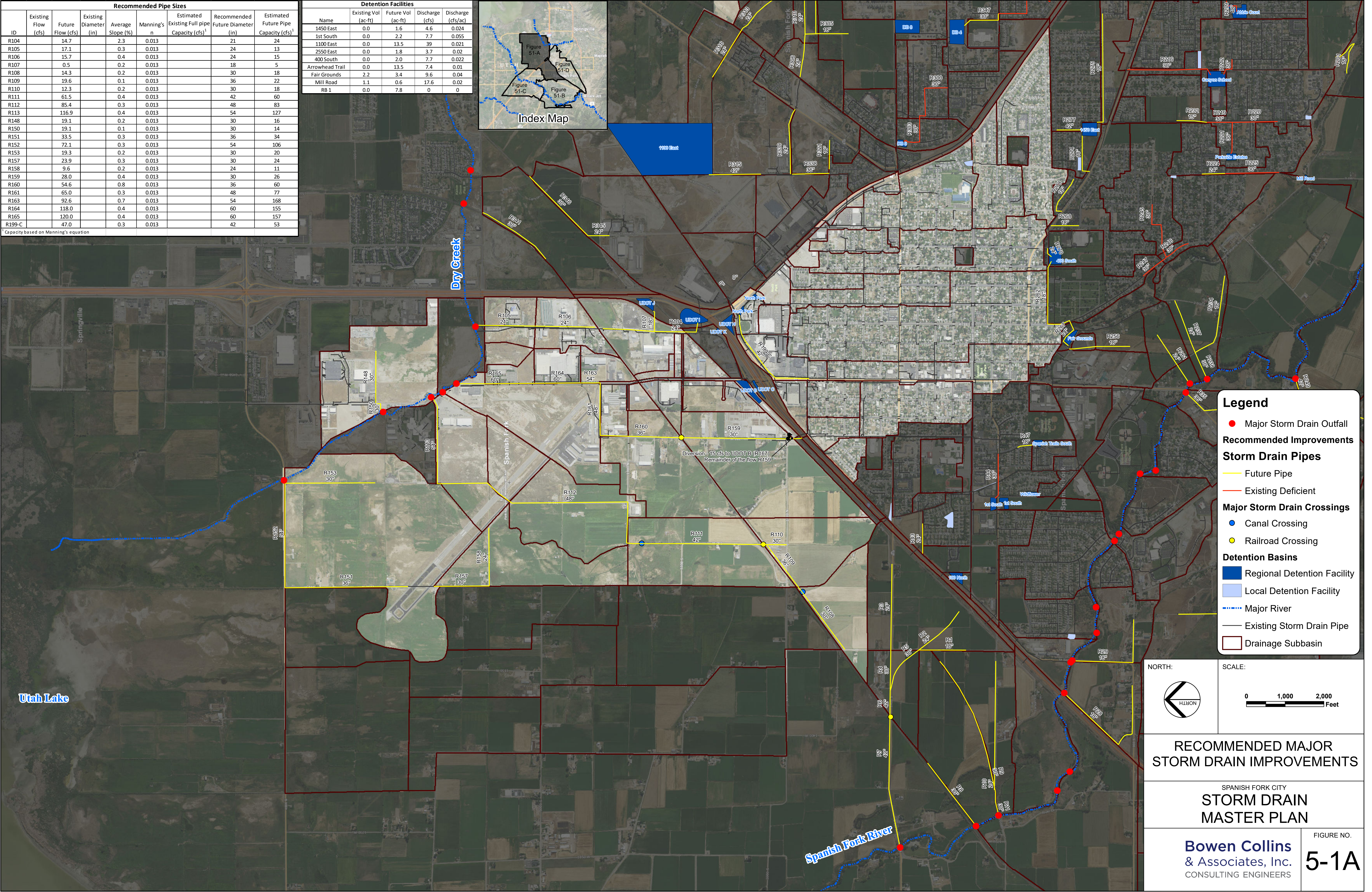
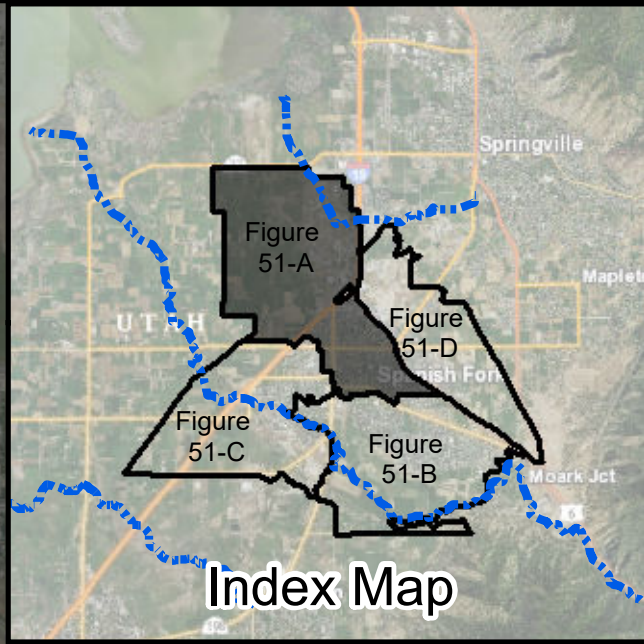


Recommended Pipe Sizes							
ID	Existing Flow (cfs)	Future Flow (cfs)	Existing Diameter (in)	Average Slope (%)	Manning's n	Estimated Existing Full pipe Capacity (cfs) ¹	Recommended Future Diameter (in)
R104		14.7		2.3	0.013		21
R105		17.1		0.3	0.013		24
R106		15.7		0.4	0.013		24
R107		0.5		0.2	0.013		18
R108		14.3		0.2	0.013		30
R109		19.6		0.1	0.013		36
R110		12.3		0.2	0.013		30
R111		61.5		0.4	0.013		42
R112		85.4		0.3	0.013		48
R113		116.9		0.4	0.013		54
R148		19.1		0.2	0.013		30
R150		19.1		0.1	0.013		30
R151		33.5		0.3	0.013		36
R152		72.1		0.3	0.013		54
R153		19.3		0.2	0.013		30
R157		23.9		0.3	0.013		30
R158		9.6		0.2	0.013		24
R159		28.0		0.4	0.013		30
R160		54.6		0.8	0.013		36
R161		65.0		0.3	0.013		48
R163		92.6		0.7	0.013		54
R164		118.0		0.4	0.013		60
R165		120.0		0.4	0.013		60
R199-C		47.0		0.3	0.013		42

¹ Capacity based on Manning's equation

Detention Facilities			
Name	Existing Vol (ac-ft)	Future Vol (ac-ft)	Discharge (cfs)
1450 East	0.0	1.6	4.6
1st South	0.0	2.2	7.7
1100 East	0.0	13.5	39
2550 East	0.0	1.8	3.7
400 South	0.0	2.0	7.7
Arrowhead Trail	0.0	13.5	7.4
Fair Grounds	2.2	3.4	9.6
Mill Road	1.1	0.6	17.6
RB 1	0.0	7.8	0



Legend

● Major Storm Drain Outfall

Recommended Improvements

Storm Drain Pipes

— Future Pipe

— Existing Deficient

Major Storm Drain Crossings

● Canal Crossing

● Railroad Crossing

Detention Basins

■ Regional Detention Facility

■ Local Detention Facility

--- Major River

— Existing Storm Drain Pipe

□ Drainage Subbasin

NORTH:

SCALE:

01,0002,000

Feet

RECOMMENDED MAJOR STORM DRAIN IMPROVEMENTS

SPANISH FORK CITY
STORM DRAIN
MASTER PLAN

Bowen Collins
& Associates, Inc.
CONSULTING ENGINEERS

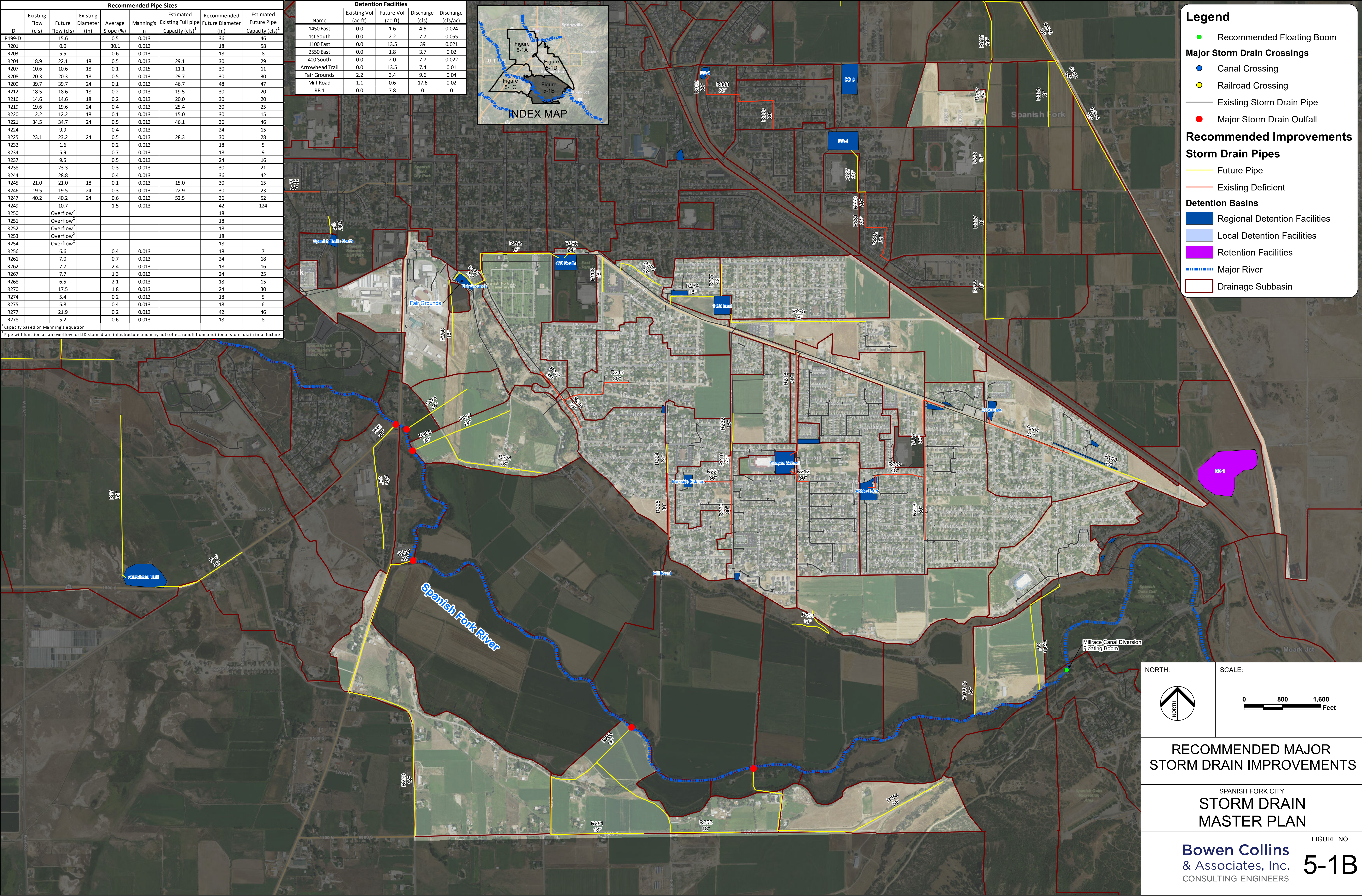
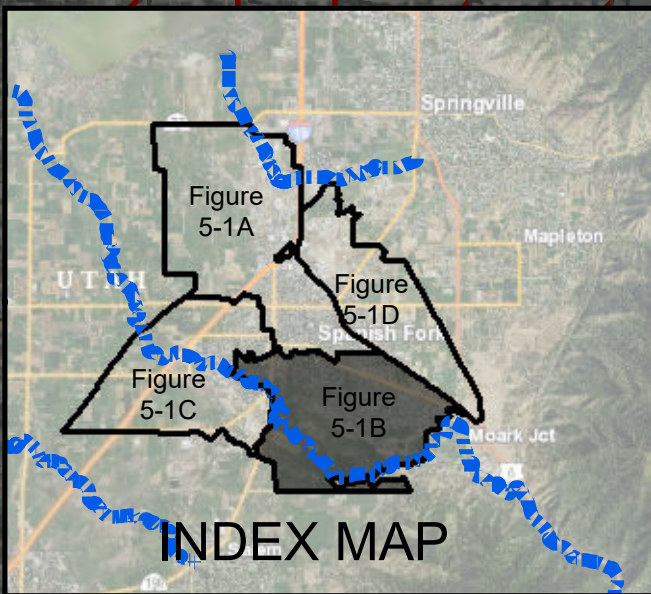
FIGURE NO.
5-1A

Recommended Pipe Sizes								
ID	Existing Flow (cfs)	Future Flow (cfs)	Existing Diameter (in)	Average Slope (%)	Manning's n	Estimated Existing Full pipe Capacity (cfs) ¹	Recommended Future Diameter (in)	Estimated Future Pipe Capacity (cfs) ¹
R199-D		15.6		0.5	0.013		36	46
R201		0.0		30.1	0.013		18	58
R203		5.5		0.6	0.013		18	8
R204	18.9	22.1	18	0.5	0.013	29.1	30	29
R207	10.6	10.6	18	0.1	0.015	11.1	30	11
R208	20.3	20.3	18	0.5	0.013	29.7	30	30
R209	39.7	39.7	24	0.1	0.013	46.7	48	47
R212	18.5	18.6	18	0.2	0.013	19.5	30	20
R216	14.6	14.6	18	0.2	0.013	20.0	30	20
R219	19.6	19.6	24	0.4	0.013	25.4	30	25
R220	12.2	12.2	18	0.1	0.013	15.0	30	15
R221	34.5	34.7	24	0.5	0.013	46.1	36	46
R224		9.9		0.4	0.013		24	15
R225	23.1	23.2	24	0.5	0.013	28.3	30	28
R232		1.6		0.2	0.013		18	5
R234		5.9		0.7	0.013		18	9
R237		9.5		0.5	0.013		24	16
R238		23.3		0.3	0.013		30	21
R244		28.8		0.4	0.013		36	42
R245	21.0	21.0	18	0.1	0.013	15.0	30	15
R246	19.5	19.5	24	0.3	0.013	22.9	30	23
R247	40.2	40.2	24	0.6	0.013	52.5	36	52
R249		10.7		1.5	0.013		42	124
R250		Overflow ²					18	
R251		Overflow ²					18	
R252		Overflow ²					18	
R253		Overflow ²					18	
R254		Overflow ²					18	
R256		6.6		0.4	0.013		18	7
R261		7.0		0.7	0.013		24	18
R262		7.7		2.4	0.013		18	16
R267		7.7		1.3	0.013		24	25
R268		6.5		2.1	0.013		18	15
R270		17.5		1.8	0.013		24	30
R274		5.4		0.2	0.013		18	5
R275		5.8		0.4	0.013		18	6
R277		21.9		0.2	0.013		42	46
R278		5.2		0.6	0.013		18	8

¹Reads hardcode Manning's coefficient

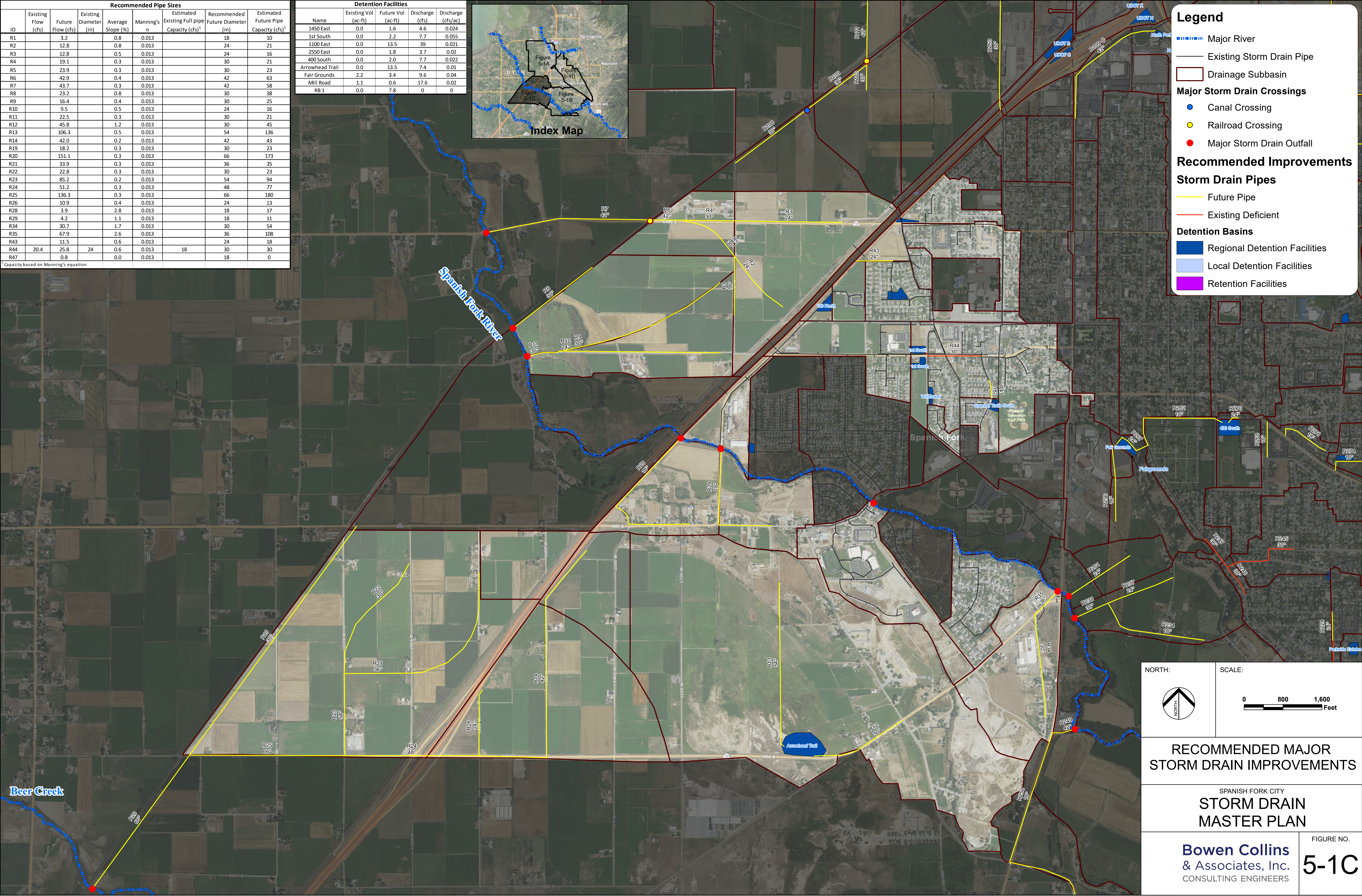
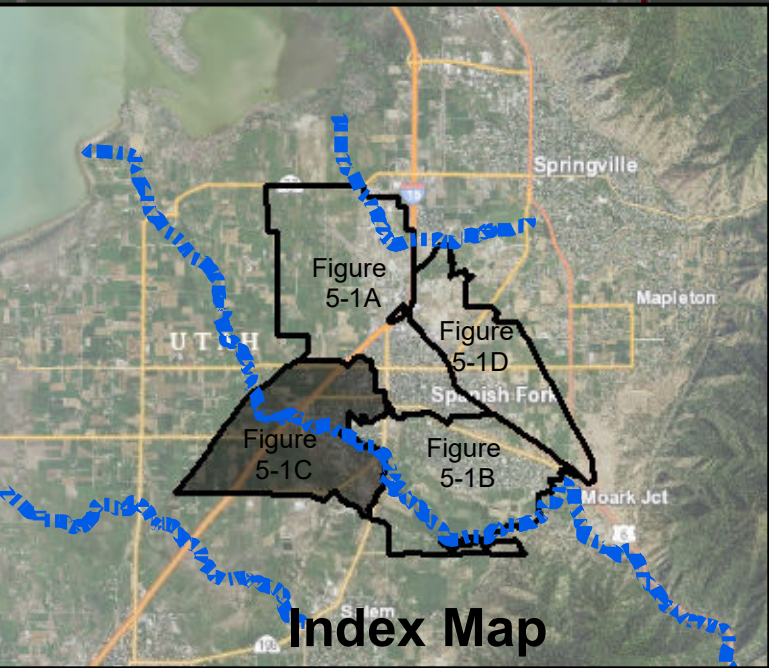
¹ Capacity based on Manning's equation
² Pipe will function as an overflow for LD storm drain infrastructure and may not collect runoff from traditional storm drain infrastructure

Detention Facilities				
Name	Existing Vol (ac-ft)	Future Vol (ac-ft)	Discharge (cfs)	Discharge (cfs/ac)
1450 East	0.0	1.6	4.6	0.024
1st South	0.0	2.2	7.7	0.055
1100 East	0.0	13.5	39	0.021
2550 East	0.0	1.8	3.7	0.02
400 South	0.0	2.0	7.7	0.022
Arrowhead Trail	0.0	13.5	7.4	0.01
Fair Grounds	2.2	3.4	9.6	0.04
Mill Road	1.1	0.6	17.6	0.02
RB 1	0.0	7.8	0	0



Recommended Pipe Sizes								
ID	Existing Flow (cfs)	Future Flow (cfs)	Existing Diameter (in)	Average Slope (%)	Manning's n	Estimated Existing Full pipe Capacity (cfs) ¹	Recommended Future Diameter (in)	Estimated Future Pipe Capacity (cfs) ¹
R1		3.2		0.8	0.013		18	10
R2		12.8		0.8	0.013		24	21
R3		12.8		0.5	0.013		24	16
R4		19.1		0.3	0.013		30	21
R5		23.9		0.3	0.013		30	23
R6		42.9		0.4	0.013		42	63
R7		43.7		0.3	0.013		42	58
R8		23.2		0.8	0.013		30	38
R9		16.4		0.4	0.013		30	25
R10		9.5		0.5	0.013		24	16
R11		22.5		0.3	0.013		30	21
R12		45.8		1.2	0.013		30	45
R13		106.3		0.5	0.013		54	136
R14		42.0		0.2	0.013		42	43
R19		18.2		0.3	0.013		30	23
R20		151.1		0.3	0.013		66	173
R21		33.9		0.3	0.013		36	35
R22		22.8		0.3	0.013		30	23
R23		85.2		0.2	0.013		54	94
R24		51.2		0.3	0.013		48	77
R25		136.3		0.3	0.013		66	180
R26		10.9		0.4	0.013		24	13
R28		3.9		2.8	0.013		18	17
R29		4.2		1.1	0.013		18	11
R34		30.7		1.7	0.013		30	54
R35		67.9		2.6	0.013		36	108
R43		11.5		0.6	0.013		24	18
R44	20.4	25.8	24	0.6	0.013	18	30	30
R47		0.8		0.0	0.013		18	0
Capacity based on Manning's equation								

Detention Facilities				
Name	Existing Vol (ac-ft)	Future Vol (ac-ft)	Discharge (cfs)	Discharge (cfs/ac)
1450 East	0.0	1.6	4.6	0.024
1st South	0.0	2.2	7.7	0.055
1100 East	0.0	13.5	39	0.021
2550 East	0.0	1.8	3.7	0.02
400 South	0.0	2.0	7.7	0.022
Arrowhead Trail	0.0	13.5	7.4	0.01
Fair Grounds	2.2	3.4	9.6	0.04
Mill Road	1.1	0.6	17.6	0.02
RB 1	0.0	7.8	0	0



Legend

- Major River
- Existing Storm Drain Pipe
- Drainage Subbasin
- Major Storm Drain Crossings
 - Canal Crossing
 - Railroad Crossing
 - Major Storm Drain Outfall

Recommended Improvements

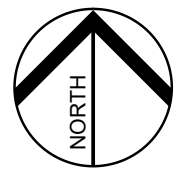
Storm Drain Pipes

- Future Pipe
- Existing Deficient

Detention Basins

- Regional Detention Facilities
- Local Detention Facilities
- Retention Facilities

NORTH:



SCALE:

0 800 1,600 Feet

RECOMMENDED MAJOR STORM DRAIN IMPROVEMENTS

SPANISH FORK CITY STORM DRAIN MASTER PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO.

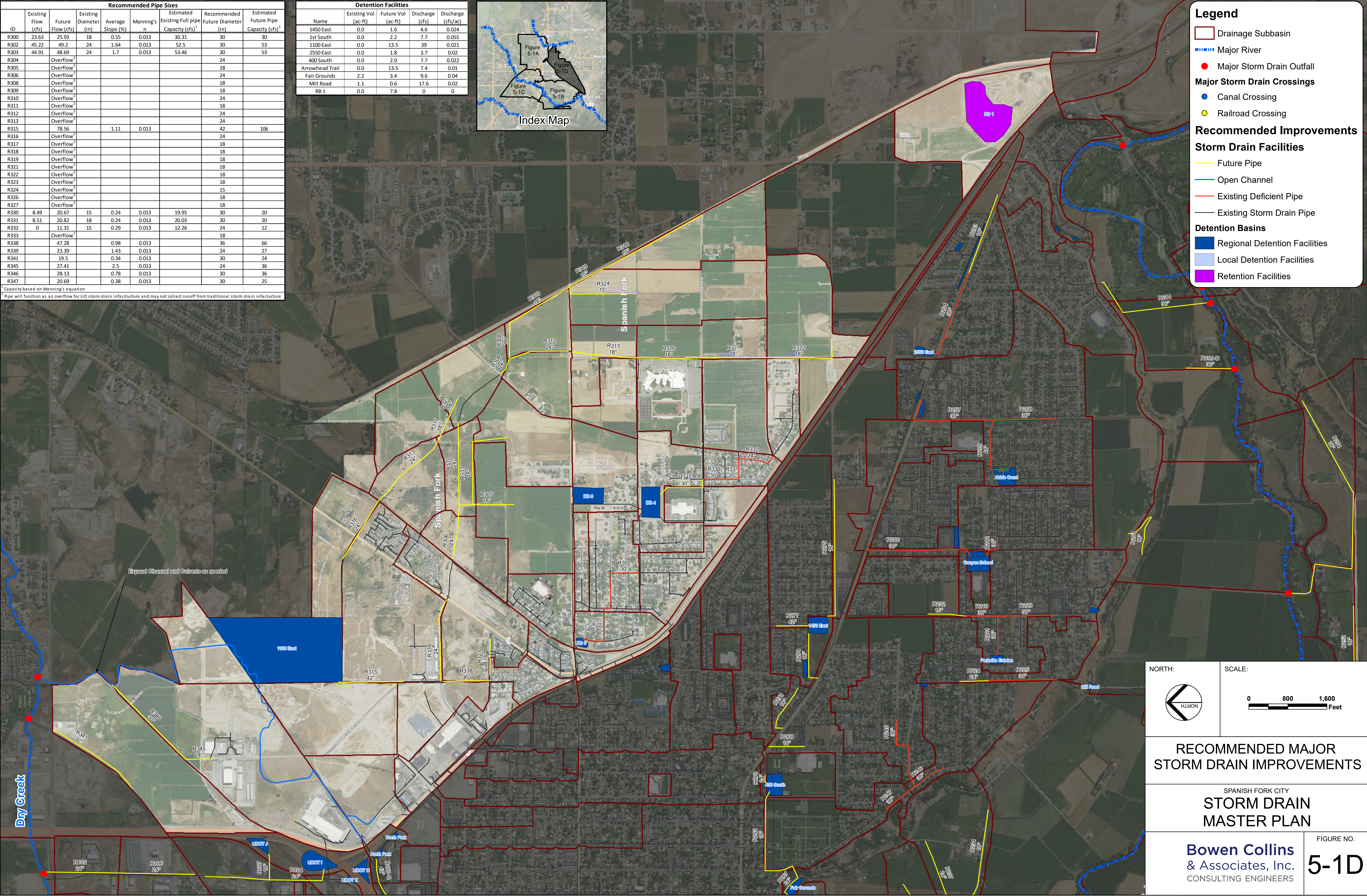
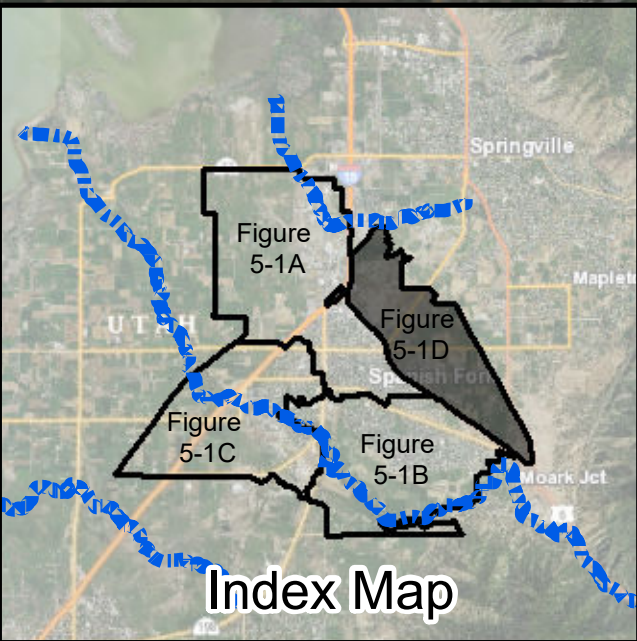
5-1C

Recommended Pipe Sizes								
ID	Existing Flow (cfs)	Future Flow (cfs)	Existing Diameter (in)	Average Slope (%)	Manning's	Estimated Existing Full pipe Capacity (cfs) ¹	Recommended Future Diameter (in)	Estimated Future Pipe Capacity (cfs) ¹
R300	23.63	25.93	18	0.55	0.013	30.31	30	30
R302	45.22	49.2	24	1.64	0.013	52.5	30	53
R303	44.91	48.69	24	1.7	0.013	53.46	30	53
R304	Overflow ²						24	
R305	Overflow ²						18	
R306	Overflow ²						24	
R308	Overflow ²						18	
R309	Overflow ²						18	
R310	Overflow ²						24	
R311	Overflow ²						18	
R312	Overflow ²						24	
R313	Overflow ²						24	
R315	78.56			1.11	0.013		42	106
R316	Overflow ²						24	
R317	Overflow ²						18	
R318	Overflow ²						18	
R319	Overflow ²						18	
R321	Overflow ²						18	
R322	Overflow ²						18	
R323	Overflow ²						18	
R324	Overflow ²						15	
R326	Overflow ²						18	
R327	Overflow ²						18	
R330	8.49	20.67	15	0.24	0.013	19.95	30	20
R331	8.51	20.82	18	0.24	0.013	20.03	30	20
R332	0	11.31	15	0.29	0.013	12.26	24	12
R333	Overflow ²						18	
R338	47.28			0.98	0.013		36	66
R339	23.39			1.43	0.013		24	27
R341	19.5			0.34	0.013		30	24
R345	27.41			2.5	0.013		24	36
R346	28.13			0.78	0.013		30	36
R347	20.69			0.38	0.013		30	25

¹ Capacity based on Manning's equation

² Pipe will function as an overflow for LID storm drain infrastructure and may not collect runoff from traditional storm drain infrastructure

Detention Facilities				
Name	Existing Vol (ac-ft)	Future Vol (ac-ft)	Discharge (cfs)	Discharge (cfs/ac)
1450 East	0.0	1.6	4.6	0.024
1st South	0.0	2.2	7.7	0.055
1100 East	0.0	13.5	39	0.021
2550 East	0.0	1.8	3.7	0.02
400 South	0.0	2.0	7.7	0.022
Arrowhead Trail	0.0	13.5	7.4	0.01
Fair Grounds	2.2	3.4	9.6	0.04
Mill Road	1.1	0.6	17.6	0.02
RB 1	0.0	7.8	0	0



Legend

- Drainage Subbasin
- Major River
- Major Storm Drain Outfall
- Major Storm Drain Crossings
 - Canal Crossing
 - Railroad Crossing
- Recommended Improvements
 - Storm Drain Facilities
 - Future Pipe
 - Open Channel
 - Existing Deficient Pipe
 - Existing Storm Drain Pipe
 - Detention Basins
 - Regional Detention Facilities
 - Local Detention Facilities
 - Retention Facilities

NORTH:

SCALE:

0

800

1,600

Feet

RECOMMENDED MAJOR STORM DRAIN IMPROVEMENTS

SPANISH FORK CITY
STORM DRAIN MASTER PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO.
5-1D