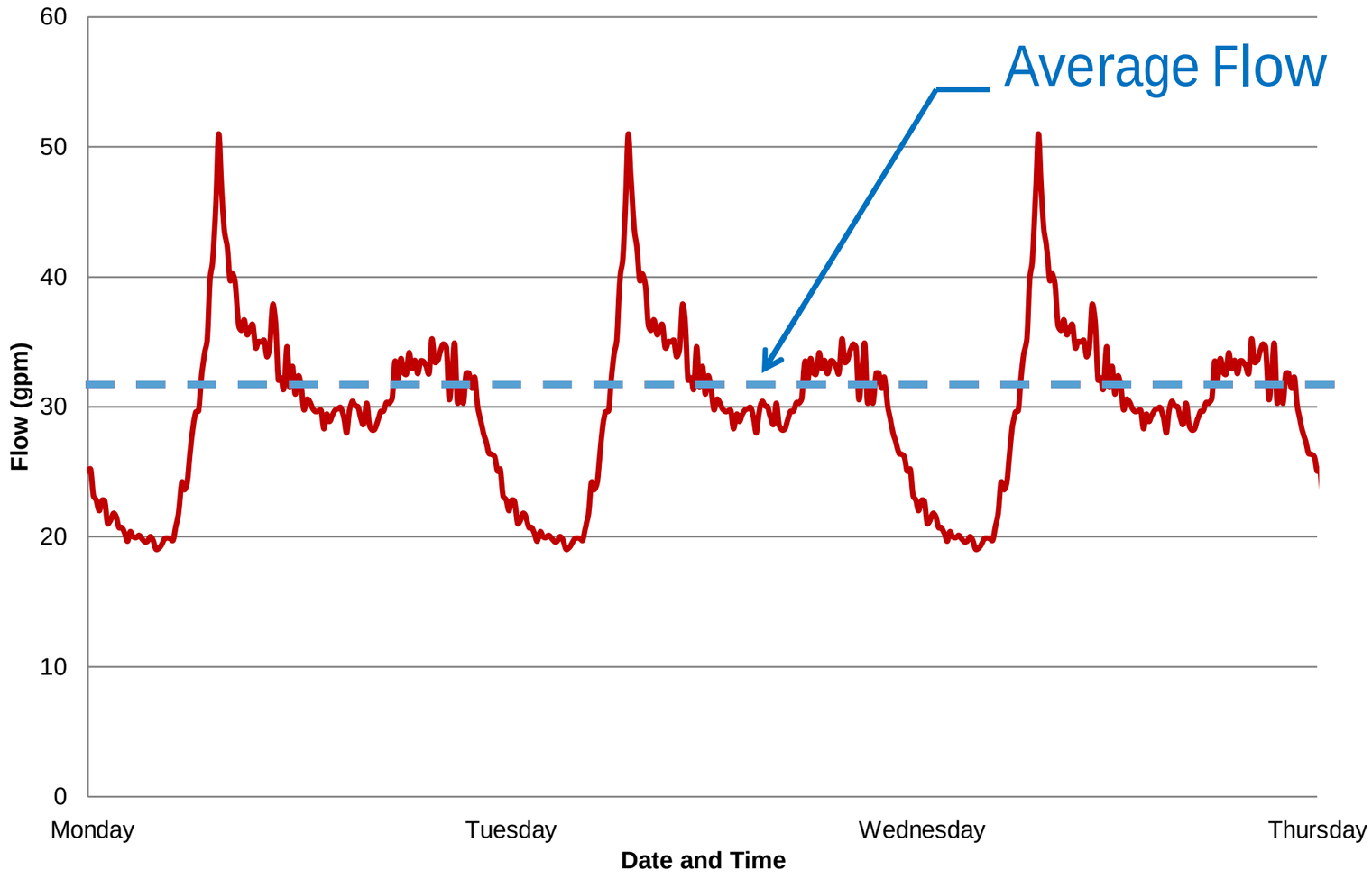
2016 Flow Monitoring Program – 9 Flow Meters and 8 Subbasins



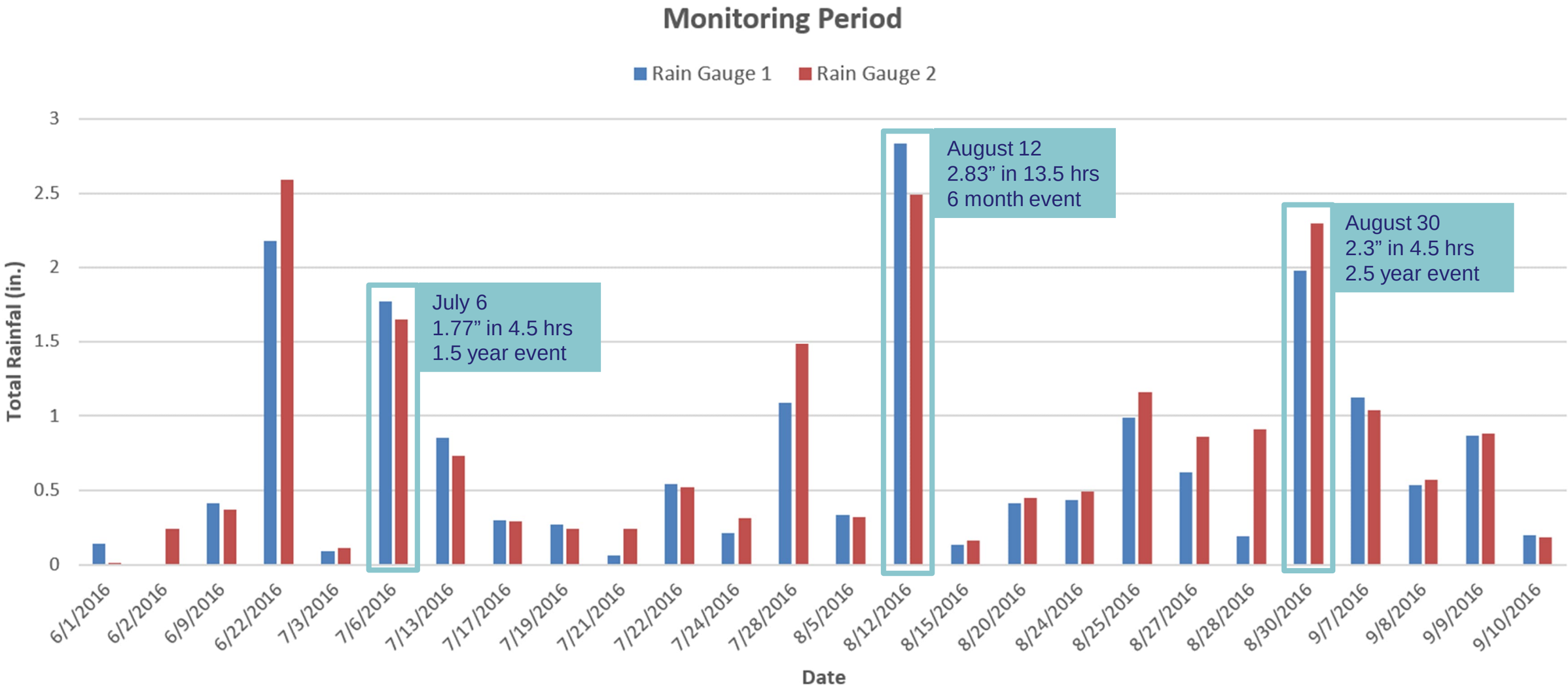
2016 Flow Monitoring Program – 100 Days of Monitoring



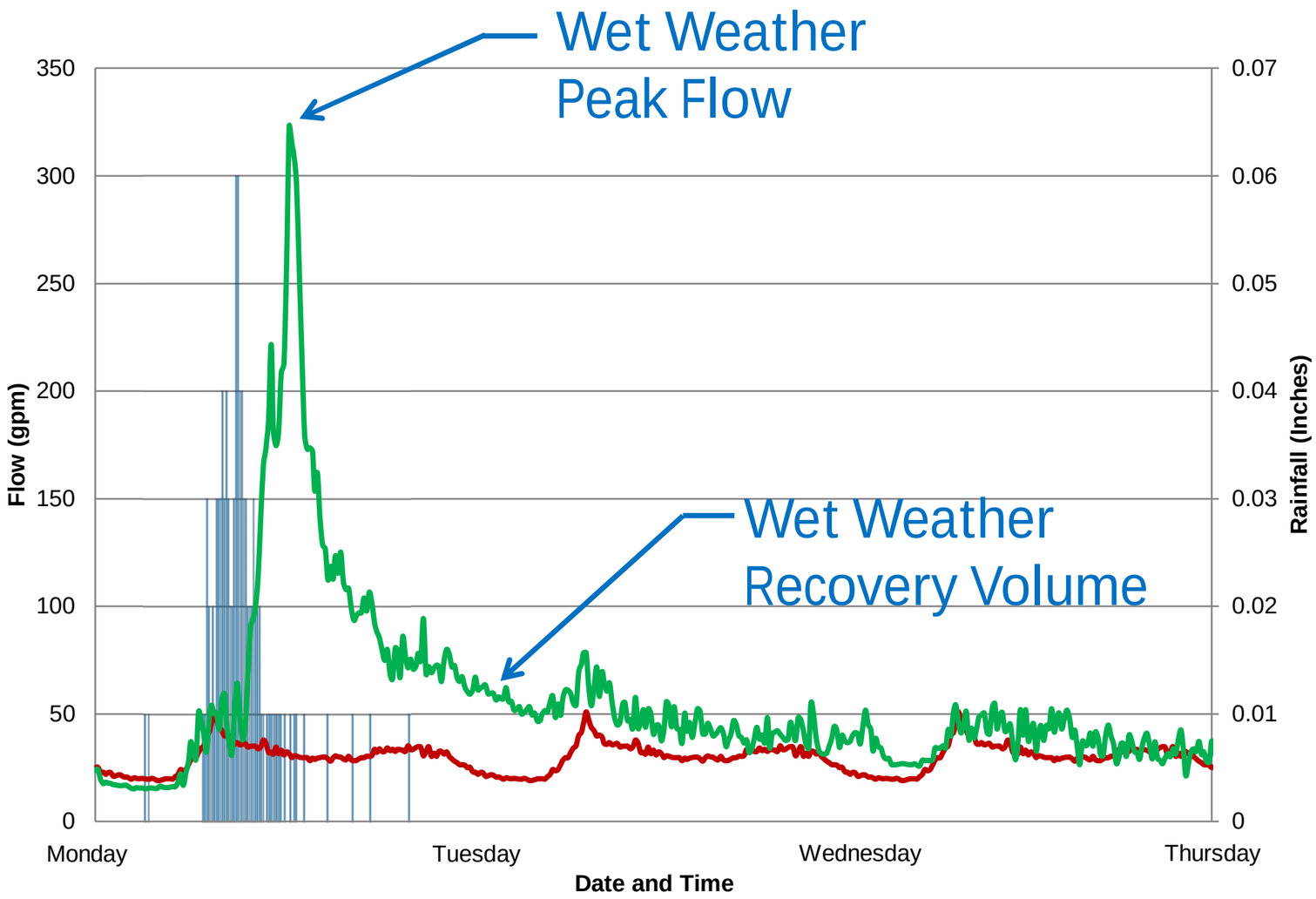
2016 Flow Monitoring Program – 100 Days of Monitoring – Dry Weather



2016 Flow Monitoring Program – 100 Days of Monitoring – Wet Weather

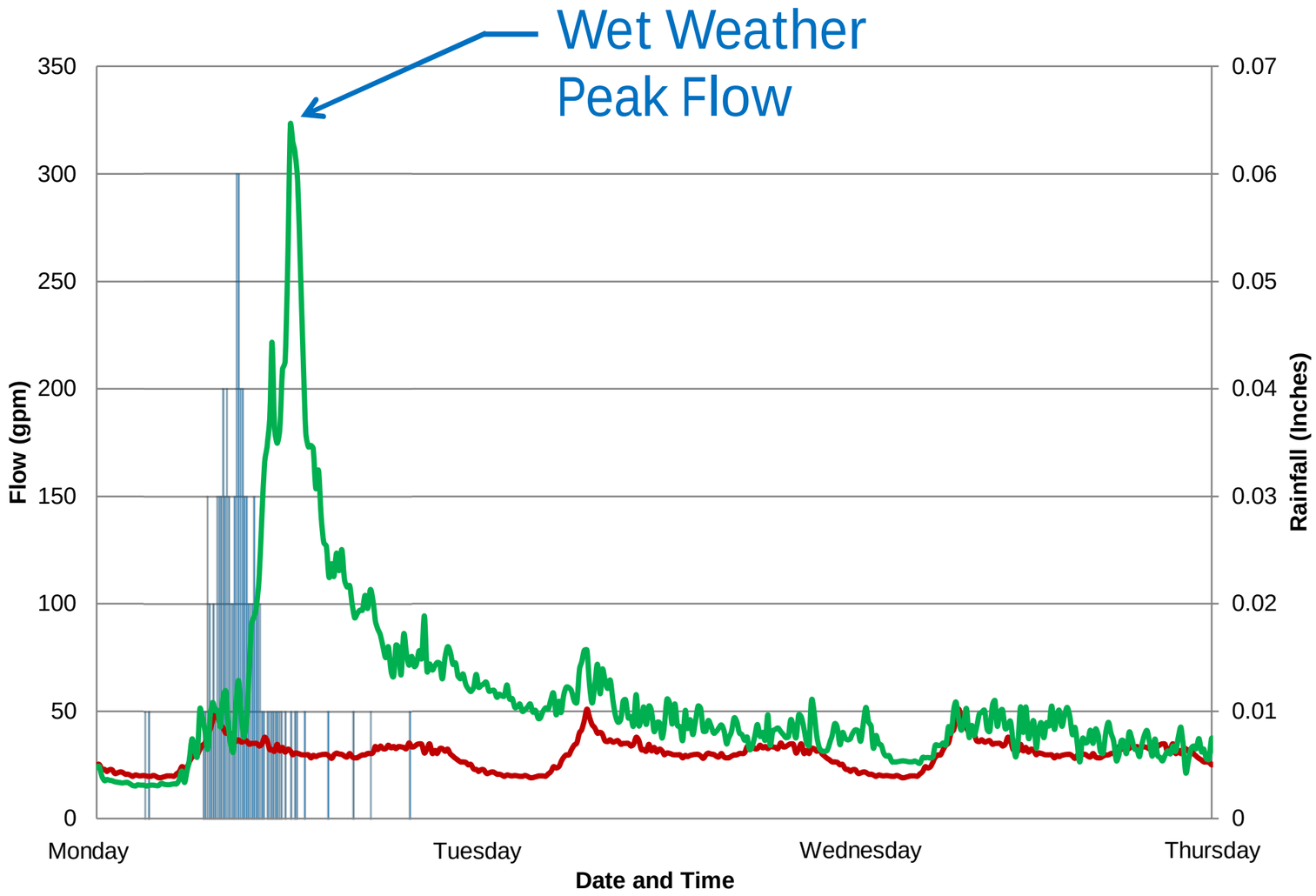


2016 Flow Monitoring Program – 100 Days of Monitoring – Wet Weather



2016 Flow Monitoring Program – Wet Weather Peak Flow

Metered Basin	Theoretic Peaking Factor
FM 1	3.32
FM 3*	3.77
FM 4	3.04
FM 5	2.75
FM 7	3.69
FM 8	2.96
FM 9	3.69



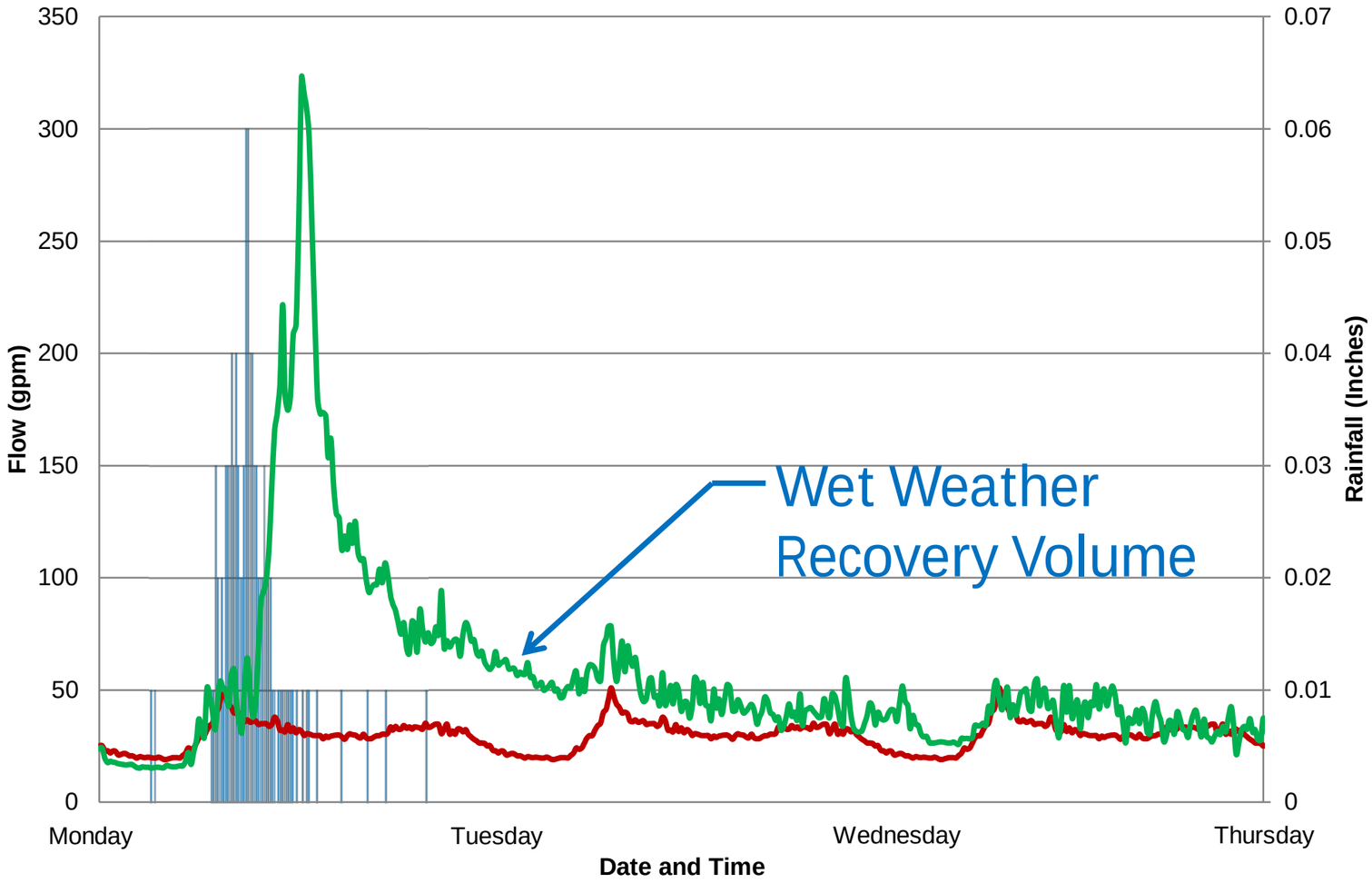
2016 Flow Monitoring Program – Wet Weather Peak Flow

Metered Basin	Theoretic Peaking Factor	Average Dry Weather Flow (gpm)	July 6, 2016		August 12, 2016		August 30, 2016	
			Peak Flow (gpm)	Peaking Factor	Peak Flow (gpm)	Peaking Factor	Peak Flow (gpm)	Peaking Factor
FM 1	3.32	179	641	3.12	1,341	6.87	2,290	11.97
FM 3*	3.77	17	N/A	N/A	N/A	N/A	N/A	N/A
FM 4	3.04	363	639	1.36	795	1.85	909	1.36
FM 5	2.75	367	1,668	6.18	2,361	6.19	2,583	7.21
FM 7	3.69	56	511	7.63	1,754	29.76	3,142	50.50
FM 8	2.96	640	3,610	8.16	3,557	5.80	9,584	8.56
FM 9	3.69	78	622	9.66	914	10.45	3,391	43.45

2016 Flow Monitoring Program – Wet Weather Peak Flow

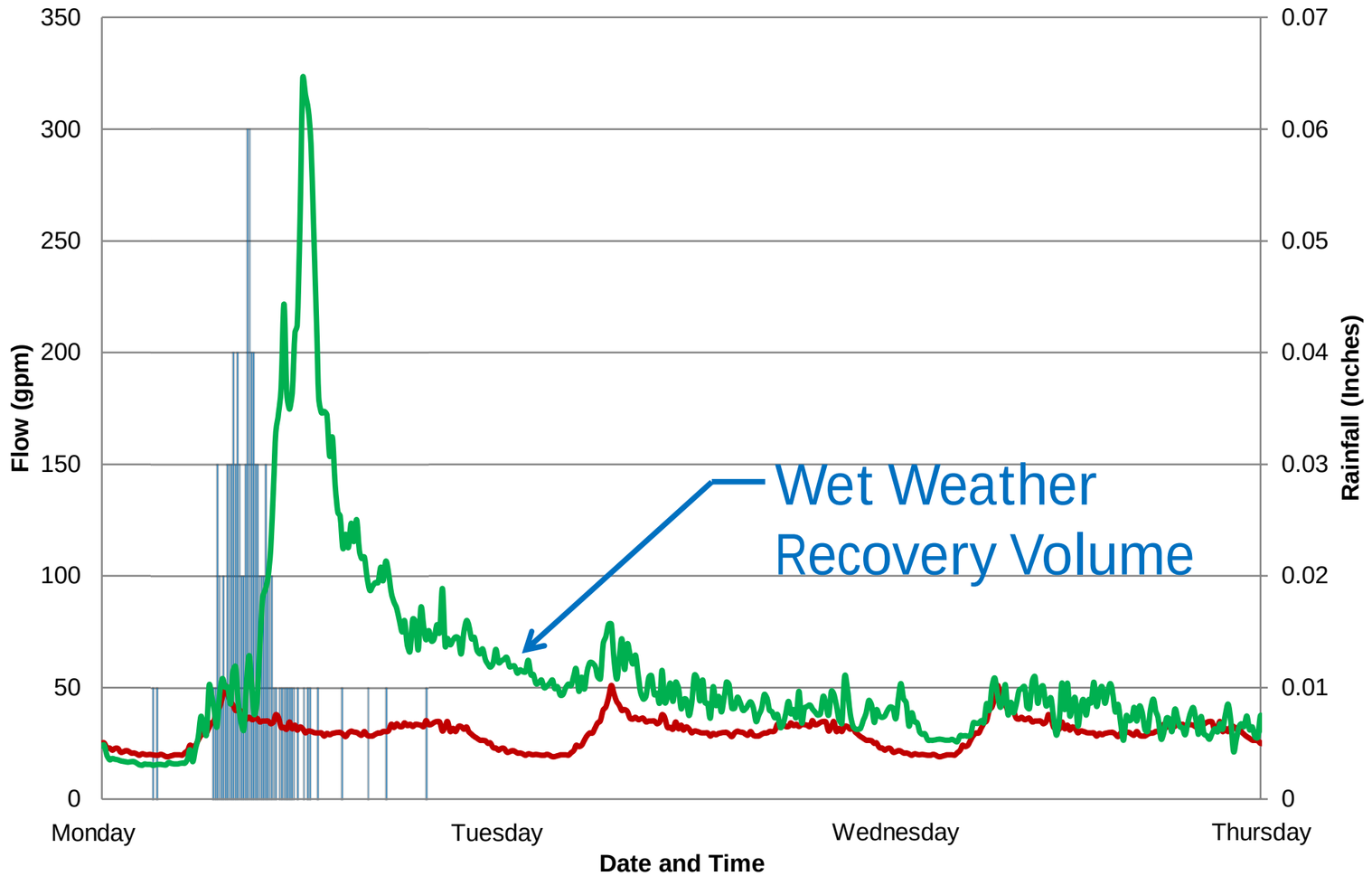
Metered Basin	Theoretic Peaking Factor	Average Dry Weather Flow (gpm)	July 6, 2016		August 12, 2016		August 30, 2016	
			Peak Flow (gpm)	Peaking Factor	Peak Flow (gpm)	Peaking Factor	Peak Flow (gpm)	Peaking Factor
FM 1	3.32	179	641	3.12	1,341	6.87	2,290	11.97
FM 3*	3.77	17	N/A	N/A	N/A	N/A	N/A	N/A
FM 4	3.04	363	639	1.36	795	1.85	909	1.36
FM 5	2.75	367	1,668	6.18	2,361	6.19	2,583	7.21
FM 7	3.69	56	511	7.63	1,754	29.76	3,142	50.50
FM 8	2.96	640	3,610	8.16	3,557	5.80	9,584	8.56
FM 9	3.69	78	622	9.66	914	10.45	3,391	43.45

2016 Flow Monitoring Program – Wet Weather Recovery Volume



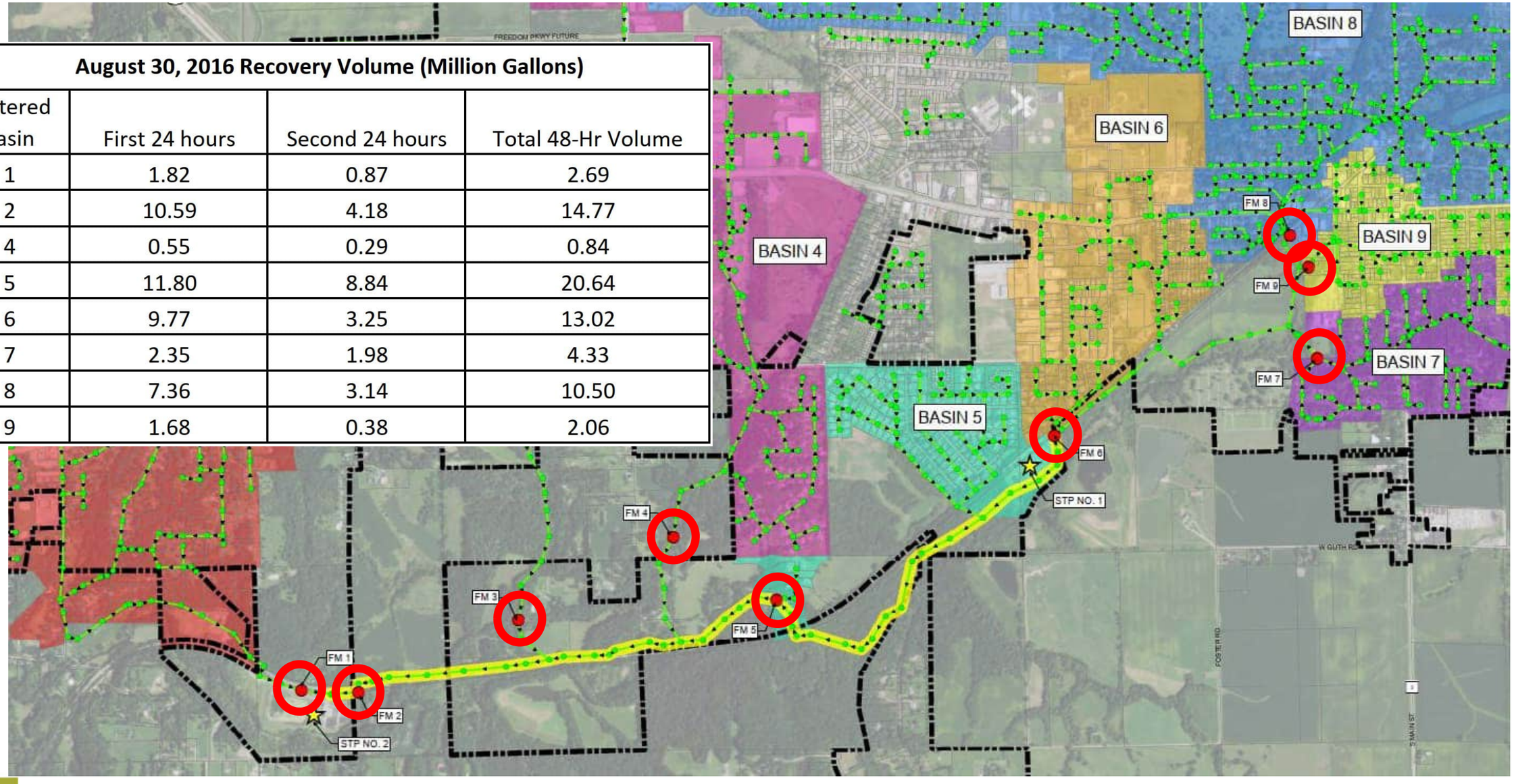
2016 Flow Monitoring Program – Wet Weather Recovery Volume

Metered Basin	July 6	August 12	August 30
	I/I Volume	I/I Volume	I/I Volume
	1,000 gallons	1,000 gallons	1,000 gallons
FM 1	1,131.67	5,028.56	7,819.43
FM 4	1,470.23	667.45	247.66
FM 5	2,392.74	2,380.64	10,807.90
FM 7	709.05	1,164.33	8,365.95
FM 8	3,983.77	500.27	13,241.92
FM 9	591.58	546.48	30,308.90

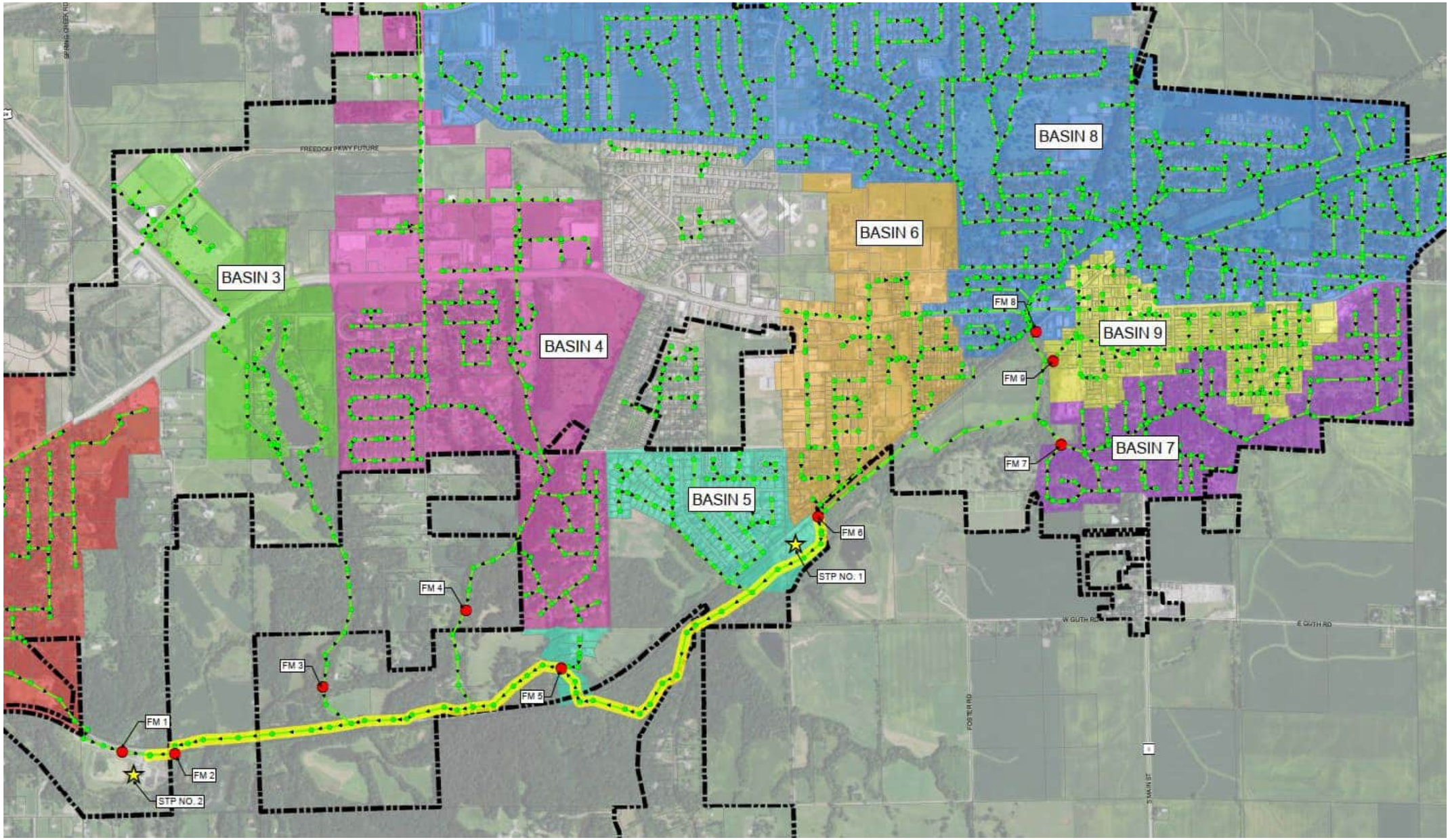


2016 Flow Monitoring Program – Wet Weather Recovery Volume

August 30, 2016 Recovery Volume (Million Gallons)			
Metered Basin	First 24 hours	Second 24 hours	Total 48-Hr Volume
1	1.82	0.87	2.69
2	10.59	4.18	14.77
4	0.55	0.29	0.84
5	11.80	8.84	20.64
6	9.77	3.25	13.02
7	2.35	1.98	4.33
8	7.36	3.14	10.50
9	1.68	0.38	2.06



2016 Flow Monitoring Program – Existing FCTS Capacity Analysis



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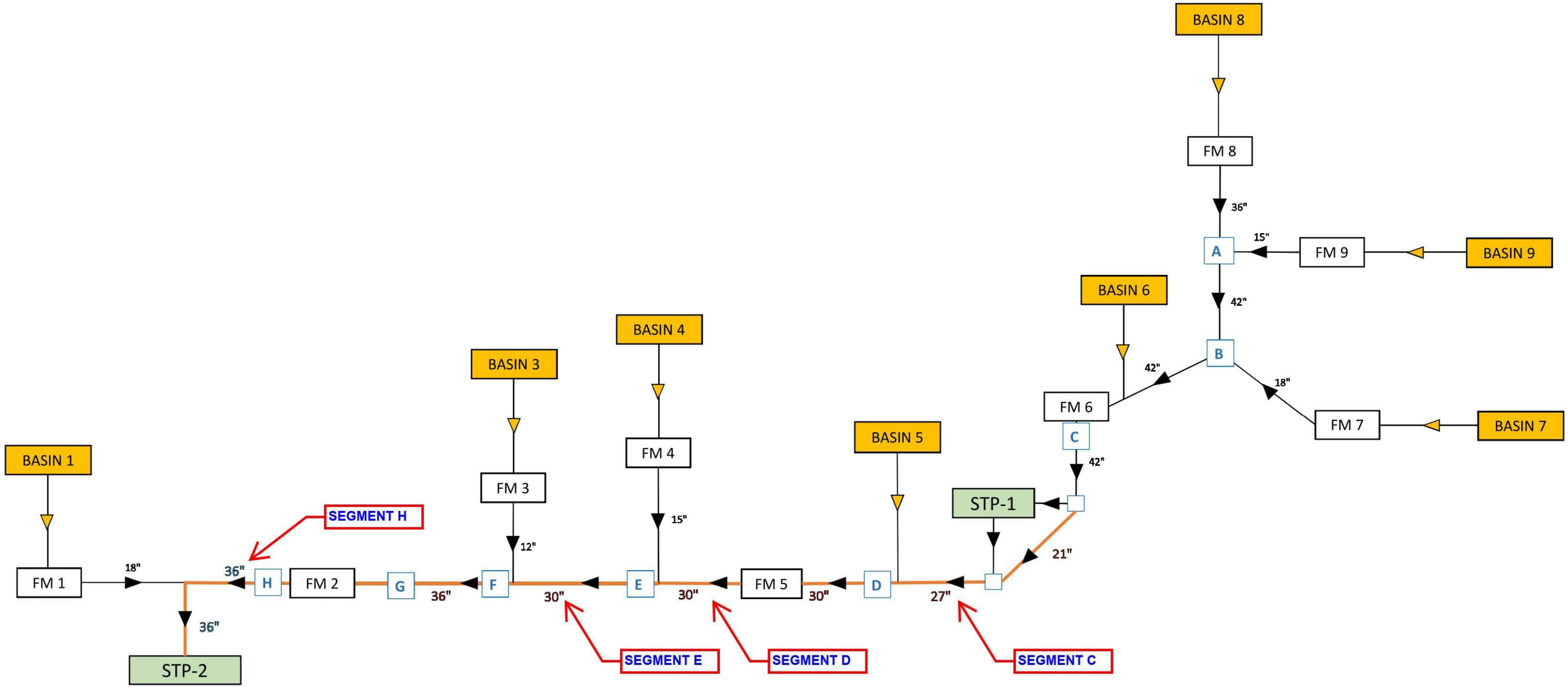


2016 Flow Monitoring Program – Existing FCTS Capacity Analysis

Flow Schematic	Metered Flows (gpm)		
	Average Daily Flow (ADF)	July 6, 2016 Peak Flow	Aug. 30, 2016 Peak Flow
Segment C	936	5,328	16,702
Basin 5	345	1,668	2,583
Segment D	1,281	6,996	19,285
Basin 4	349	639	909
Segment E	1,630	7,635	20,194
Basin 3	17	139	139
Segment H	1,647	7,774	20,333
Basin 1	179	641	2,290
STP-2	1,826	8,415	22,623

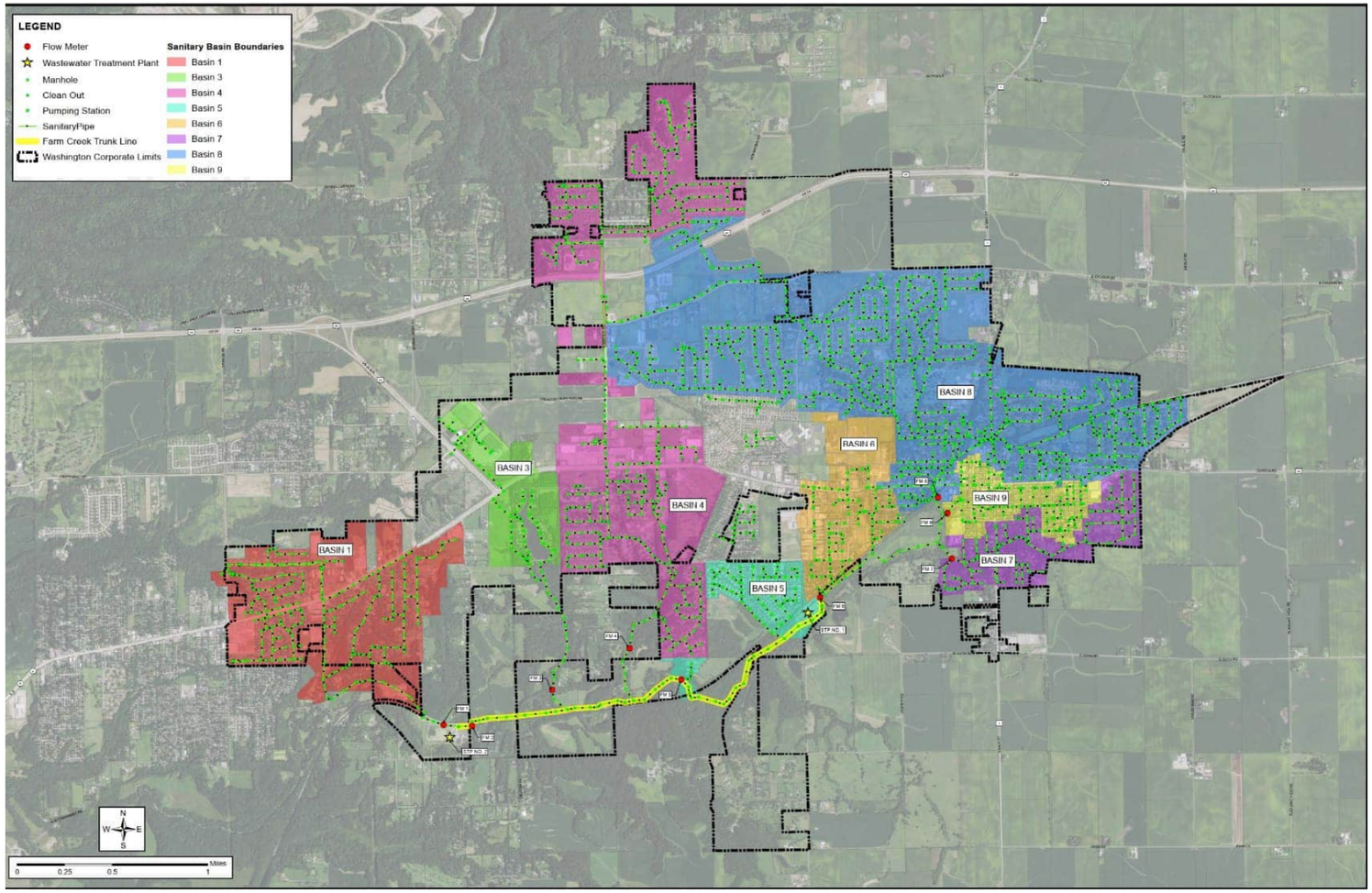
2016 Flow Monitoring Program – Existing FCTS Capacity Analysis

Flow Schematic	Metered Flows (gpm)			Existing Full-Pipe Capacity (gpm)		
	Average Daily Flow (ADF)	July 6, 2016 Peak Flow	Aug. 30, 2016 Peak Flow	Existing Pipe Size (inch)	Pipe Slope [5] (%)	Existing Pipe Capacity
Segment C	936	5,328	16,702	27	0.280	7,354
Basin 5	345	1,668	2,583			
Segment D	1,281	6,996	19,285	30	0.058	4,433
Basin 4	349	639	909			
Segment E	1,630	7,635	20,194	30	0.058	4,433
Basin 3	17	139	139			
Segment H	1,647	7,774	20,333	36	0.046	6,420
Basin 1	179	641	2,290			
STP-2	1,826	8,415	22,623	36	0.060	7,332

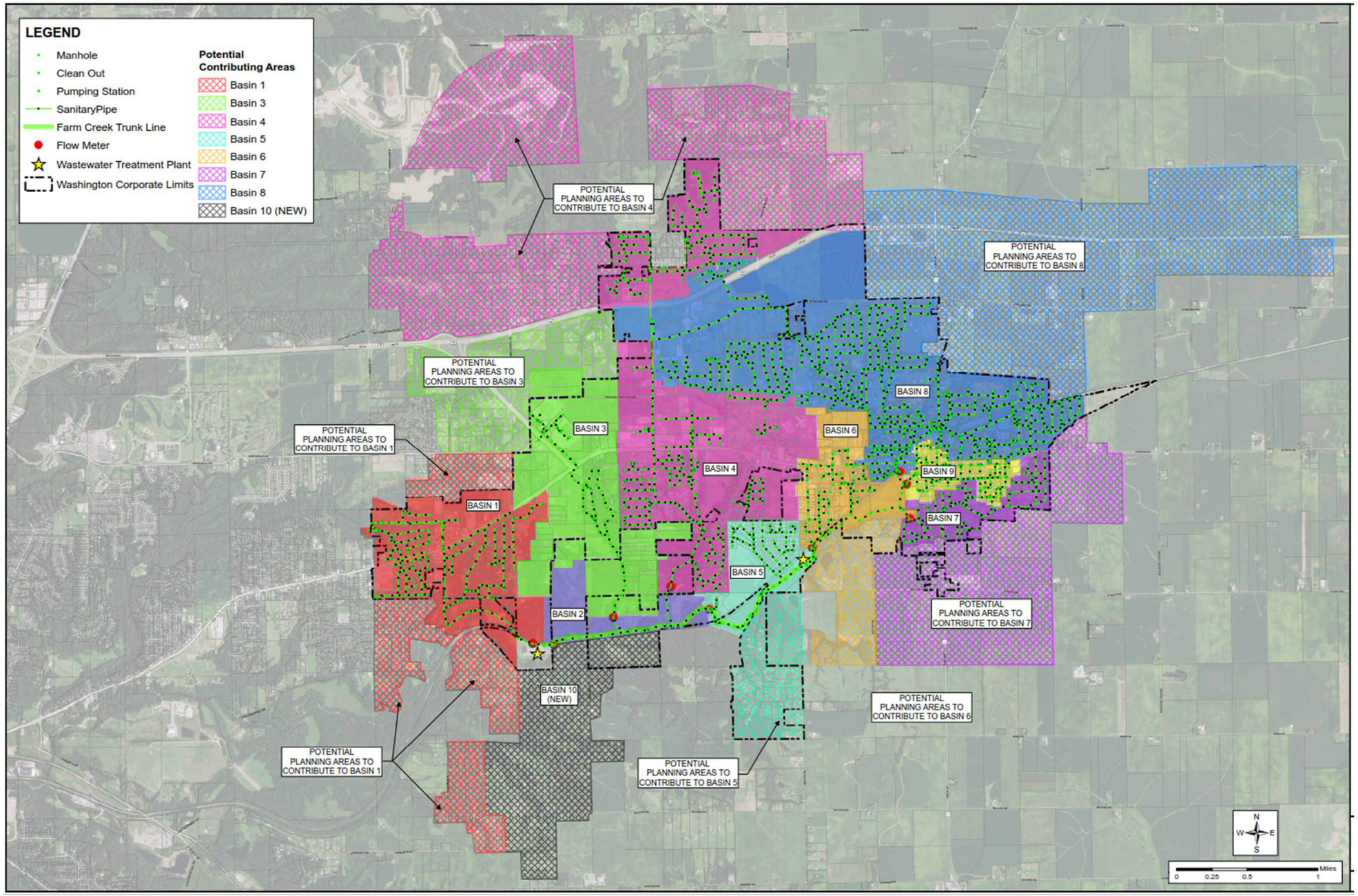
2016 Flow Monitoring Program – Existing FCTS Capacity Analysis

Flow Schematic	Metered Flows (gpm)			Existing Full-Pipe Capacity (gpm)			% of Pipe Capacity		
	Average Daily Flow (ADF)	July 6, 2016 Peak Flow	Aug. 30, 2016 Peak Flow	Existing Pipe Size (inch)	Pipe Slope [5] (%)	Existing Pipe Capacity	ADF	July 6, 2016	Aug. 30, 2016
Segment C	936	5,328	16,702	27	0.280	7,354	13%	72%	227%
Basin 5	345	1,668	2,583						
Segment D	1,281	6,996	19,285	30	0.058	4,433	29%	158%	435%
Basin 4	349	639	909						
Segment E	1,630	7,635	20,194	30	0.058	4,433	37%	172%	456%
Basin 3	17	139	139						
Segment H	1,647	7,774	20,333	36	0.046	6,420	26%	121%	317%
Basin 1	179	641	2,290						
STP-2	1,826	8,415	22,623	36	0.060	7,332	25%	115%	309%

2016 Flow Monitoring Program – Projected Future Flow Conditions



2016 Flow Monitoring Program – Projected Future Flow Conditions



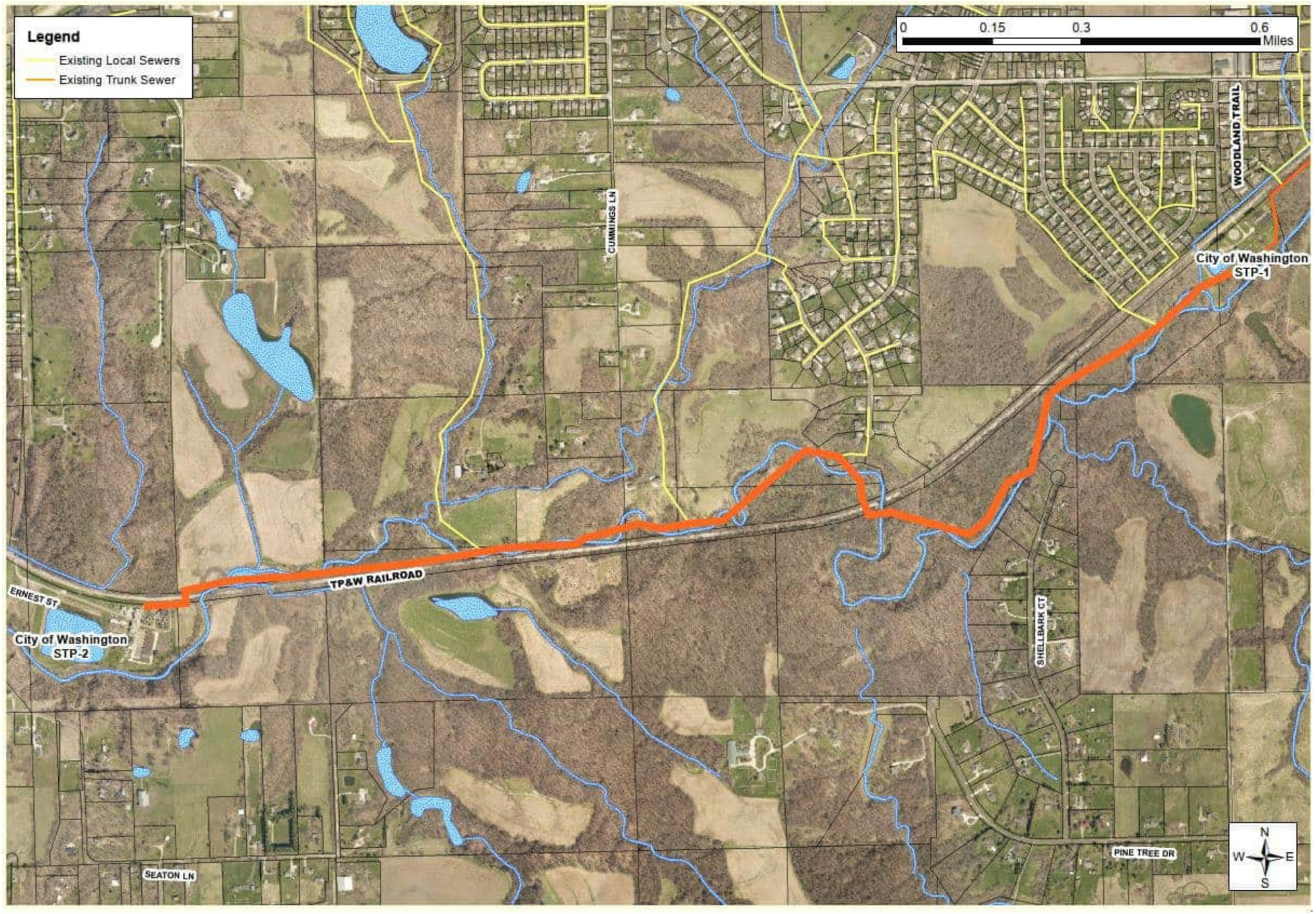
2016 Flow Monitoring Program – Projected Future Flow Conditions

Flow Schematic	Pipe Size for July 6, 2016 Rain Event			
	Pipe Size (inch)	Pipe Capacity (gpm)	% of Pipe Capacity at ADF	% of Pipe Capacity July 6
Segment C	36	16,394	29%	84%
Basin 5				
Segment D	36	16,394	32%	96%
Basin 4				
Junction E	36	17,708	36%	100%
Basin 3				
Junction H	36	18,930	38%	101%
Basin 1				
STP-2	36	21,165	36%	96%

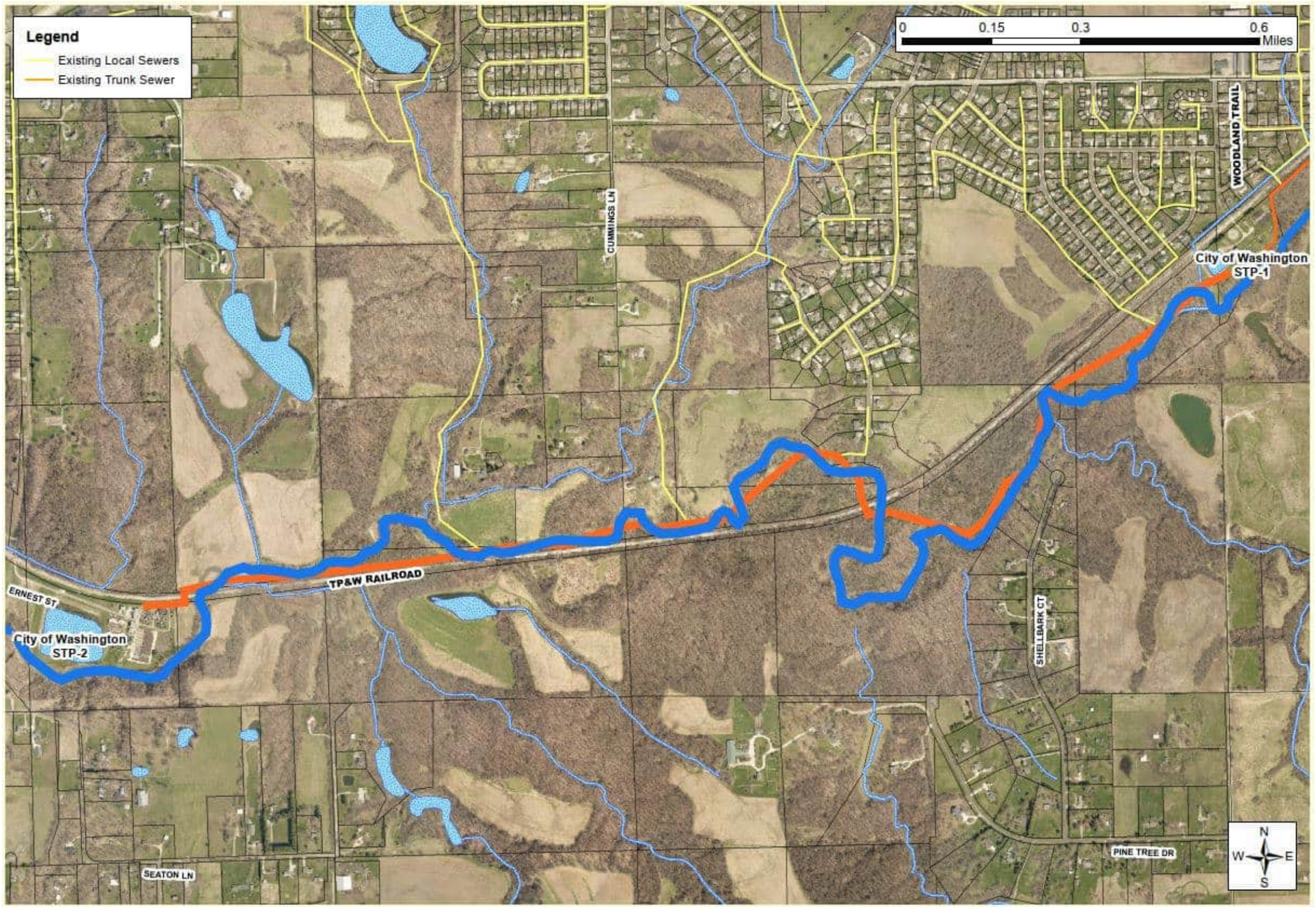
2016 Flow Monitoring Program – Projected Future Flow Conditions

Flow Schematic	Pipe Size for July 6, 2016 Rain Event				Pipe Size for Aug. 30, 2016 Rain Event		
	Pipe Size (inch)	Pipe Capacity (gpm)	% of Pipe Capacity at ADF	% of Pipe Capacity July 6	Pipe Size (inch)	Pipe Capacity (gpm)	% of Pipe Capacity Aug. 30
Segment C	36	16,394	29%	84%	42	24,729	101%
Basin 5							
Segment D	36	16,394	32%	96%	42	24,729	114%
Basin 4							
Junction E	36	17,708	36%	100%	42	26,711	113%
Basin 3							
Junction H	36	18,930	38%	101%	42	28,555	111%
Basin 1							
STP-2	36	21,165	36%	96%	42	31,925	108%

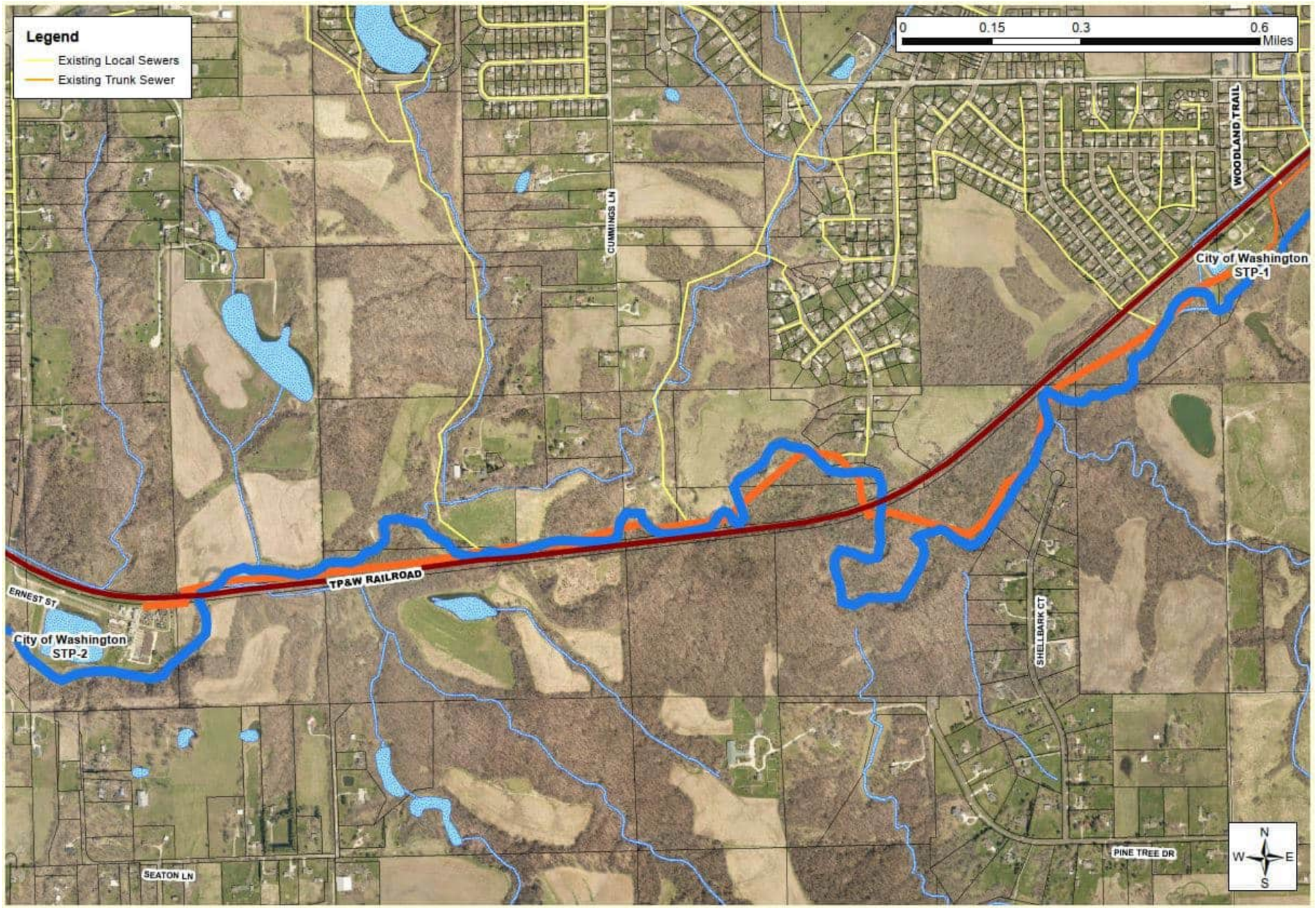
Existing Farm Creek Trunk Sewer (FCTS) – Alternative Route Analysis



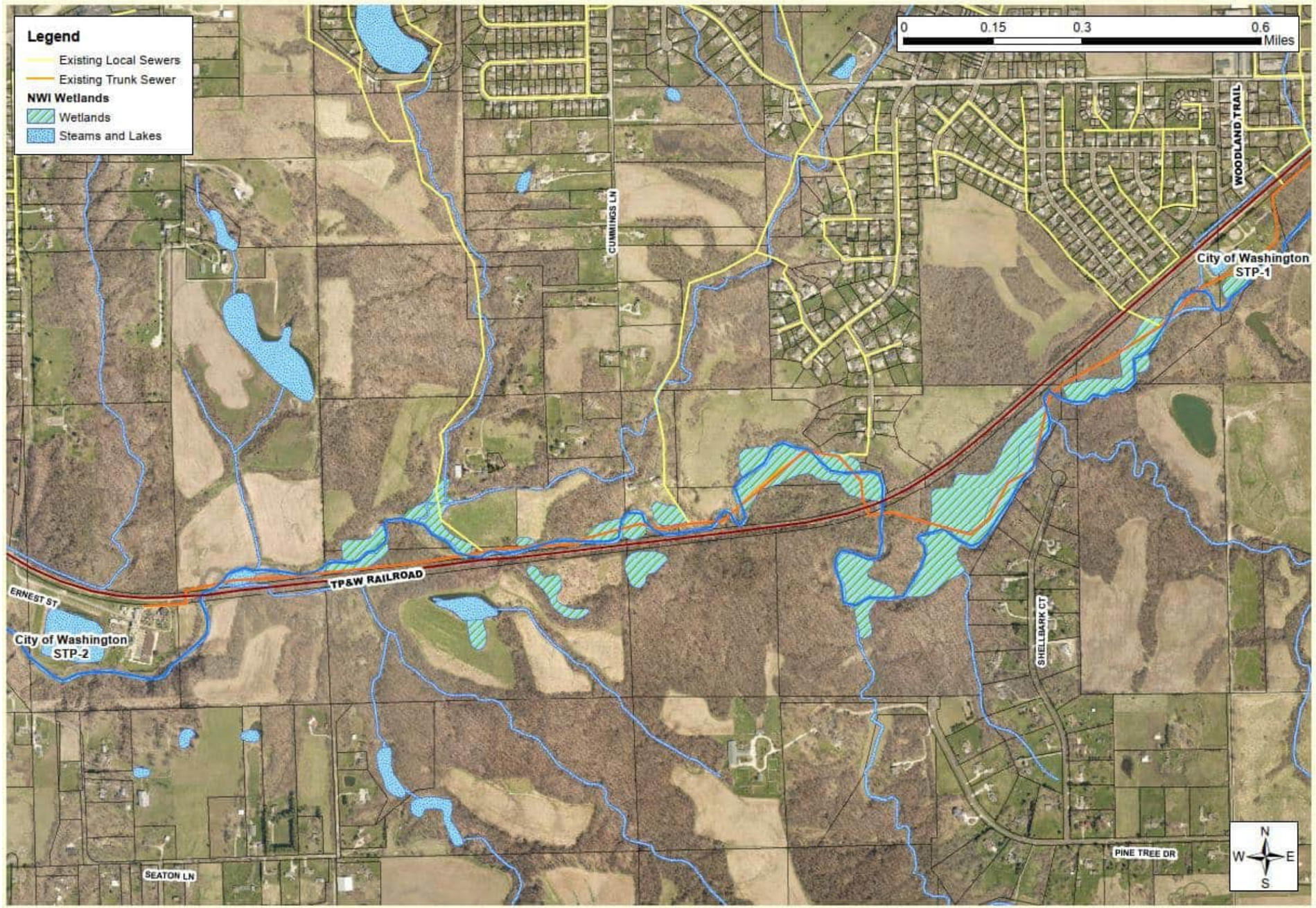
Existing Farm Creek Trunk Sewer (FCTS) – Farm Creek



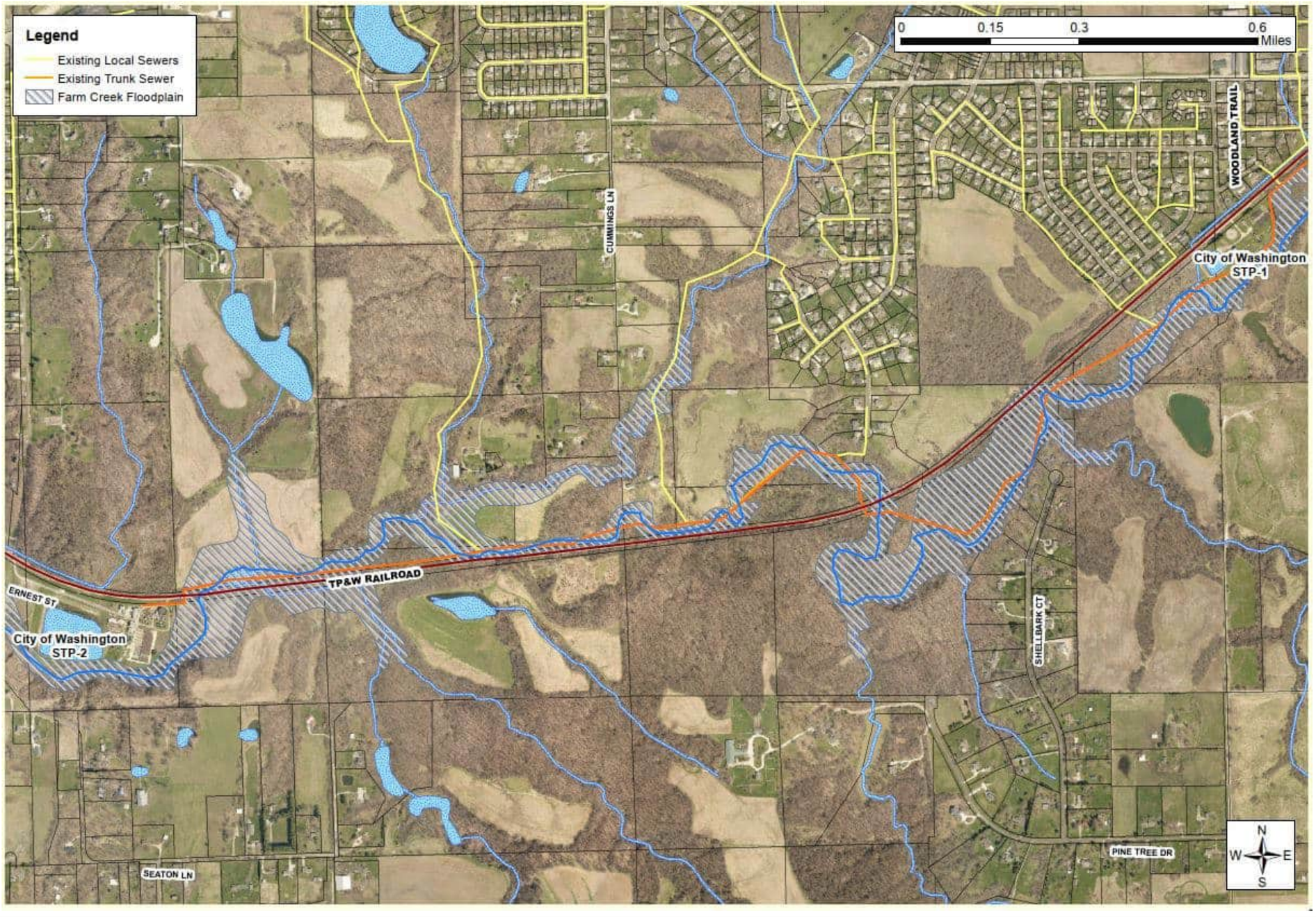
Existing Farm Creek Trunk Sewer (FCTS) - Railroad



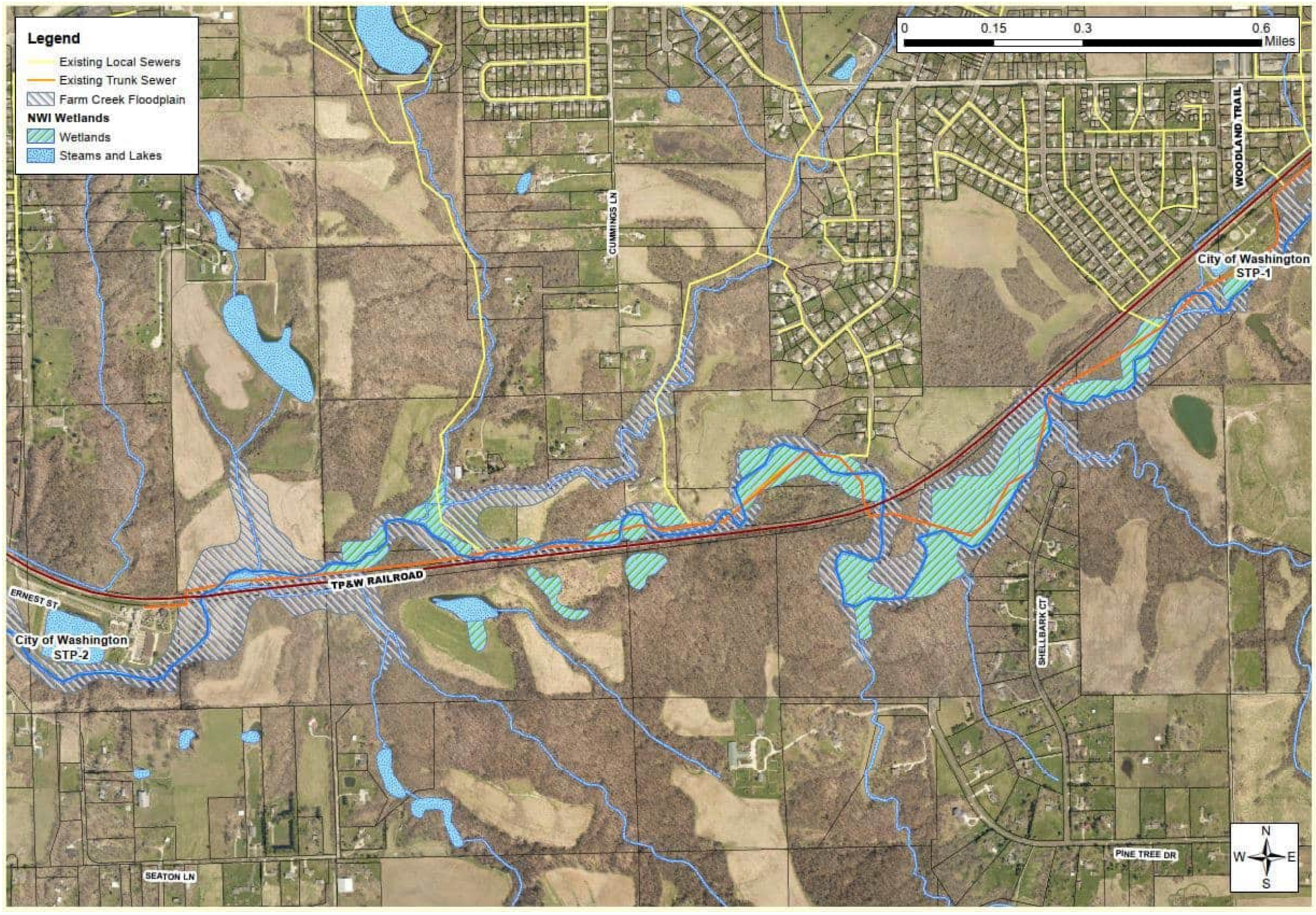
Existing Farm Creek Trunk Sewer (FCTS) – National Wetland Inventory



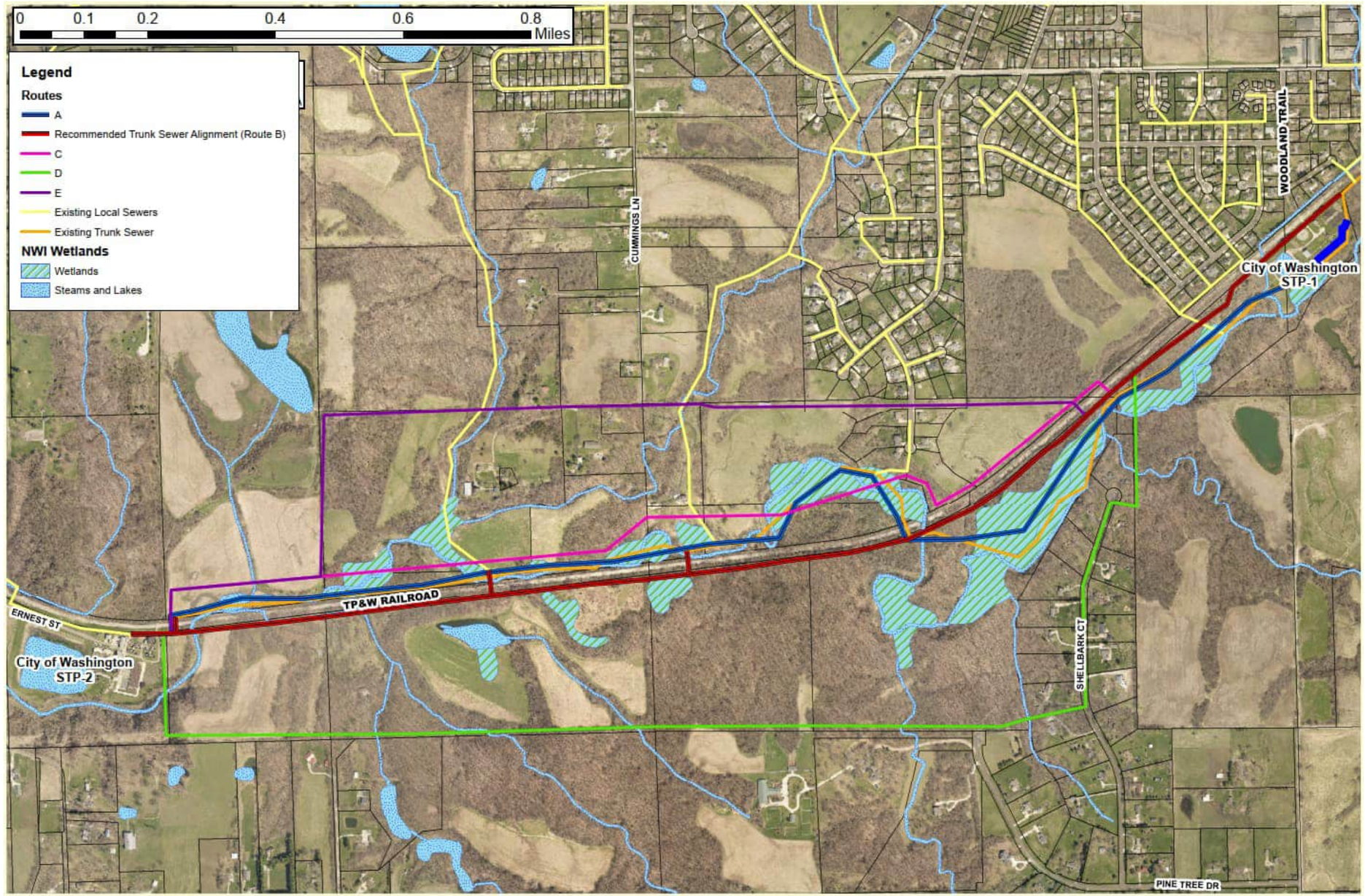
Existing Farm Creek Trunk Sewer (FCTS) – Mapped Flood Plain



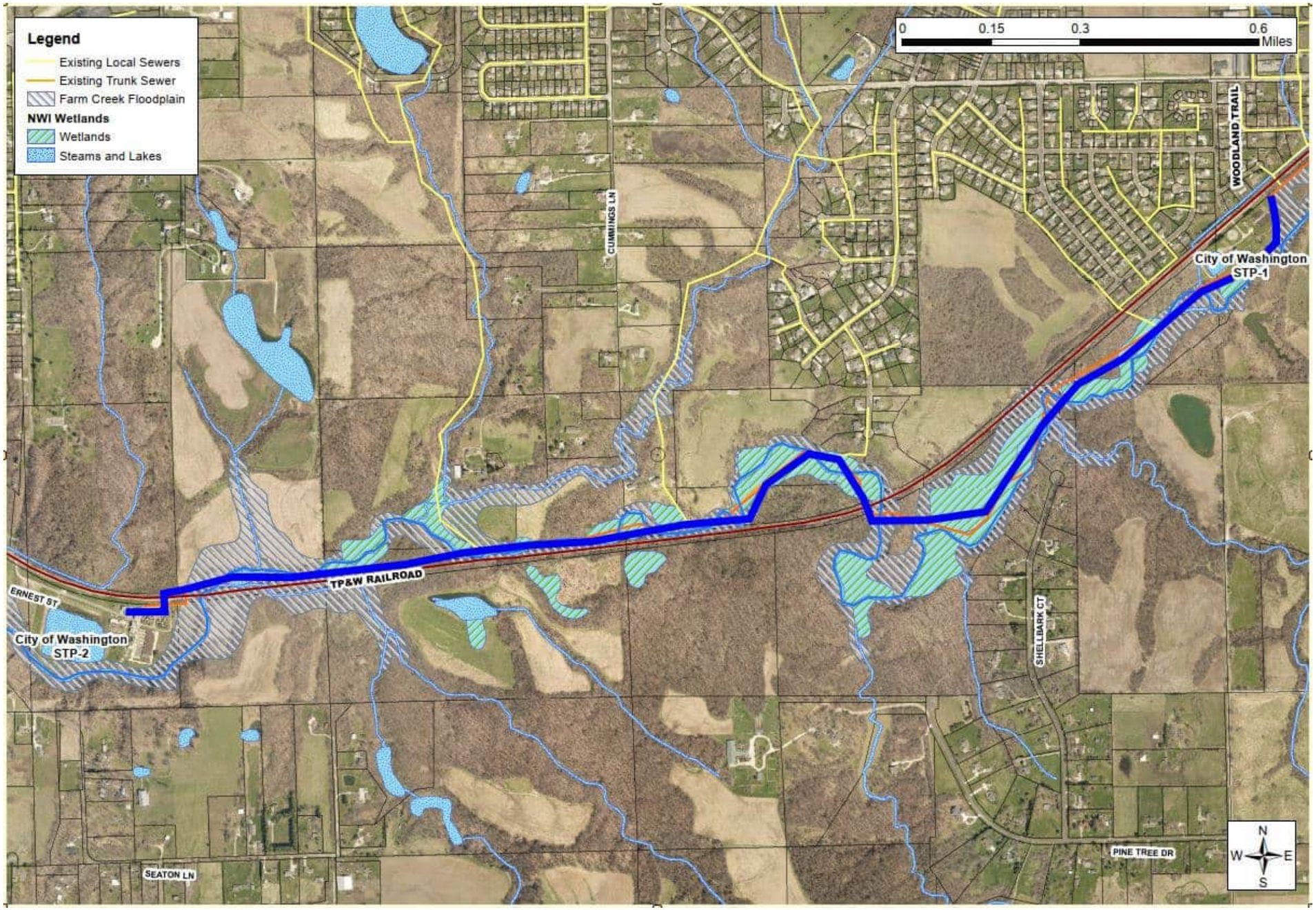
Existing Farm Creek Trunk Sewer (FCTS) – Existing Conditions



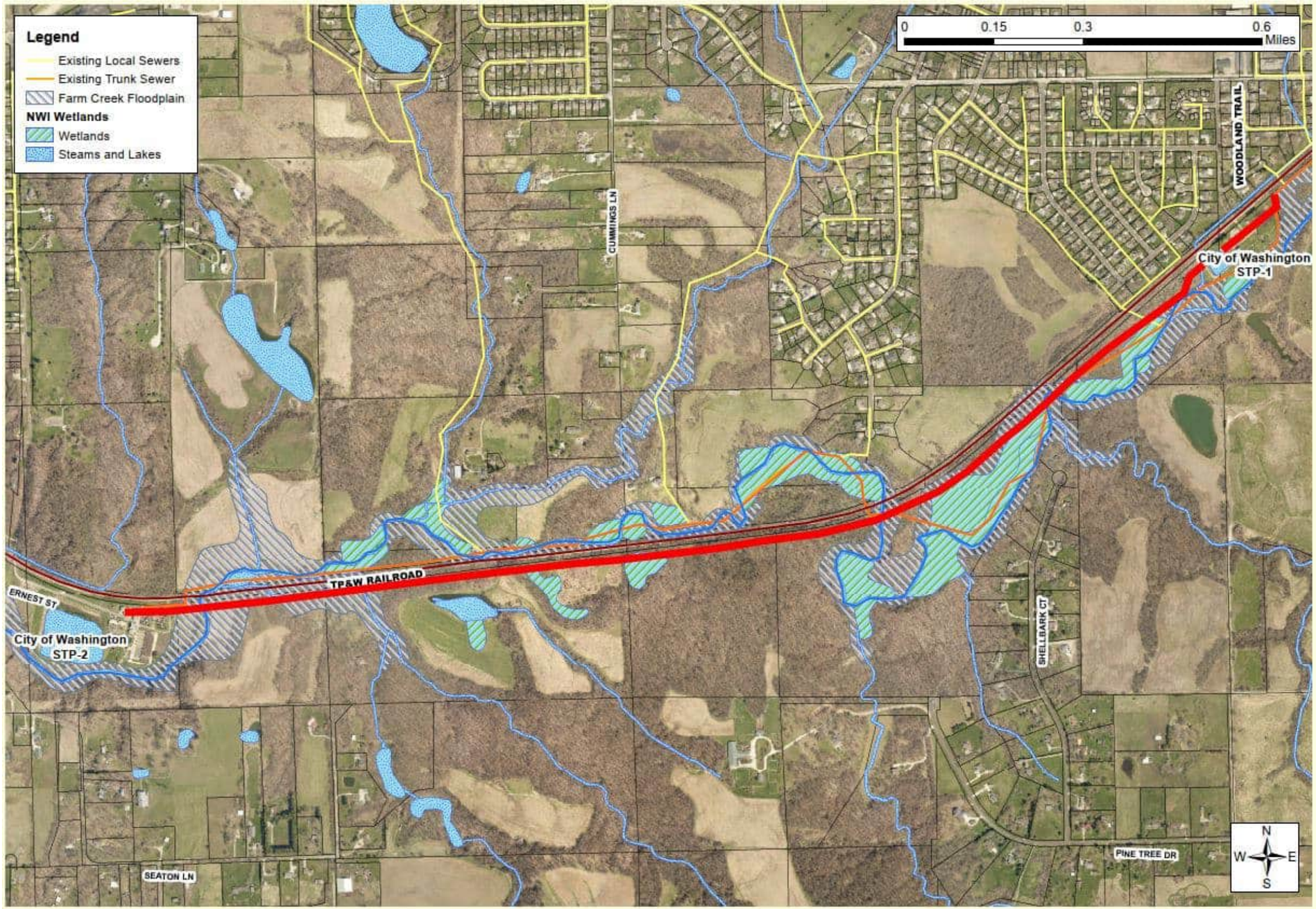
Alternative Route Analyses – 5 Primary Alignments



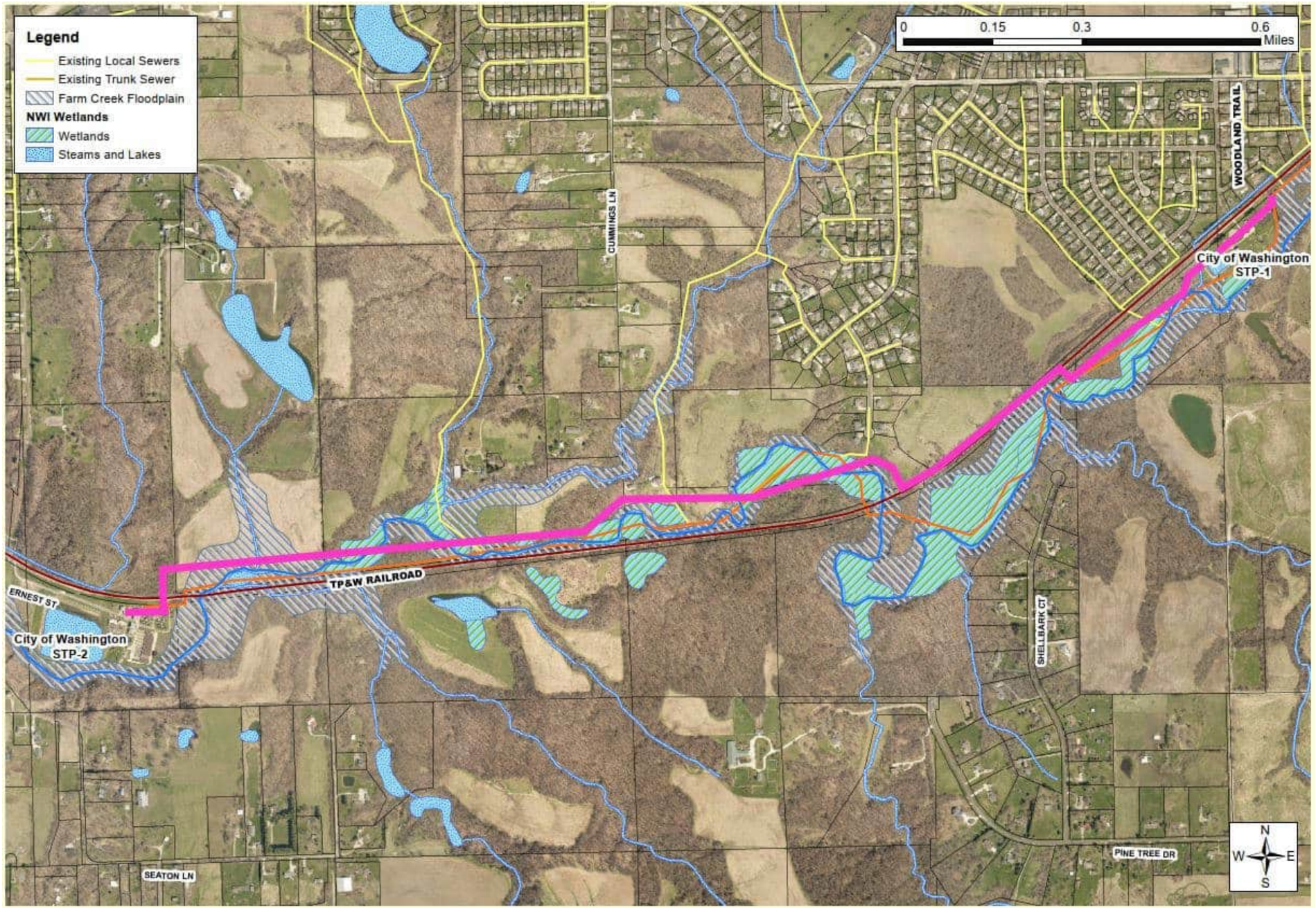
Alternative Route Analyses– City Route A



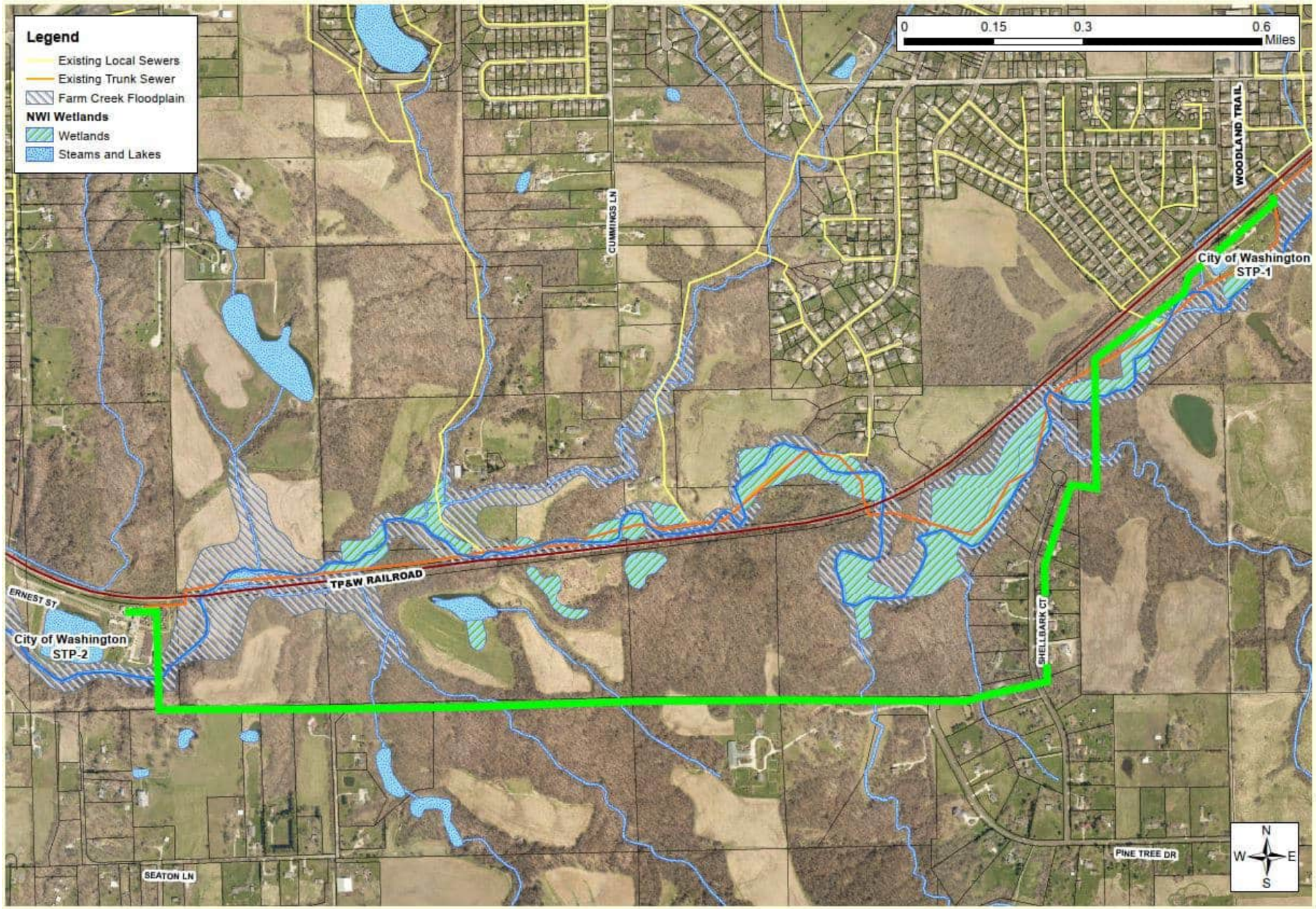
Alternative Route Analyses– City Route B



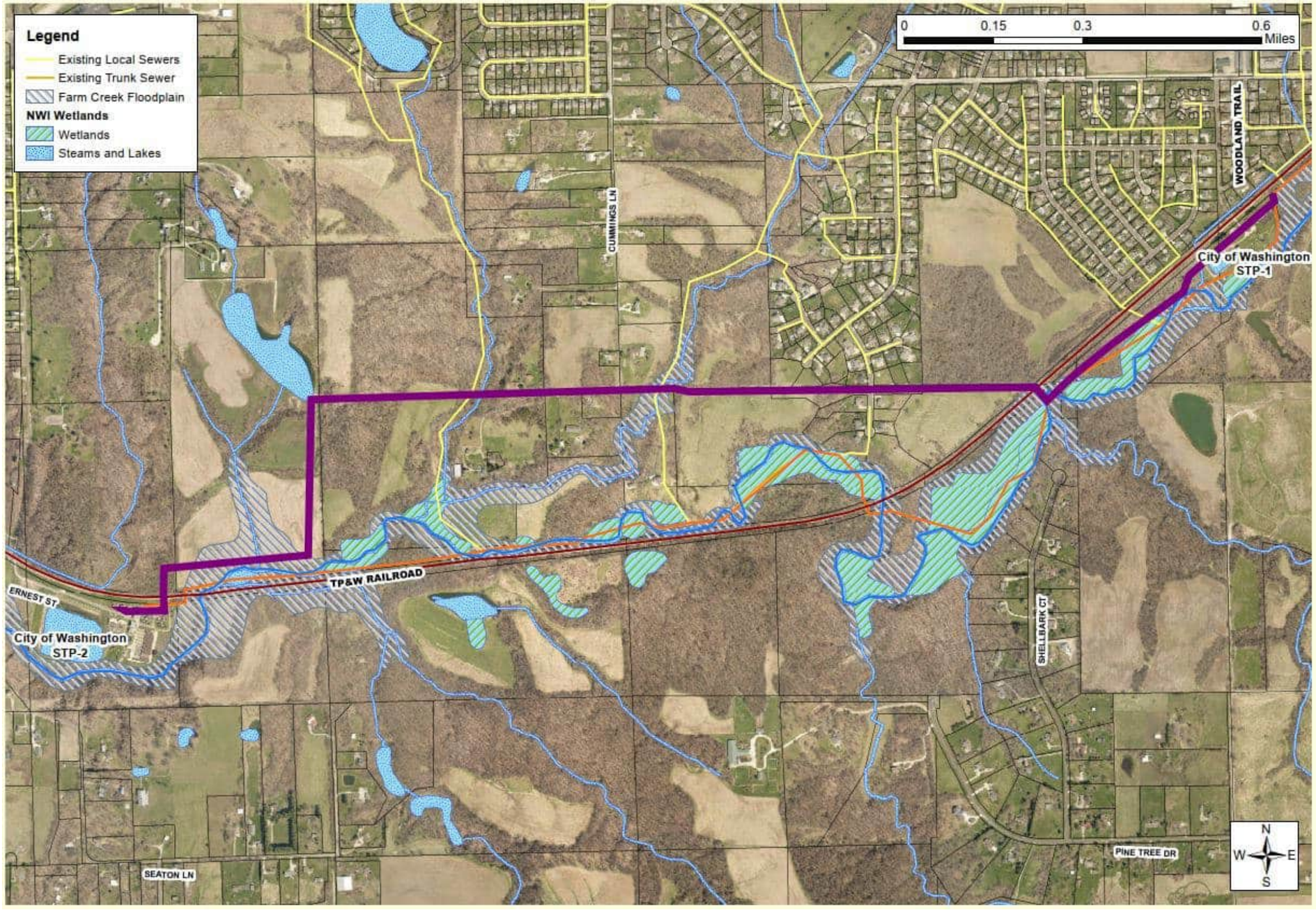
Alternative Route Analyses– City Route C



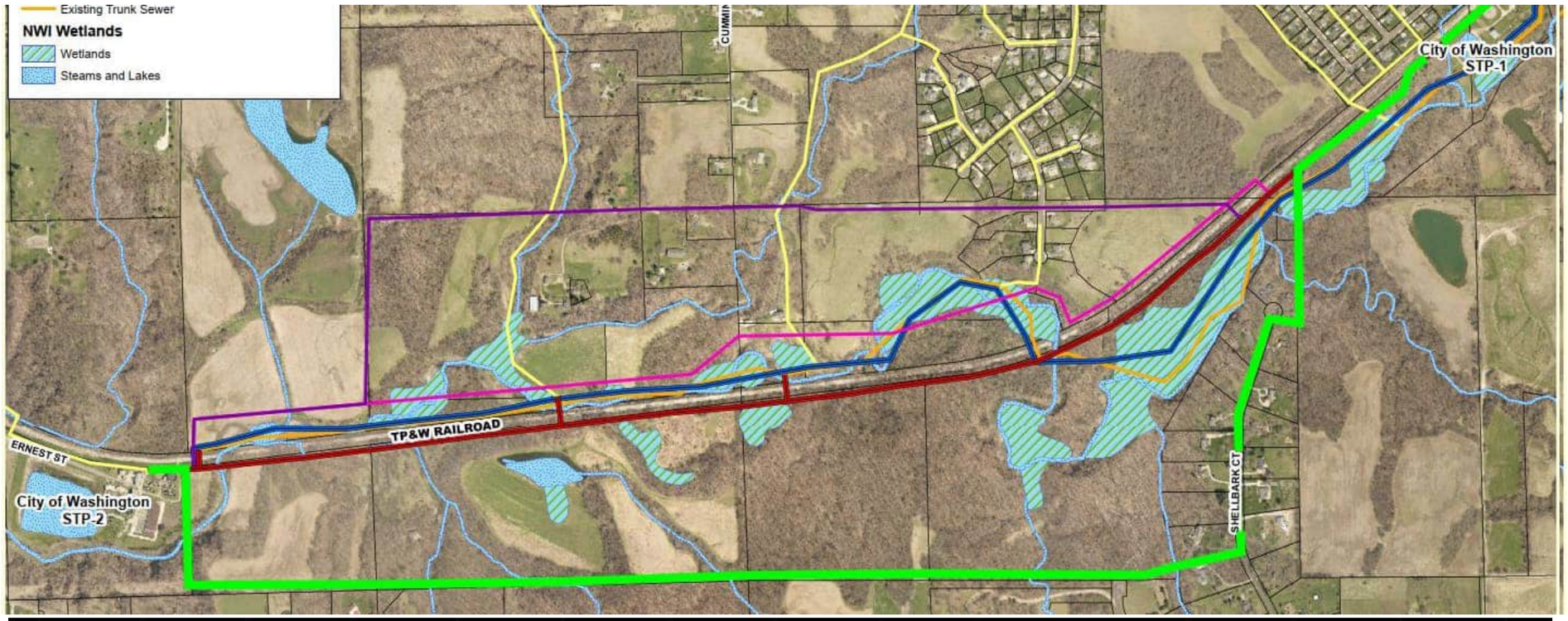
Alternative Route Analyses– City Route D

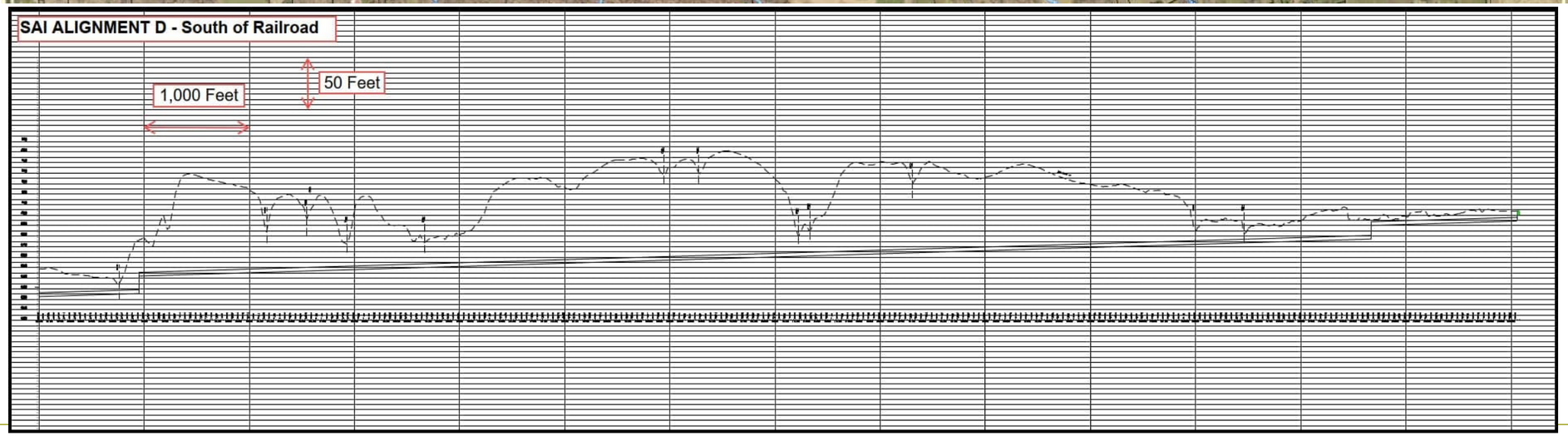


Alternative Route Analyses– City Route E



City’s Alternative Route Study – Route D Profile





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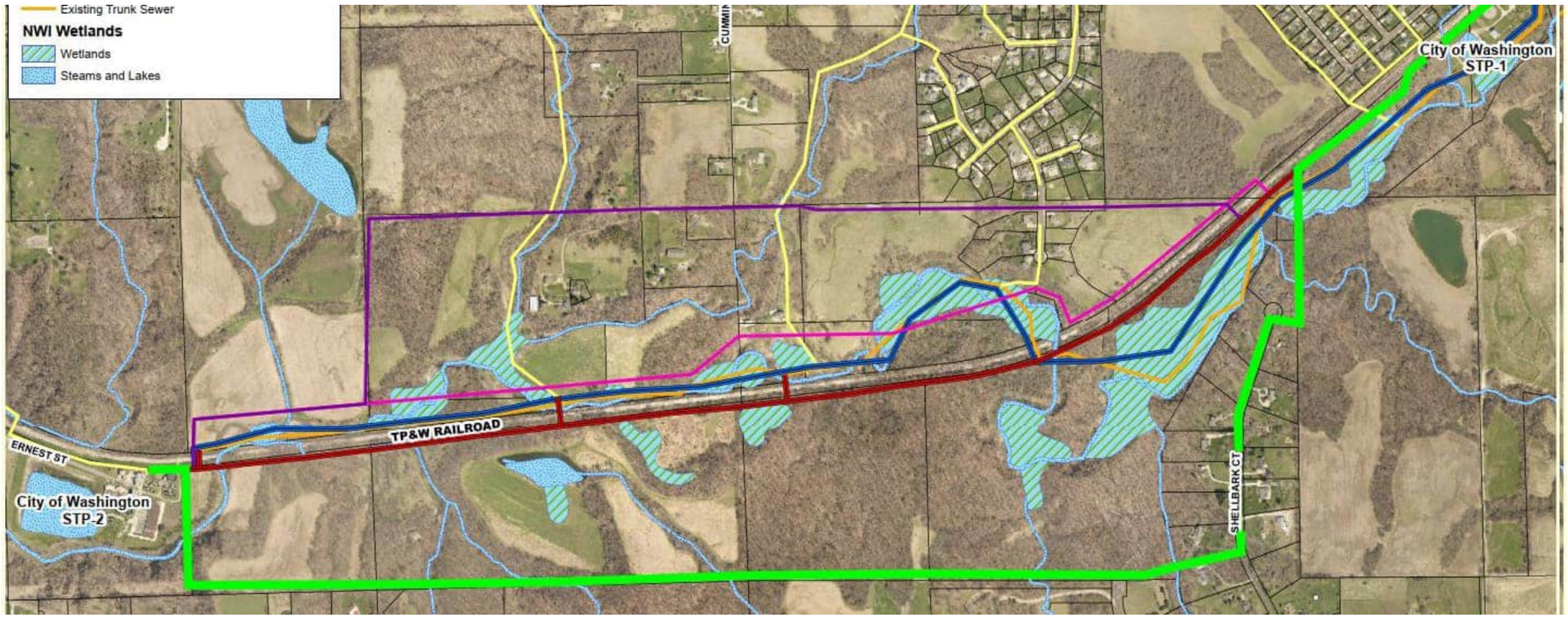

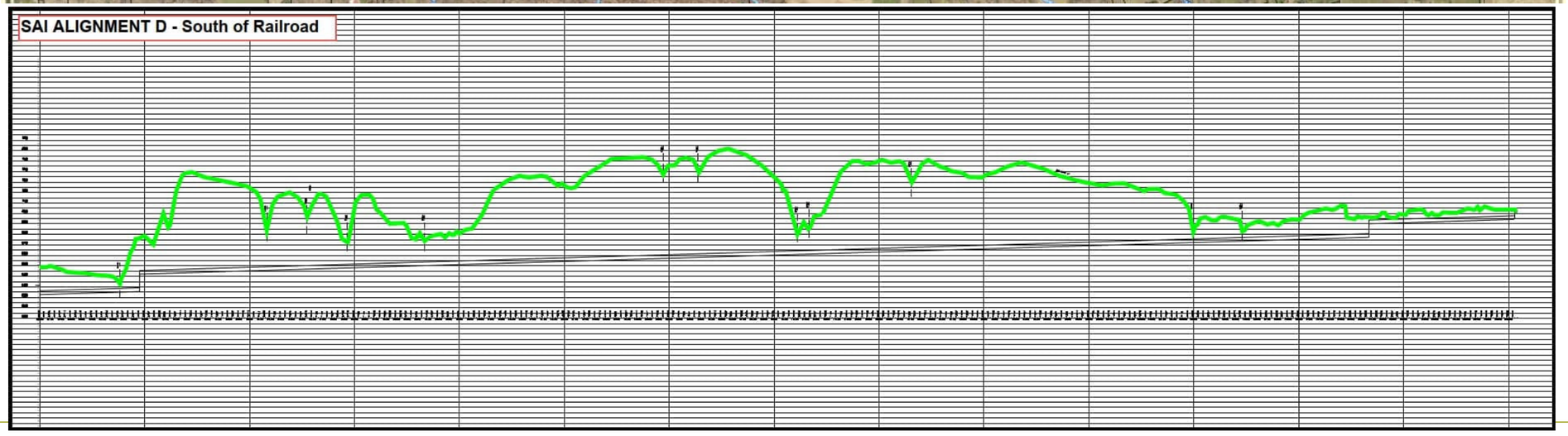

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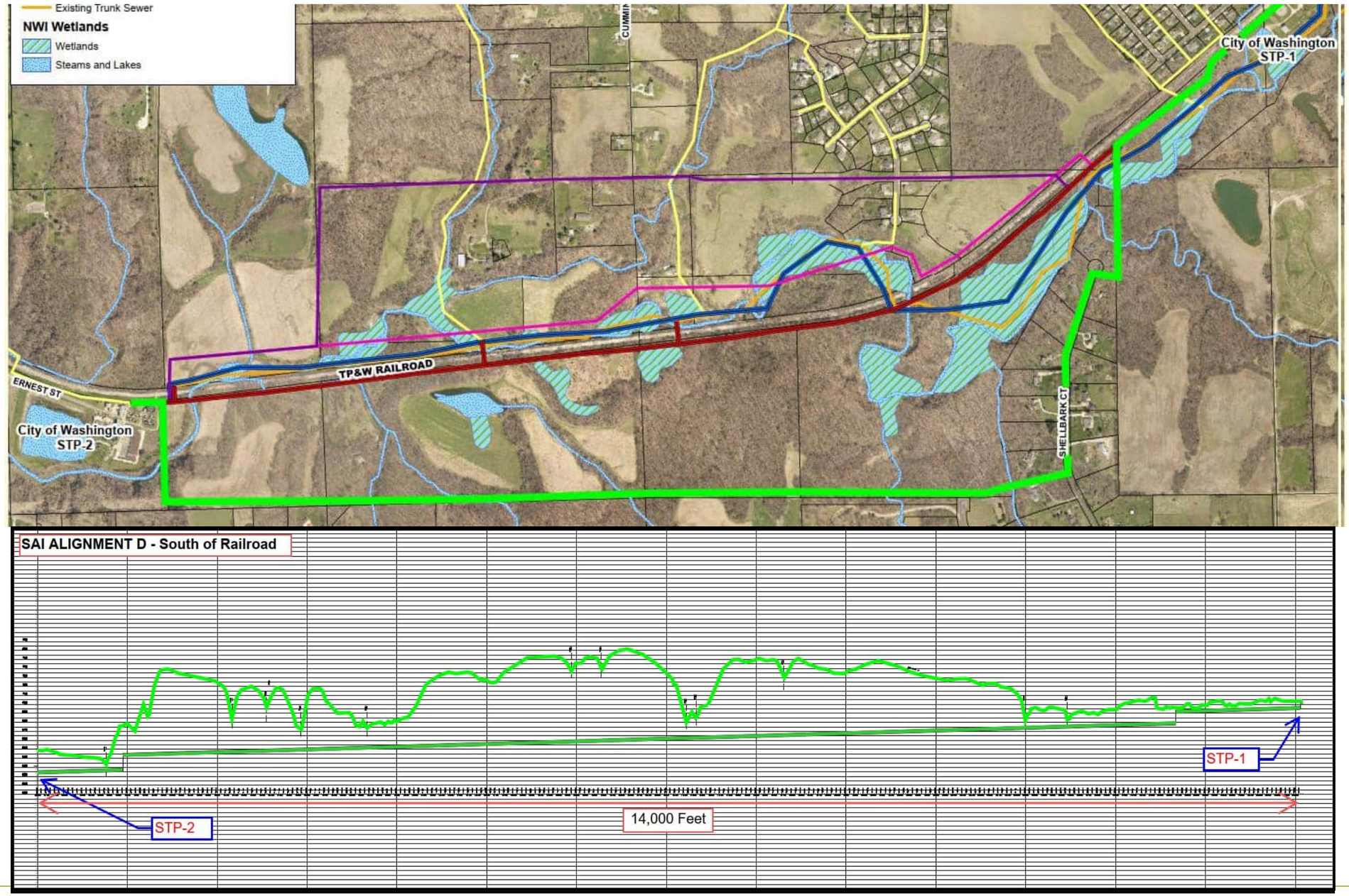

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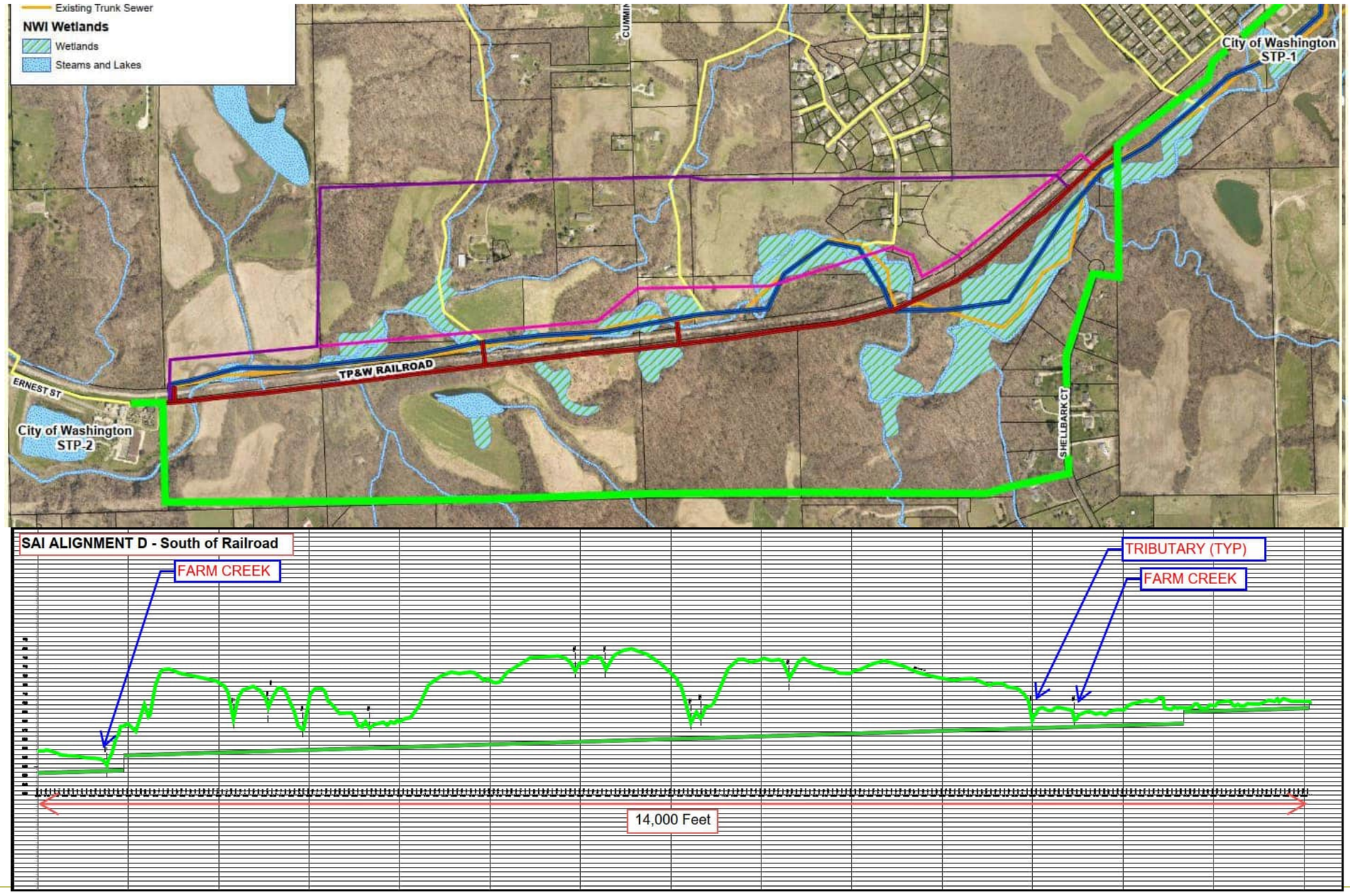

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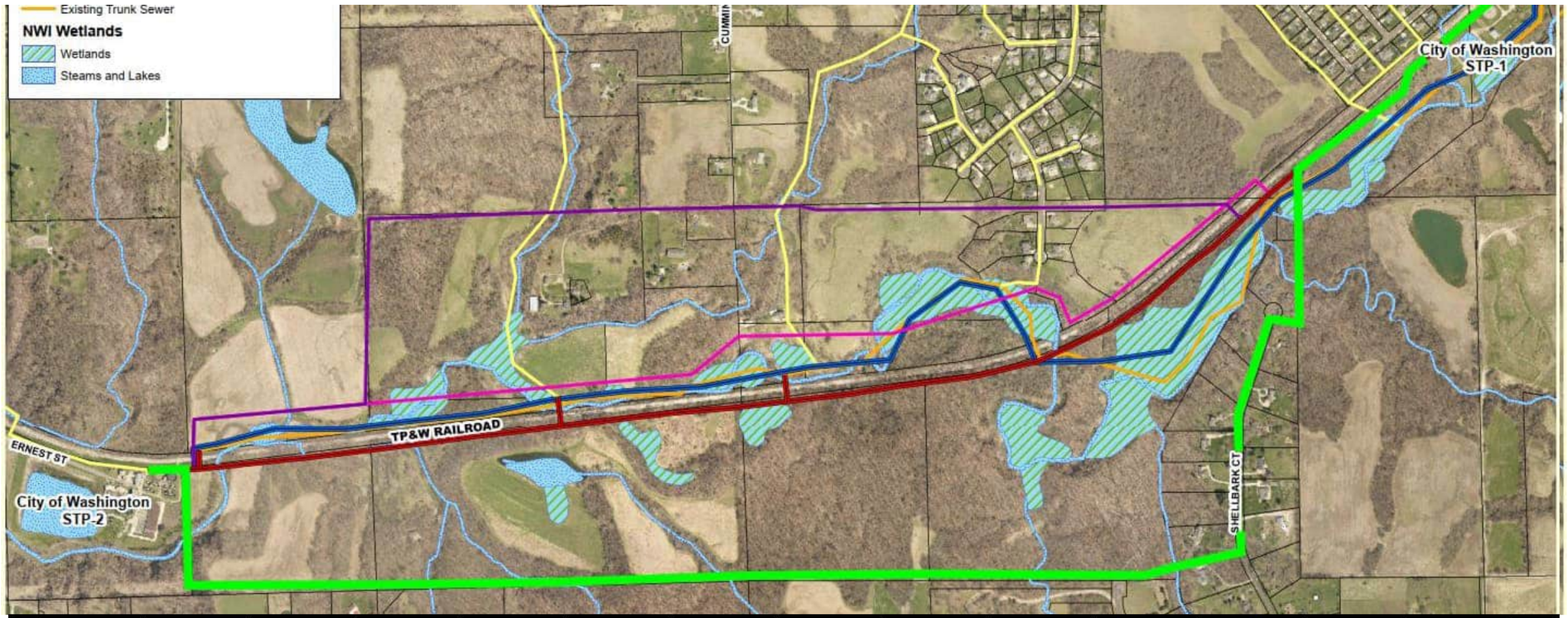

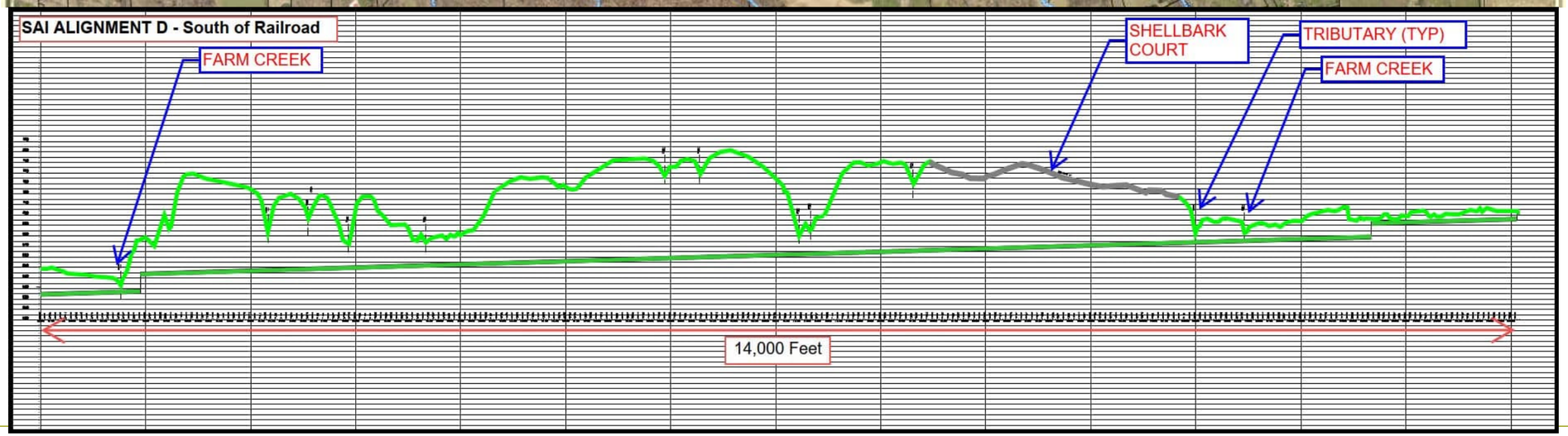

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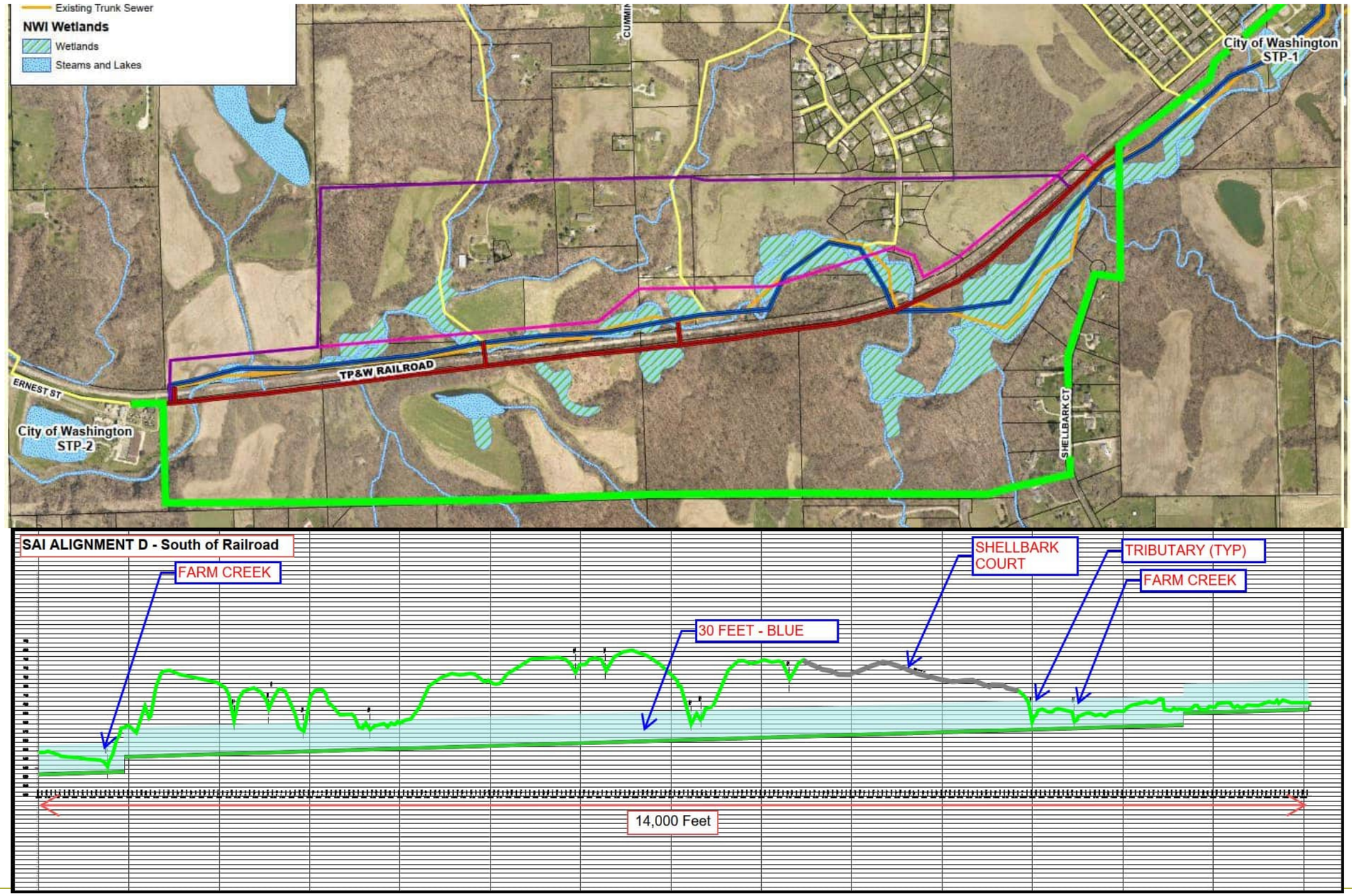

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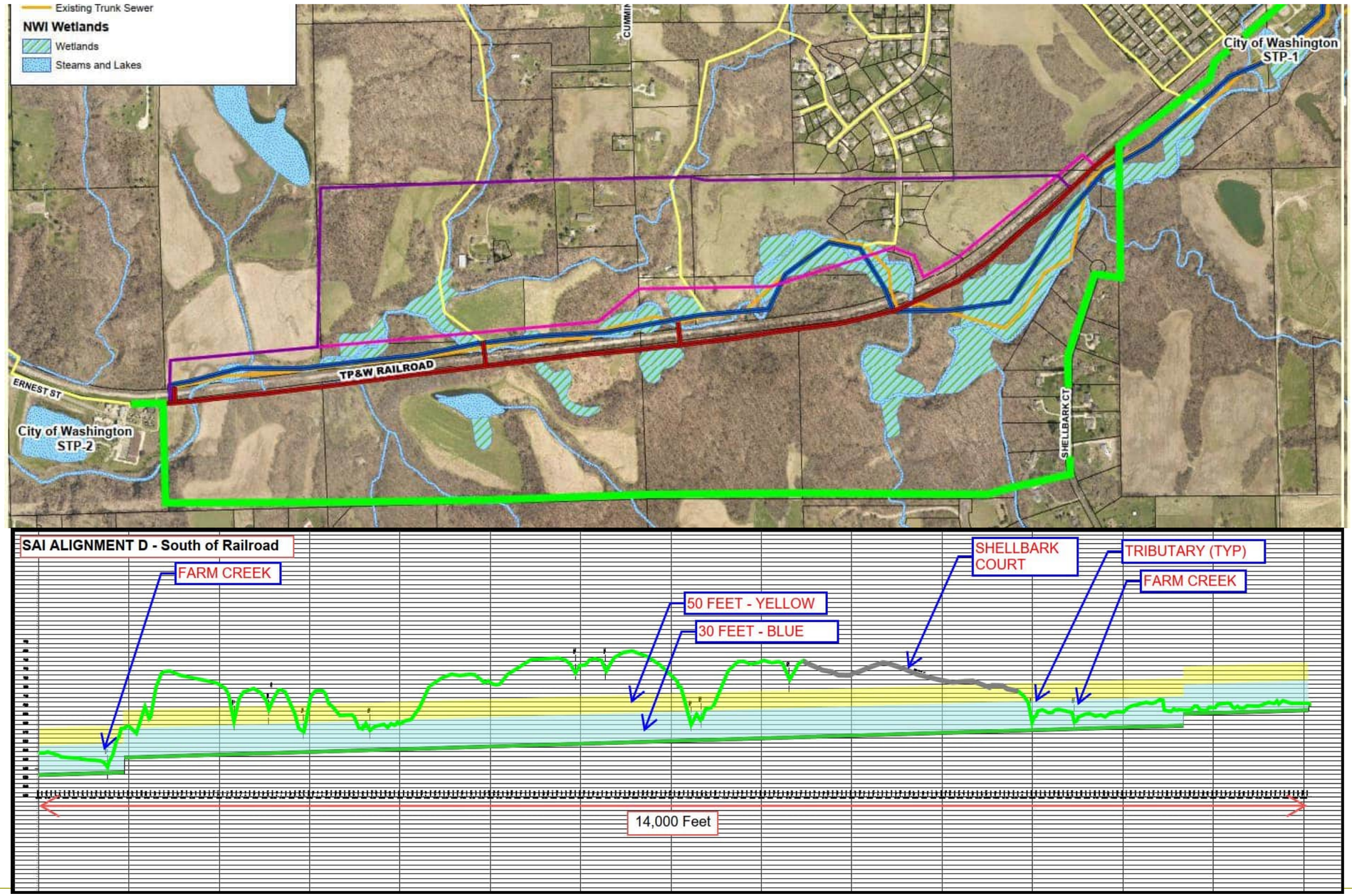

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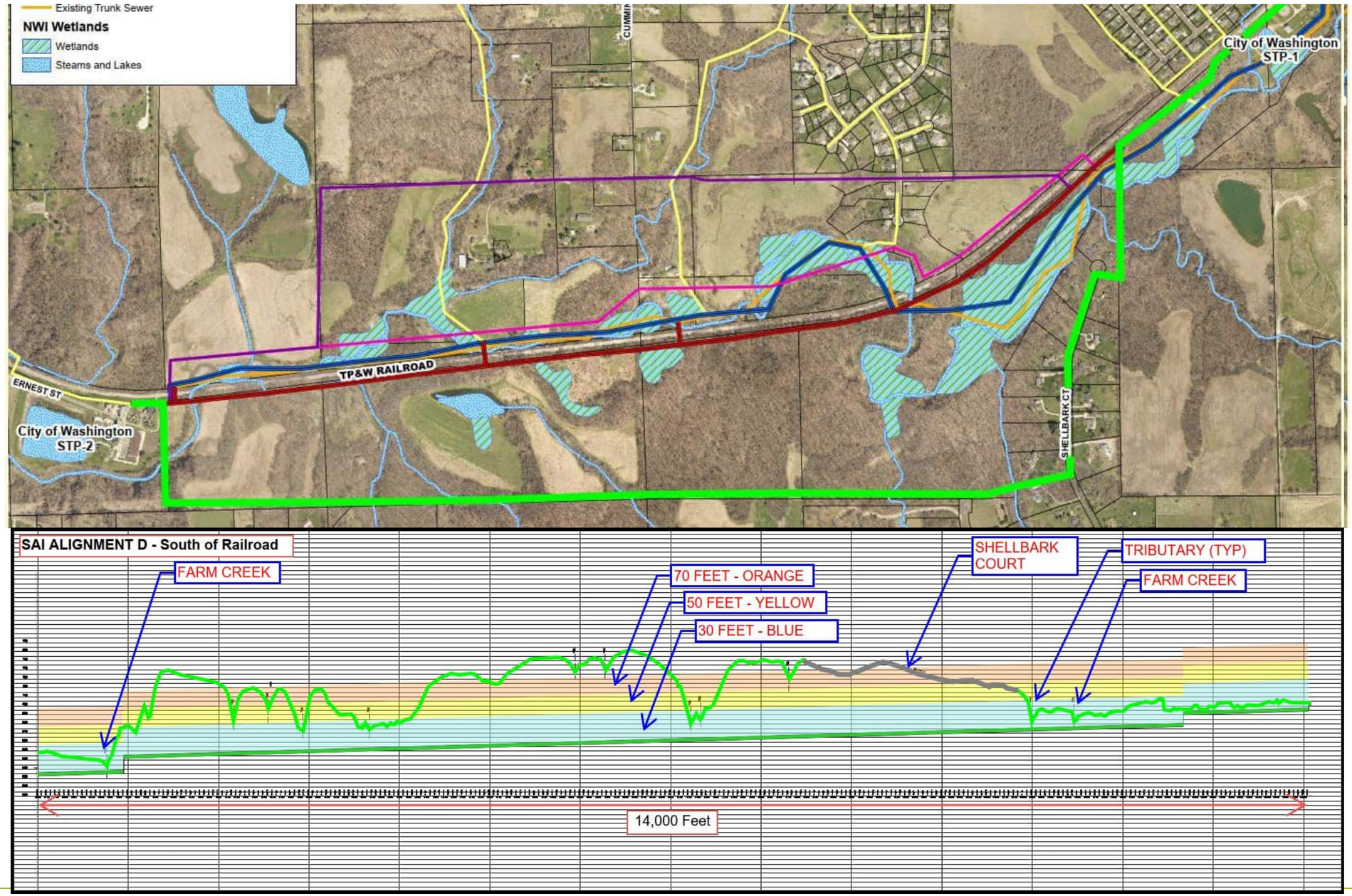

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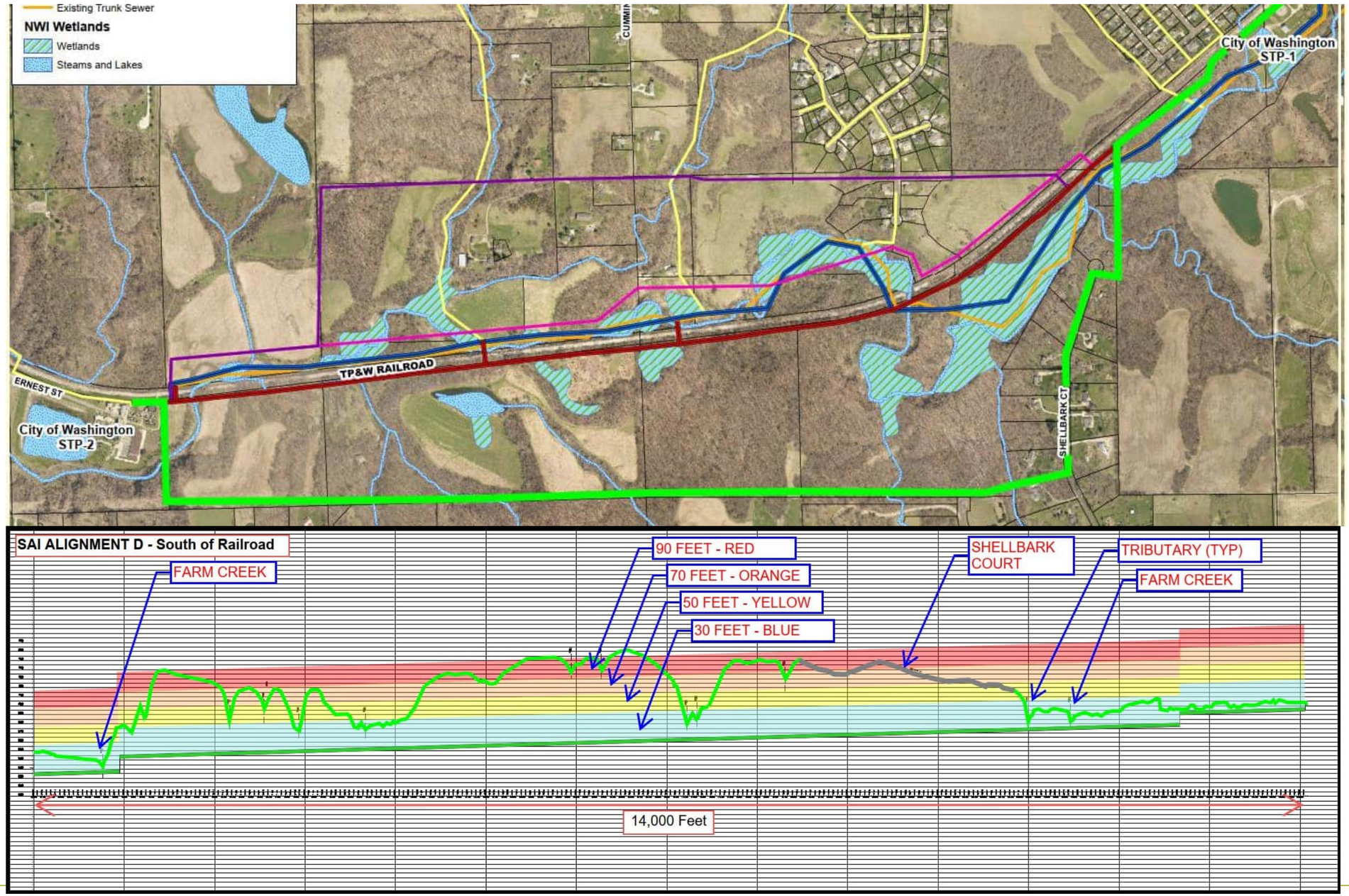

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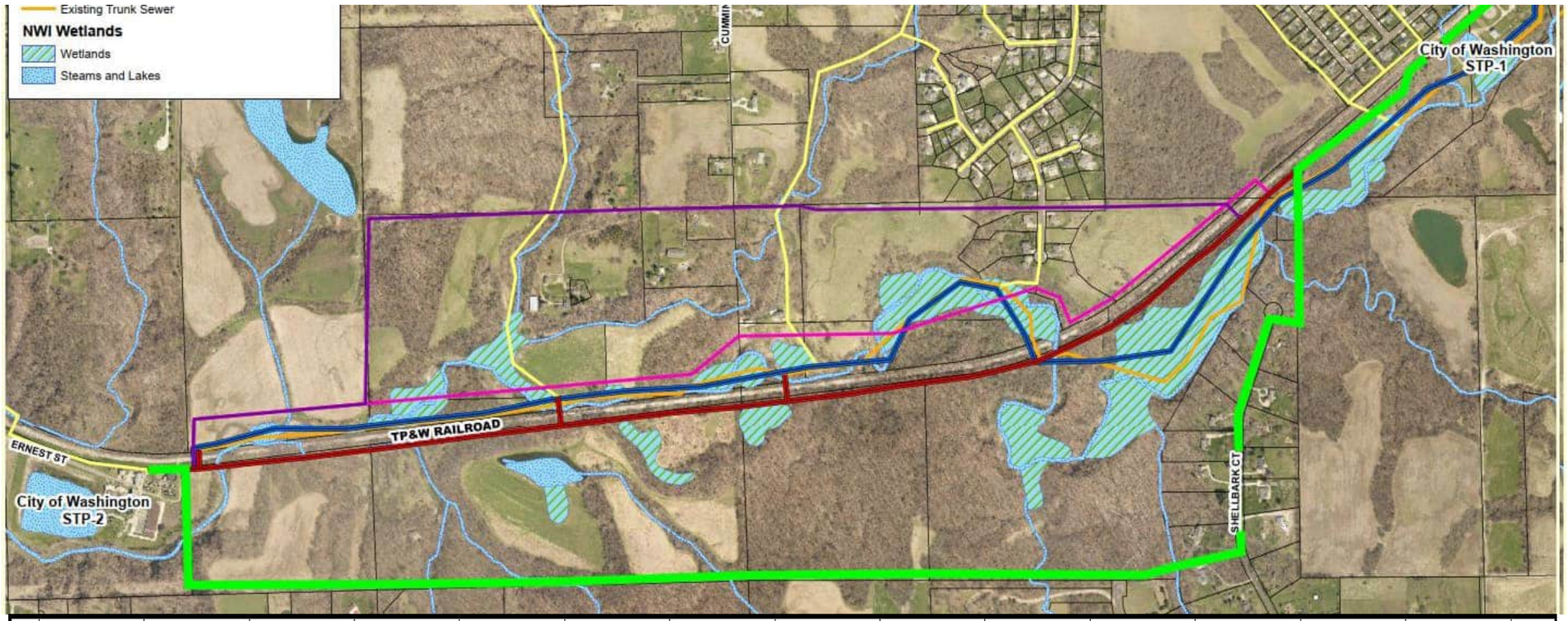

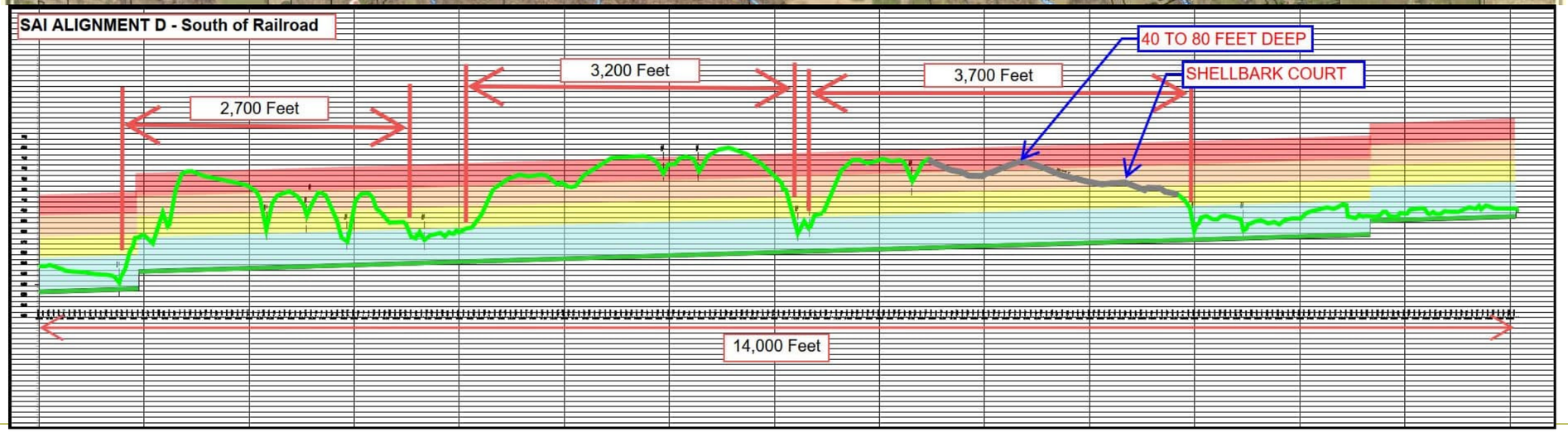

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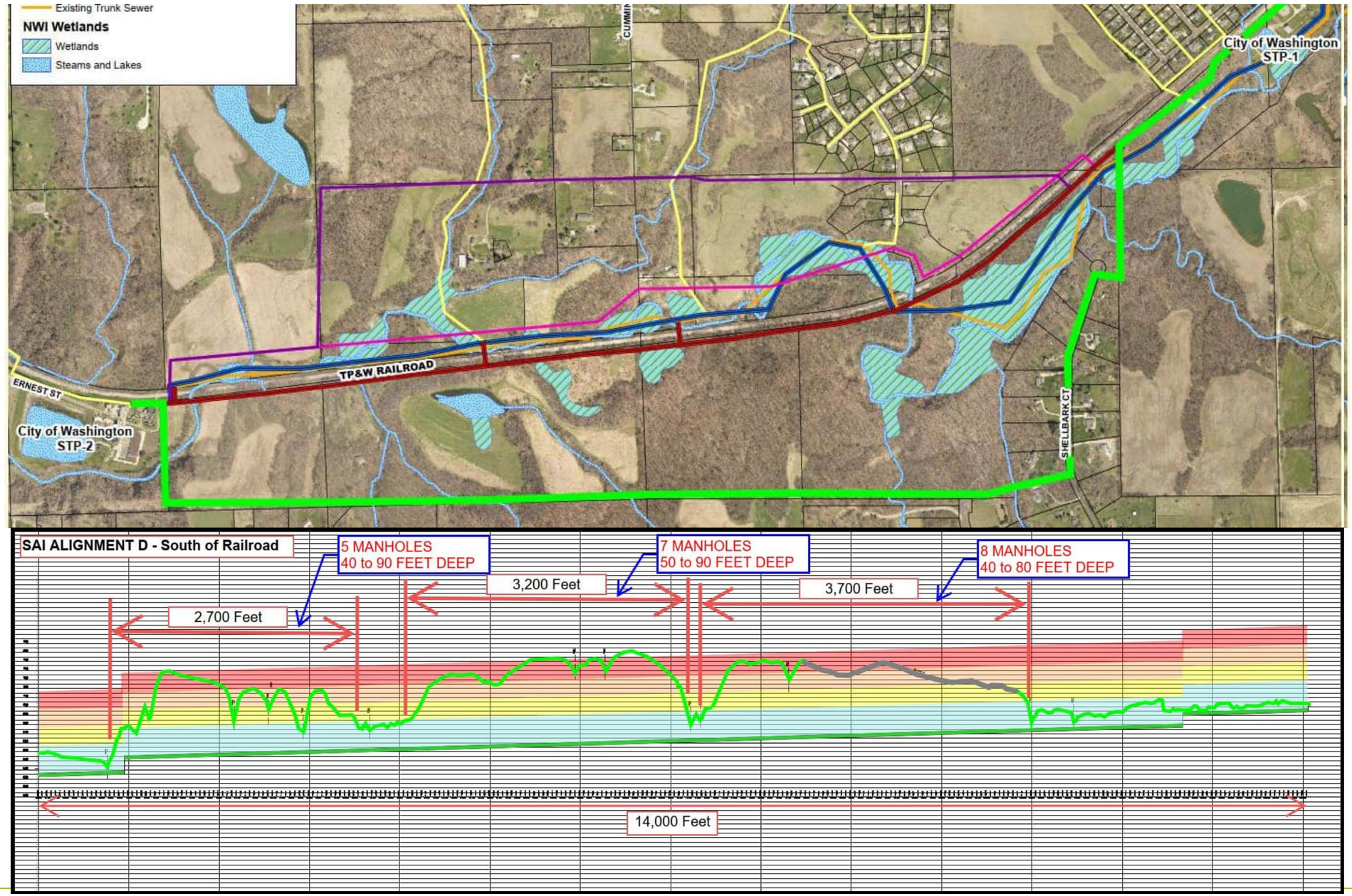
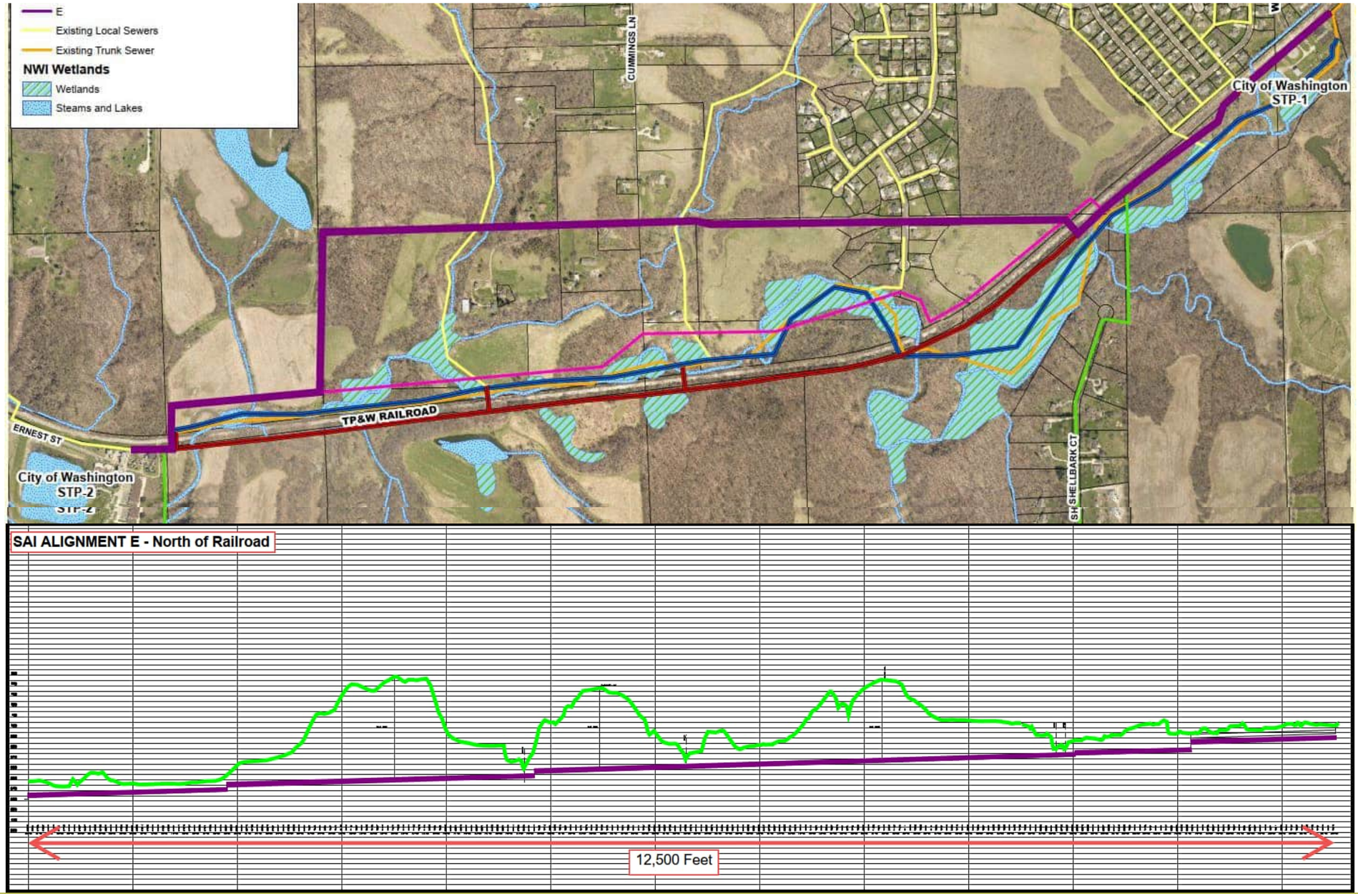
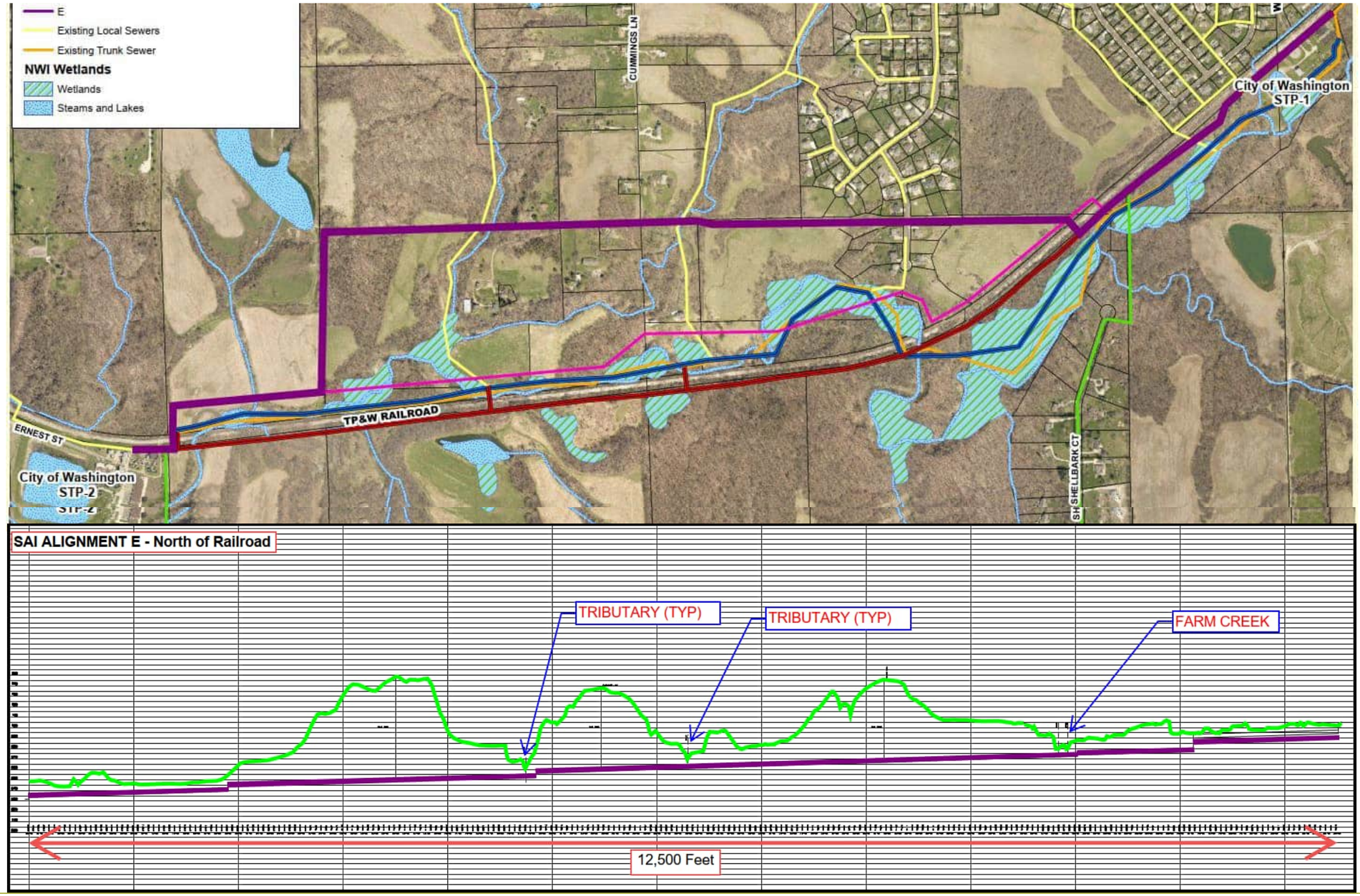


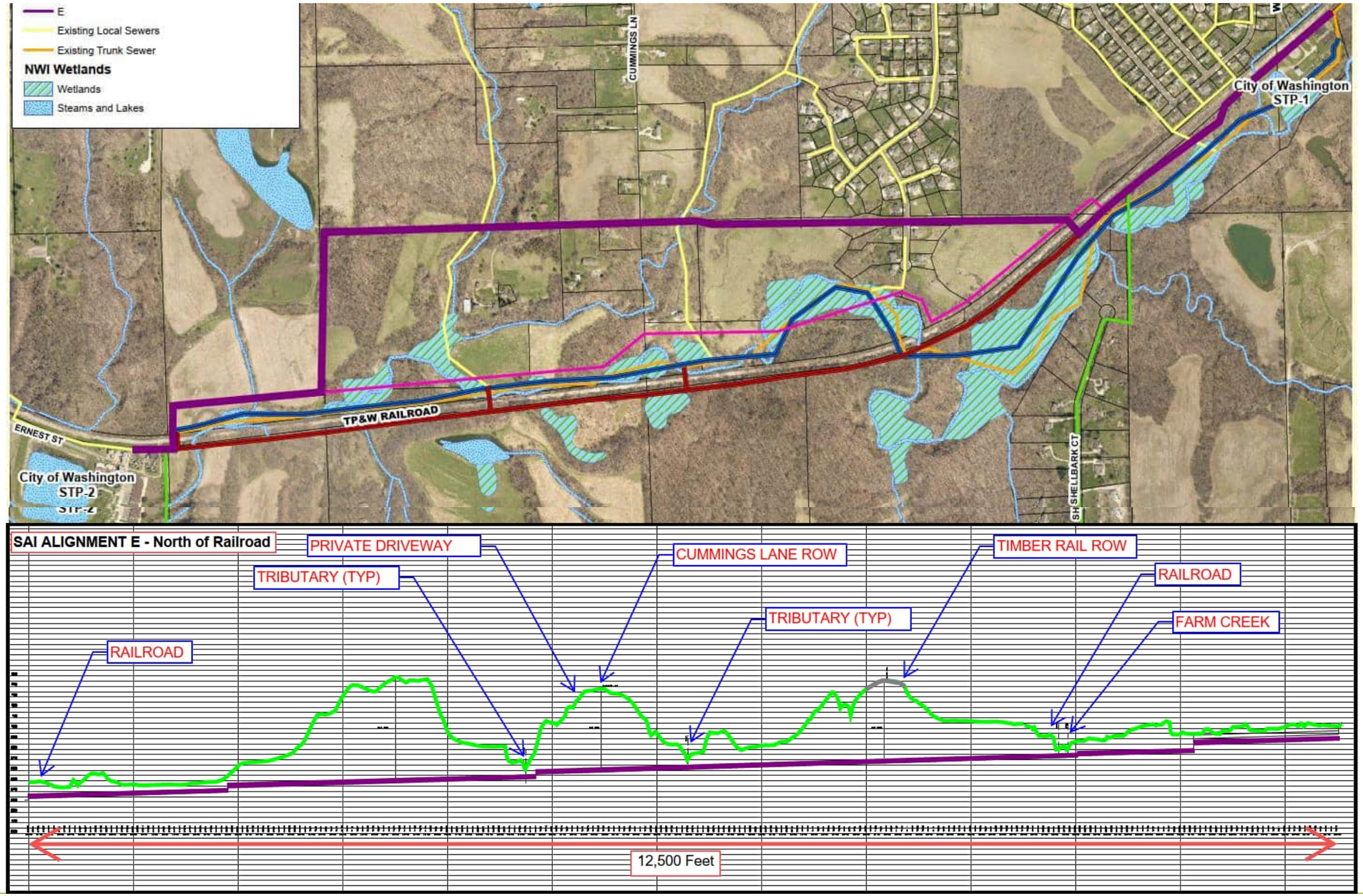
City’s Alternative Route Study – Route E Profile



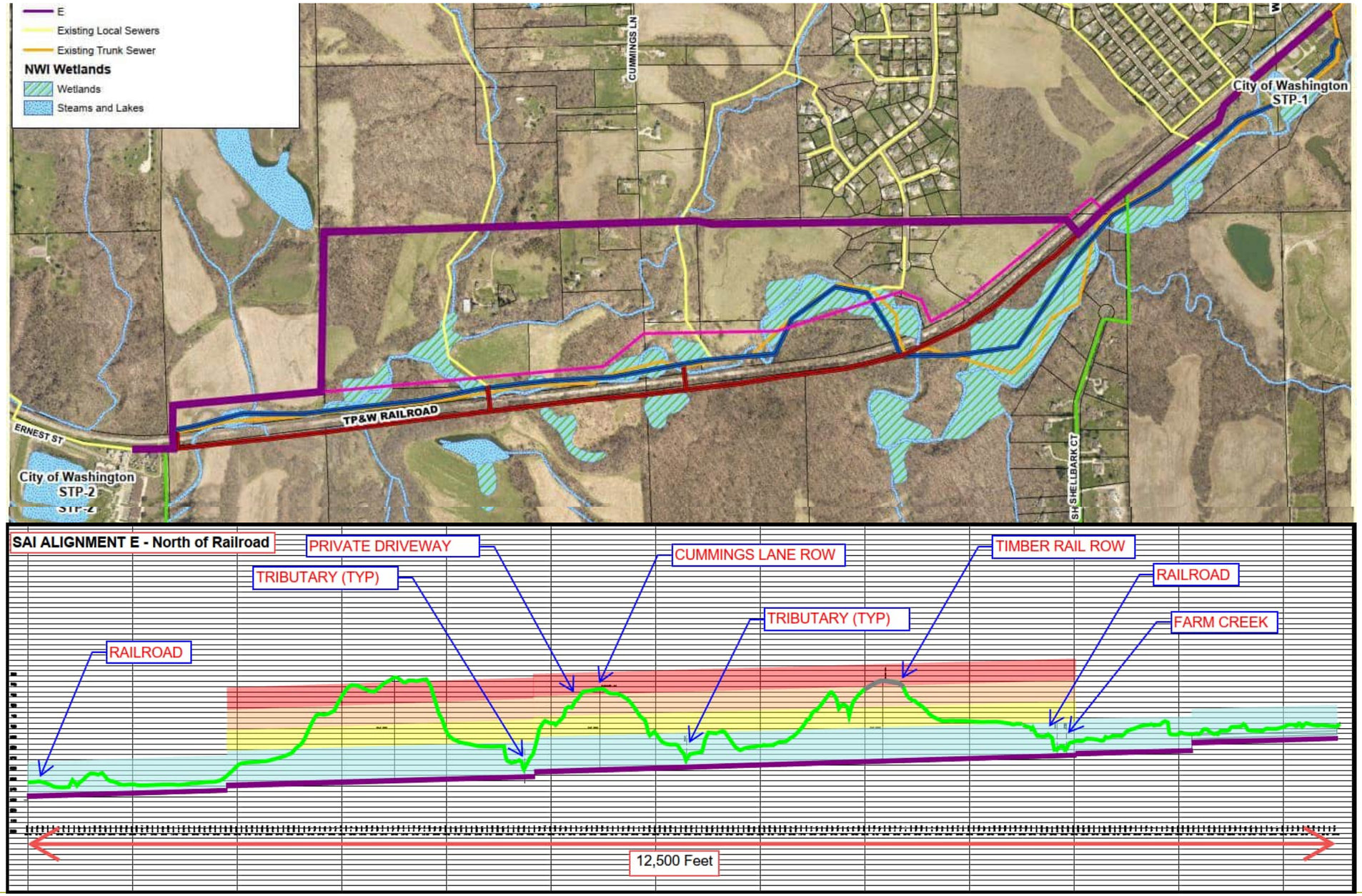
City’s Alternative Route Study – Route E Profile



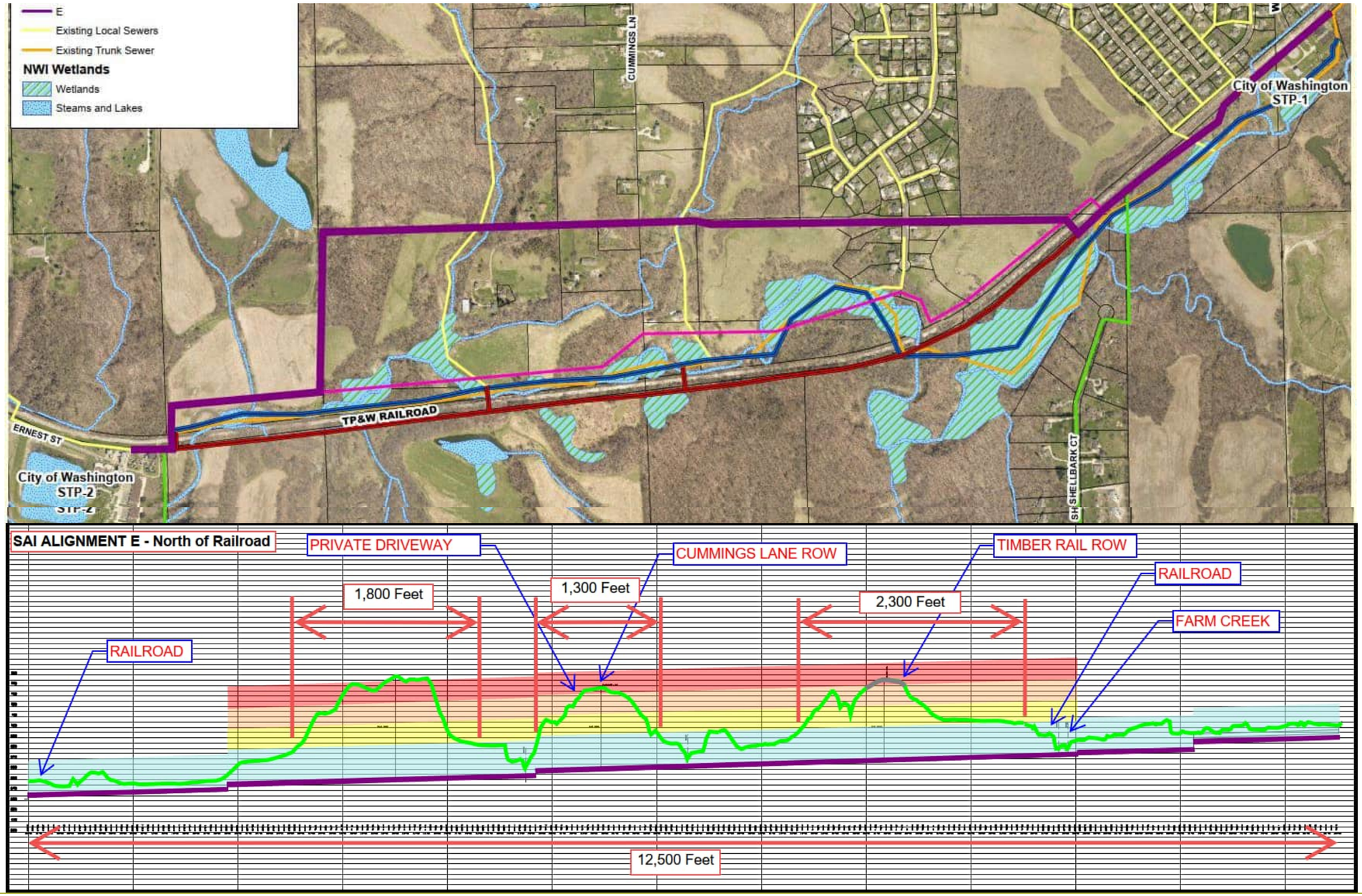
City’s Alternative Route Study – Route E Profile



City’s Alternative Route Study – Route E Profile



City’s Alternative Route Study – Route E Profile



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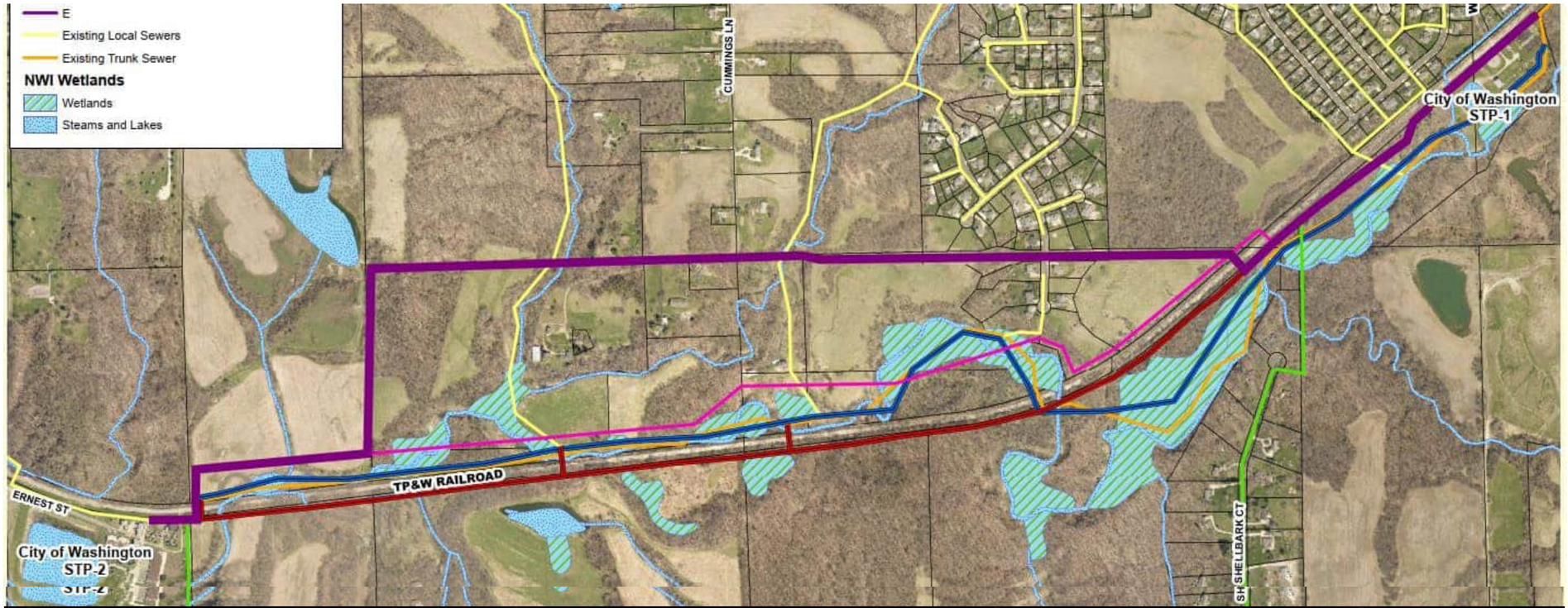
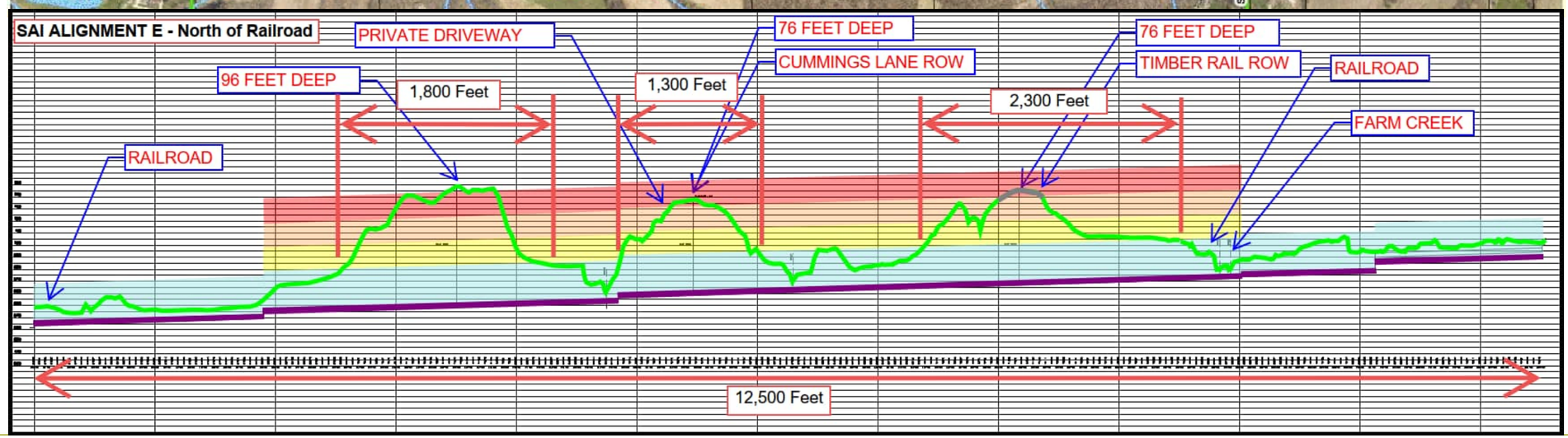
City’s Alternative Route Study – Route E Profile





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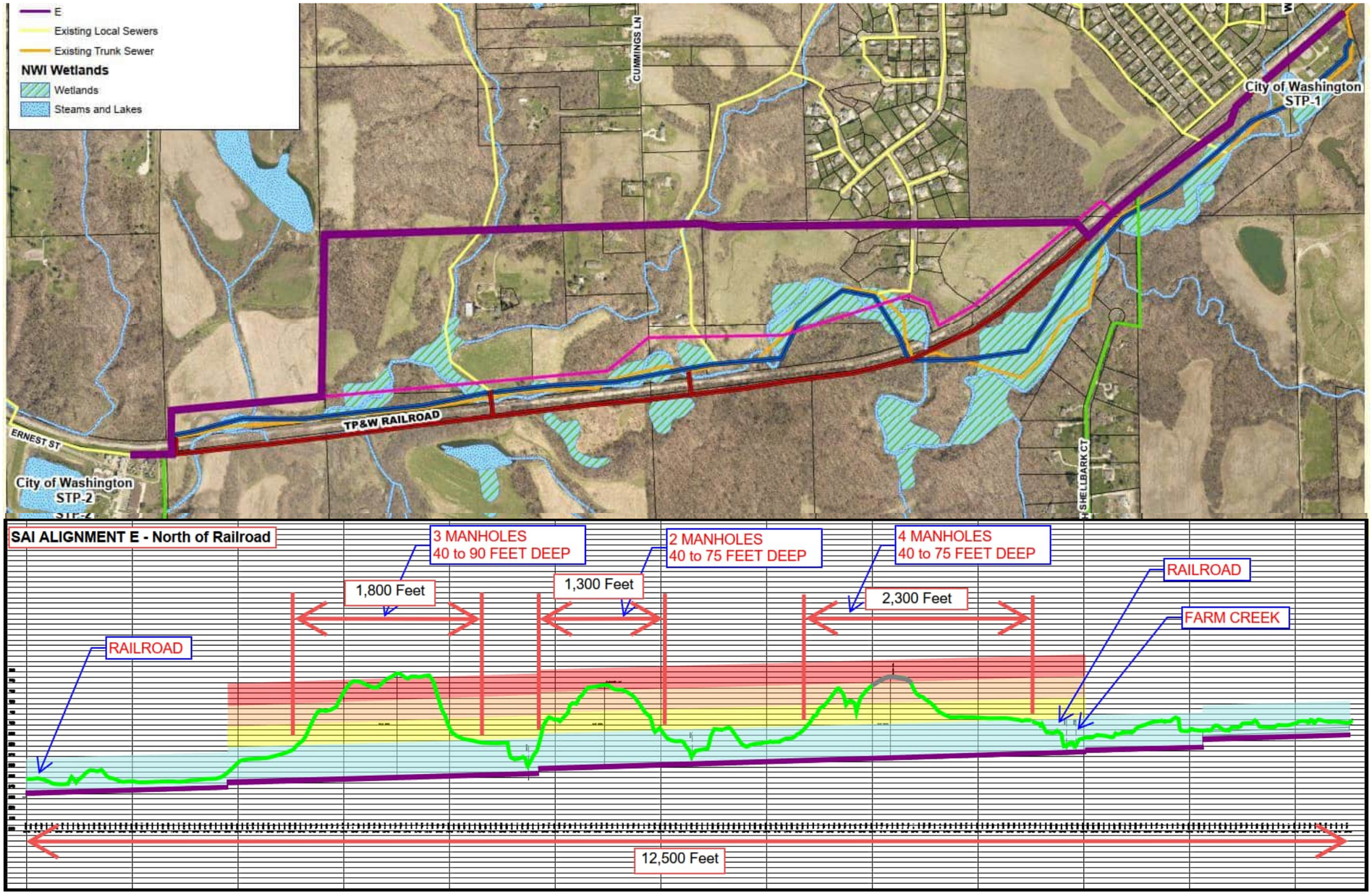
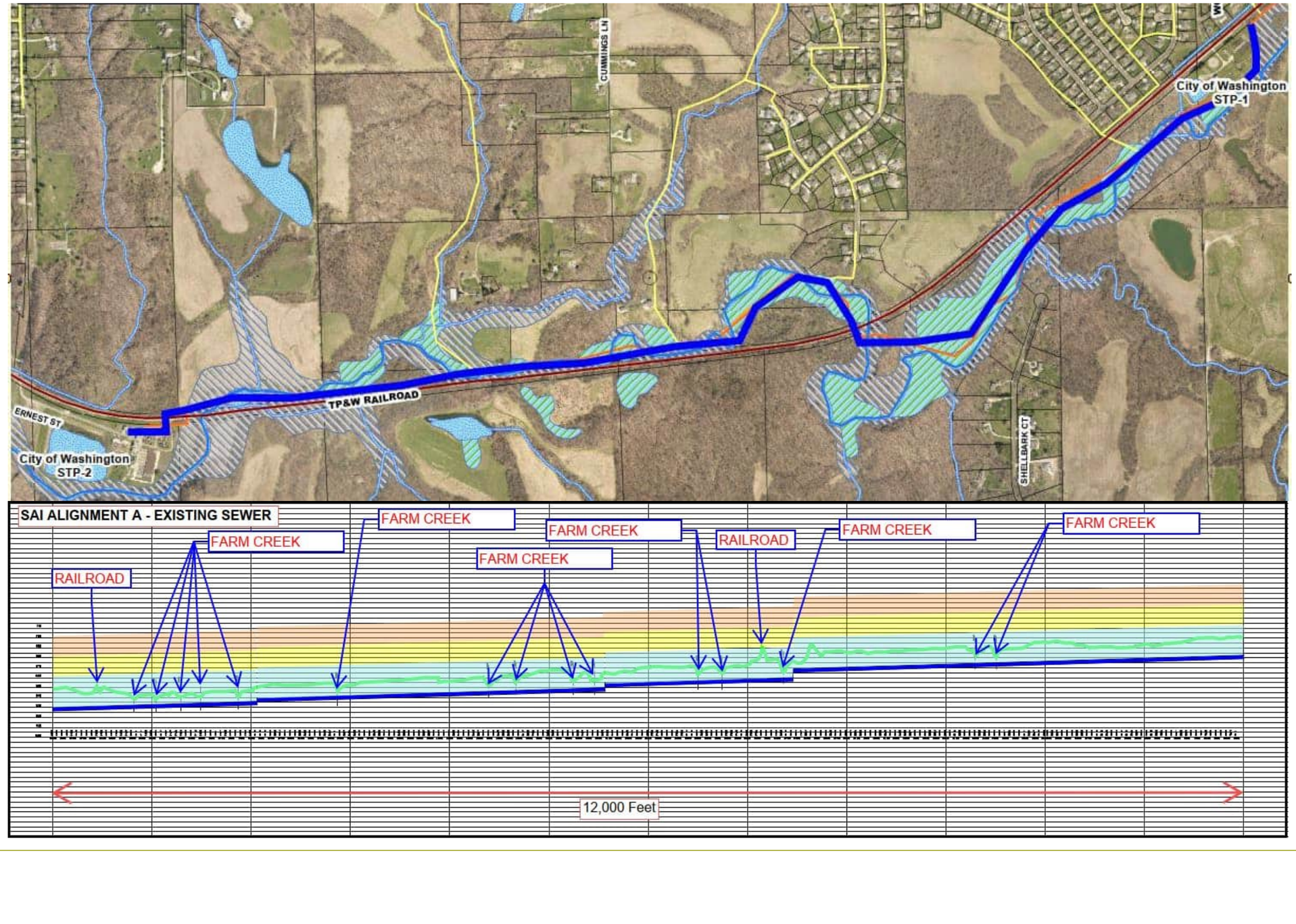
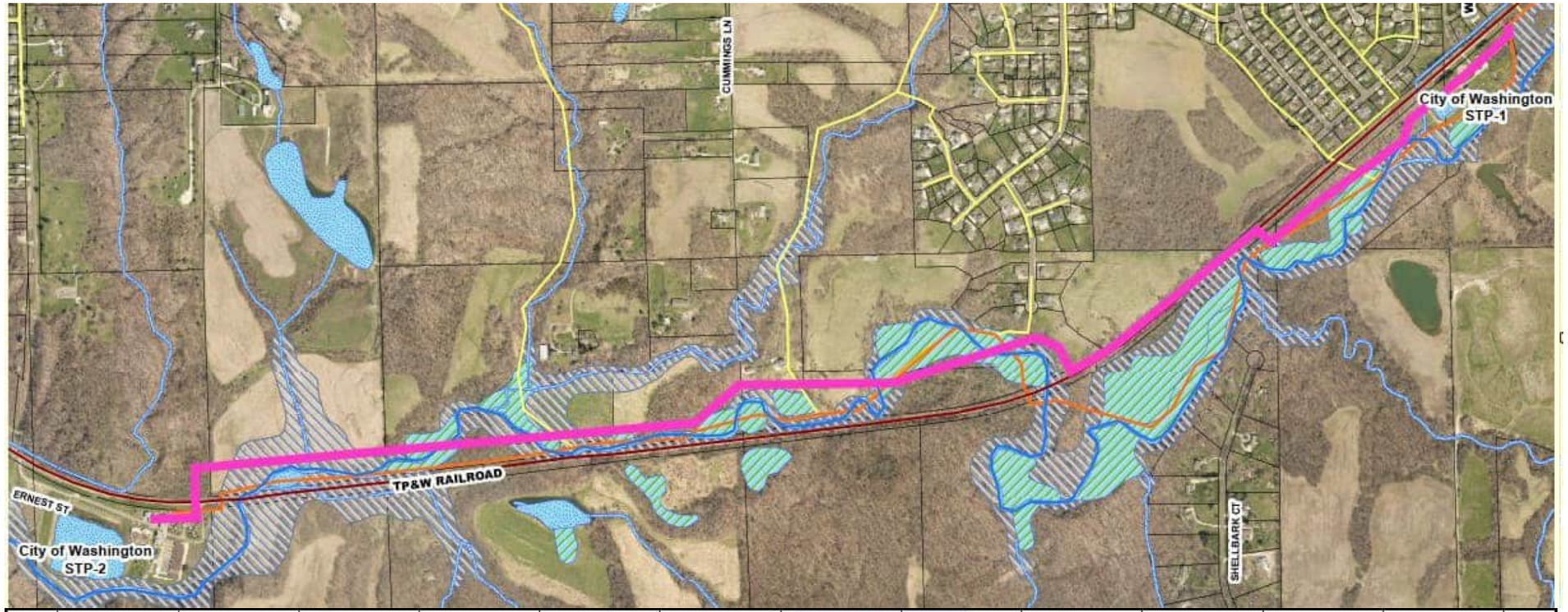
City’s Alternative Route Study – Route E Profile

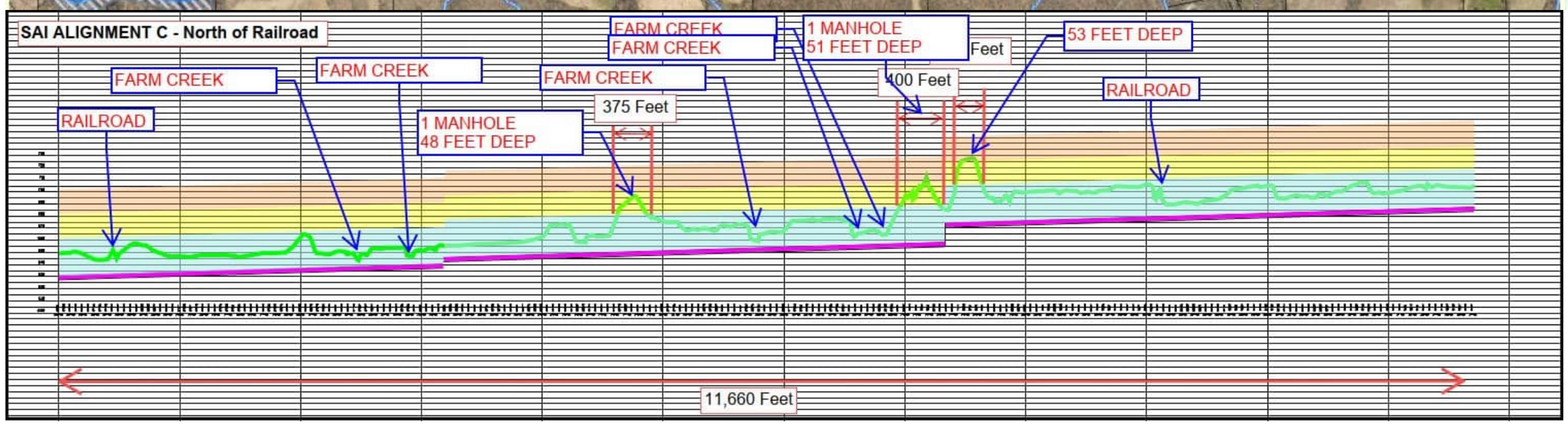


City’s Alternative Route Study – Route A Profile



City's Alternative Route Study – Route C Profile





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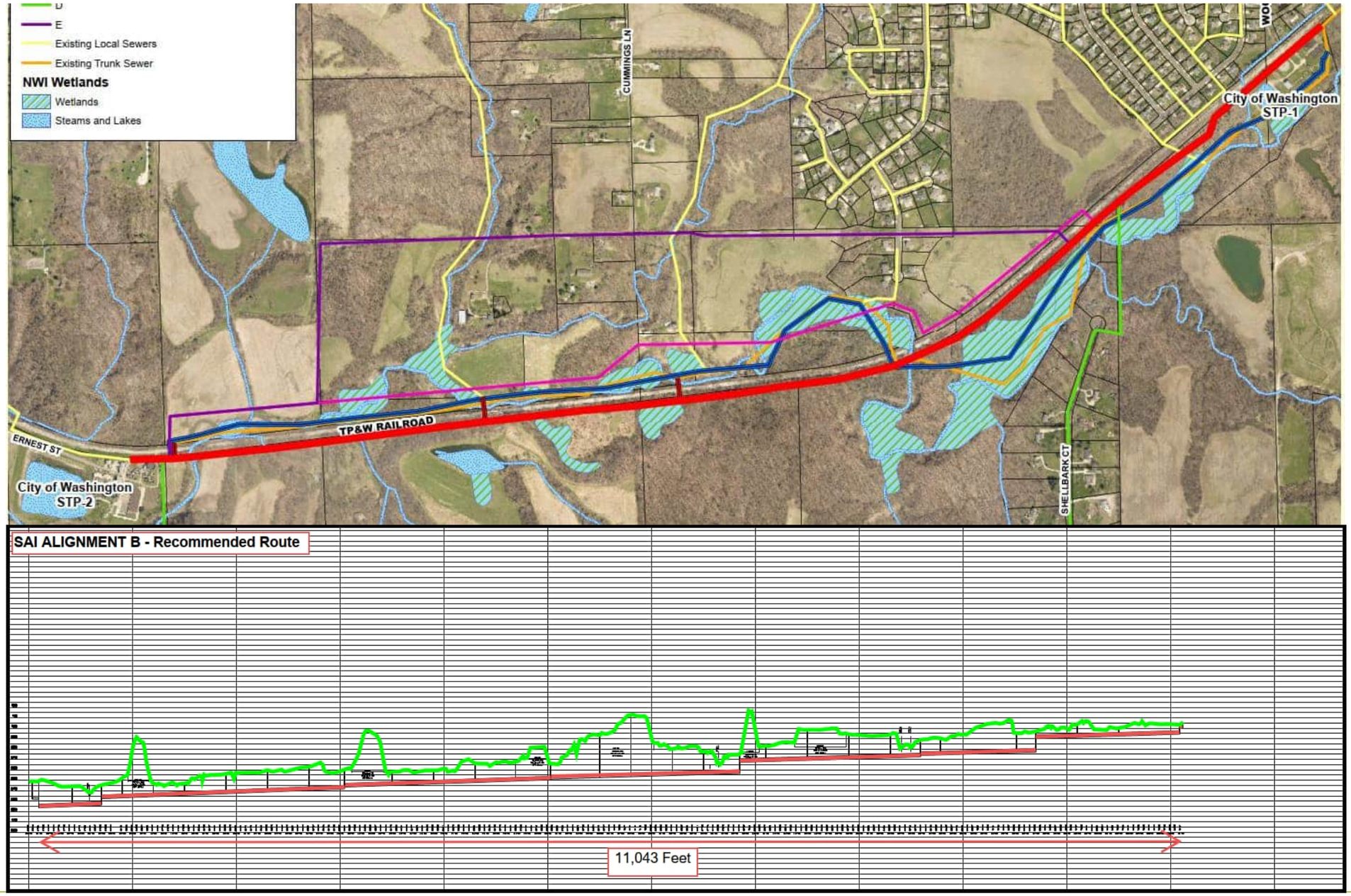
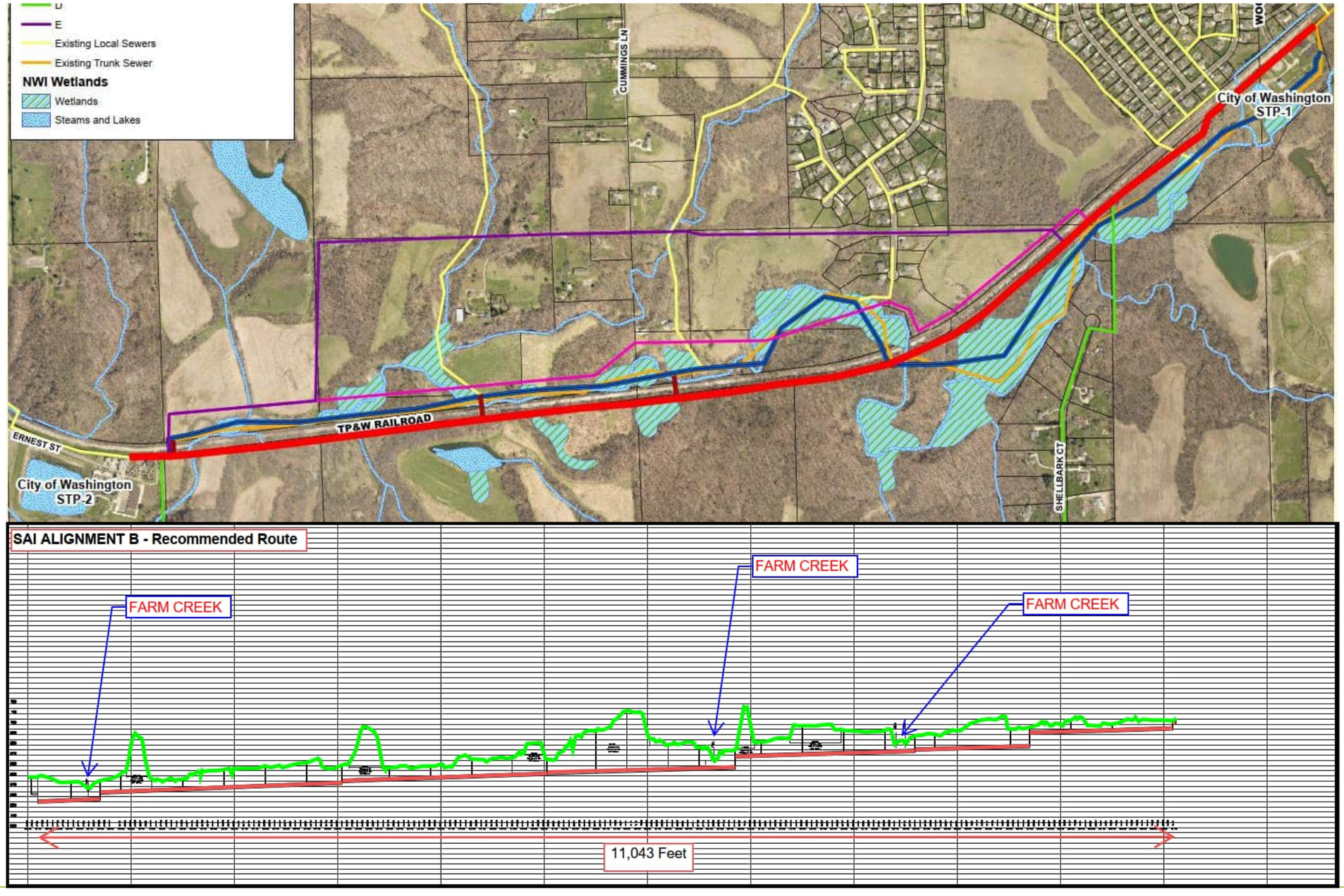
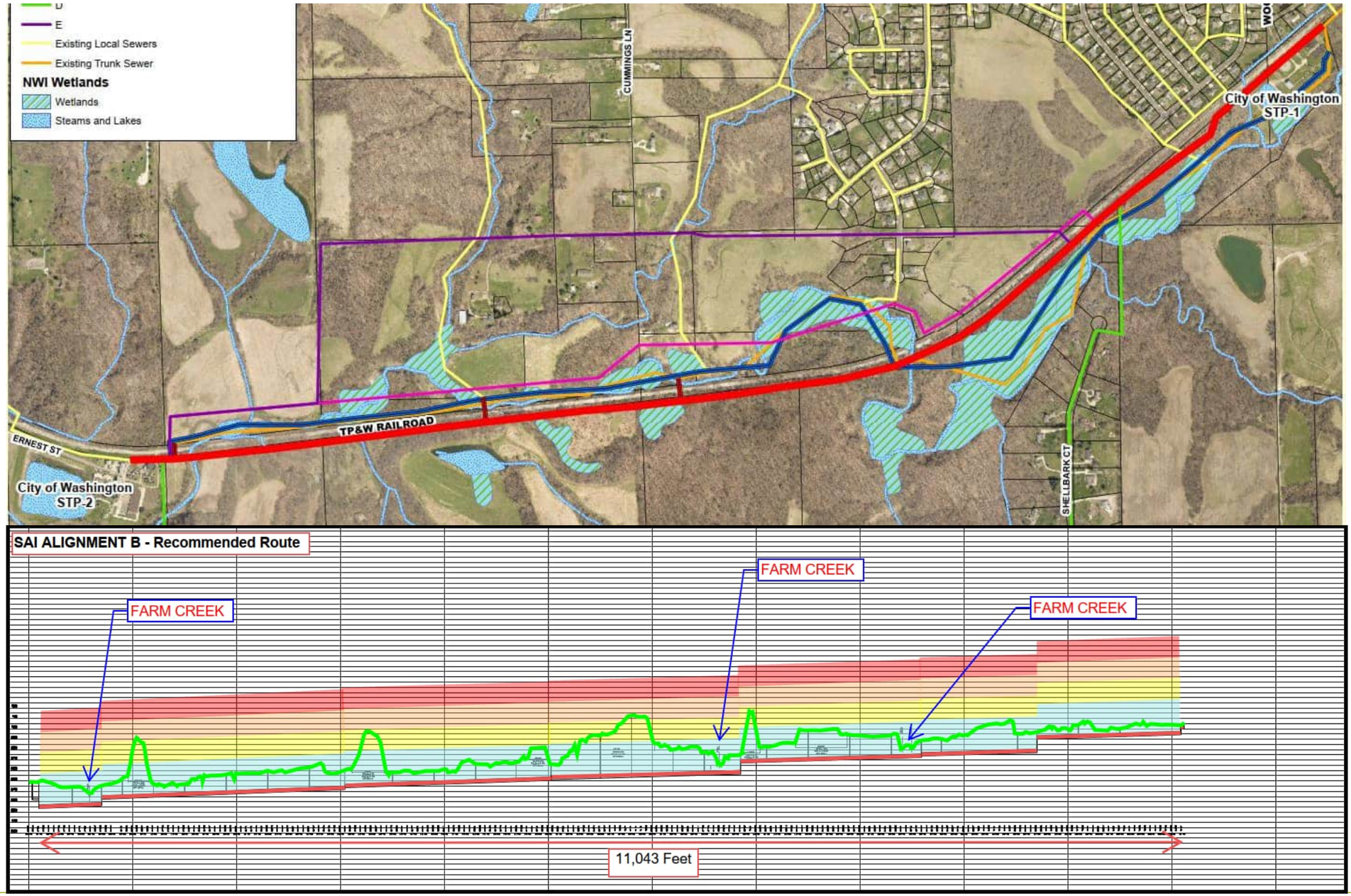
City’s Alternative Route Study – Route B Profile



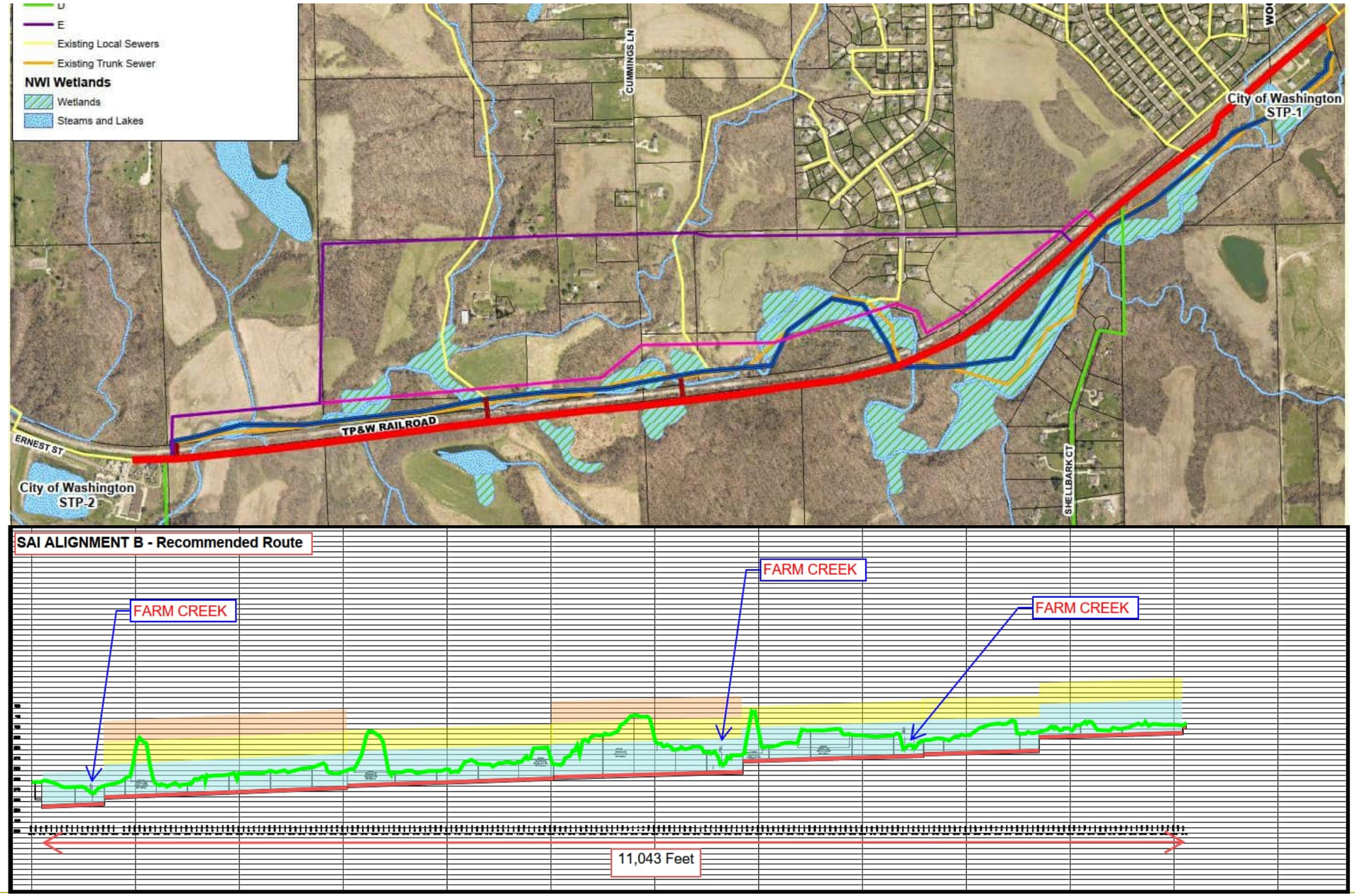
City’s Alternative Route Study – Route B Profile



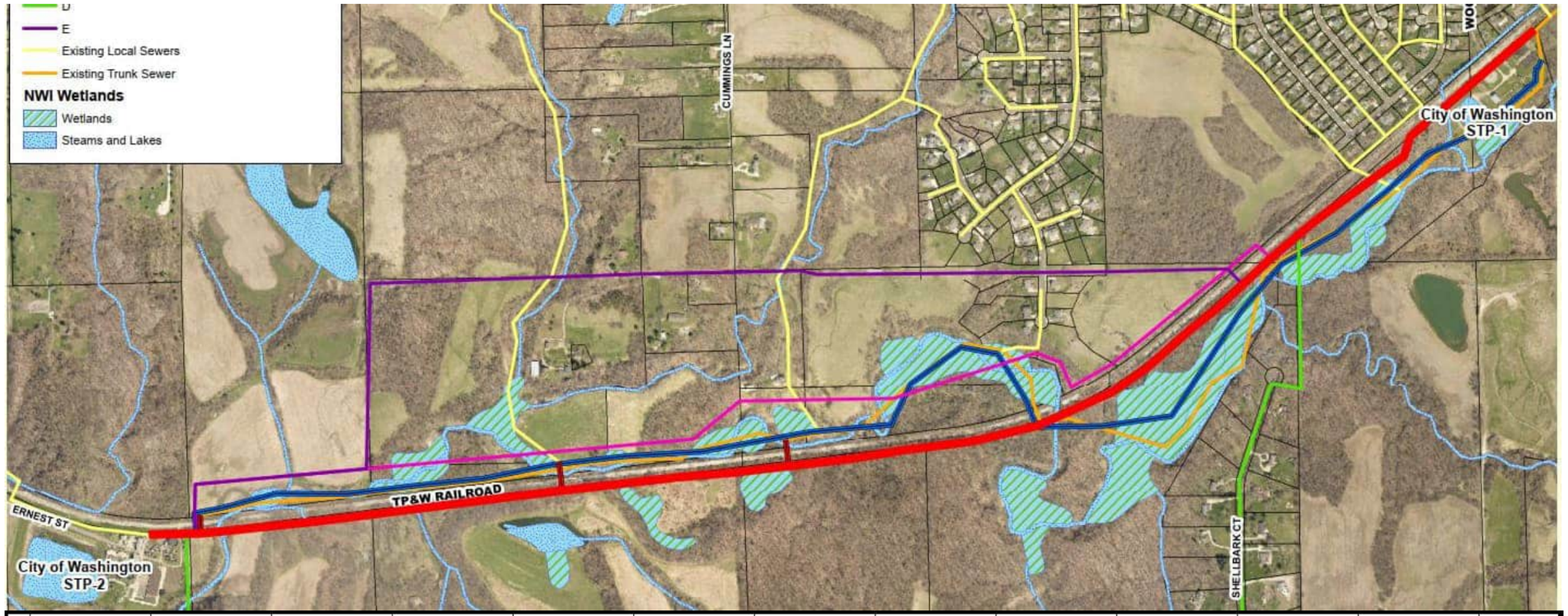
City’s Alternative Route Study – Route B Profile

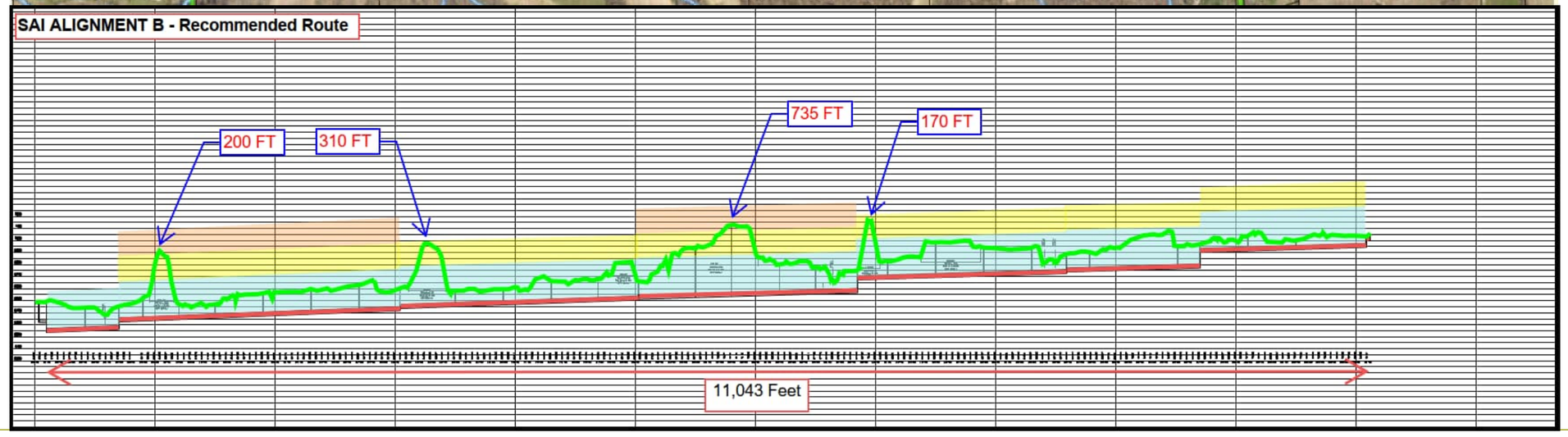


City’s Alternative Route Study – Route B Profile



City’s Alternative Route Study – Route B Profile





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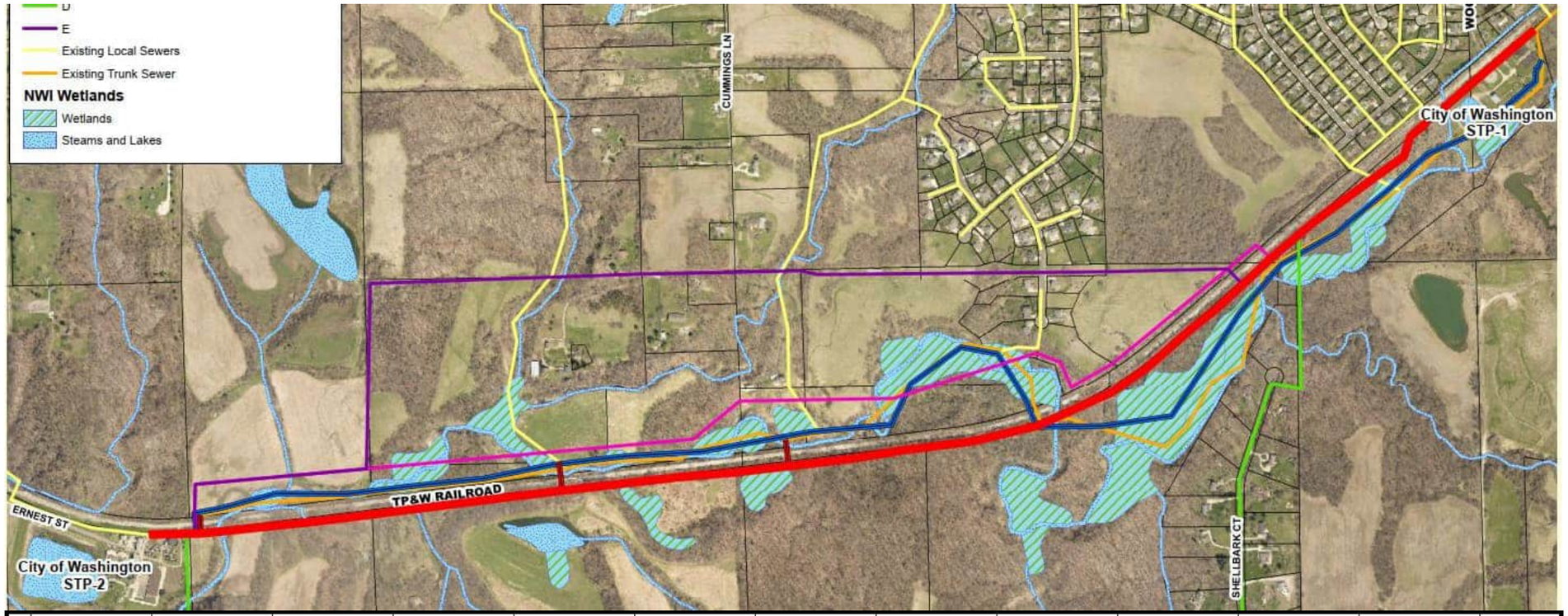
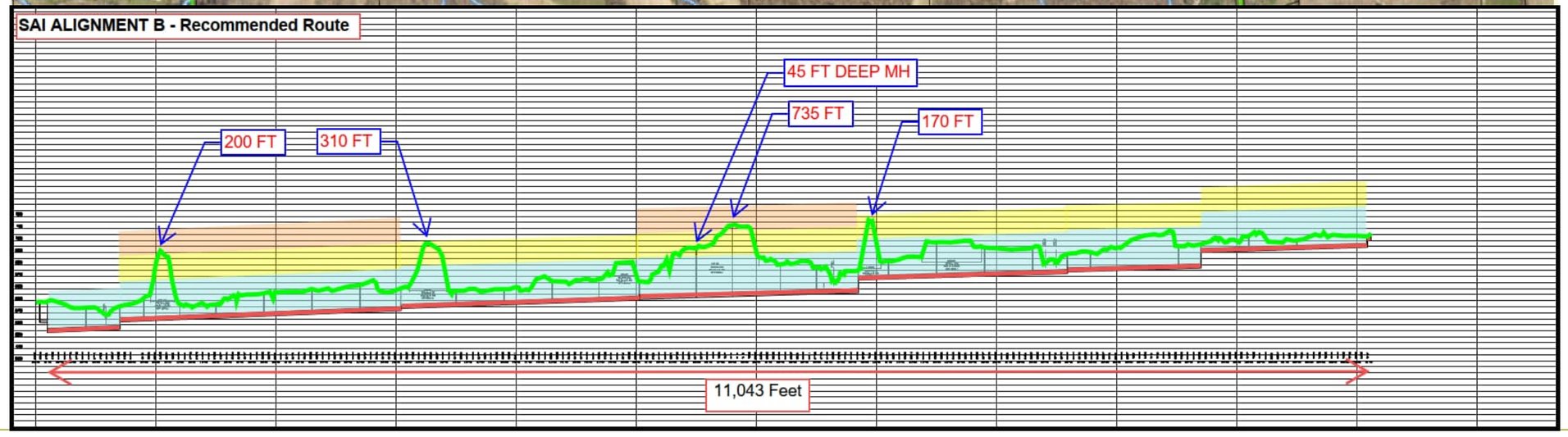
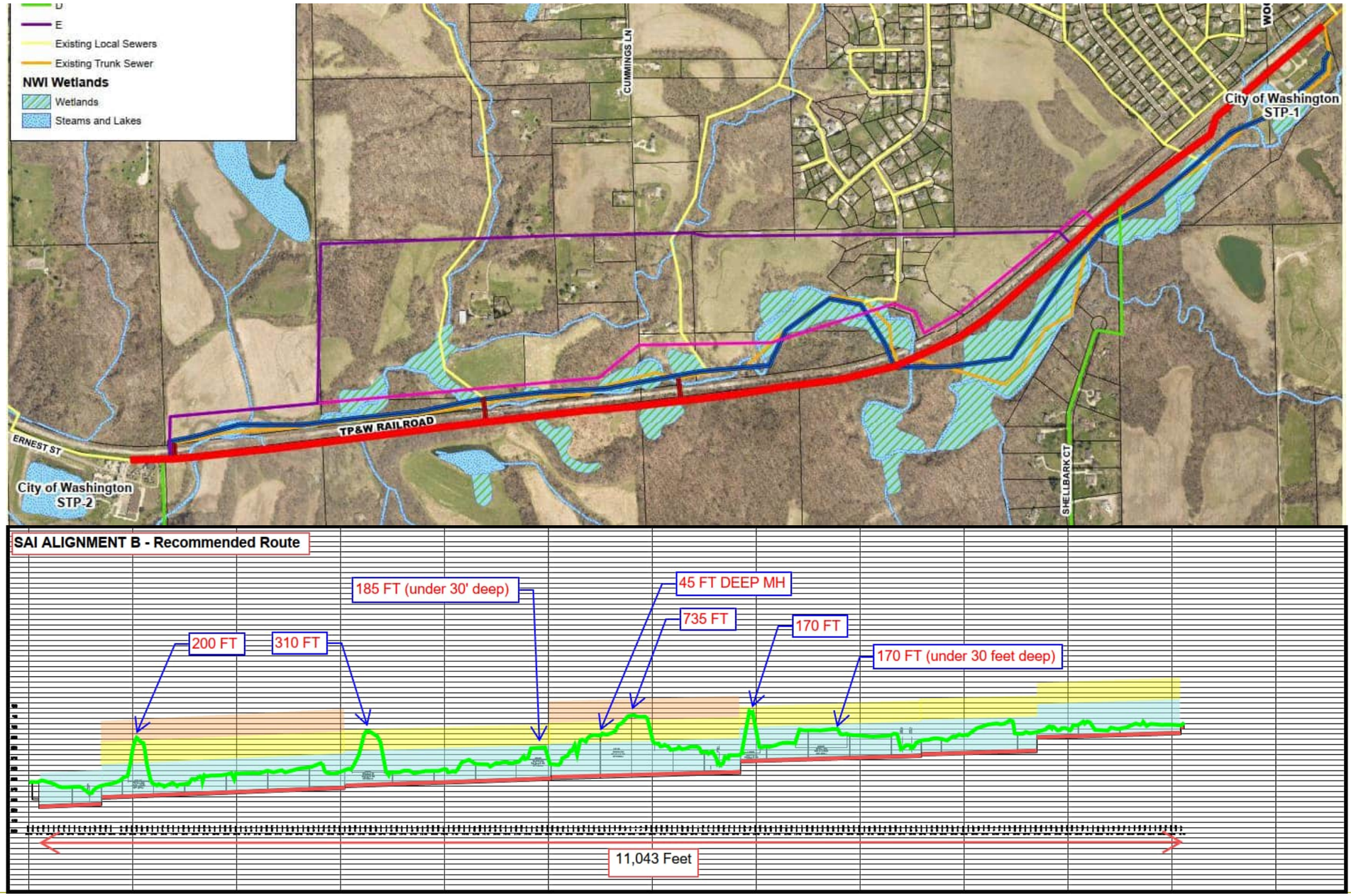
City’s Alternative Route Study – Route B Profile

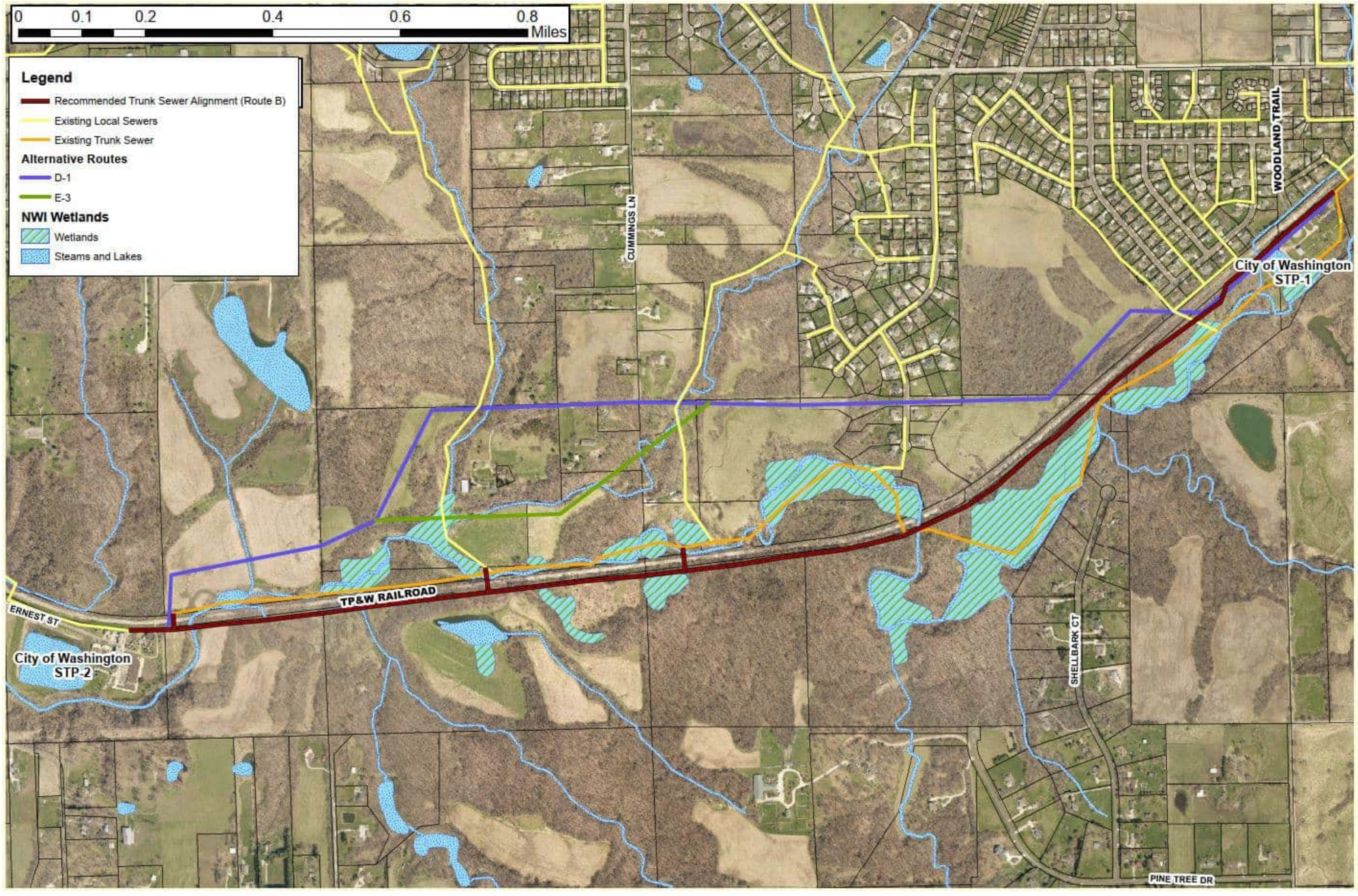




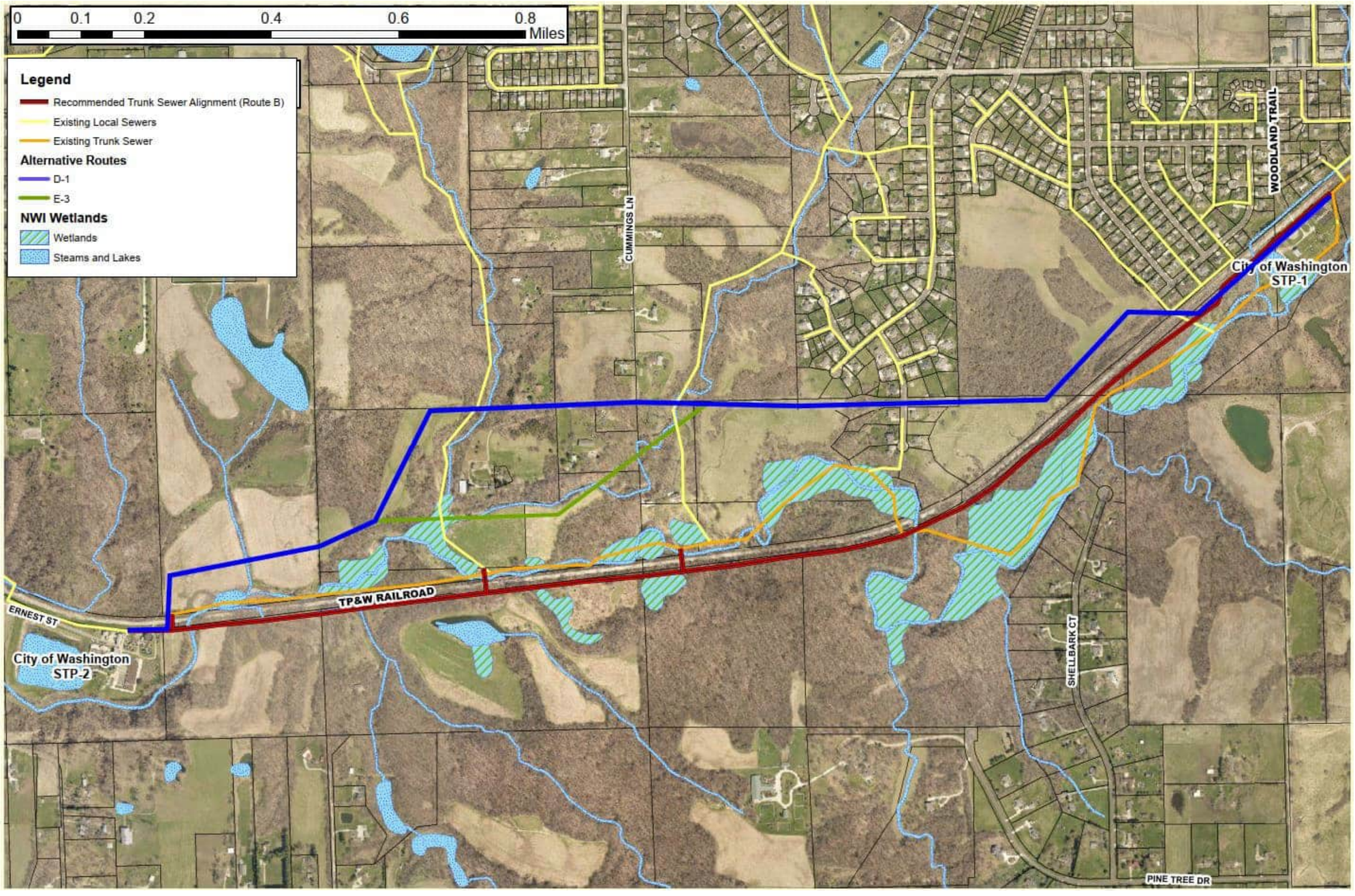
City’s Alternative Route Study – Route B Profile



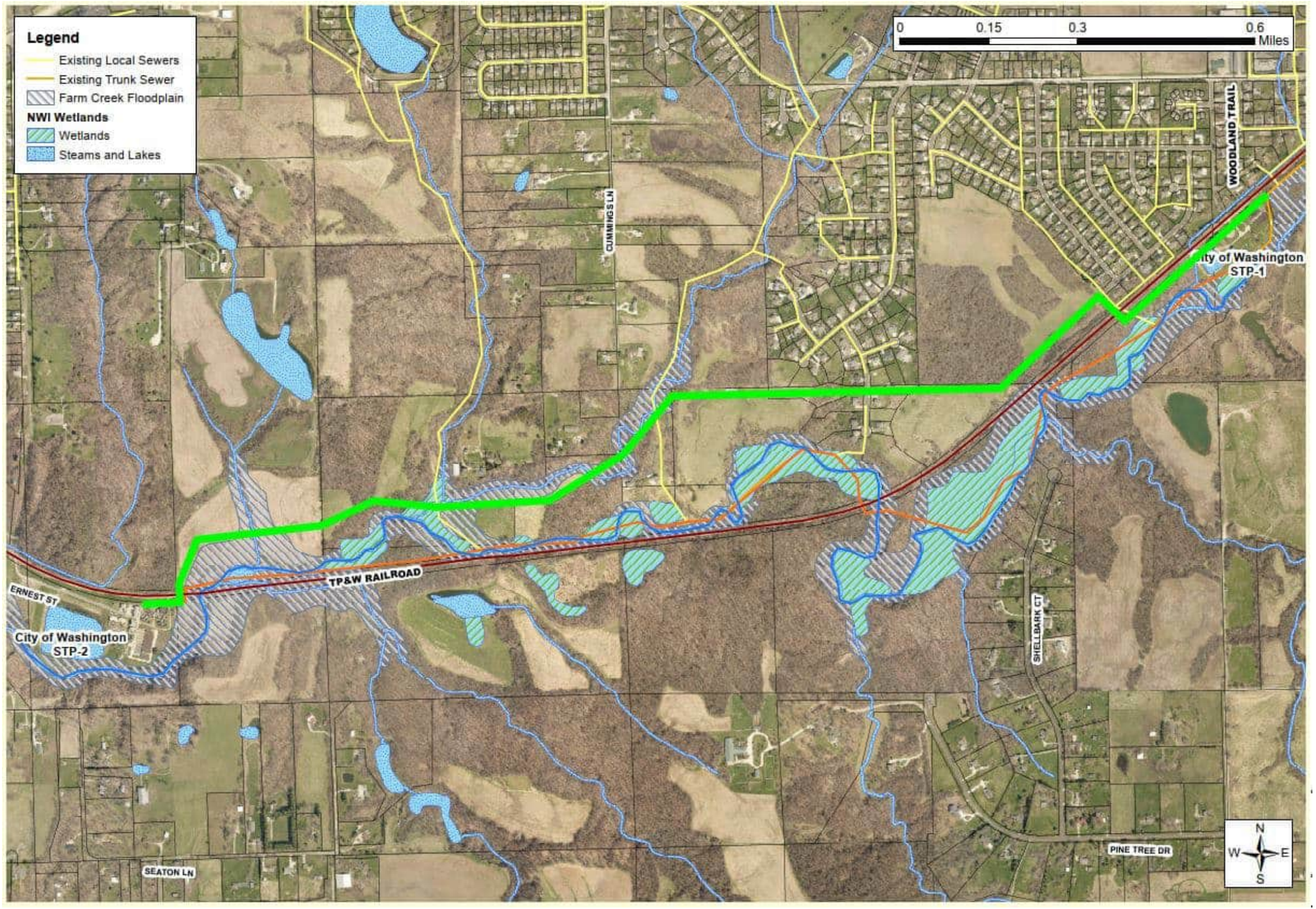
Alternative Route Analyses– GST 4 Primary Alignments



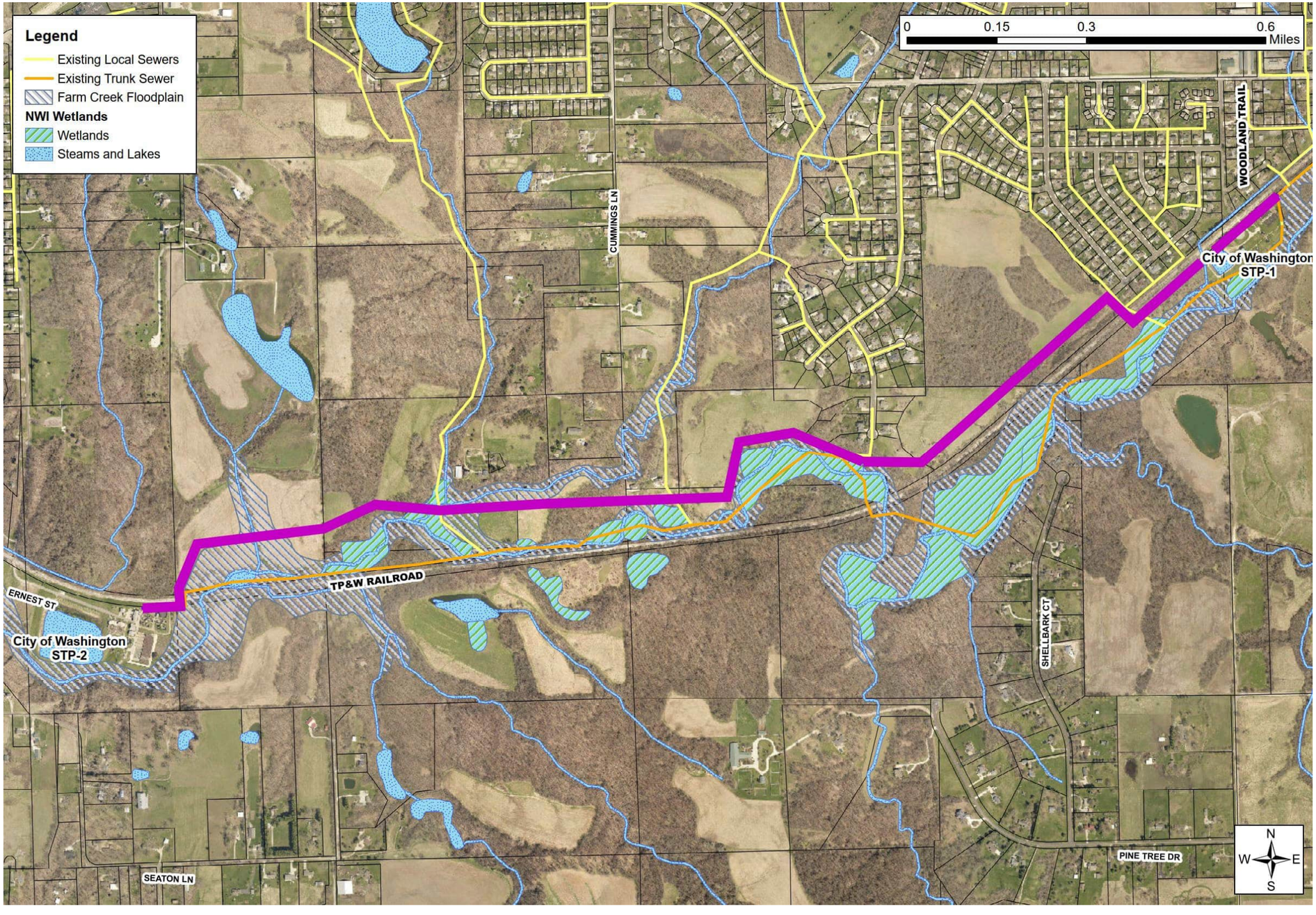
Alternative Route Analyses– GST Route D-1



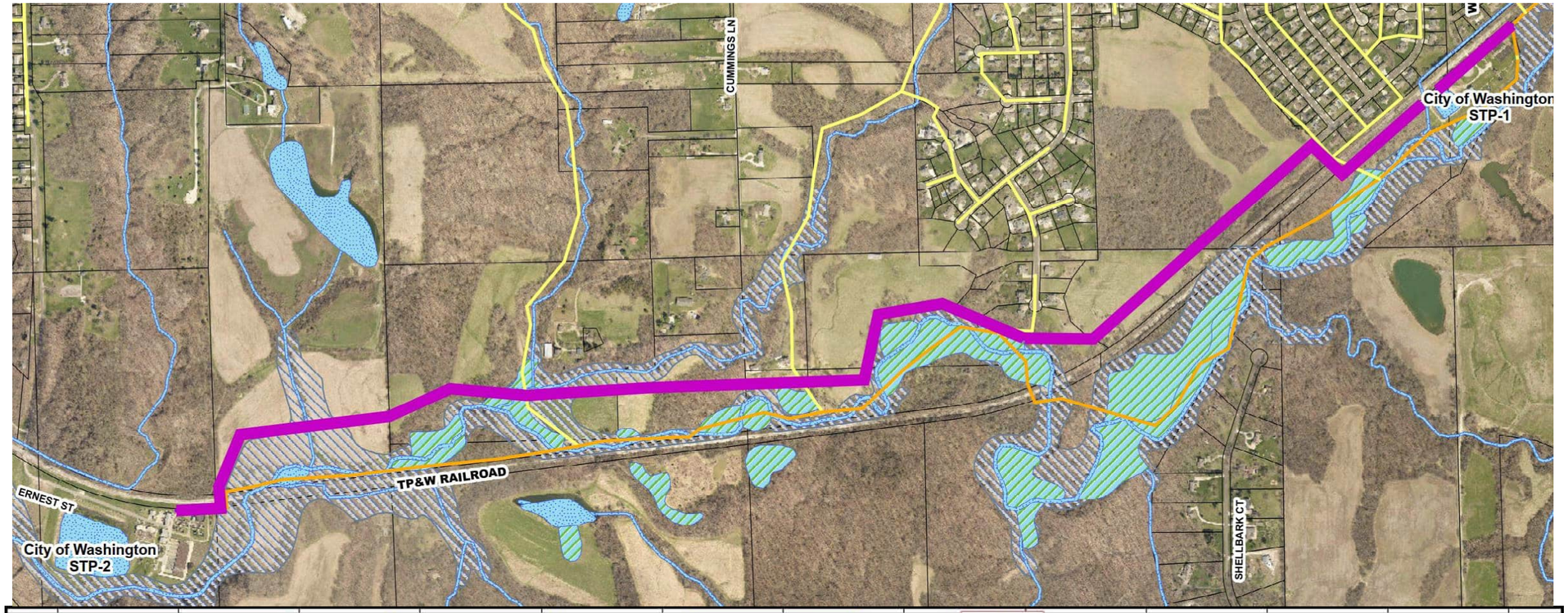
Alternative Route Analyses– GST Route E-3

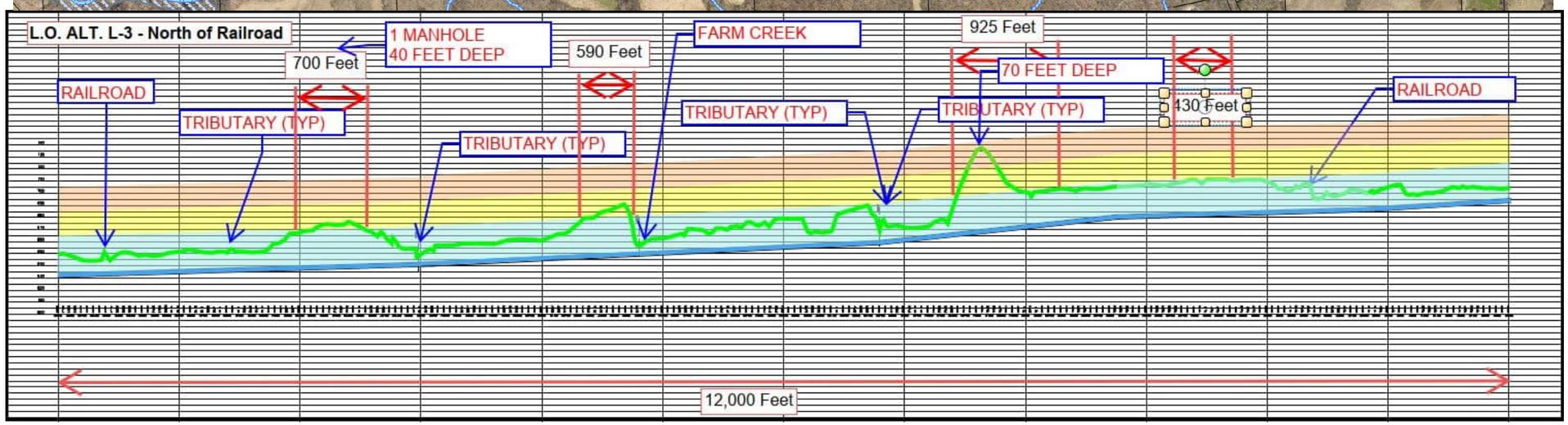


Alternative Route Analyses– GST Route (L-1) L-3



Alternative Route Analyses– GST Route L-3 Profile





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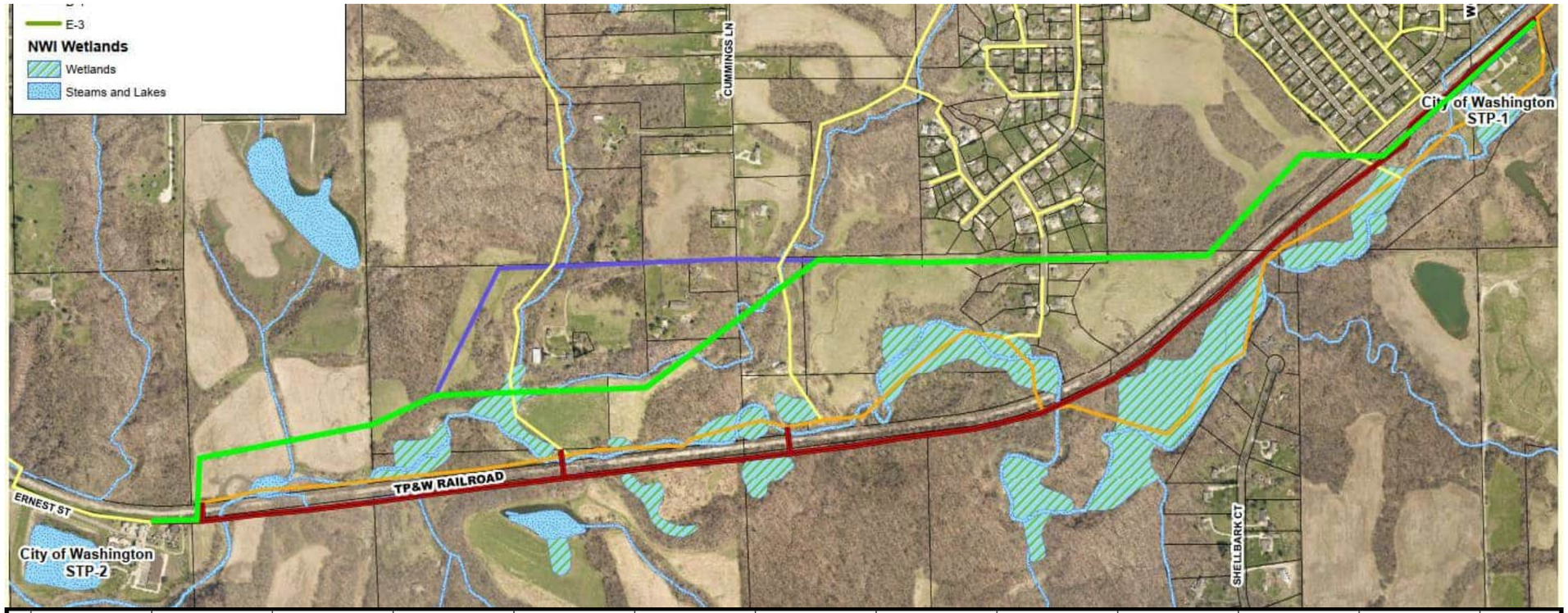
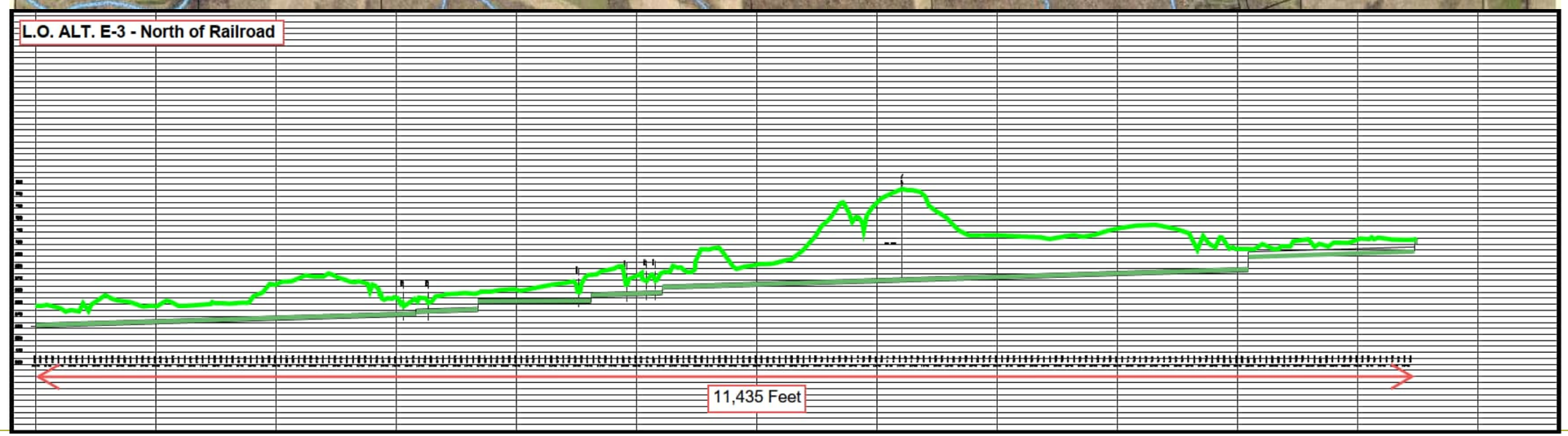
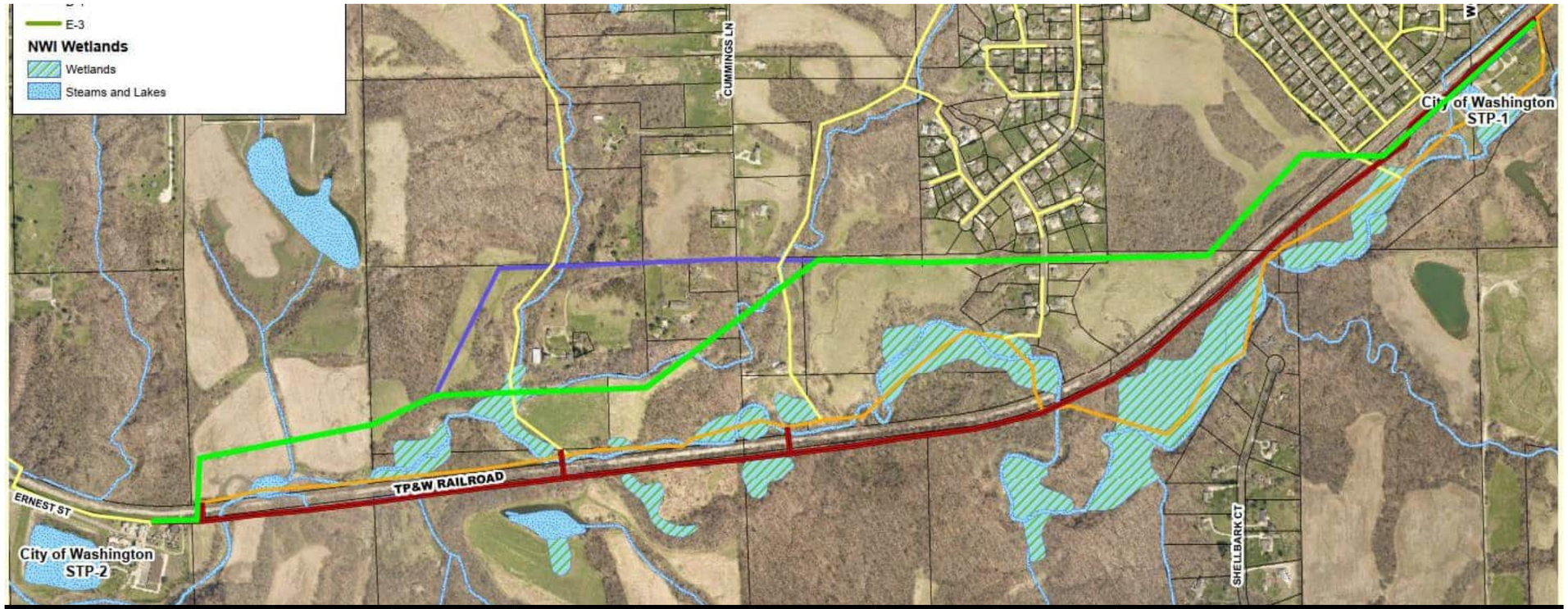
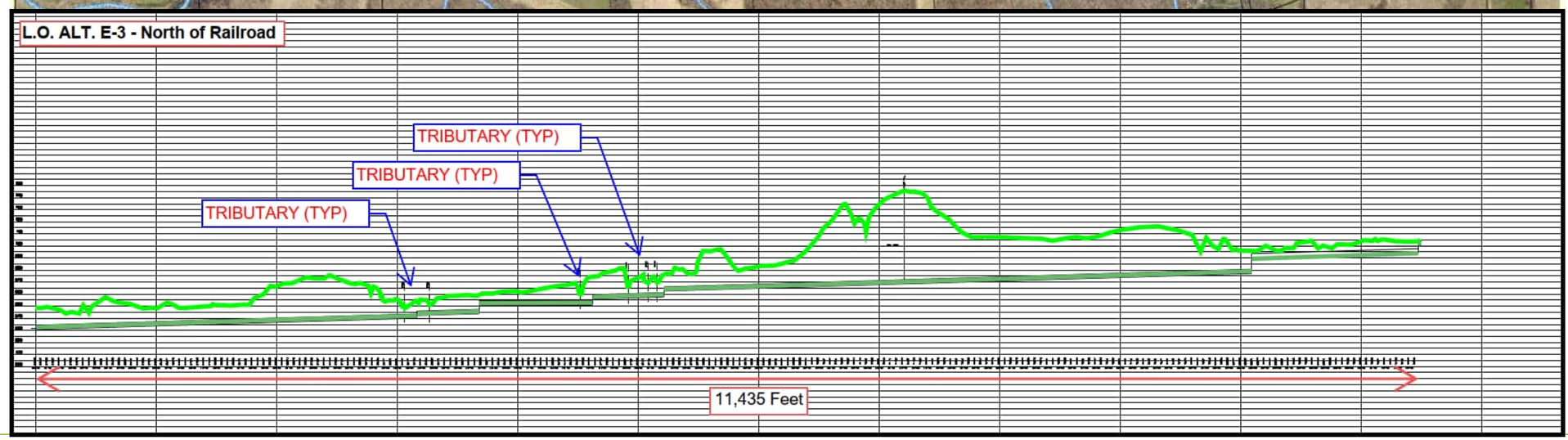
Alternative Route Analyses– GST Route E-3 Profile





Alternative Route Analyses– GST Route E-3 Profile





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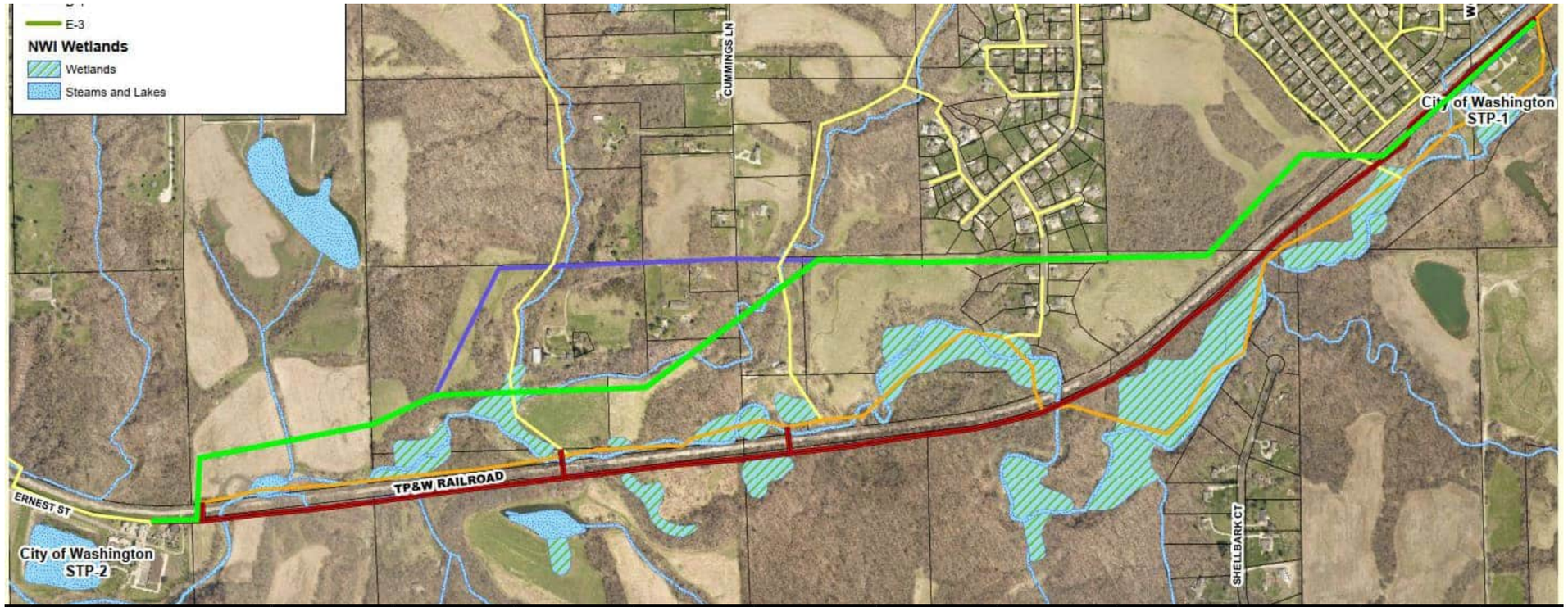
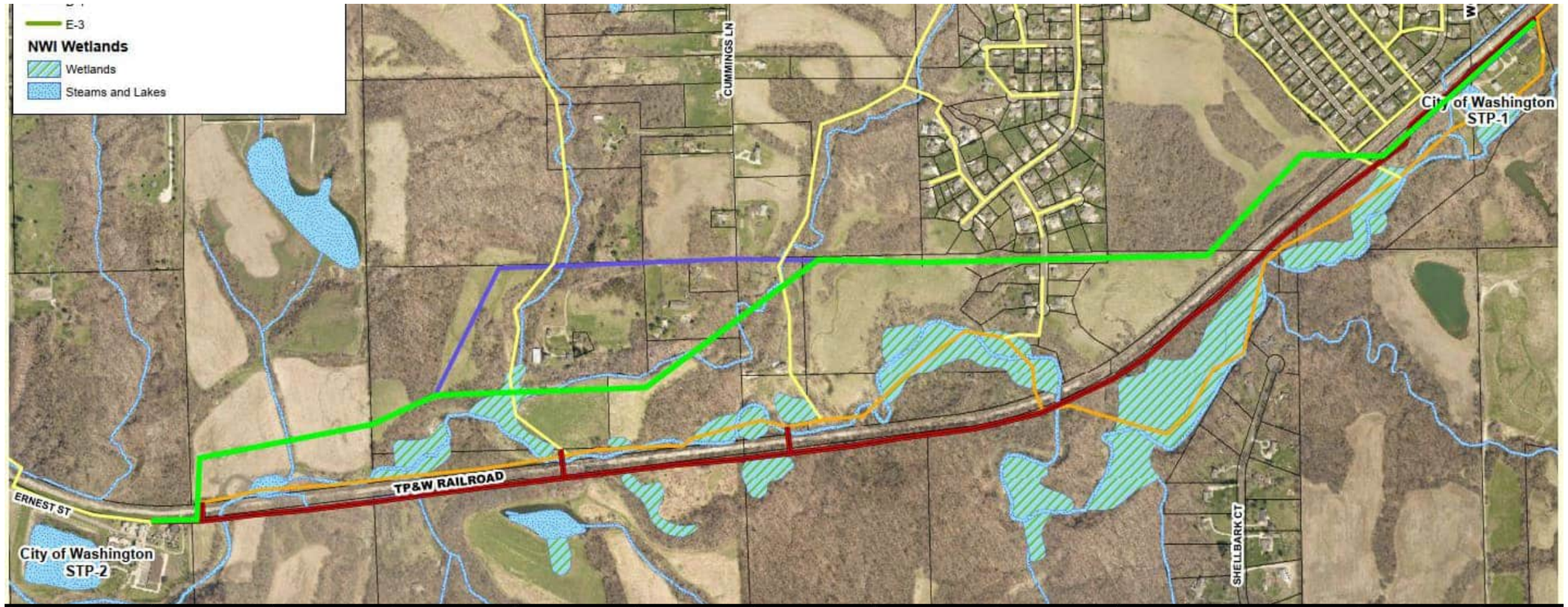
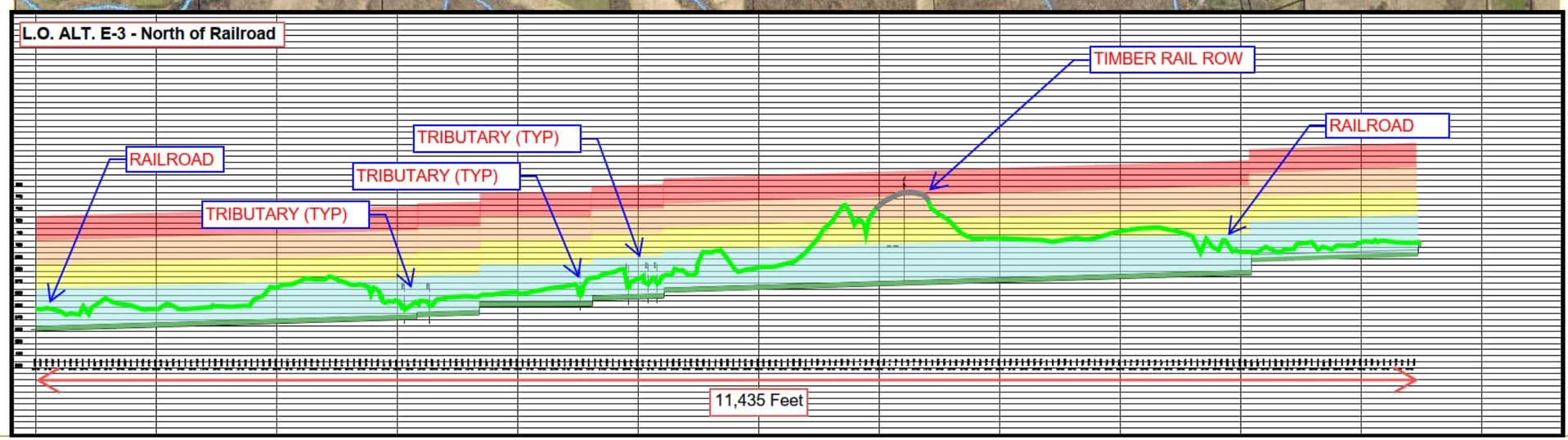
Alternative Route Analyses– GST Route E-3 Profile



Alternative Route Analyses– GST Route E-3 Profile





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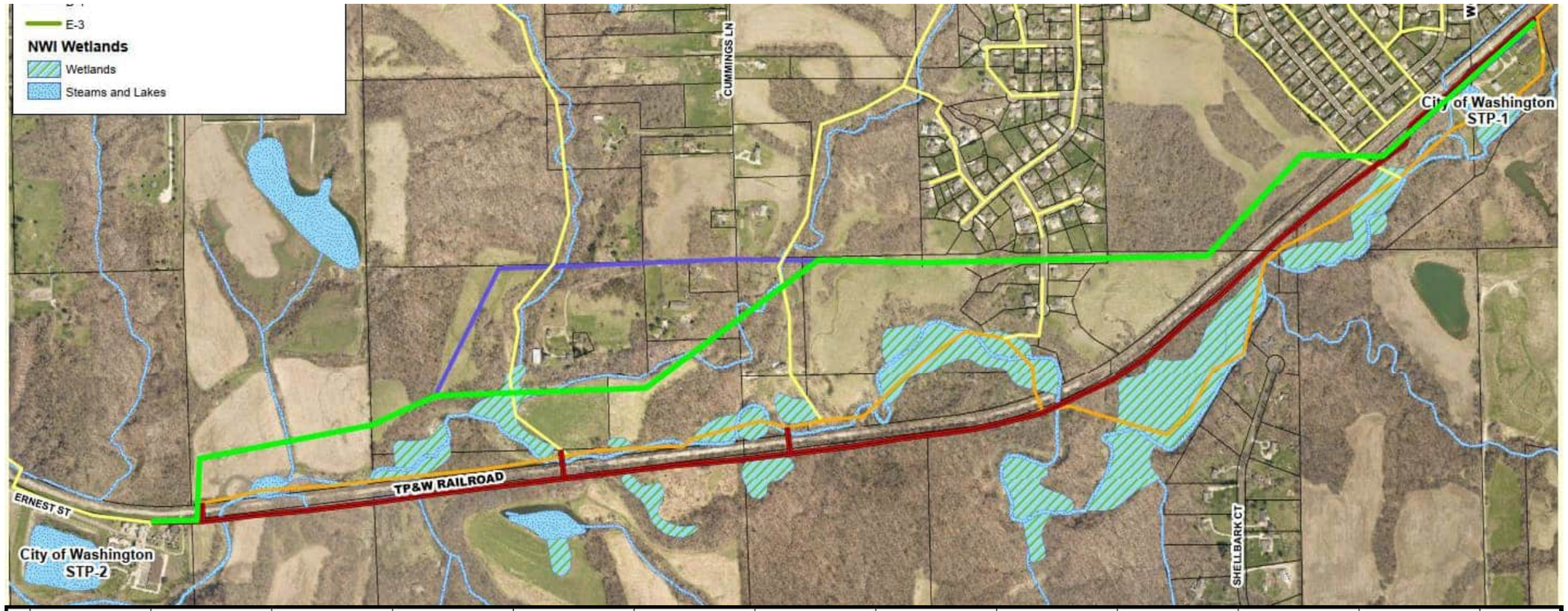
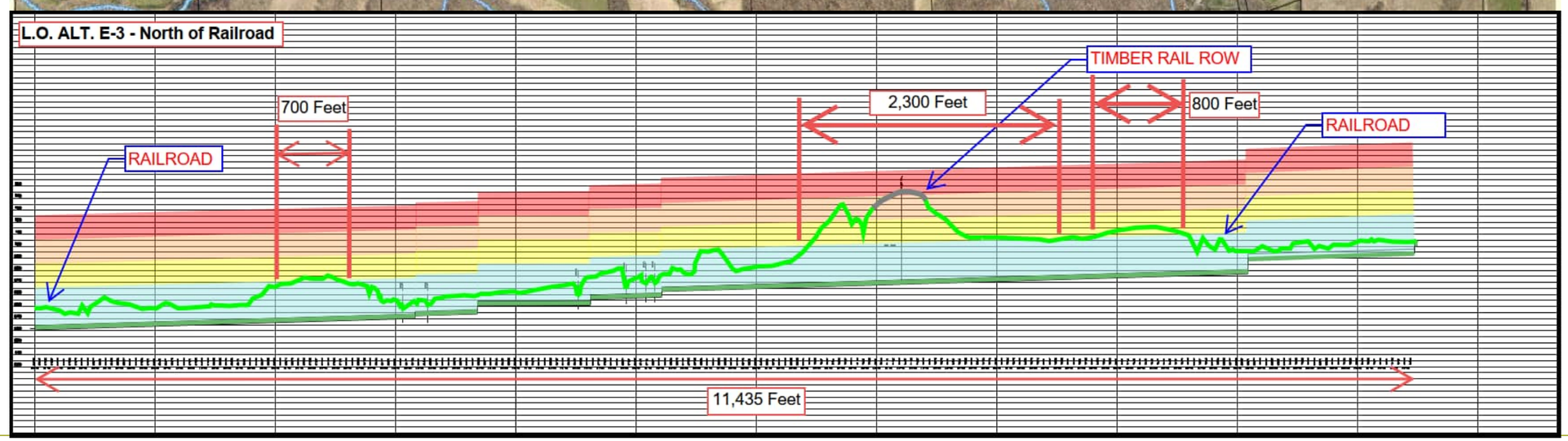
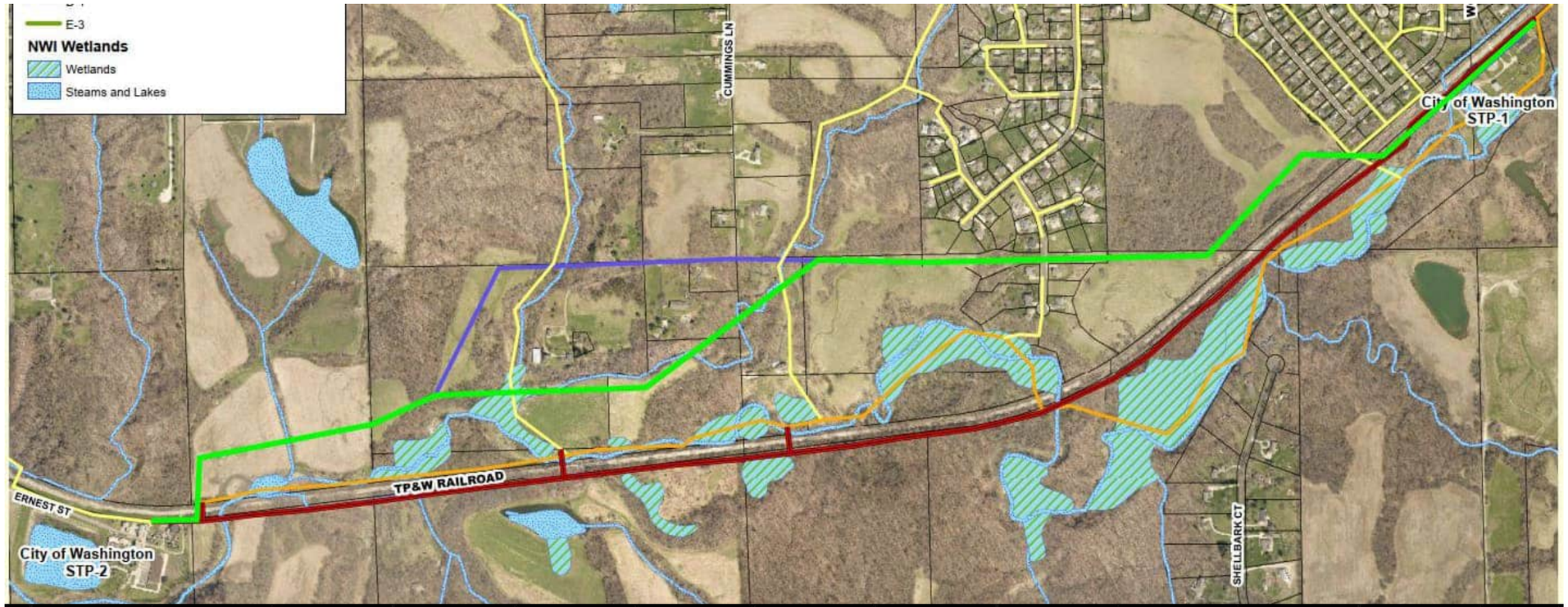
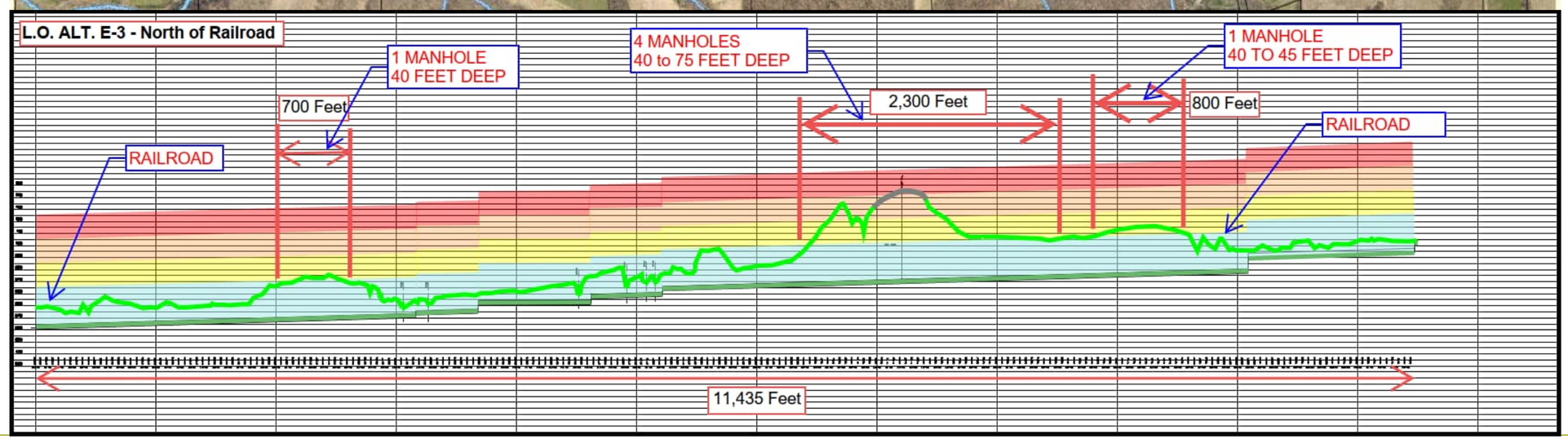
Alternative Route Analyses– GST Route E-3 Profile



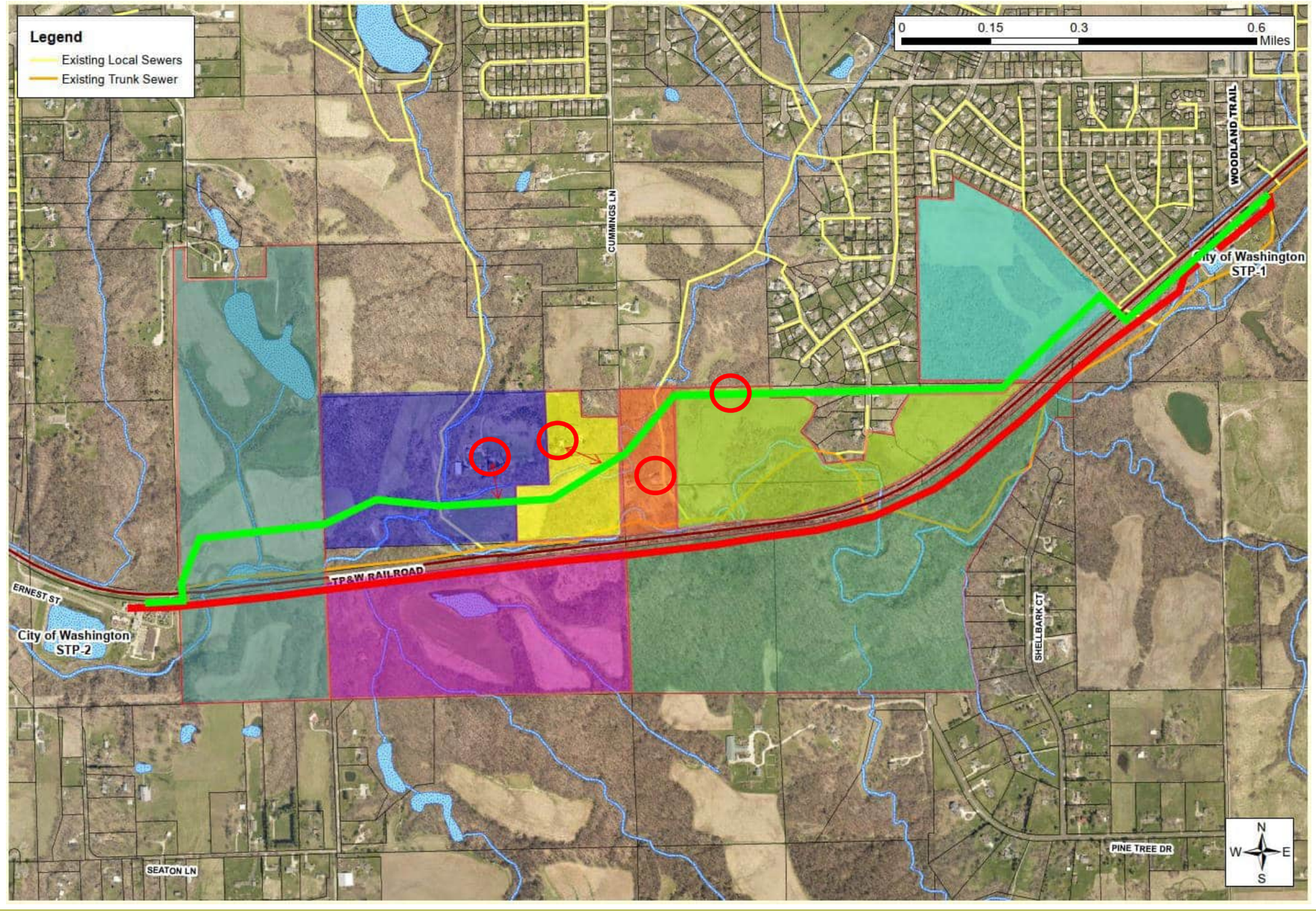


Alternative Route Analyses– GST Route E-3 Profile





Property Owners and Easements and Existing Structures



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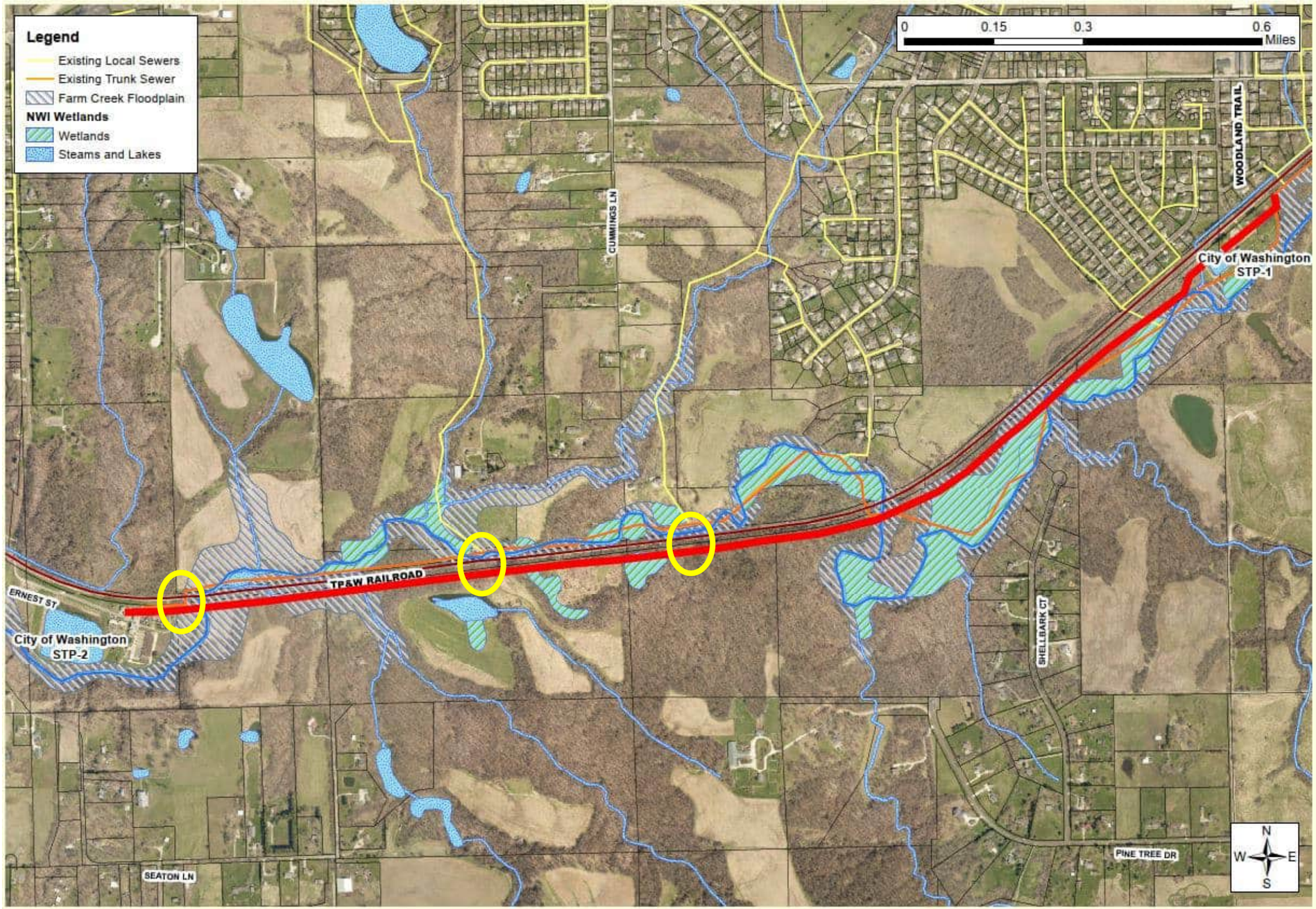
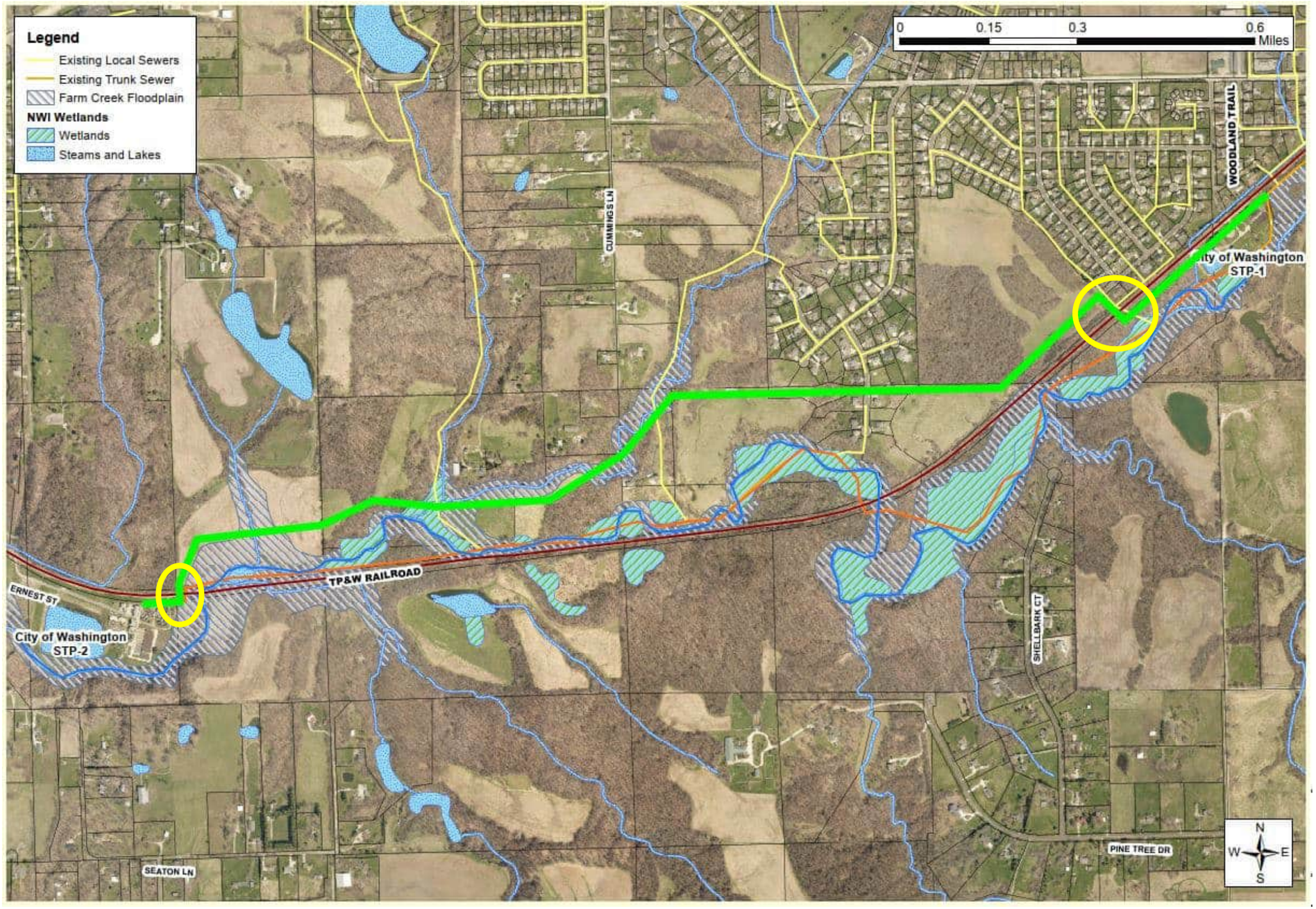
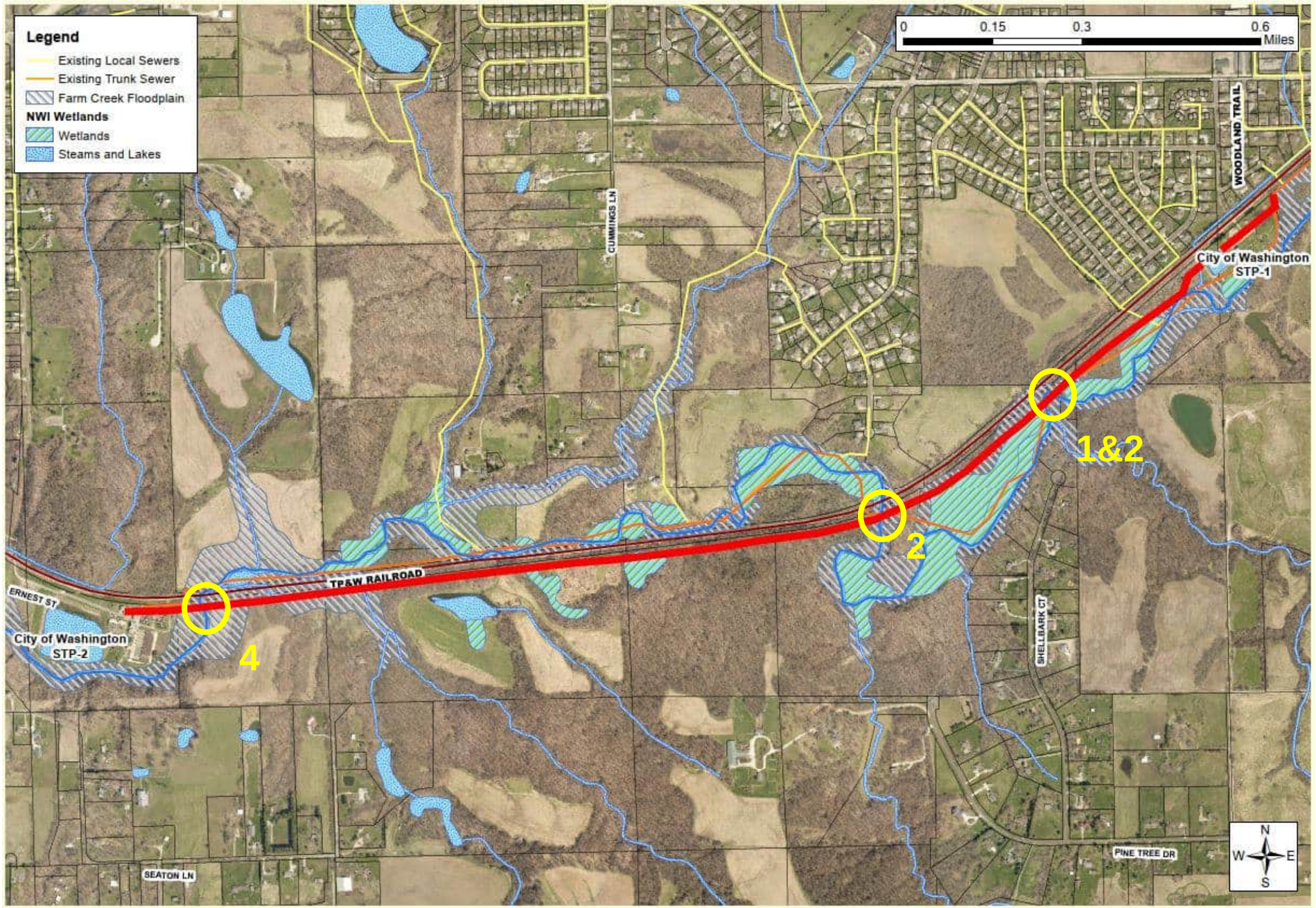
Railroad Crossings – Route B



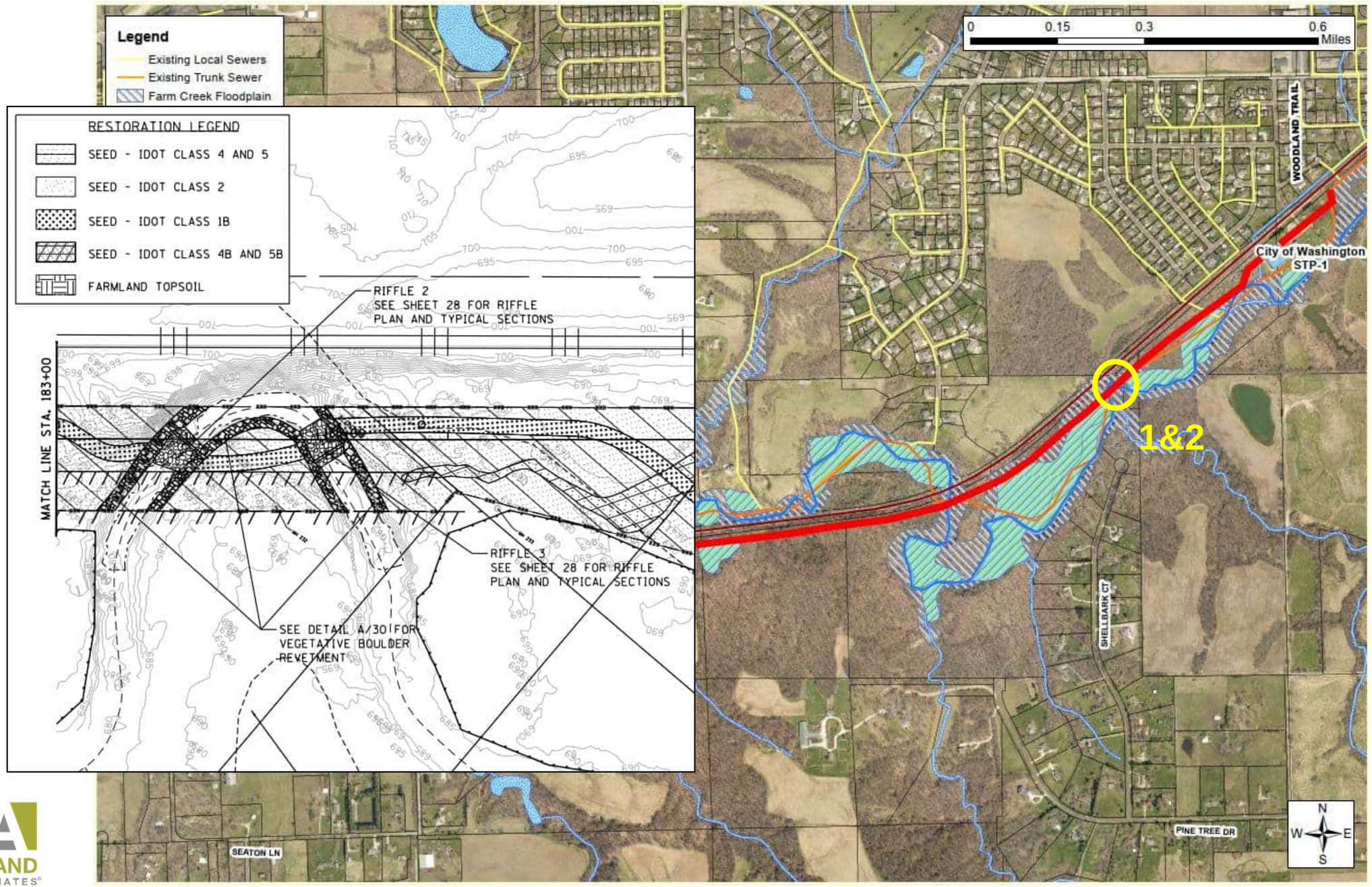
Railroad Crossngs – Route E-3, L-1, L-3



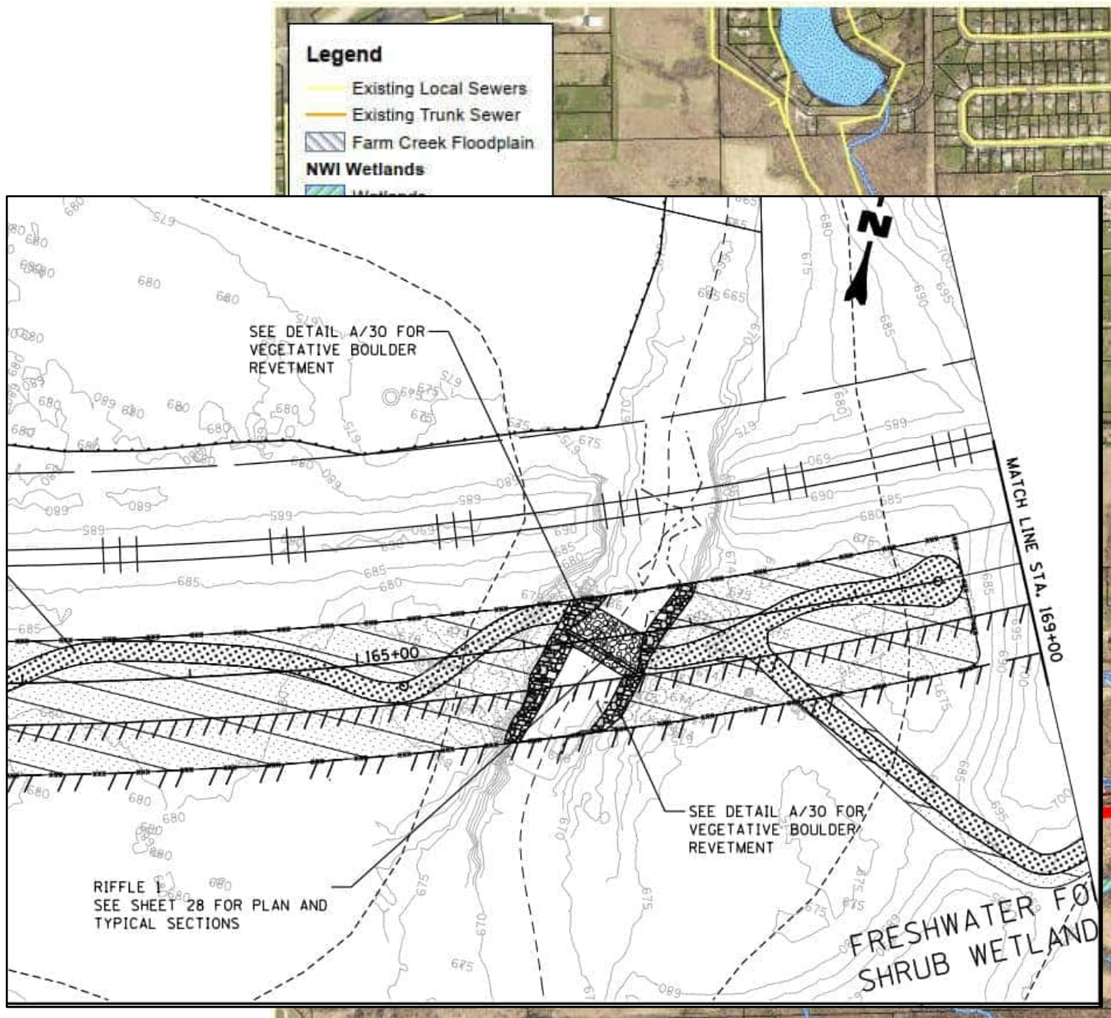
Accessibility – Route B – Farm Creek Crossings

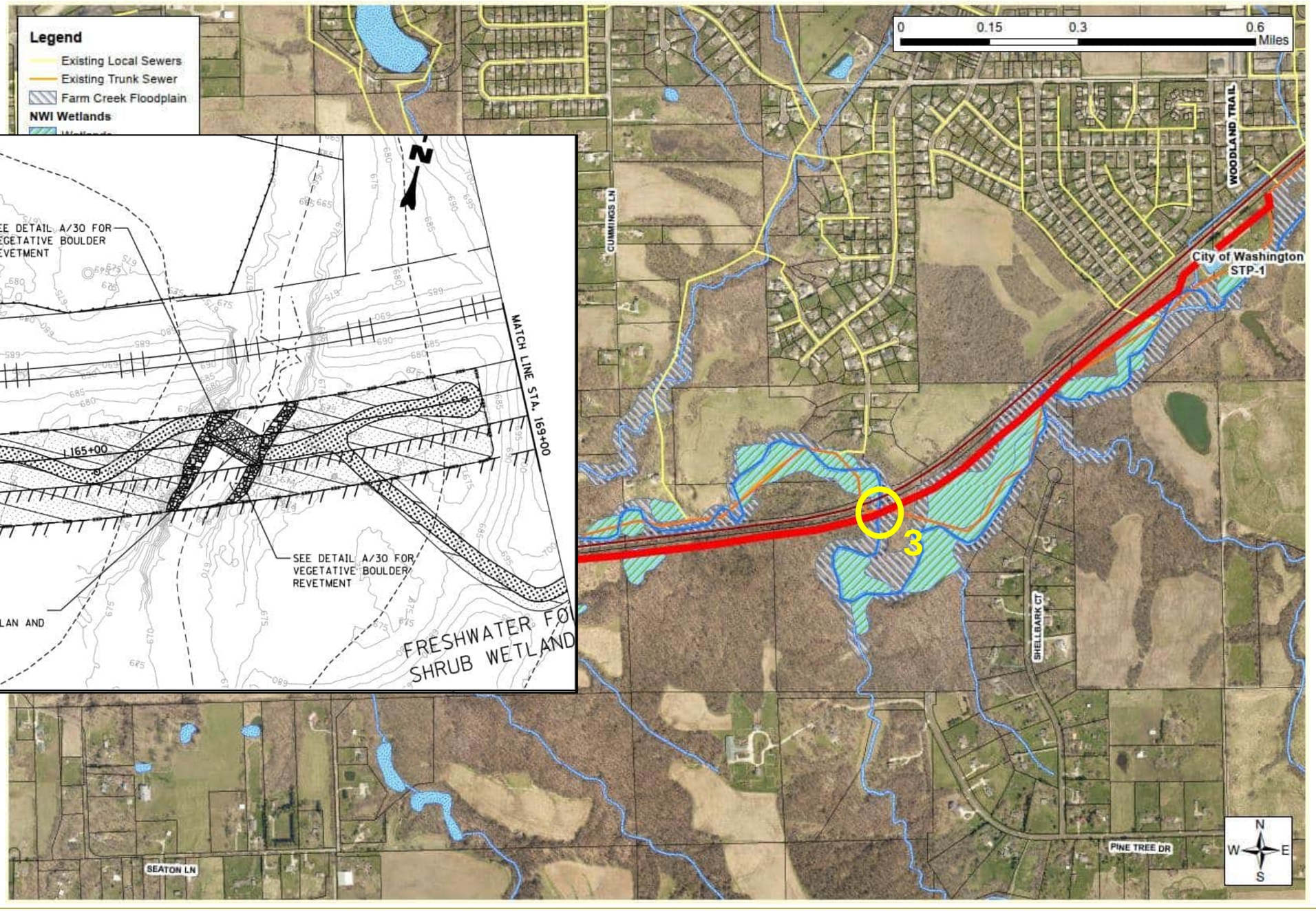


Accessibility – Route B Farm Crossing No. 1 & 2

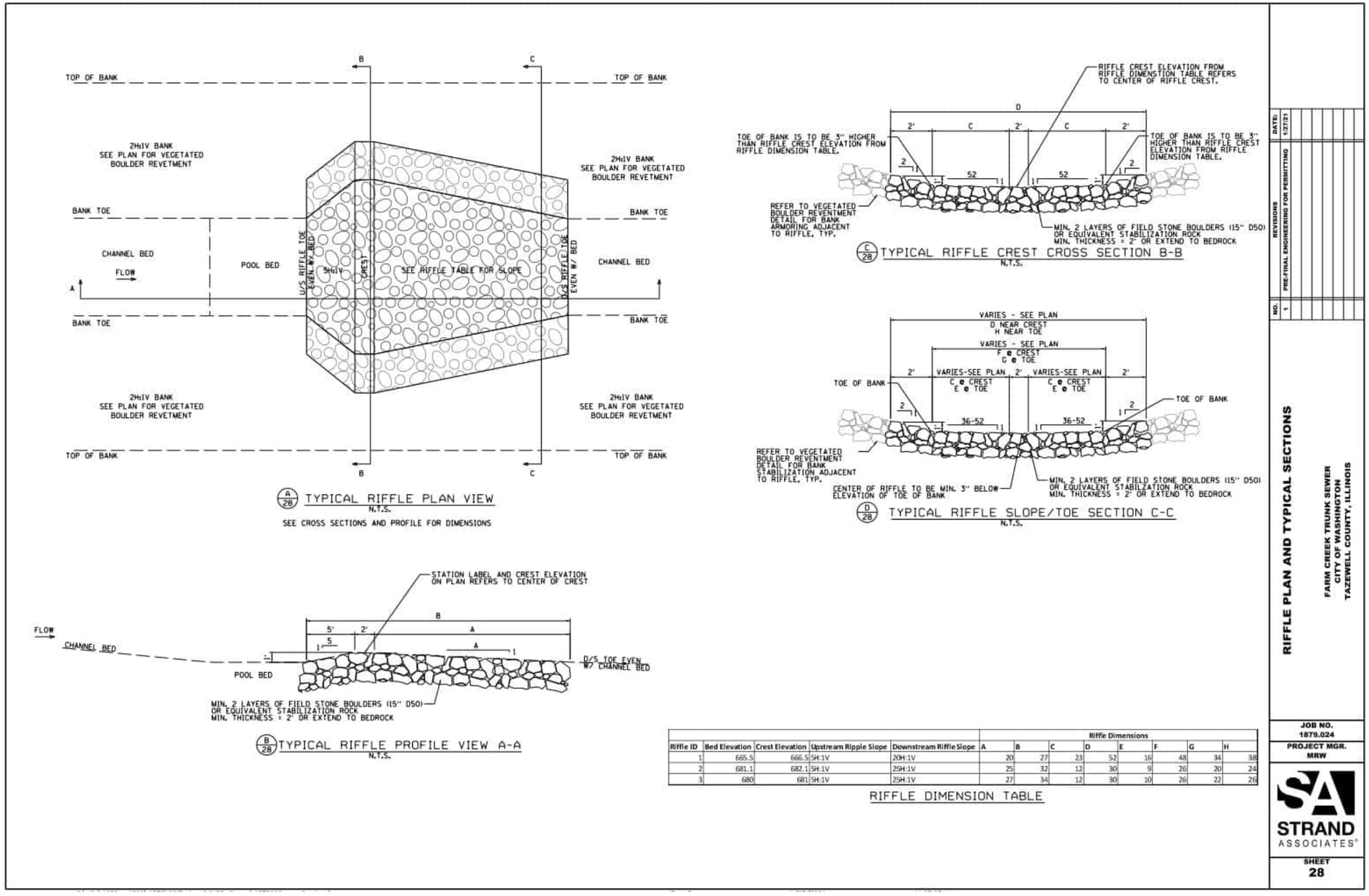


Accessibility – Route B Farm Crossing No. 3





Accessibility – Farm Creek Crossing Riffles



					Riffle Dimensions							
Riffle ID	Bed Elevation	Crest Elevation	Upstream Ripple Slope	Downstream Riffle Slope	A	B	C	D	E	F	G	H
1	665.5	666.5	5H:1V	20H:1V	20	27	23	52	16	48	34	38
2	681.1	682.1	5H:1V	25H:1V	25	32	12	30	9	26	20	24
3	680	681	5H:1V	25H:1V	27	34	12	30	10	26	22	26

RIFFLE DIMENSION TABLE

NO. 1 — PRE-FINAL ENGINEERING FOR PERMITTING — DATE: 1/27/21

REVISIONS

RIFFLE PLAN AND TYPICAL SECTIONS

FARM CREEK TRUNK SEWER
CITY OF WASHINGTON
TAZEWELL COUNTY, ILLINOIS

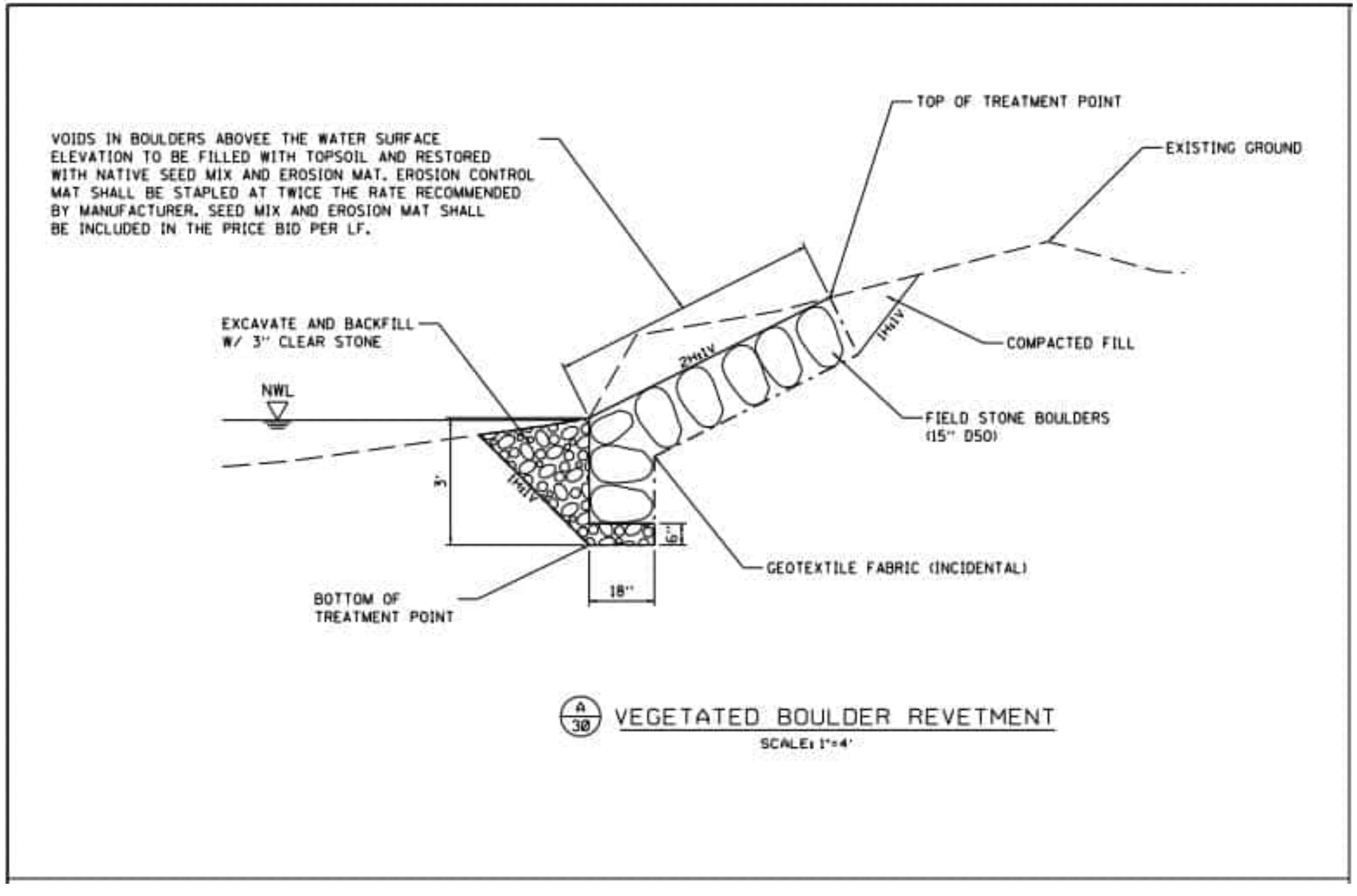
JOB NO. 1879.024
PROJECT MGR. MRW

STRAND ASSOCIATES®

SHEET 28

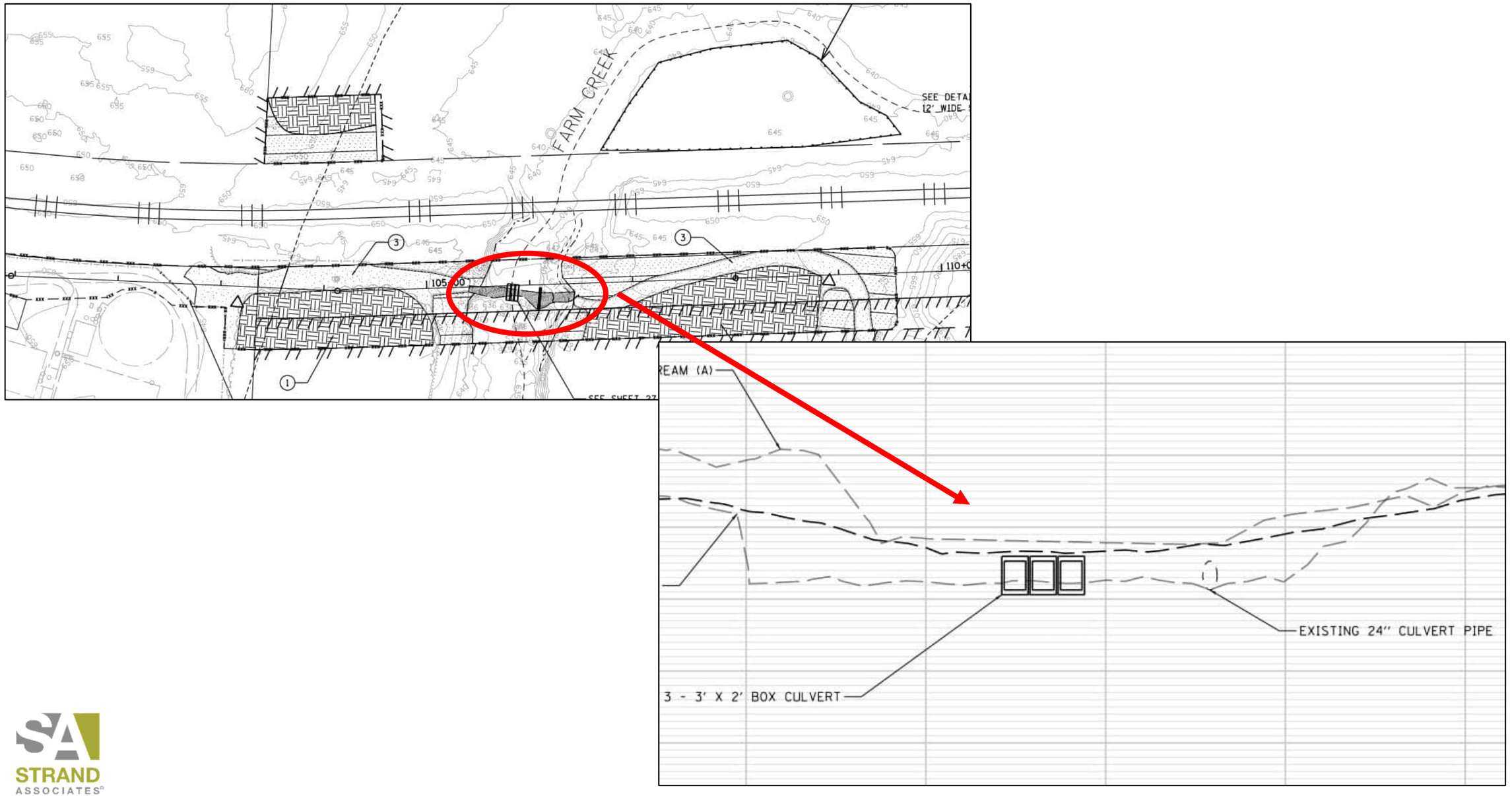
STRAND ASSOCIATES®

Accessibility – Farm Creek Crossing Bank Stabilization

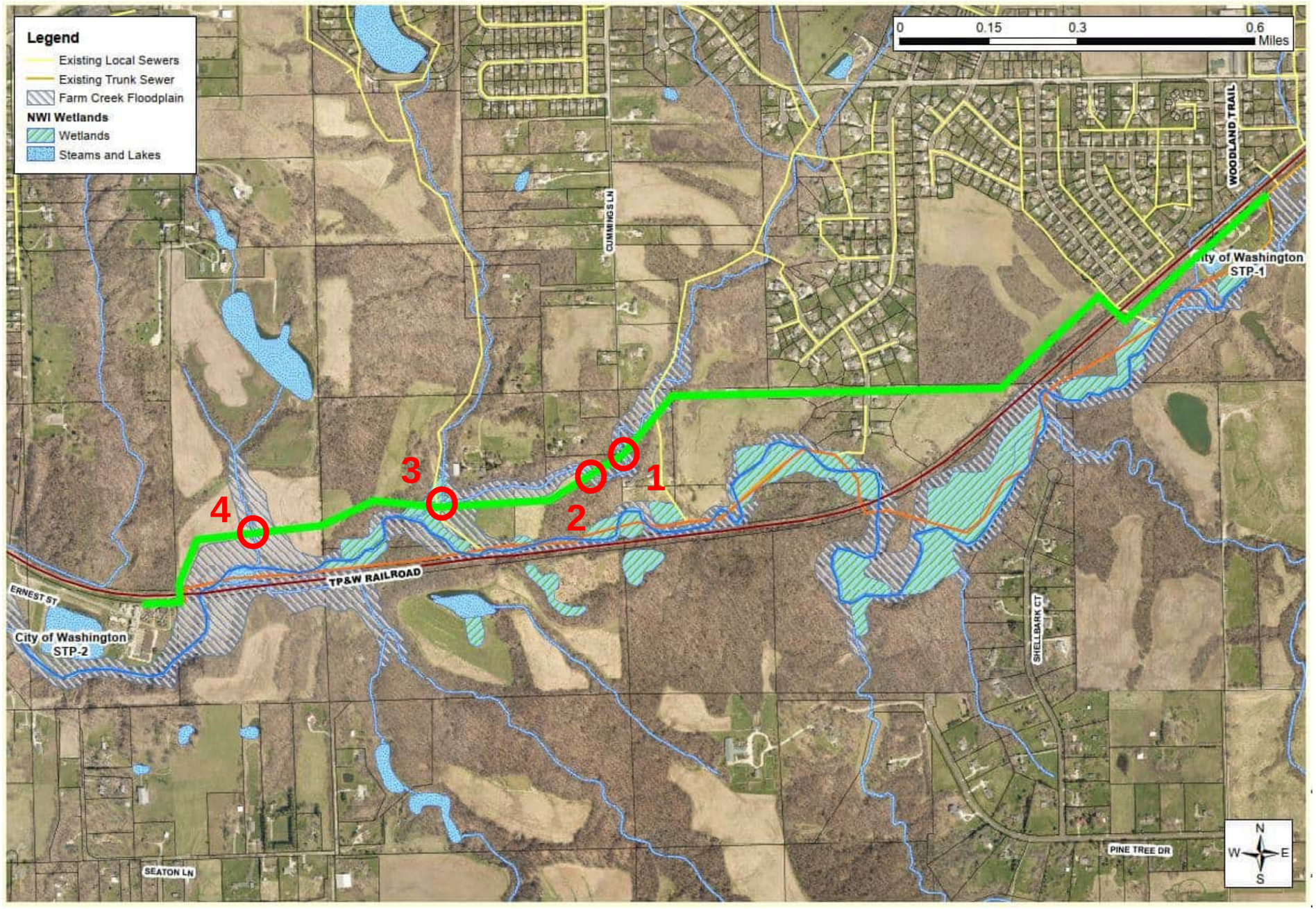


Accessibility – Route B Farm Crossing No. 4

Accessibility – Existing Farm Creek Crossing No. 4



Accessibility – Route E-3 – Ravine Crossings



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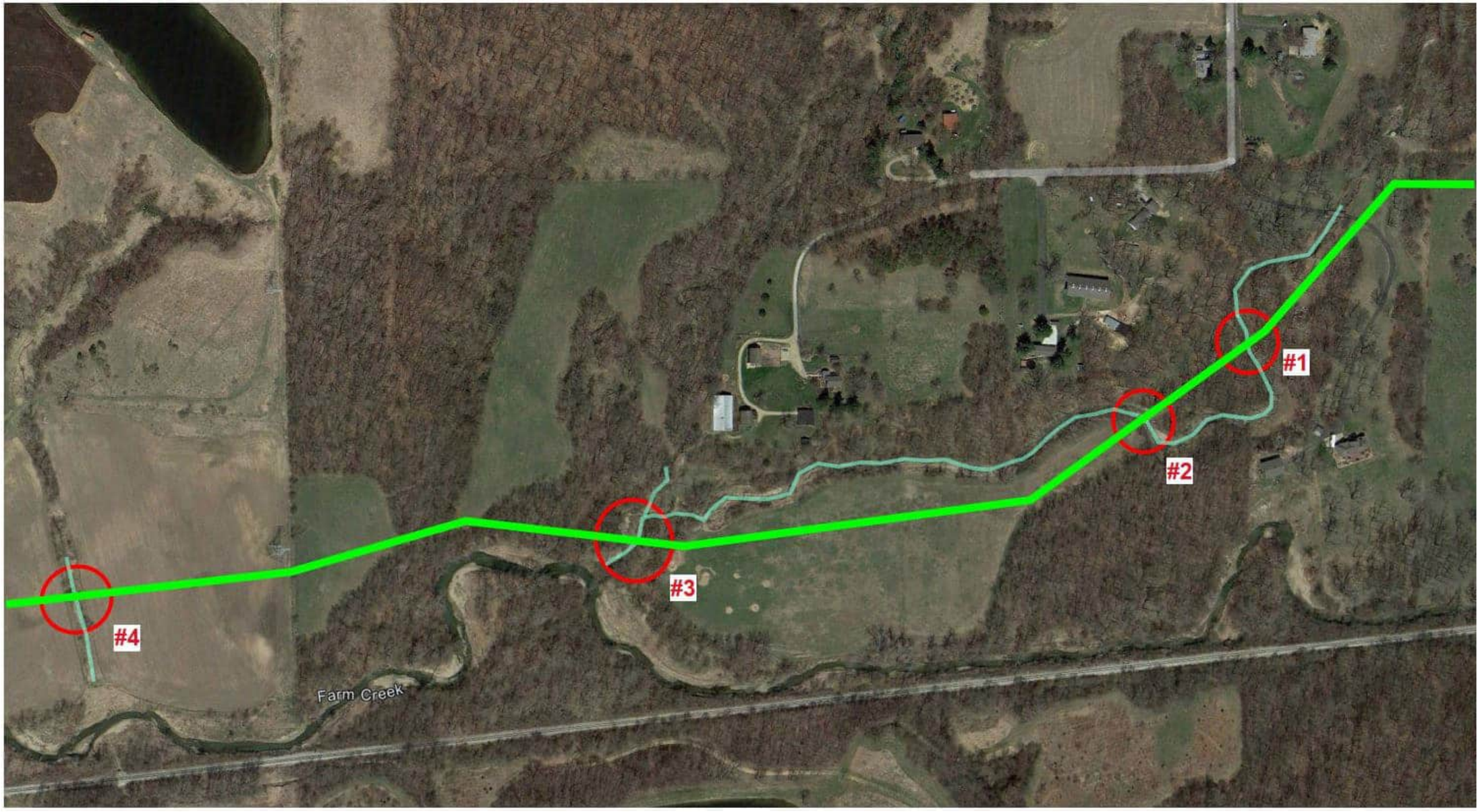
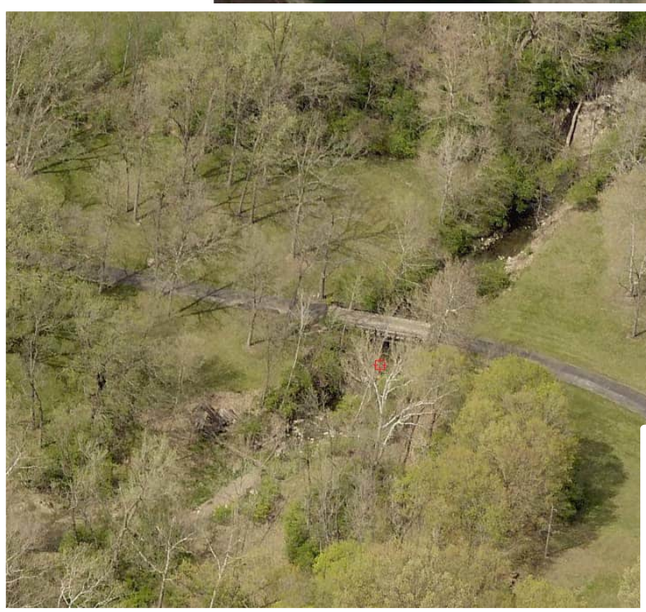
Accessibility – Route E-3 – Ravine Crossings



Accessibility – Route E-3 – Ravine Crossing No. 1



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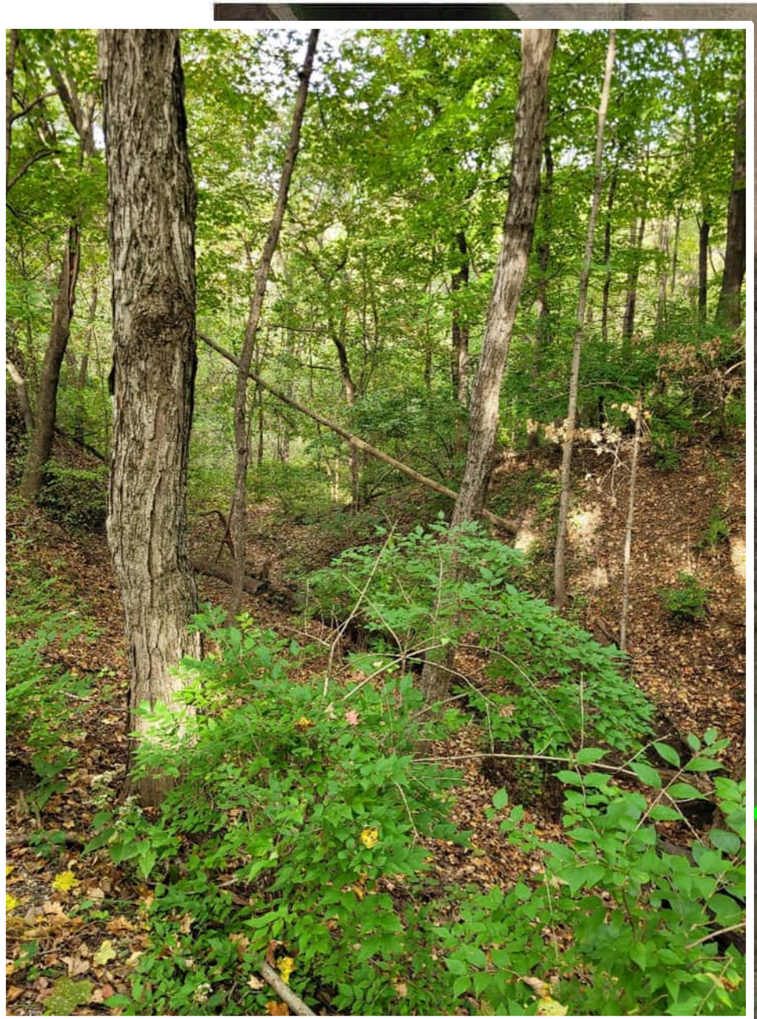
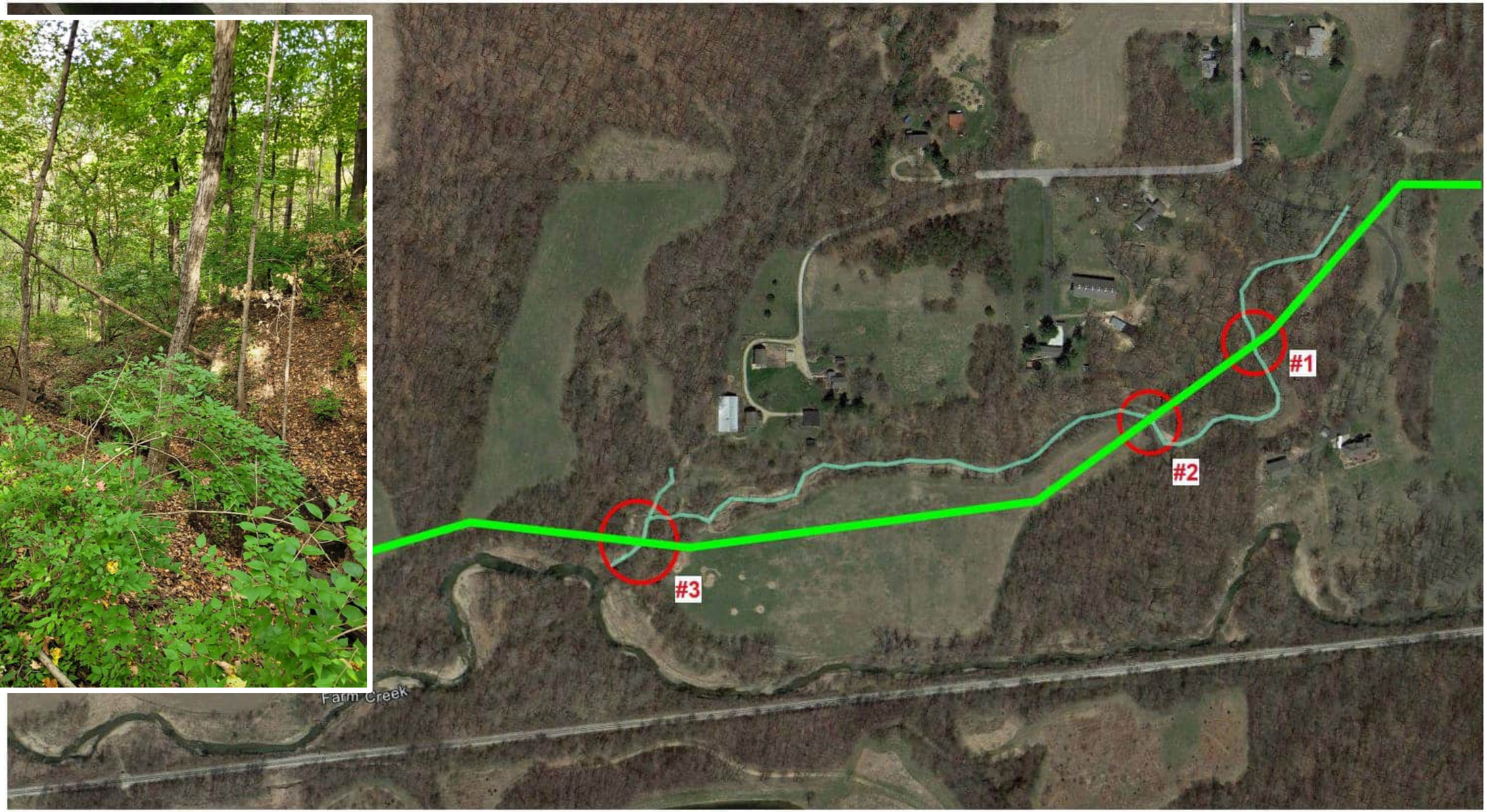
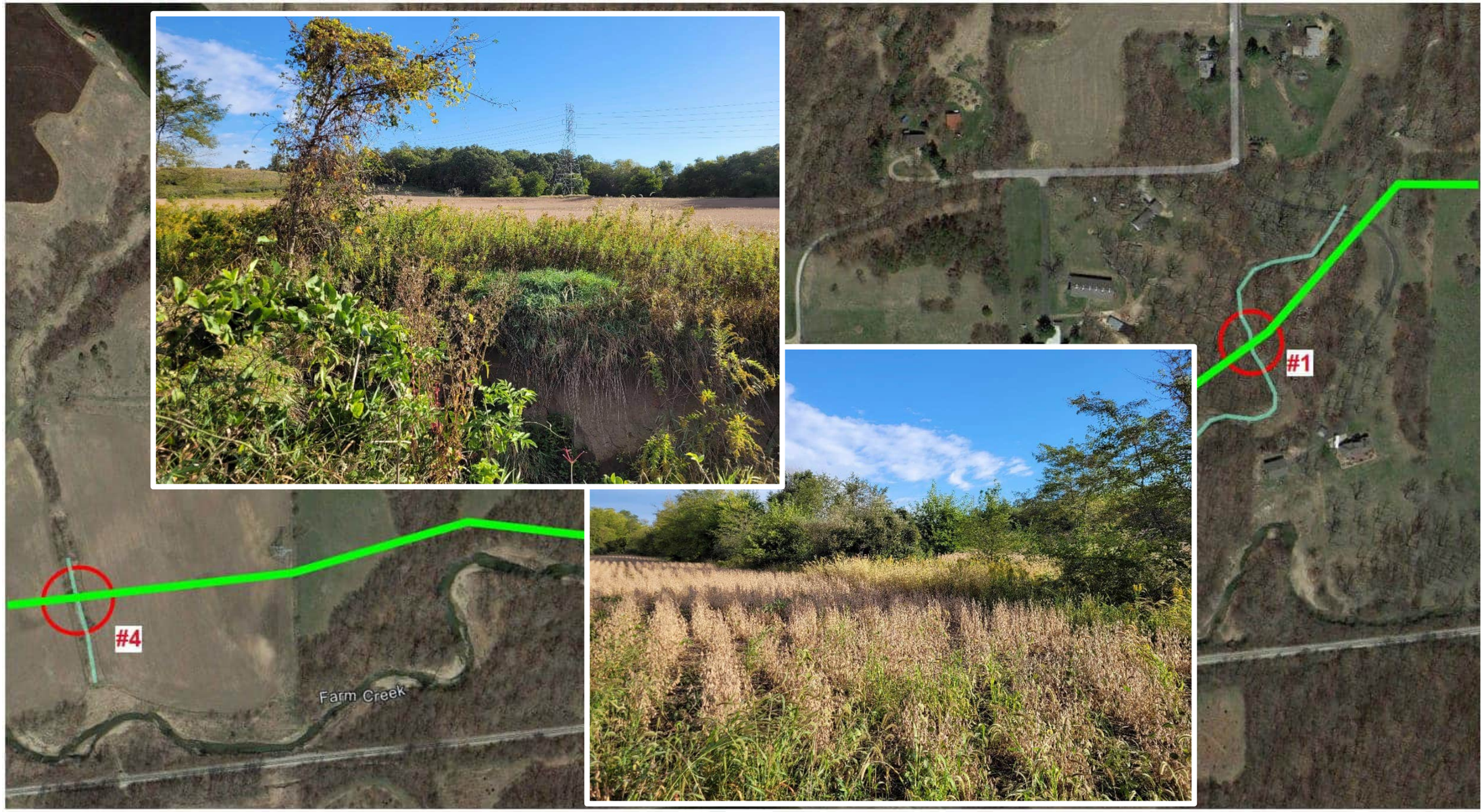
Accessibility – Route E-3 – Ravine Crossing No. 2

Accessibility – Route E-3 – Ravine Crossing No. 3





Accessibility – Route E-3 – Ravine Crossing No. 4



Recommended Route Determination - Comparison of Route Metrics

Feauture/Element	Recommended Route B 12/11/23 SAI Determination	GST Route E-3 12/11/23 SAI Determination	GST Route L-3 12/11/23 SAI Determination	City Route A 12/11/23 SAI Determination	City Route C 12/11/23 SAI Determination
Total Linear Feet - Trunk Sewer Only	11,160	11,580	12,060	12,000	11,660
Additional Linear Feet - Local Sanitary Sewer	480	500	520	260	400
Total Length of Sewer	11,640	12,080	12,580	12,260	12,060
Trenchless Construction, Linear Feet	1,775	2,400	2,890	240	1,025
Jack and Bore Locations	7	7	6	3	4
Railroad Crossings	2	2	2	2	2
Maximum Manhole Depth, Feet	46	44	36.5	26.0	50.9
Average Manhole Depth, Feet	22.3	21	21.2	17.2	22.5
Quantity of Manholes Over 30 Feet Deep	4	4	6	0	3
Averge Sewer Depth, Feet	21.3	22.3	21.6	16.1	21.6
Farm Creek Crossings	4	0	1	15	4
Tributary Crossings	1	4	2	0	2
Wetland Crossing, Linear Feet	812	575	1080	7085	1870
Floodplain Crossings, Linear Feet	2848	1500	1100	8370	3560
Easements Required - No. of Properties	5	6	7	6	7
Easements Required - Sewer in Linear Feet	8375	8275	10065	9000	8825
Easements Required - Access in Linear Feet	2800				
Alignment in Public ROW, L.FT. (% of Route)	2873 (26%)	3260 (28%)	1995 (17%)	2750 (23%)	2835 (24%)
Open Access Corridors, L.FT. (% of Route)	2047 (19%)	8026 (69%)	5900 (49%)	1705 (14%)	5575 (48%)
Forest/Forested Riparian, L.FT. (% of Route)	8996 (81%)	3602 (31%)	6160 (51%)	10295 (86%)	6085 (52%)

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Recommended Route Determination - Comparison of Cost Opinions

Farm Creek Trunk Sewer Replacement
City of Washington Illinois

Description	Units	Estimated Unit Price	ENGINEER'S OPCC (ROUTE B) Preliminary Engineering Report OPCC Estimated Quantity	ENGINEER'S OPCC (ROUTE B) Preliminary Engineering Report OPCC Estimated Probable Cost	ENGINEER'S OPCC (ROUTE D) Preliminary Engineering Report OPCC Estimated Quantity	ENGINEER'S OPCC (ROUTE D) Preliminary Engineering Report OPCC Estimated Probable Cost	ENGINEER'S OPCC (ROUTE E) Preliminary Engineering Report OPCC Estimated Quantity	ENGINEER'S OPCC (ROUTE E) Preliminary Engineering Report OPCC Estimated Probable Cost	ENGINEER'S OPCC (ROUTE D-1) Preliminary Engineering Report OPCC Estimated Quantity	ENGINEER'S OPCC (ROUTE D-1) Preliminary Engineering Report OPCC Estimated Probable Cost	ENGINEER'S OPCC (ROUTE E-3) Preliminary Engineering Report OPCC Estimated Quantity	ENGINEER'S OPCC (ROUTE E-3) Preliminary Engineering Report OPCC Estimated Probable Cost
FOUNDATION MATERIAL	CY	$52.00	417.12	$21,690.00	475	$24,700.00	500	$26,000.00	500	$26,000.00	575	$29,900.00
RESTORATION-SEED, class 2 (topsoil,fertilizer,excelsior blanket, mulch incidental)	ACRE	$9,654.55	4.3	$41,707.67	8.6	$82,739.51	7.7	$73,878.57	7.2	$69,609.32	7.5	$72,409.14
RESTORATION-SEED, class 4/5 (topsoil,fertilizer,excelsior blanket, mulch incidental)	ACRE	$9,654.55	4.3	$41,707.67	8.6	$82,739.51	7.7	$73,878.57	7.2	$69,609.32	7.5	$72,409.14
RESTORATION-SEED, class 4B/5B (topsoil,fertilizer,excelsior blanket, mulch incidental)	ACRE	$9,654.55	4.3	$41,707.67	8.6	$82,739.51	7.7	$73,878.57	7.2	$69,609.32	7.5	$72,409.14
PERIMETER EROSION BARRIER	FT	$4.00	7508	$30,032.00	12,000	$48,000.00	10,000	$40,000.00	10,000	$40,000.00	10,000	$40,000.00
TREE REMOVAL (OVER 6 UNITS DIAMETER)	EA	$12.00	7508	$90,096.00	10,000	$120,000.00	10,500	$126,000.00	11,000	$132,000.00	12,000	$144,000.00
STABILIZED CONSTRUCTION ACCESS	EA	$6,000.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00		$0.00
SANITARY SEWER, 42-IN HOBAS - OPEN CUT	LF	$350.00	9385	$3,284,750.00	4,400	$1,540,000.00	7100	$2,485,000.00	7,181	$2,513,350.00	7,235	$2,532,250.00
SANITARY SEWER, 42-IN HOBAS - TRENCHLESS	LF	$896.55	1740	$1,560,000.00	9,600	$8,606,896.55	5400	$4,841,379.31	4,600	$4,124,130.00	4,200	$3,765,510.00
SANITARY SEWER, 12-IN PVC SDR 26 - OPEN CUT	LF	$80.00	520	$41,600.00	550	$44,000.00	575	$46,000.00	550	$44,000.00	600	$48,000.00
SANITARY SEWER, 18-IN PVC SDR 26 - OPEN CUT	LF	$140.00	220	$30,800.00	300	$42,000.00	325	$45,500.00	350	$49,000.00	400	$56,000.00
SANITARY SEWER, 42-IN HOBAS - BORE AND JACK 60" STEEL CASING (RAILROAD CROSSING)	LF			$0.00		$0.00	240	$240,000.00	240	$240,000.00	240	$240,000.00
TRENCHLESS CONSTRUCTION, 8-IN SANITARY SEWER WITH 20-IN STEEL CASING	LF	$400.00	140	$56,000.00	200	$80,000.00	225	$90,000.00	250	$100,000.00	300	$120,000.00
TRENCHLESS CONSTRUCTION, 18-IN SANITARY SEWER WITH 30-IN STEEL CASING	LF	$450.00	280	$126,000.00	360	$162,000.00	400	$180,000.00	450	$202,500.00	500	$225,000.00
NEW 12-IN INSIDE EXISTING 30-IN	LF	$1,250.00	12	$15,000.00		$0.00		$0.00		$0.00		$0.00
PROTECT EXISTING SANITARY SEWER AT CROSSINGS	EA	$4,000.00	3	$12,000.00	3	$12,000.00	3	$12,000.00	3	$12,000.00	3	$12,000.00
ABANDONMENT OF EXISTING SANITARY MANHOLES	EA	$2,000.00	39	$78,000.00	39	$78,000.00	39	$78,000.00	39	$78,000.00	39	$78,000.00
SA			14	$126,000.00	6	$54,000.00	8	$72,000.00	12	$108,000.00	8	$72,000.00
SA			3	$36,000.00	1	$12,000.00	2	$24,000.00	3	$36,000.00	2	$24,000.00
SA			1	$15,000.00	2	$30,000.00	2	$30,000.00	1	$15,000.00	2	$30,000.00
SA			1	$18,000.00		$0.00	2	$36,000.00	2	$36,000.00	4	$72,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 35' TO 40' DEEP	EA		1	$21,000.00		$0.00	2	$42,000.00	2	$42,000.00	2	$42,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 40' TO 45' DEEP	EA	$25,000.00		$0.00	4	$100,000.00	2	$50,000.00	2	$50,000.00	2	$50,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 45' TO 50' DEEP	EA	$26,000.00		$0.00		$0.00	2	$52,000.00	2	$52,000.00	2	$52,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 50' TO 55' DEEP	EA	$28,000.00		$0.00	4	$112,000.00	1	$28,000.00	2	$56,000.00	2	$56,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 55' TO 60' DEEP	EA	$30,000.00		$0.00	6	$180,000.00	1	$30,000.00	2	$60,000.00	2	$60,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 60' TO 65' DEEP	EA	$31,000.00		$0.00		$0.00		$0.00	2	$62,000.00	2	$62,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 65' TO 70' DEEP	EA	$32,000.00		$0.00		$0.00	2	$64,000.00	2	$64,000.00	2	$64,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 70' TO 75' DEEP	EA	$33,000.00		$0.00		$0.00		$0.00		$0.00	2	$66,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 75' TO 80' DEEP	EA	$34,000.00		$0.00	4	$136,000.00	1	$34,000.00		$0.00	3	$102,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 80' TO 85' DEEP	EA	$35,000.00		$0.00	4	$140,000.00	2	$70,000.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 85' TO 90' DEEP	EA	$42,000.00		$0.00	4	$168,000.00	1	$42,000.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 90' TO 95' DEEP	EA	$45,000.00		$0.00		$0.00	2	$90,000.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 90' TO 95' DEEP	EA	$50,000.00		$0.00		$0.00	2	$100,000.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA CONSTRUCTED ON EXISTING SEWER PIPE	EA	$12,000.00	3	$36,000.00		$0.00		$0.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 8-FT DIA, LESS THAN 20 FT DEEP	EA	$18,000.00	5	$90,000.00		$0.00		$0.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 8-FT DIA, 20 -25 FT DEEP	EA	$22,000.00	3	$66,000.00		$0.00		$0.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 8-FT DIA JUNCTION MANHOLE	EA	$20,000.00	2	$40,000.00	2	$40,000.00	2	$40,000.00	2	$40,000.00	2	$40,000.00
OUTSIDE DROP MANHOLE CONNECTION, 18"	EA	$8,000.00	1	$8,000.00	1	$8,000.00	1	$8,000.00	1	$8,000.00	1	$8,000.00
SUBTOTAL CONSTRUCTION				**$5,927,091.00**		**$11,985,815.09**		**$9,243,515.01**		**$8,398,807.97**		**$8,307,887.43**
MOBILIZATION (CONTRACTOR PROFIT, BONDS, INSURANCE)	LS		2%	$118,541.82	2.00%	$239,716.30	2%	$184,870.30	2.00%	$167,976.16	2%	$166,157.75
ENGINEERING AND LEGAL	LS		5%	$296,354.55	5.00%	$599,290.75	5%	$462,175.75	5.00%	$419,940.40	5%	$415,394.37
TOTAL BASE PROJECT						$12,824,822.15		$9,890,561.06		$8,986,724.53		
Contingencies - Base			25.00%	$1,481,772.75	25.00%	$2,996,453.77	25%	$2,310,878.75	25%	$2,099,701.99	25%	$2,076,971.86
Total - Base Project w/ Contingencies				**$7,823,760.12**		**$15,821,275.92**		**$12,201,439.81**		**$11,086,426.52**		**$10,966,411.41**

July 2021 Strand Presentation

Recommended Route Determination - Comparison of Cost Opinions

July-21	**Strand Associates Presentation**		
	Strand Route B Cost Opinion	$7,823,773	
	GST Route E-3 Cost Opinion	$10,966,411	40% Higher
	Difference	$3,142,638	

Recommended Route Determination - Comparison of Cost Opinions

Updated Estimates

	Alternative A *Strand*	Alternative B *L-1*	Alternative C *E-3*
2/15/2022*	$8,000,000.00CE	$10,980,000.00CE	$12,580,000.00CE
6/12/2023** no change		$9,570,000.00CE	$11,850,000.00CE

Memorandum

July 2023 Hamilton Presentation

te, using EOPCC unit prices from others

* *Estimates are from the report, not from 2/11/22 presentation to Council which included Pump Station and FCTS Abandonment Estimates*

** *Exclusive of Pump Station and FCTS Abandonment Estimates*

EDI Environmental Design International inc. Chicago & Joliet

STRAND ASSOCIATES®

Recommended Route Determination - Comparison of Cost Opinions

July-21	**Strand Associates Presentation**		
	Strand Route B Cost Opinion	$7,823,773	
	GST Route E-3 Cost Opinion	$10,966,411	40% Higher
	Difference	$3,142,638	
July-23	**Hamilton Presentation**		
	Strand Route B Cost Opinion	$8,000,000	
	GST Route E-3 Cost Opinion	$11,850,000	48% Higher
	Difference	$3,850,000	

Recommended Route Determination - Comparison of Cost Opinions

Item No.	Description	Units	Estimated Unit Price	STRAND OPCC (ROUTE B) Preliminary Engineering Report OPCC		GST (ROUTE E-3) Preliminary Engineering Report OPCC	
				Estimated Quantity	Estimated Probable Cost	Estimated Quantity	Estimated Probable Cost
1.01	SANITARY SEWER, 42-IN HOBAS - OPEN CUT	LF	$350.00	9385	$3,284,750.00	9,478	$3,317,300.00
1.02	SANITARY SEWER, 42-IN HOBAS - TRENCHLESS	LF	$800.00	1775	$1,420,000.00	1,862	$1,489,600.00
1.03	SANITARY SEWER, 42-IN HOBAS - BORE AND JACK 60" STEEL CASING (RAILROAD CROSSING)	LF	$1,000.00	0	$0.00	240	$240,000.00
1.04	WORK SHAFT - TRENCHLESS CONSTRUCTION - 42" SANITARY SEWER	EA	$12,000.00	14	$168,000.00	12	$144,000.00
1.05	SANITARY SEWER, 12-IN PVC SDR 26 - OPEN CUT	LF	$80.00	25	$2,000.00	500	$40,000.00
1.06	SANITARY SEWER, 18-IN PVC SDR 26 - OPEN CUT	LF	$140.00	150	$21,000.00	20	$2,800.00
1.07	TRENCHLESS CONSTRUCTION, 8-IN SANITARY SEWER WITH 20-IN STEEL CASING (RAILROAD	LF	$400.00	0	$0.00		$0.00
1.08	TRENCHLESS CONSTRUCTION, 18-IN SANITARY SEWER WITH 30-IN STEEL CASING (RAILROAD	LF	$450.00	305	$137,250.00		$0.00
1.09	NEW 12-IN INSIDE EXISTING 30-IN	LF	$1,250.00	135	$168,750.00		$0.00
1.1	FOUNDATION MATERIAL	CY	$52.00	417.12	$21,690.24	421	$21,892.00
1.11	PROTECT EXISTING SANITARY SEWER AT CROSSINGS	EA	$4,000.00	3	$12,000.00	3	$12,000.00
1.12	SELECT GRANULAR BACKFILL - CA7	CY	$30.00		$0.00		$0.00
1.13	SANITARY MANHOLE, TYPE A, 6-FT DIA, LESS THAN 20' DEEP	EA	$9,000.00	14	$126,000.00	12	$108,000.00
1.14	SANITARY MANHOLE, TYPE A, 6-FT DIA, 20' TO 25' DEEP	EA	$12,000.00	3	$36,000.00	3	$36,000.00
		EA	$15,000.00	1	$15,000.00	4	$60,000.00
		EA	$18,000.00	1	$18,000.00	2	$36,000.00
		EA	$21,000.00	1	$21,000.00	1	$21,000.00
		EA	$25,000.00		$0.00	1	$25,000.00
1.19	SANITARY MANHOLE, TYPE A, 6-FT DIA, 45' TO 50' DEEP	EA	$26,000.00	1	$26,000.00		$0.00
1.2	SANITARY MANHOLE, TYPE A, 6-FT DIA, 50' TO 55' DEEP	EA	$28,000.00		$0.00		$0.00
1.21	SANITARY MANHOLE, TYPE A, 6-FT DIA, 55' TO 60' DEEP	EA	$30,000.00		$0.00		$0.00
1.22	SANITARY MANHOLE, TYPE A, 6-FT DIA, 60' TO 65' DEEP	EA	$31,000.00		$0.00		$0.00
1.23	SANITARY MANHOLE, TYPE A, 6-FT DIA, 65' TO 70' DEEP	EA	$32,000.00		$0.00		$0.00
1.24	SANITARY MANHOLE, TYPE A, 6-FT DIA, 70' TO 75' DEEP	EA	$33,000.00		$0.00		$0.00
1.25	SANITARY MANHOLE, TYPE A, 6-FT DIA CONSTRUCTED ON EXISTING SEWER PIPE	EA	$12,000.00	3	$36,000.00		$0.00
1.26	SANITARY MANHOLE, TYPE A, 8-FT DIA, LESS THAN 20 FT DEEP	EA	$18,000.00	5	$90,000.00	5	$90,000.00
1.27	SANITARY MANHOLE, TYPE A, 8-FT DIA, 20 -25 FT DEEP	EA	$22,000.00	3	$66,000.00		$0.00
1.28	SANITARY MANHOLE, TYPE A, 8-FT DIA, 25-30 FT DEEP	EA	$26,000.00		$0.00		$0.00
1.29	SANITARY MANHOLE, TYPE A, 8-FT DIA JUNCTION MANHOLE	EA	$20,000.00	2	$40,000.00	1	$20,000.00
1.3	OUTSIDE DROP MANHOLE CONNECTION, 18"	EA	$8,000.00	1	$8,000.00		$0.00
1.31	RESTORATION-SEED, class 2 (topsoil,fertilizer,excelsior blanket, mulch incidental)	ACRE	$9,655.00	4.3	$41,709.60	4.4	$42,482.00
1.32	RESTORATION-SEED, class 4/5 (topsoil,fertilizer,excelsior blanket, mulch incidental)	ACRE	$9,655.00	4.3	$41,709.60	4.4	$42,482.00
1.33	RESTORATION-SEED, class 4B/5B (topsoil,fertilizer,excelsior blanket, mulch incidental)	ACRE	$9,655.00	4.3	$41,709.60	4.4	$42,482.00
1.34	SILT FENCE/EROSION CONTROLS	FT	$4.00	7508	$30,032.00	7,582	$30,328.00
1.35	STABILIZED CONSTRUCTION ACCESS	EA	$6,000.00	0	$0.00	0	$0.00
1.36	TREE REMOVAL (OVER 6 UNITS DIAMETER)	EA	$12.00	7508	$90,096.00	1,896	$22,752.00
	SUBTOTAL CONSTRUCTION				**$5,962,697.04**		**$5,844,118.00**
	MOBILIZATION	LS		2%	$119,253.94	2.00%	$116,882.36
	LEGAL AND LAND ACQUISITION	LS		5%	$298,134.85	5.00%	$292,205.90
	CONTIGENCIES	LS		25%	$1,490,674.26	25.00%	$1,461,029.50
	TOTAL BASE PROJECT				**$7,870,760.09**		**$7,714,235.76**

October 2023 Strand Presentation

STRAND ASSOCIATES®

Recommended Route Determination - Comparison of Cost Opinions

July-21	**Strand Associates Presentation**			
		Strand Route B Cost Opinion	$7,823,773	
		GST Route E-3 Cost Opinion	$10,966,411	40% Higher
		Difference	$3,142,638	
July-23	**Hamilton Presentation**			
		Strand Route B Cost Opinion	$8,000,000	
		GST Route E-3 Cost Opinion	$11,850,000	48% Higher
		Difference	$3,850,000	
October-23	**Strand Associates Presentation**			
		Strand Route B Cost Opinion	$7,823,773	
		GST Route E-3 Cost Opinion	$7,714,235	-1% Lower
		Difference	-$109,538	

Recommended Route Determination - Comparison of Cost Opinions

Farm Creek Trunk Sewer Replacement
City of Washington Illinois

Description	Units	Estimated Unit Price (2021)	ENGINEER'S OPCC (ROUTE B) Estimated Quantity	ENGINEER'S OPCC (ROUTE B) Estimated Probable Cost	ENGINEER'S OPCC (ROUTE E-3) Estimated Quantity	ENGINEER'S OPCC (ROUTE E-3) Estimated Probable Cost	ENGINEER'S OPCC (ROUTE L-3) Estimated Quantity	ENGINEER'S OPCC (ROUTE L-3) Estimated Probable Cost
FOUNDATION MATERIAL	CY	$52.00	469	$24,401.00	428	$22,256.00	459	$23,842.00
RESTORATION-SEED, class 2 (topsoil,fertilizer,excelsior blanket, mulch incidental)	ACRE	$9,654.55	4.3	$41,709.60	4.4	$42,480.03	4.4	$42,480.03
RESTORATION-SEED, class 4/5 (topsoil,fertilizer,excelsior blanket, mulch incidental)	ACRE	$9,654.55	4.3	$41,709.60	4.4	$42,480.03	4.4	$42,480.03
RESTORATION-SEED, class 4B/5B (topsoil,fertilizer,excelsior blanket, mulch incidental)	ACRE	$9,654.55	4.3	$41,709.60	4.4	$42,480.03	4.4	$42,480.03
PERIMETER EROSION BARRIER	FT	$4.00	7508	$30,032.00	10,000	$40,000.00	13,000	$52,000.00
TREE REMOVAL (OVER 6 UNITS DIAMETER)	EA	$12.00	7508	$90,096.00	3,000	$36,000.00	5,000	$60,000.00
STABILIZED CONSTRUCTION ACCESS	EA	$6,000.00	0	$0.00		$0.00		$0.00
WORK SHAFT - TRENCHLESS CONSTRUCTION - 42" SANITARY SEWER	EA	$12,000.00	14	$168,000.00	15	$180,000.00	15	$180,000.00
SANITARY SEWER, 42-IN HOBAS - OPEN CUT	LF	$350.00	9385	$3,284,750.00	8,560	$2,996,000.00	9,170	$3,209,500.00
SANITARY SEWER, 42-IN HOBAS - TRENCHLESS	LF	$896.55	1775	$1,597,500.00	2,865	$2,578,500.00	2,635	$2,371,500.00
SANITARY SEWER, 12-IN PVC SDR 26 - OPEN CUT	LF	$80.00	25	$2,000.00	500	$40,000.00	500	$40,000.00
SANITARY SEWER, 18-IN PVC SDR 26 - OPEN CUT	LF	$140.00	150	$21,000.00	20	$2,800.00	20	$2,800.00
SANITARY SEWER, 42-IN HOBAS - BORE AND JACK 60" STEEL CASING (RAILROAD CROSSING)	LF		0	$0.00	255	$255,000.00	255	$255,000.00
TRENCHLESS CONSTRUCTION, 8-IN SANITARY SEWER WITH 20-IN STEEL CASING	LF	$400.00	0	$0.00		$0.00		$0.00
TRENCHLESS CONSTRUCTION, 18-IN SANITARY SEWER WITH 30-IN STEEL CASING	LF	$450.00	305	$137,250.00		$0.00		$0.00
NEW 12-IN INSIDE EXISTING 30-IN	LF	$1,250.00	135	$67,500.00		$0.00		$0.00
		$4,000.00	3	$12,000.00	3	$12,000.00	4	$16,000.00
		$2,000.00	39	$78,000.00	39	$78,000.00	39	$78,000.00
		$9,000.00	11	$99,000.00	17	$153,000.00	18	$162,000.00
		$12,000.00	11	$132,000.00	2	$24,000.00	3	$36,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 25' TO 30' DEEP	EA	$15,000.00	7	$105,000.00	4	$60,000.00	6	$90,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 30' TO 35' DEEP	EA	$18,000.00	3	$54,000.00	3	$54,000.00	4	$72,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 35' TO 40' DEEP	EA	$21,000.00	1	$21,000.00	1	$21,000.00	2	$42,000.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 40' TO 45' DEEP	EA	$25,000.00		$0.00	1	$25,000.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 45' TO 50' DEEP	EA	$26,000.00	1	$26,000.00	1	$26,000.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 50' TO 55' DEEP	EA	$28,000.00		$0.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 55' TO 60' DEEP	EA	$30,000.00		$0.00	1	$30,000.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 60' TO 65' DEEP	EA	$31,000.00		$0.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 65' TO 70' DEEP	EA	$32,000.00		$0.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 70' TO 75' DEEP	EA	$33,000.00		$0.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 75' TO 80' DEEP	EA	$34,000.00		$0.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 80' TO 85' DEEP	EA	$35,000.00		$0.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 85' TO 90' DEEP	EA	$42,000.00		$0.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 90' TO 95' DEEP	EA	$45,000.00		$0.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA, 90' TO 95' DEEP	EA	$50,000.00		$0.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 6-FT DIA CONSTRUCTED ON EXISTING SEWER PIPE	EA	$12,000.00	3	$36,000.00	4	$48,000.00	4	$48,000.00
SANITARY MANHOLE, TYPE A, 8-FT DIA, LESS THAN 20 FT DEEP	EA	$18,000.00		$0.00		$0.00	1	$18,000.00
SANITARY MANHOLE, TYPE A, 8-FT DIA, 20 -25 FT DEEP	EA	$22,000.00		$0.00		$0.00		$0.00
SANITARY MANHOLE, TYPE A, 8-FT DIA JUNCTION MANHOLE	EA	$20,000.00	2	$40,000.00	1	$20,000.00	2	$40,000.00
OUTSIDE DROP MANHOLE CONNECTION, 18"	EA	$8,000.00	1	$8,000.00	1	$8,000.00	1	$8,000.00
SUBTOTAL CONSTRUCTION				**$6,158,657.80**		**$6,836,996.09**		**$6,932,082.09**
MOBILIZATION (CONTRACTOR PROFIT, BONDS, INSURANCE)	LS		2%	$123,173.16	2%	$136,739.92	2%	$138,641.64
ENGINEERING AND LEGAL	LS		5%	$307,932.89	13%	$888,809.49	13%	$901,170.67
TOTAL BASE PROJECT				$6,589,763.85		$7,862,545.51		$7,971,894.41
Contingencies - Base			10%	$658,976.38	25%	$1,965,636.38	25%	$1,992,973.60
Total - Base Project w/ Contingencies				**$7,248,740.23**		**$9,828,181.88**		**$9,964,868.01**

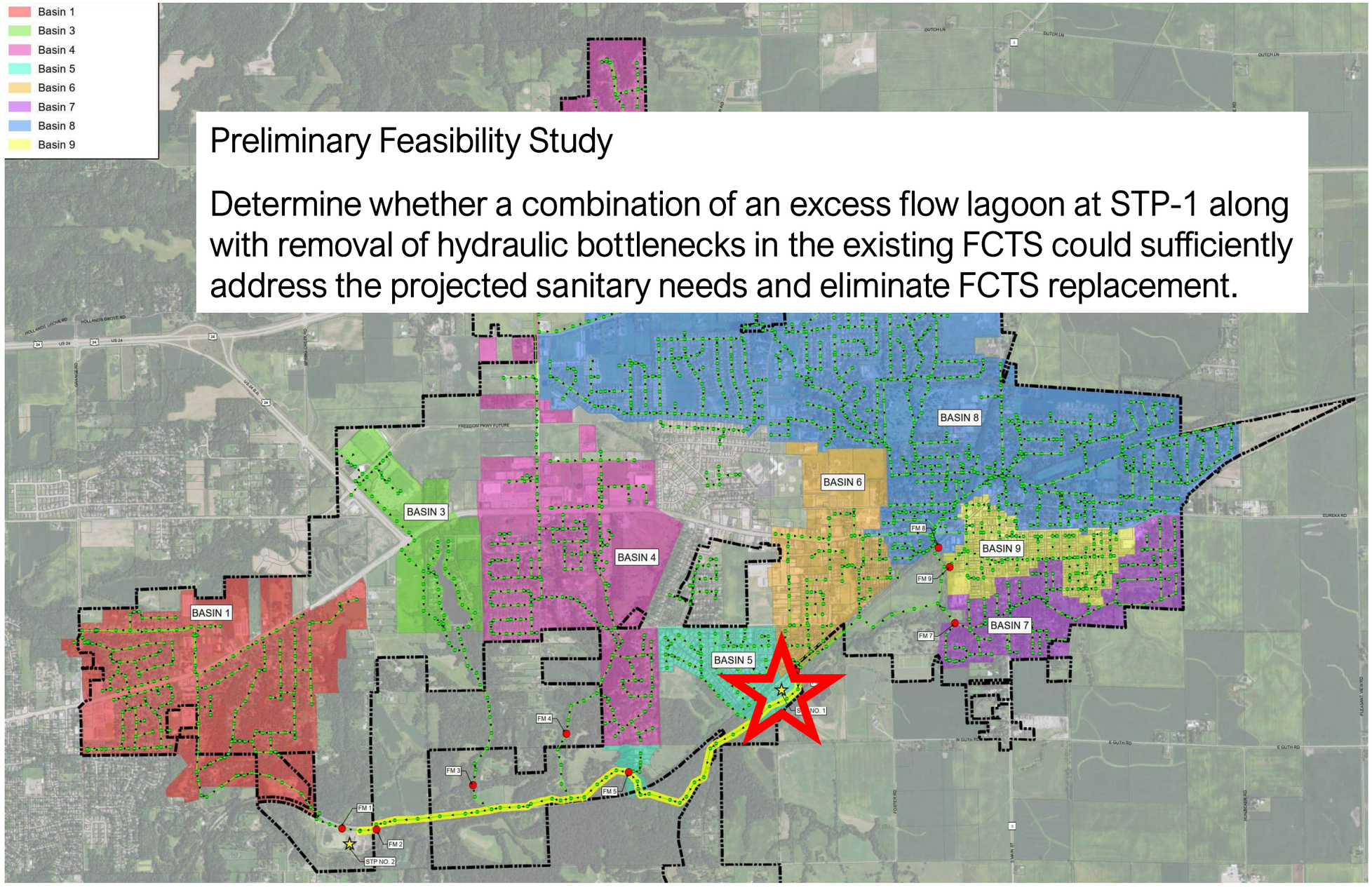
December 11 Strand Presentation

STRAND ASSOCIATES®

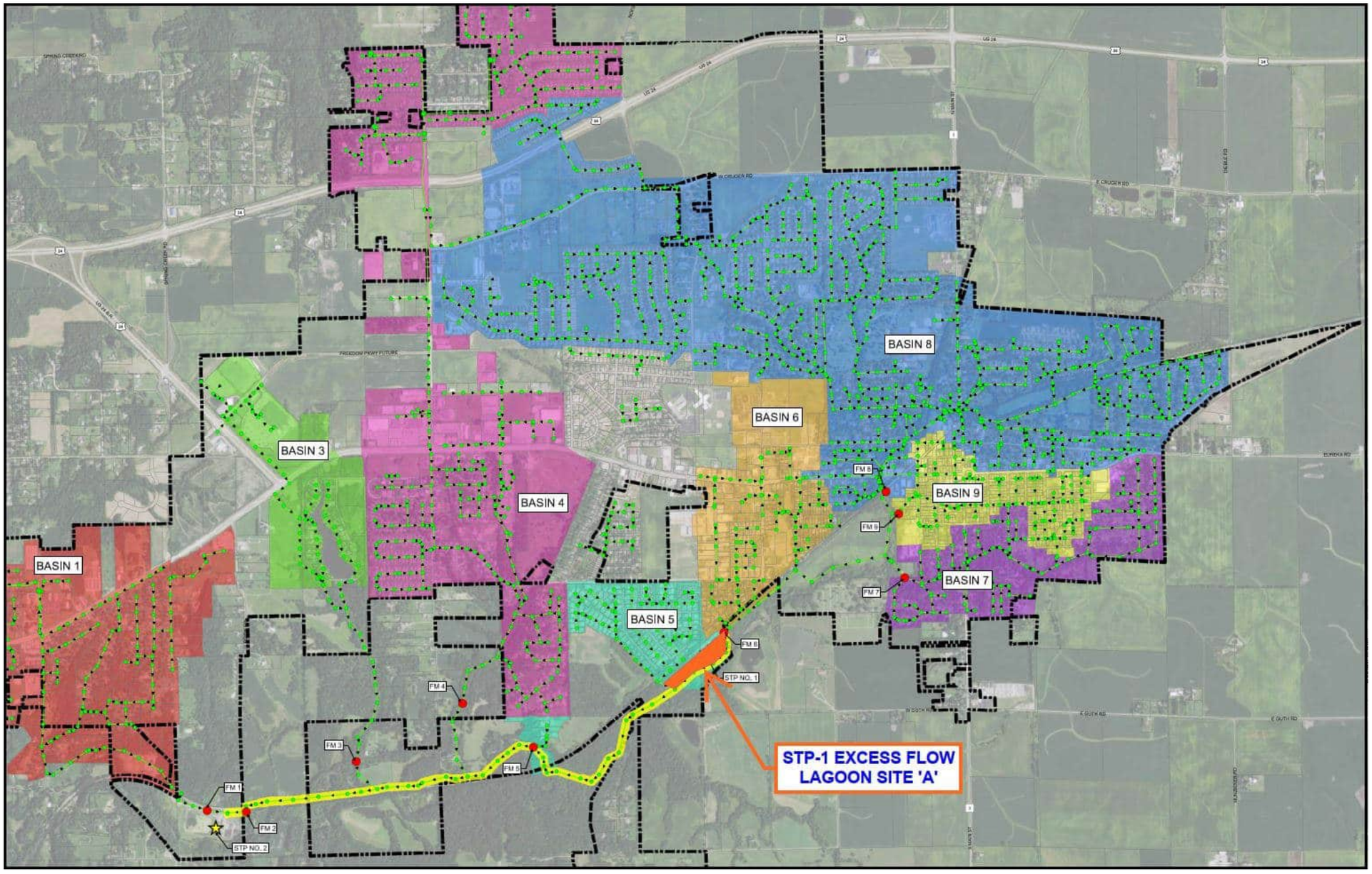
Recommended Route Determination - Comparison of Cost Opinions

July-21	**Strand Associates Presentation**			
		Strand Route B Cost Opinion	$7,823,773	
		GST Route E-3 Cost Opinion	$10,966,411	40% Higher
		Difference	$3,142,638	
July-23	**Hamilton Presentation**			
		Strand Route B Cost Opinion	$8,000,000	
		GST Route E-3 Cost Opinion	$11,850,000	48% Higher
		Difference	$3,850,000	
October-23	**Strand Associates Presentation**			
		Strand Route B Cost Opinion	$7,823,773	
		GST Route E-3 Cost Opinion	$7,714,235	-1% Lower
		Difference	-$109,538	
December-23	**Strand Associates Presentation**			
		Strand Route B Cost Opinion	$7,248,740	
		GST Route E-3 Cost Opinion	$9,828,182	36% Higher
		Difference	$2,579,442	

Feasibility of Excess Flow Lagoon and Focused Conveyance Improvements



Feasibility of Excess Flow Lagoon and Focused Conveyance Improvements



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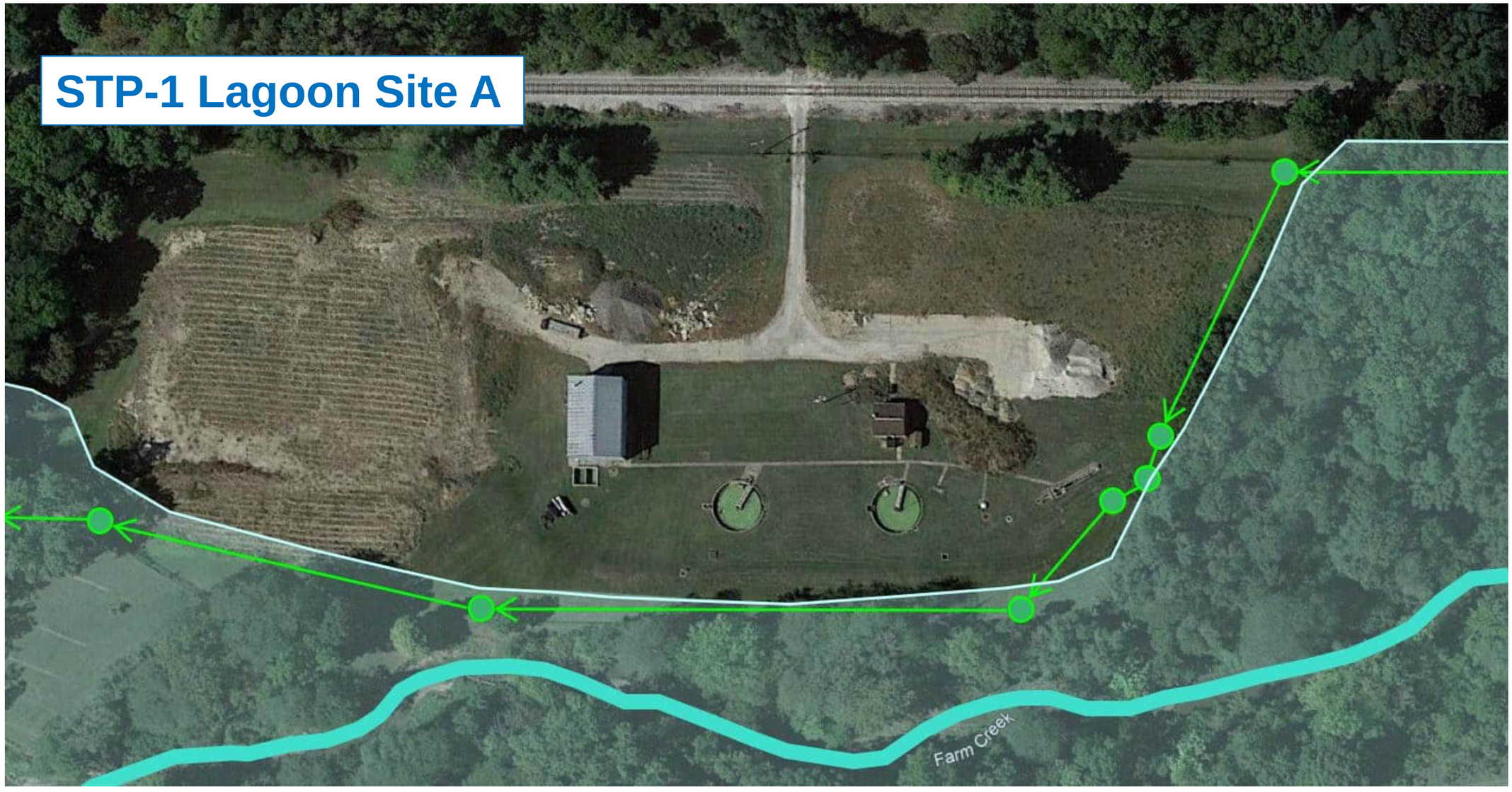

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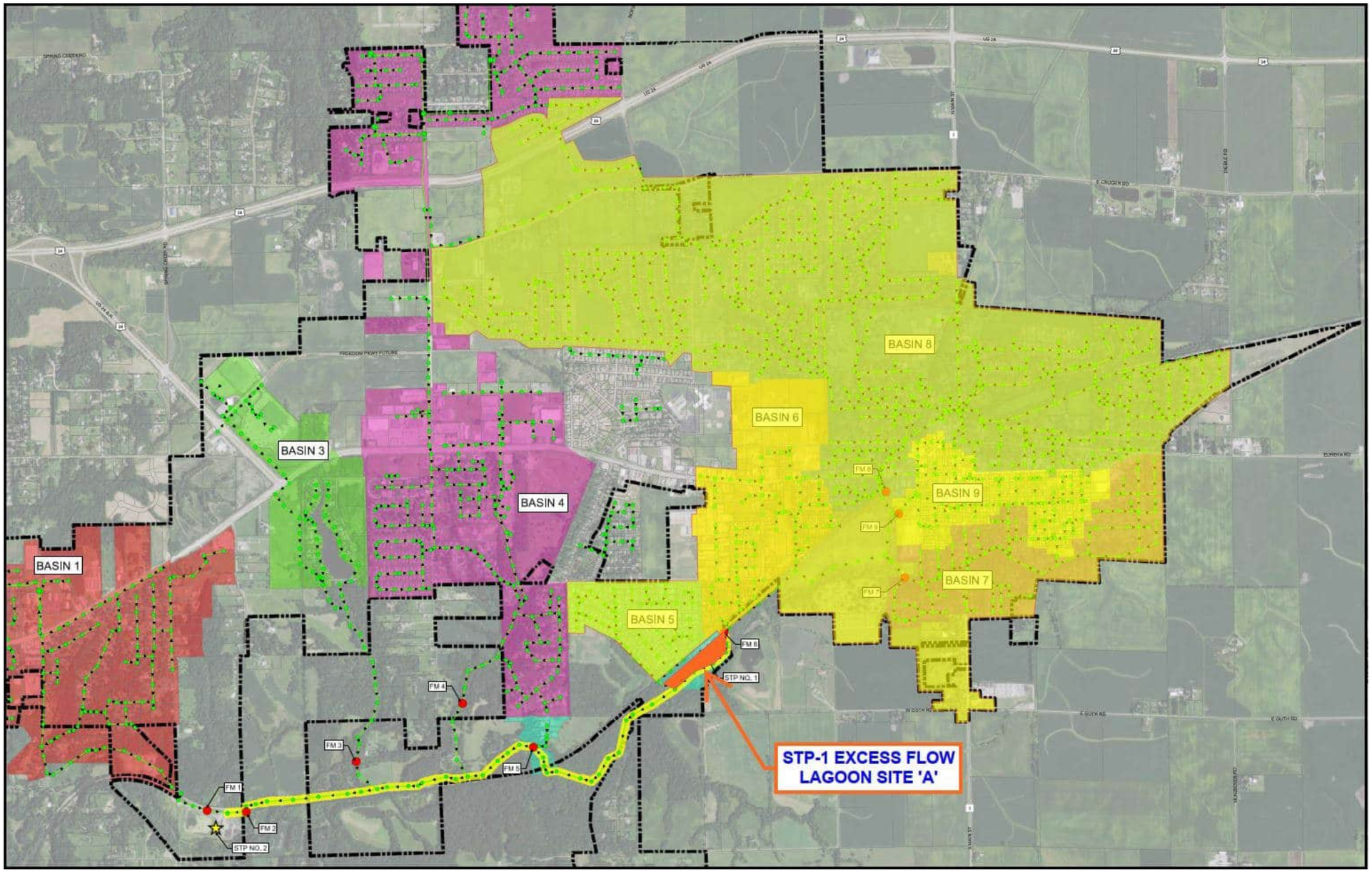

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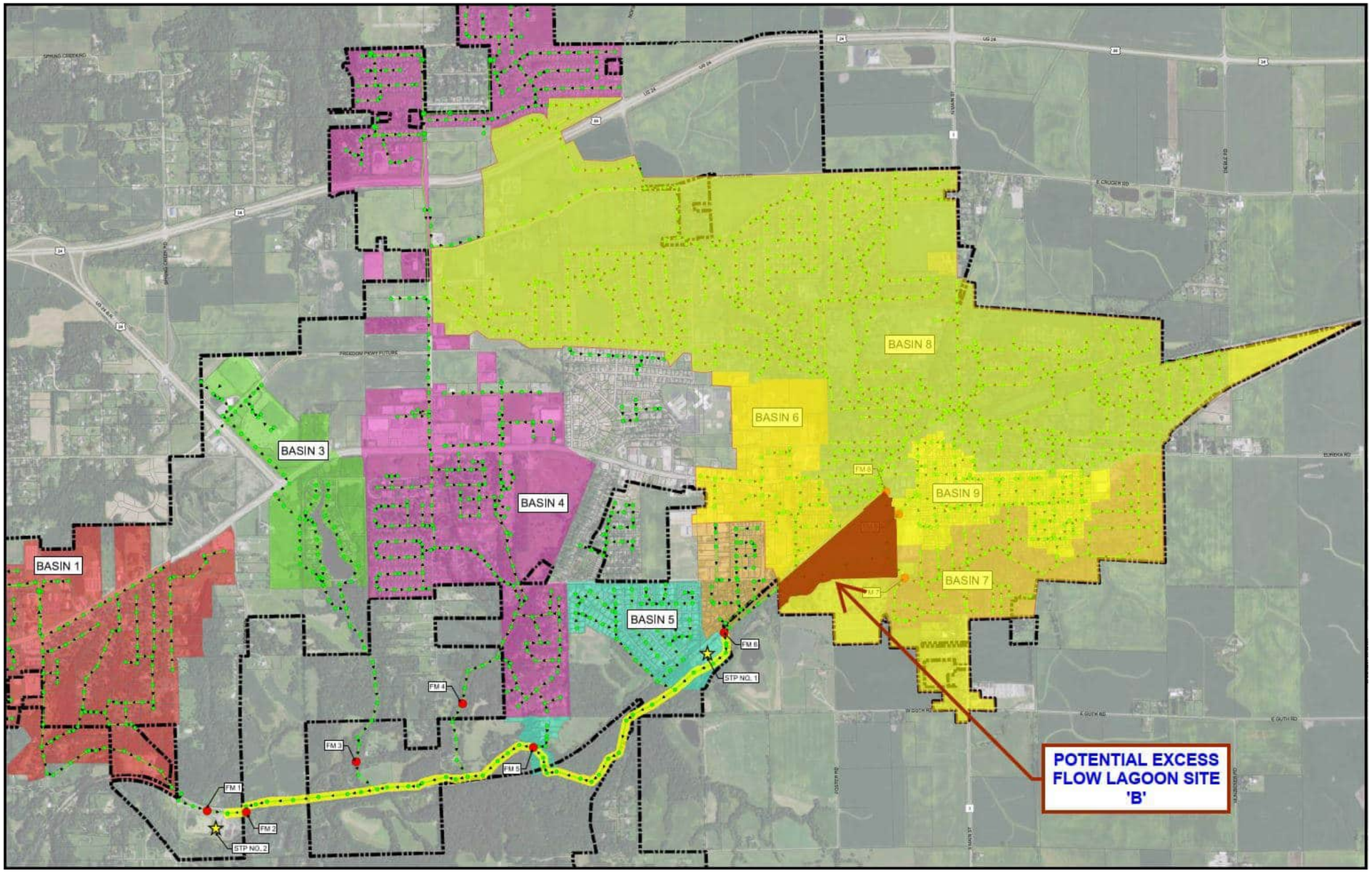
Feasibility of Excess Flow Lagoon and Focused Conveyance Improvements



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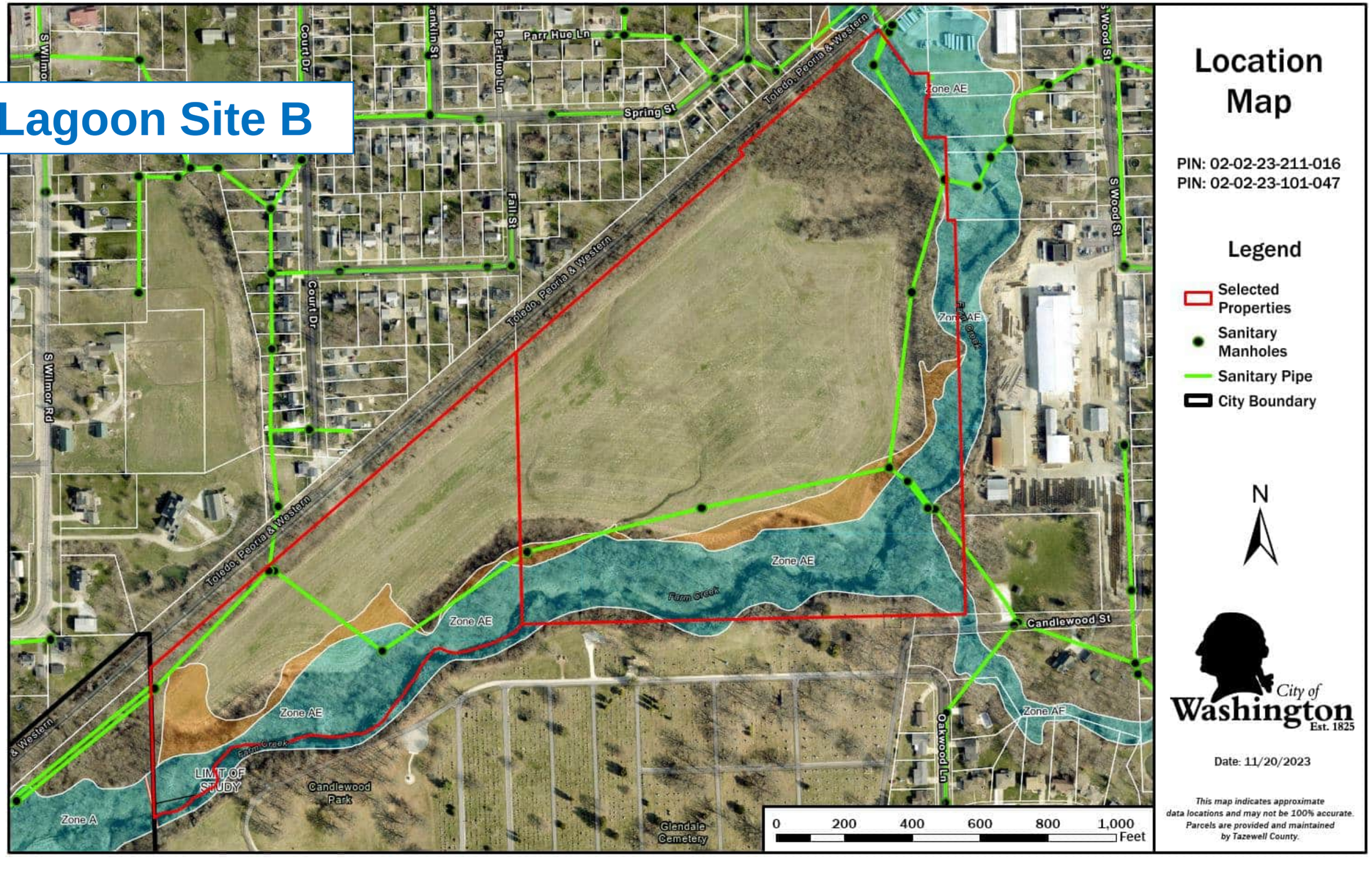

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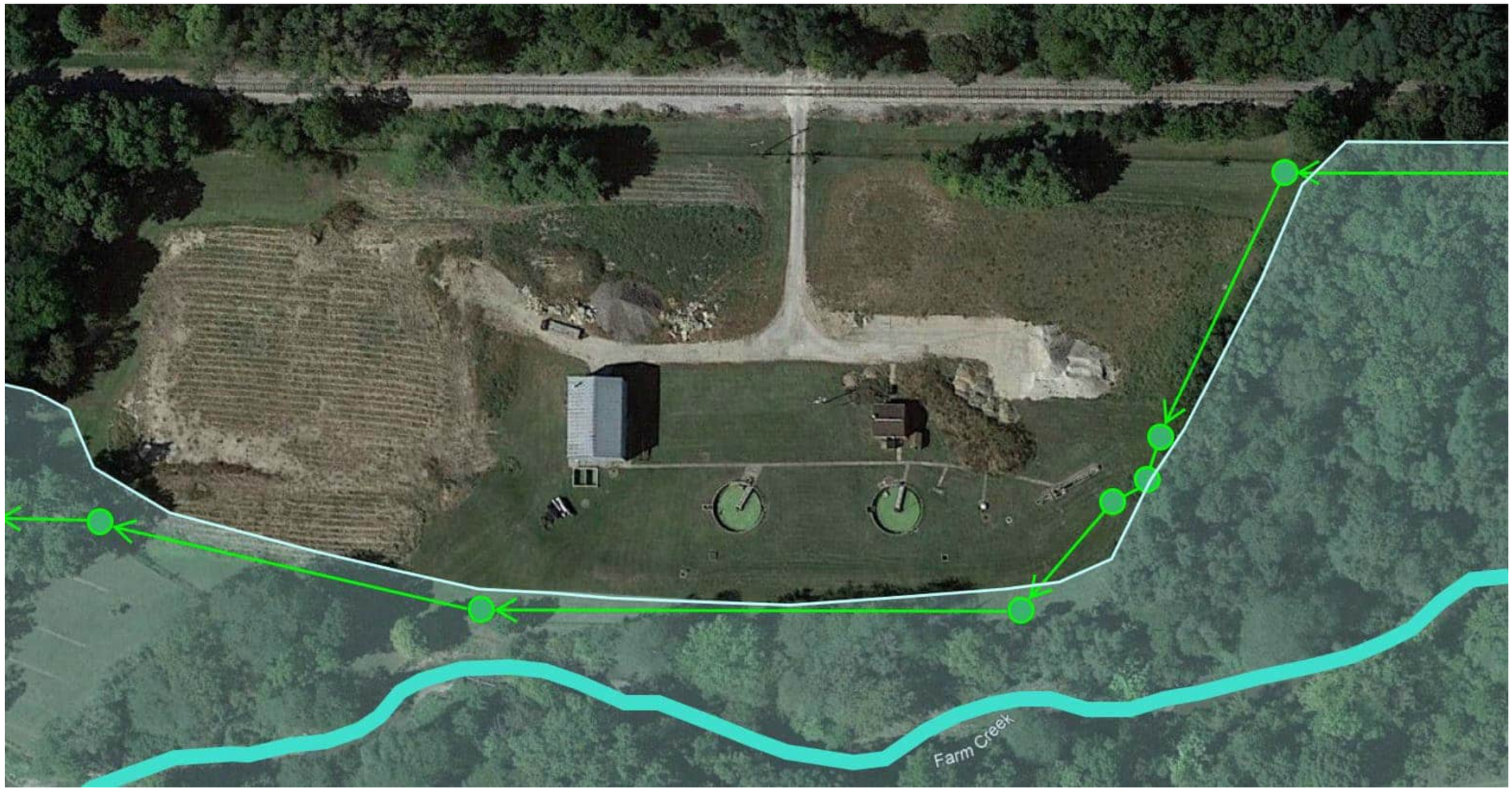

Feasibility of Excess Flow Lagoon and Focused Conveyance Improvements

Preliminary Feasibility Study	Site A	Site B
• 2016 flow monitoring data	X	X
• Existing sewer manhole rim and invert elevations	X	
• Hydraulic model of proposed FCTS	X	
• Soil borings/geotechnical evaluations	2	

Basis of Design Report

- Gather updated flow monitoring data
- Obtain additional soil borings and geotechnical evaluations
- More dynamic hydraulic modeling
- IEPA engagement

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