EXHIBIT A-3

SYSTEM HYDRAULIC MODEL

Northern Kentucky Water District

FIRE FLOW CERTIFICATION

Sub-District O
Gene St., Scenic Ridge Dr., Mason Rd., Alexander Rd., Fiskburg Rd., Goshorn Rd., Webster Rd., Pfanstiehl Rd., Elliott Rd., Justice Ln., Highwater Rd., Trace Run Rd., Mann Rd., & Steep Creek Rd.
Kenton County, KY
June 30, 2024

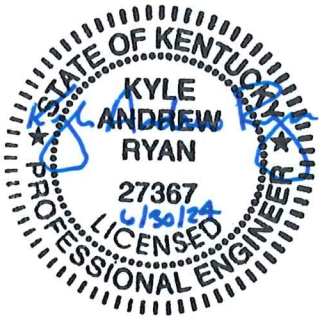
I certify that the proposed improvements meet the 807 KAR 5:066, Section 10b regulation for fire flow protection relating to KRS Chapter 278. I am certifying that "the system can provide a minimum fire flow of 250 gallons per minute; and the water system supporting this flow has the capability of providing this flow for a period of not less than two (2) hours plus consumption at the maximum daily rate". This certification is based on the information available and is not a guarantee of any precise results.

This certification is based on hydraulic modeling performed using InfoWater, the program available from Innovyze. Supporting documentation and operating conditions are attached and are the basis for this certification.

It should be noted that input data used for modeling is based on available data. Results can change and are dependent on the demand conditions, which can vary at any given time. These values will impact the final results when adjusted. The certification is based on estimated conditions and contains many assumptions based on historical data.

With this certification, the Northern Kentucky Water District will permit the construction of fire hydrants within this project.

Fire flow analyses were made using a hydrant within the project area that would provide a representative result that should simulate the results at other hydrants within the system. Minor variations at different hydrants would still provide a flow rate that meets the minimum standard.



Northern Kentucky Water District

HYDRAULIC AND FLUSHING VELOCITY CERTIFICATION

Sub-District O
Gene St., Scenic Ridge Dr., Mason Rd., Alexander Rd., Fiskburg Rd., Goshorn Rd., Webster Rd., Pfanstiehl Rd., Elliott Rd., Justice Ln., Highwater Rd., Trace Run Rd., Mann Rd., & Steep Creek Rd.
Kenton County, KY
June 30, 2024

I certify that the proposed improvements are hydraulically capable of meeting the Kentucky Division of Water General Design Criteria for Surface and Ground Water Supplies standard for flushing velocity in the main meeting 2.5 feet per second while maintaining at least 20 psi pressure in accordance with 401 KAR 8:100.

The maximum flow rate that can reliably be supplied to the main and meet 20 psi in the system under maximum hour conditions is:

- Gene Street – 1,400 gpm
- Scenic Ridge Drive – 1,500 gpm
- Mason Road – 425 gpm
- Alexander Rd., Fiskburg Rd., & Pfanstiehl Rd. – 500 gpm
- Goshorn Road – 600 gpm
- Webster Road – 1,500 gpm
- Elliott Road – 950 gpm
- Justice Lane – 450 gpm
- Highwater Road – 1,500 gpm
- Trace Run Road – 950 gpm
- Mann Road & Steep Creek Road – 850 gpm

At least 30 psi can be maintained under the peak domestic demand for the 123 customers affected. The peak domestic demand using the D.R. Taylor formula is:

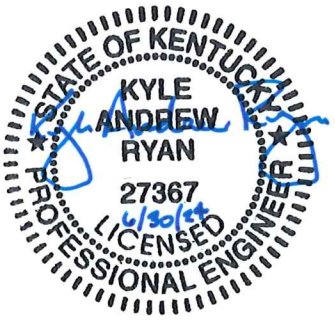
- 22.4 gpm on Gene Street (5 potential customers)
- 24.5 gpm on Scenic Ridge Drive (6 potential customers)
- 20.0 gpm on Mason Road (4 potential customers)
- 64.8 gpm on Alexander Rd., Fiskburg Rd., & Pfanstiehl Rd. (42 potential customers)
- 36.1 gpm on Goshorn Road (13 potential customers)
- 34.6 gpm on Webster Road (12 potential customers)
- 36.1 gpm on Elliott Road (13 potential customers)
- 20.0 gpm on Justice Lane (4 potential customers)
- 10.0 gpm on Highwater Road (1 potential customer)
- 31.6 gpm on Trace rund Road (10 potential customers)
- 36.1 gpm on Mann Rd. & Steep Creek Rd. (13 potential customers)

This certification is based on the information available and is not a guarantee of any precise results. Results are based on hydraulic modeling performed using InfoWater, the program available from Innovyze. Supporting documentation and operating conditions are attached and are the basis for this certification.

It should be noted that input data used for modeling is based on available data. Results can change and are dependent on the demand conditions, which can vary at any given time. These values will impact the final results when adjusted. The certification is based on estimated conditions for maximum hour demand conditions and contains many assumptions based on historical data.

With this certification, the Northern Kentucky Water District will permit the construction of the proposed development.

The assumed Hazen-Williams roughness coefficient for all new pipe was 120, which is suitable for ductile iron or PVC. The water level in the Devon, Industrial, Independence, Kenton Lands, & Barrington Tanks were one-half full.



Sub-District O
Gene St., Scenic Ridge Dr., Mason Rd.,
Alexander Rd., Fiskburg Rd., Goshorn Rd.,
Webster Rd., Pfanstiehl Rd., Elliott Rd., Justice Ln.
Highwater Rd., Trace Run Rd., Mann Rd., Steep Creek Rd.
Kenton County, Kentucky
Output from InfoWater model - copied to Excel
June 30, 2024

Northern Kentucky Water District

Maximum Hour Run for Potential Customers

Gene Street

Maximum Hour Run, 5 potential Customers = 22.4 GPM				
9047N	7.5	940	1064.2	53.8
J68	7.5	912	1064.1	65.9
J70	7.5	930	1064.1	58.1

Scenic Ridge Drive

Maximum Hour Run, 6 potential Customers = 24.5 GPM				
8004N	4.9	846	1070.6	97.3
J72	4.9	838	1070.6	100.8
J74	4.9	842	1070.6	99.0
J76	4.9	824	1070.6	106.9
J80	4.9	851	1070.6	95.2

Mason Road

Maximum Hour Run, 4 potential Customers = 20 GPM				
9671N	6.7	740	1014.6	119.0
J82	6.7	576	1014.6	190.0
J84	6.7	665	1014.6	151.5

Alexander Rd, Fiskburg Road, & Pfanstiehl Road

Maximum Hour Run, 42 potential Customers = 64.8 GPM				
7109N	5.4	874	1047.5	75.2
J100	5.4	827	1047.4	95.5
J102	5.4	828	1047.4	95.1
J104	5.4	868	1047.4	77.7
J106	5.4	874	1047.4	75.1
J108	5.4	867	1047.4	78.2
J110	5.4	860	1047.4	81.2
J112	5.4	878	1047.4	73.4
J114	5.4	862	1047.4	80.3
J94	5.4	882	1047.4	71.7
J96	5.4	735	1047.4	135.3
J98	5.4	857	1047.4	82.5

Goshorn Road

Maximum Hour Run, 13 potential Customers = 36.1 GPM				
7010N	7.2	870	1047.6	76.9
J86	7.2	848	1047.5	86.4
J88	7.2	864	1047.5	79.5
J90	7.2	863	1047.5	79.9
J92	7.2	877	1047.5	73.9

Webster Road

Maximum Hour Run, 12 potential Customers = 34.6 GPM				
J116	5.8	653	1089.1	188.9
J118	5.8	642	1089.1	193.7
J120	5.8	623	1089.1	201.9
J122	5.8	615	1089.1	205.4
J124	5.8	635	1089.1	196.8
J126	5.8	615	1089.1	205.4

Elliott Road

Maximum Hour Run, 13 potential Customers = 36.1 GPM				
9239N	7.2	887	1049.4	70.4
J128	7.2	837	1049.3	92.0
J130	7.2	875	1049.3	75.5
J132	7.2	857	1049.3	83.3
J134	7.2	878	1049.3	74.2

Justice Lane

Maximum Hour Run, 4 potential Customers = 20 GPM				
7922N	6.7	844	1036.0	83.2
J136	6.7	840	1036.0	84.9
J138	6.7	847	1036.0	81.9

Highwater Road

Maximum Hour Run, 1 potential Customers = 10 GPM				
1962N	5.0	796	1015.6	95.2
J140	5.0	775	1015.6	104.3

Trace Run Road

Maximum Hour Run, 10 potential Customers = 31.6 GPM				
9162N	7.9	886	1059.1	75.0
J142	7.9	861	1059.1	85.8
J144	7.9	882	1059.1	76.7
J146	7.9	876	1059.1	79.3

Mann Road & Steep Creek Road

Maximum Hour Run, 13 potential Customers = 36.1 GPM				
8647N	7.2	598	739.0	61.1
J148	7.2	575	738.9	71.0
J150	7.2	530	739.0	90.5
J152	7.2	538	739.0	87.1
J154	7.2	548	739.0	82.7

Flushing Velocities Under Maximum Hour

Gene Street

Flushing velocity for new 8" pipe (under max hour)				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
9047N	7.5	940	1061.3	52.6
J68	392.0	912	1056.5	62.6
J70	7.5	930	1059.0	55.9

Pipe Information for flushing velocity for new 8" pipe					
Pipe ID	Length, ft	Diam, inch	Flow, gpm	Velocity, fps	Roughness
P577	599	8	399	2.6	120
P579	668	8	392	2.5	120

Scenic Ridge Drive

Flushing velocity for new 8" pipe (under max hour)				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
8004N	4.9	846	1063.5	94.2
J72	392.0	838	1057.7	95.2
J74	4.9	842	1058.6	93.8
J76	4.9	824	1061.1	102.7
J80	4.9	851	1062.9	91.8

Pipe Information for flushing velocity for new 8" pipe					
Pipe ID	Length, ft	Diam, inch	Flow, gpm	Velocity, fps	Roughness
P581	129	8	407	2.6	120
P583	667	8	397	2.5	120
P585	238	8	392	2.5	120
P587	470	8	402	2.6	120

Mason Road

Flushing velocity for new 8" pipe (under max hour)				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
9671N	6.7	740	906.8	72.3
J82	392.0	576	902.6	141.5
J84	6.7	665	904.7	103.9

Pipe Information for flushing velocity at 2.5 fps for new 8" pipe					
Pipe ID	Length, ft	Diam, inch	Flow, gpm	Velocity, fps	Roughness
P589	545	8	399	2.5	120
P591	574	8	392	2.5	120

Alexander Rd., Fiskburg Rd.

Flushing velocity for new 8" pipe (under max hour)				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
7109N	5.4	874	998.7	54.1
J100	5.4	827	994.4	72.5
J102	5.4	828	994.4	72.1
J104	5.4	868	994.4	54.8
J106	5.4	874	981.5	46.6
J108	5.4	867	988.6	52.7
J110	392.0	860	971.7	48.4
J112	5.4	878	974.0	41.6
J114	5.4	862	977.8	50.2
J94	5.4	882	994.5	48.7
J96	5.4	735	994.4	112.4
J98	5.4	857	994.4	59.5

Pipe Information for flushing velocity at 2.5 fps for new 8" pipe					
Pipe ID	Length, ft	Diam, inch	Flow, gpm	Velocity, fps	Roughness
P601	901	8	446	2.9	120
P613	1429	8	414	2.6	120
P615	1748	8	408	2.6	120
P617	945	8	403	2.6	120
P619	1001	8	397	2.5	120
P621	614	8	392	2.5	120

Pfanstiel Road

Flushing velocity for new 8" pipe (under max hour)				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
7109N	5.4	874	998.7	54.1
J100	5.4	827	972.2	62.9
J102	5.4	828	977.1	64.6
J104	5.4	868	989.3	52.6
J106	5.4	874	994.4	52.2
J108	5.4	867	994.4	55.2
J110	5.4	860	994.4	58.2
J112	5.4	878	994.4	50.4
J114	5.4	862	994.4	57.4
J94	5.4	882	994.5	48.7
J96	392.0	735	966.8	100.4
J98	5.4	857	983.8	54.9

Pipe Information for flushing velocity at 2.5 fps for new 8" pipe					
Pipe ID	Length, ft	Diam, inch	Flow, gpm	Velocity, fps	Roughness
P603	1250	8	414	2.6	120
P605	1369	8	408	2.6	120
P607	1690	8	403	2.6	120
P609	1291	8	397	2.5	120
P611	1445	8	392	2.5	120

Goshorn Road

Flushing velocity for new 8" pipe (under max hour)				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
7010N	7.2	870	999.7	56.2
J86	392.0	848	982.3	58.2
J88	7.2	864	988.6	54.0
J90	7.2	863	985.3	53.0
J92	7.2	877	995.5	51.4

Pipe Information for flushing velocity at 2.5 fps for new 8" & 12" pipe					
Pipe ID	Length, ft	Diam, inch	Flow, gpm	Velocity, fps	Roughness
P593	1007	8	414	2.6	120
P595	1724	8	406	2.6	120
P597	852	8	399	2.6	120
P599	816	8	392	2.5	120

Webster Road

Flushing velocity for new 8" pipe (under max hour)				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
J116	5.8	653	1053.0	173.3
J118	392.0	642	1049.5	176.6
J120	5.8	623	1056.2	187.7
J122	392.0	615	1058.5	192.2
J124	5.8	635	1079.5	192.6
J126	5.8	615	1059.2	192.5

Pipe Information for flushing velocity for new 8" pipe					
Pipe ID	Length, ft	Diam, inch	Flow, gpm	Velocity, fps	Roughness
P625	1446	8	801	5.1	120
P627	179	8	392	2.5	120
P629	751	8	404	2.6	120
P631	832	8	398	2.5	120
P633	949	8	392	2.5	120

Elliott Road

Flushing velocity for new 8" pipe (under max hour)				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
9239N	7.2	887	1031.9	62.8
J128	392.0	837	1012.8	76.2
J130	7.2	875	1020.7	63.1
J132	7.2	857	1016.3	69.0
J134	7.2	878	1025.8	64.0

Pipe Information for flushing velocity for new 8" pipe					
Pipe ID	Length, ft	Diam, inch	Flow, gpm	Velocity, fps	Roughness
P635	1491	8	414	2.6	120
P637	1261	8	406	2.6	120
P639	1128	8	399	2.6	120
P641	939	8	392	2.5	120

Justice Lane

Flushing velocity for new 8" pipe (under max hour)				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
7922N	6.7	844	954.2	47.8
J136	392.0	840	947.4	46.5
J138	6.7	847	952.0	45.5

Pipe Information for flushing velocity for new 8" pipe					
Pipe ID	Length, ft	Diam, inch	Flow, gpm	Velocity, fps	Roughness
P643	562	8	399	2.5	120
P645	1239	8	392	2.5	120

Highwater Road

Flushing velocity for new 8" pipe (under max hour)				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
1962N	5.0	796	1007.4	91.6
J140	392.0	775	1006.0	100.1

Pipe Information for flushing velocity for new 8" pipe					
Pipe ID	Length, ft	Diam, inch	Flow, gpm	Velocity, fps	Roughness
P647	366	8	392	2.5	120

Trace Run Road

Flushing velocity for new 8" pipe (under max hour)				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
9162N	7.9	886	1045.7	69.2
J142	392.0	861	1029.5	73.0
J144	7.9	882	1040.3	68.6
J146	7.9	876	1035.5	69.1

Pipe Information for flushing velocity for new 8" pipe					
Pipe ID	Length, ft	Diam, inch	Flow, gpm	Velocity, fps	Roughness
P649	1356	8	408	2.6	120
P651	1236	8	400	2.6	120
P653	1594	8	392	2.5	120

Steep Creek

Flushing velocity for new 8" pipe (under max hour)				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
8647N	7.2	598	736.2	59.9
J148	392.0	575	713.1	59.9
J150	7.2	530	721.1	82.8
J152	7.2	538	727.7	82.2
J154	7.2	548	721.1	75.0

Pipe Information for flushing velocity for new 8" pipe					
Pipe ID	Length, ft	Diam, inch	Flow, gpm	Velocity, fps	Roughness
P655	2060	8	414	2.6	120
P657	1656	8	406	2.6	120
P659	2122	8	392	2.5	120

Mann Road

Flushing velocity for new 8" pipe (under max hour)				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
8647N	7.2	598	736.2	59.9
J148	7.2	575	721.0	63.3
J150	7.2	530	721.1	82.8
J152	7.2	538	727.7	82.2
J154	392.0	548	718.7	74.0

Pipe Information for flushing velocity for new 8" pipe					
Pipe ID	Length, ft	Diam, inch	Flow, gpm	Velocity, fps	Roughness
P661	627	8	392	2.5	120

Maximum Available Flow Under Maximum Hour

Gene Street

Maximum Hour Run, Maximum Available Flow				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
9047N	7.5	940	1047.3	46.5
J68	1400.0	912	997.0	36.8
J70	7.5	930	1023.4	40.5

Scenic Ridge Drive

Maximum Hour Run, Maximum Available Flow				
ID	Demand, gpm	Elevation, ft	Grade, ft	Pressure, psi
8004N	4.9	846	1039.9	84.0
J72	1500.0	838	971.9	58.0
J74	4.9	842	982.6	60.9
J76	4.9	824	1012.7	81.8
J80	4.9	851	1034.0	79.3

Mason Road

Maximum Hour Run, Maximum Available Flow				
9671N	6.7	740	890.5	65.2
J82	425.0	576	885.6	134.1
J84	6.7	665	888.1	96.7
9673N*	1.5	842	896.1	23.4

* Area of min. pressure

Alexander Rd, Fiskburg Road, & Pfanstiehl Road

Maximum Hour Run, Maximum Available Flow				
7109N	5.4	874	977.9	45.0
J100	5.4	827	971.5	62.6
J102	5.4	828	971.5	62.2
J104	5.4	868	971.5	44.9
J106	5.4	874	951.6	33.6
J108	5.4	867	962.5	41.4
J110	500.0	860	936.2	33.0
J112	5.4	878	939.8	26.8
J114	5.4	862	945.8	36.3
J94	5.4	882	971.5	38.8
J96	5.4	735	971.5	102.5
J98	5.4	857	971.5	49.6

Goshorn Road

Maximum Hour Run, Maximum Available Flow				
7010N	7.2	870	957.7	38.0
J86	600.0	848	920.2	31.3
J88	7.2	864	934.1	30.4
J90	7.2	863	926.9	27.7
J92	7.2	877	948.9	31.2

Webster Road

Maximum Hour Run, Maximum Available Flow				
J116	5.8	653	932.6	121.1
J118	1500.0	642	890.0	107.5
J120	5.8	623	970.2	150.5
J122	5.8	615	1004.4	168.7
J124	5.8	635	1071.2	189.0
J126	5.8	615	1004.4	168.7

Elliott Road

Maximum Hour Run, Maximum Available Flow				
9239N	7.2	887	996.4	47.4
J128	950.0	837	901.3	27.9
J130	7.2	875	941.5	28.8
J132	7.2	857	919.4	27.1
J134	7.2	878	966.5	38.3

Justice Lane

Maximum Hour Run, Maximum Available Flow				
7922N	6.7	844	936.4	40.1
J136	450.0	840	927.7	38.0
J138	6.7	847	933.6	37.5
7944N*	0.1	871.08	941.7	30.6

*Area of min. pressure

Highwater Road

Maximum Hour Run, Maximum Available Flow				
1962N	5.0	796	961.7	71.8
J140	1500.0	775	945.3	73.8

Trace Run Road

Maximum Hour Run, Maximum Available Flow				
9162N	7.9	886	1005.8	51.9
J142	950.0	861	923.9	27.3
J144	7.9	882	978.8	42.0
J146	7.9	876	954.6	34.1

Mann Road & Steep Creek Road

Maximum Hour Run, Maximum Available Flow				
8647N	7.2	598	727.9	56.3
J148	850.0	575	634.1	25.6
J150	7.2	530	667.3	59.5
J152	7.2	538	694.1	67.6
J154	7.2	548	667.3	51.7

Pipe ID	From Node	To Node
P577	9047N	J70
P579	J70	J68
P585	J74	J72
P583	J76	J74
P587	J80	J76
P581	8004N	J80
P589	9671N	J84
P591	J84	J82
P593	7010N	J92
P595	J92	J88
P597	J88	J90
P599	J90	J86
P601	7109N	J94
P603	J94	J104
P605	J104	J98
P607	J98	J102
P609	J102	J100
P611	J100	J96
P613	J94	J108
P615	J108	J106
P617	J106	J114
P619	J114	J112
P621	J112	J110
P625	J124	J126
P627	J126	J122
P629	J126	J120
P631	J120	J116
P633	J116	J118
P635	9239N	J134
P637	J134	J130
P639	J130	J132
P641	J132	J128
P643	7922N	J138
P645	J138	J136
P647	1962N	J140
P649	9162N	J144
P651	J144	J146
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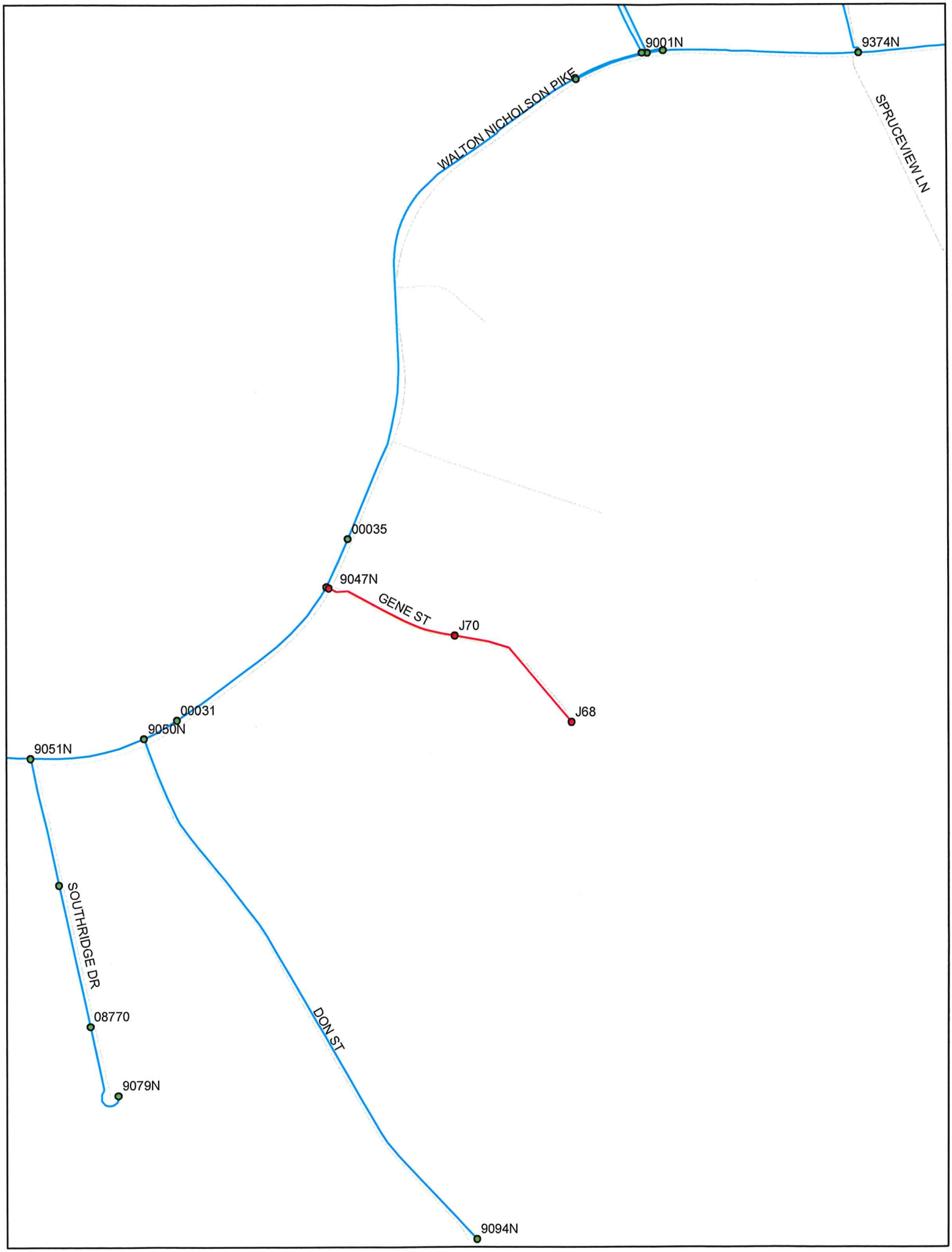
P659	J150	J148
P661	J150	J154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9374N
WALTON NICHOLSON PIKE
SPRUCEVIEW LN
00035
9047N
GENE ST
J70
J68
00031
9050N
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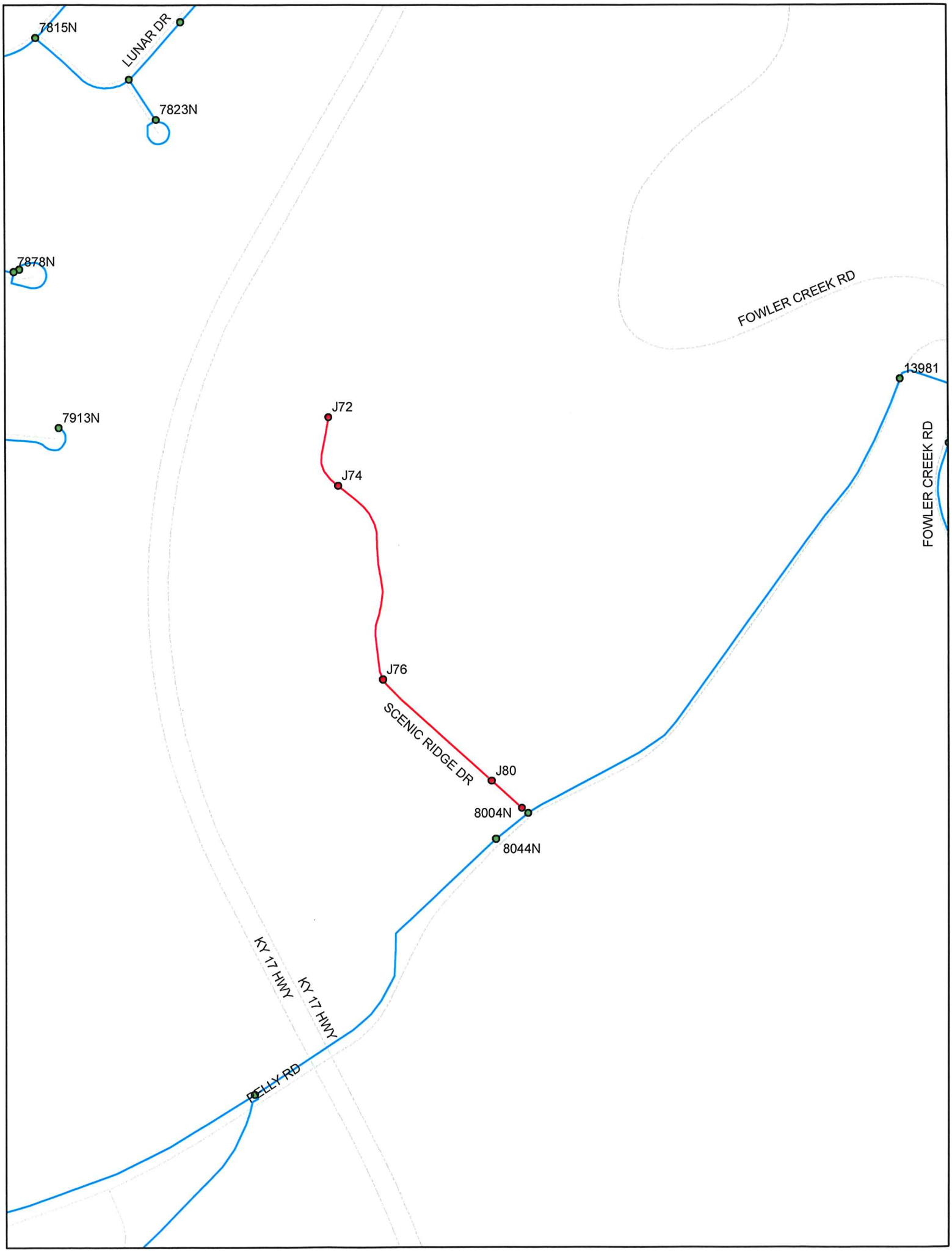
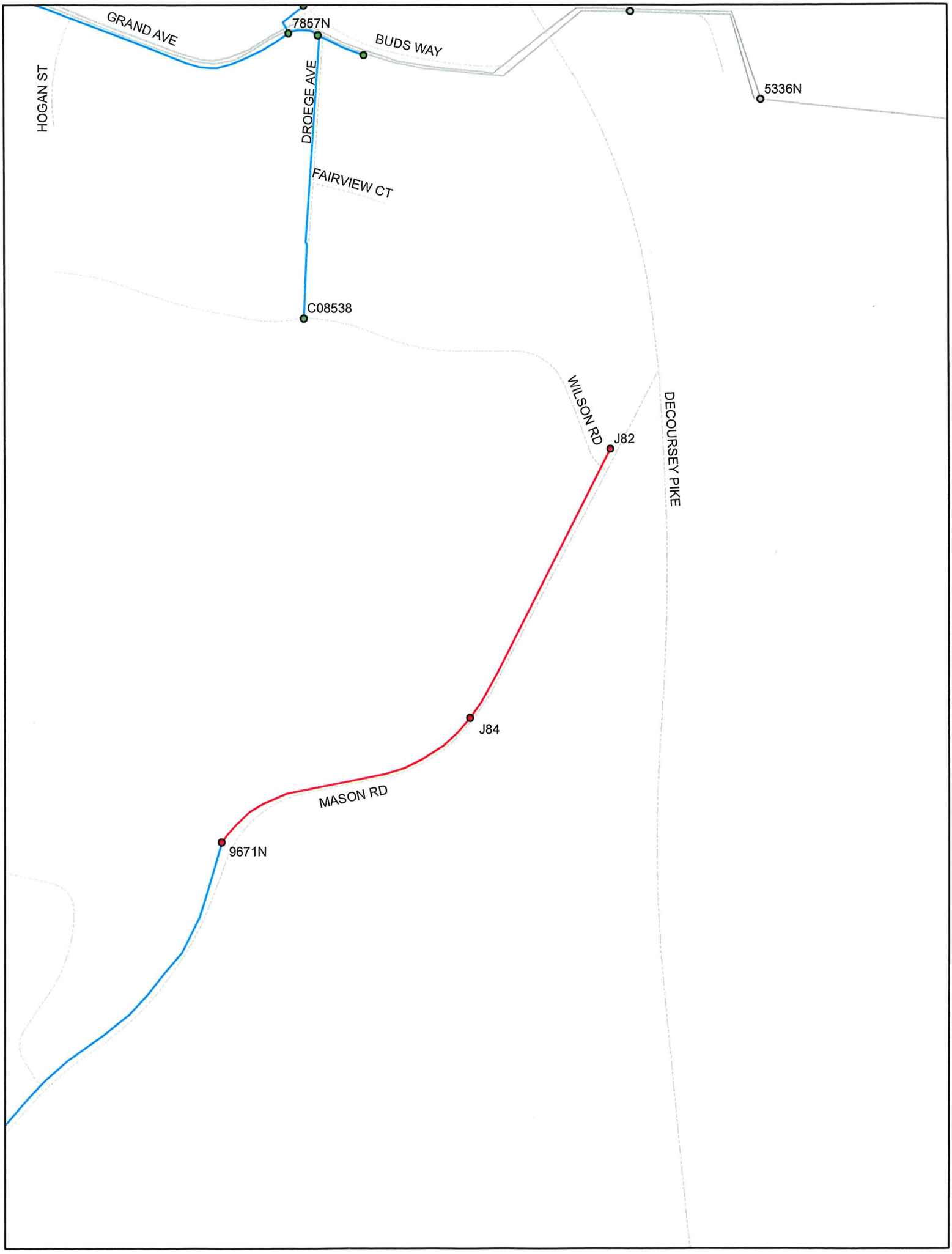
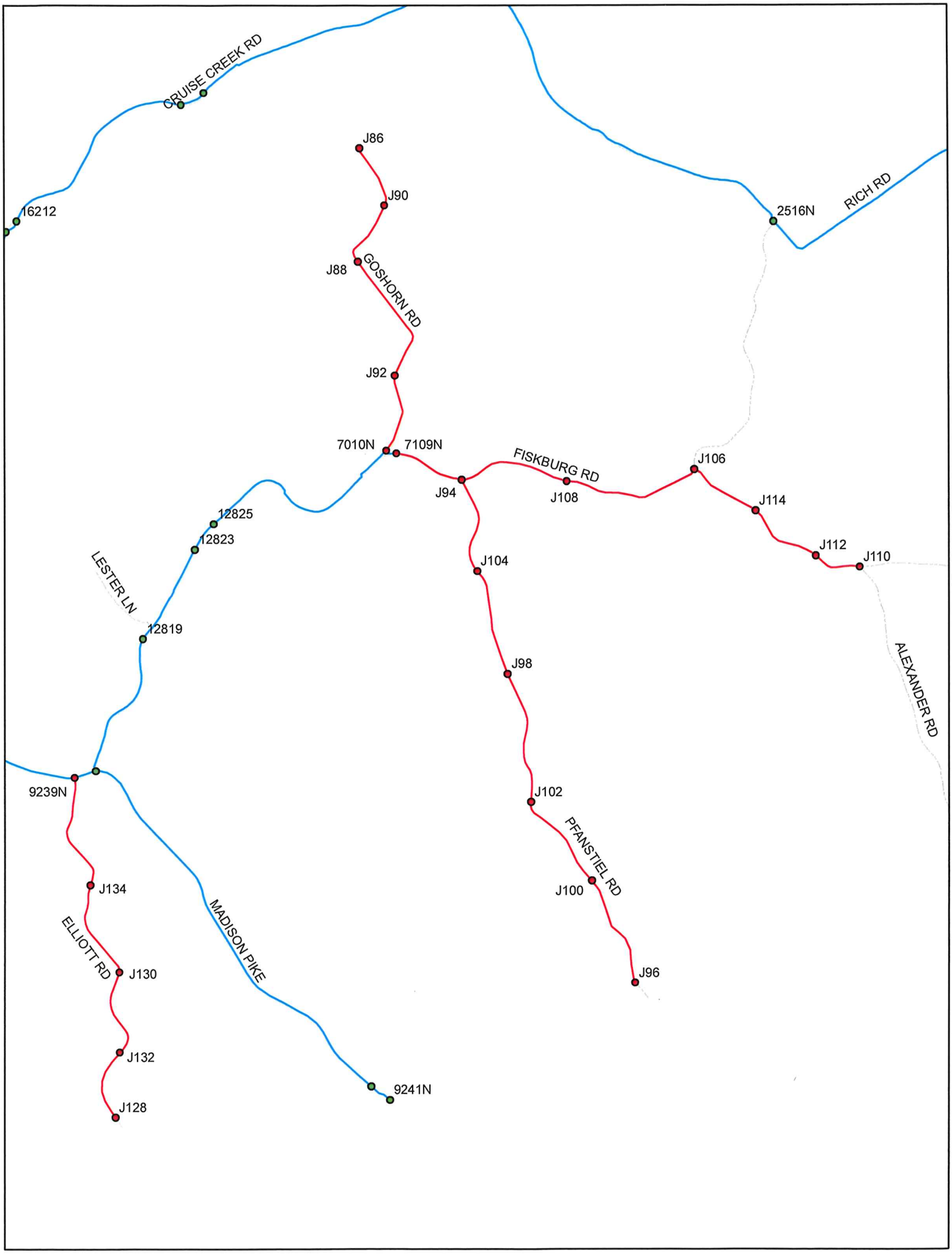
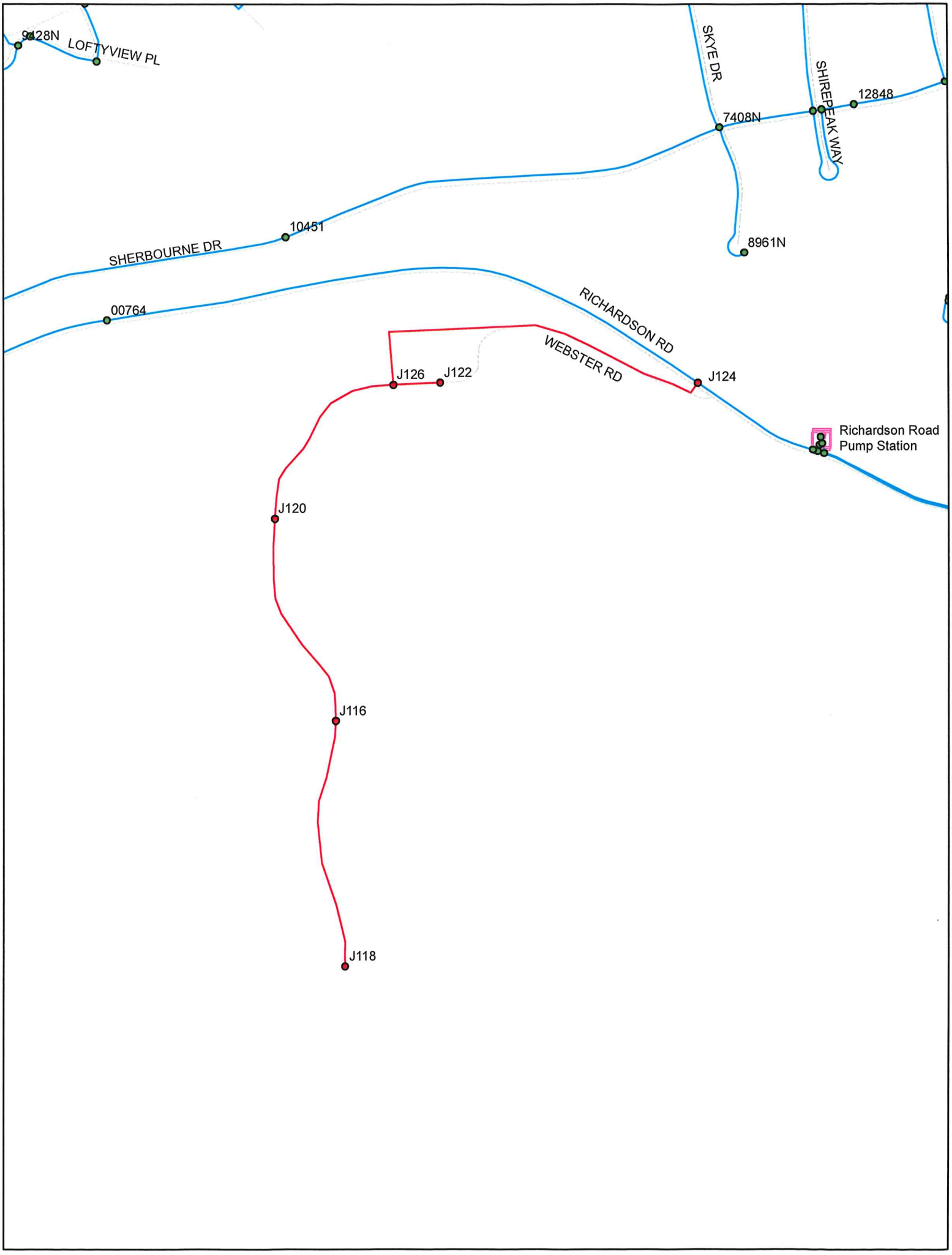
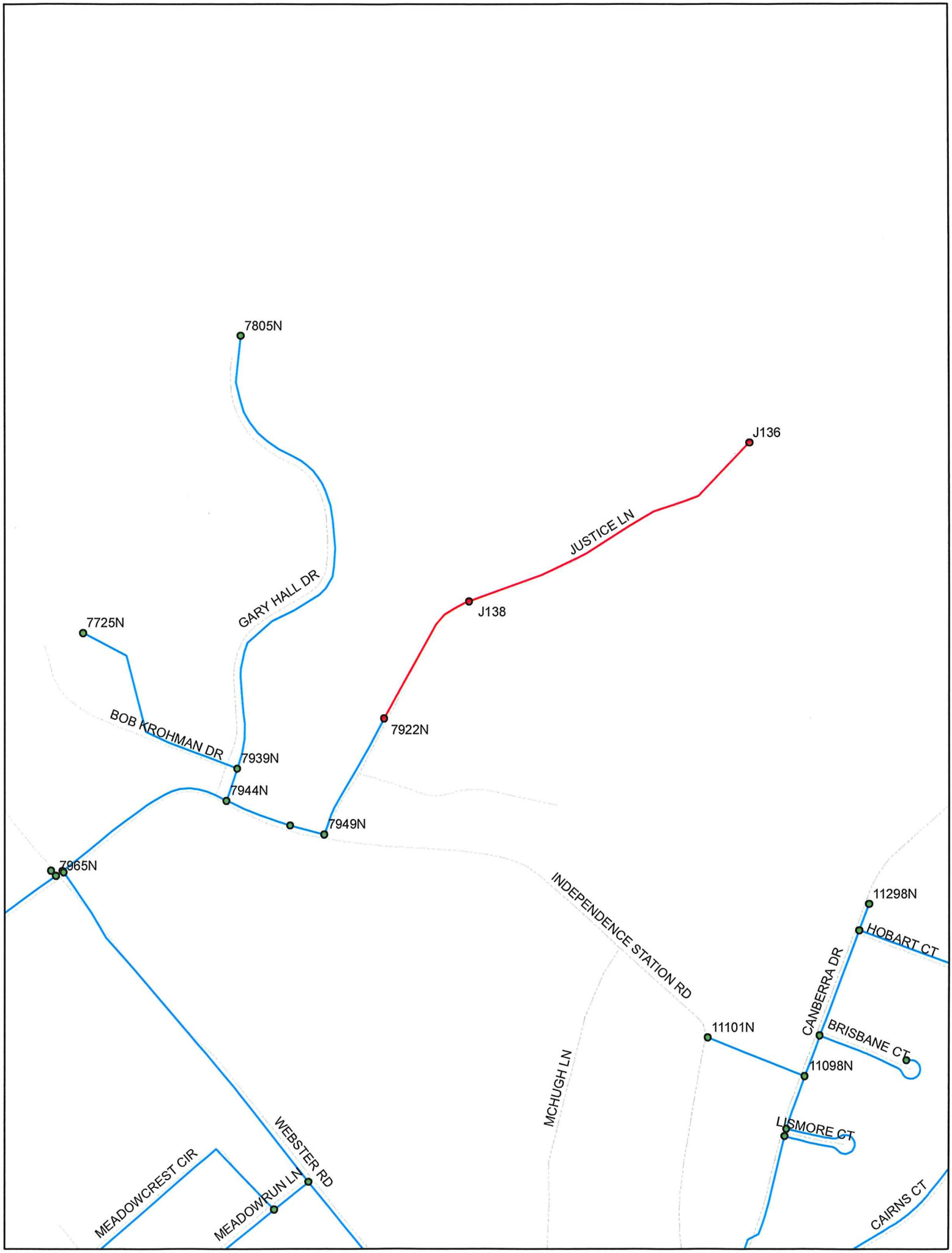
SOUTHRIDGE DR
08770
9079N
DON ST
9094N

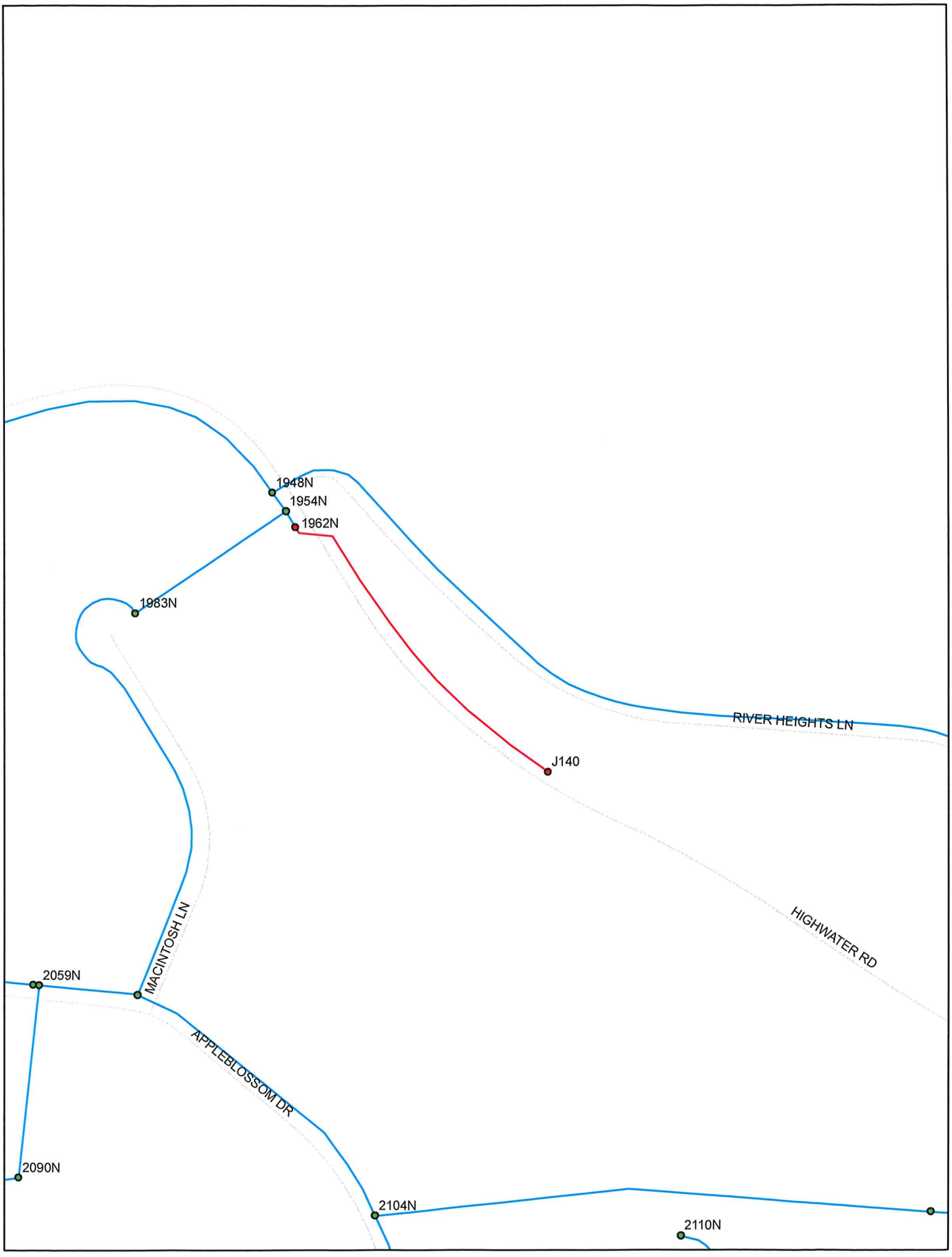

7815N
LUNAR DR
7823N
7878N
FOWLER CREEK RD
13981
7913N
J72
J74
FOWLER CREEK RD
J76
SCENIC RIDGE DR
J80
8004N
8044N
KY 17 HWY
KY 17 HWY
BELLY RD

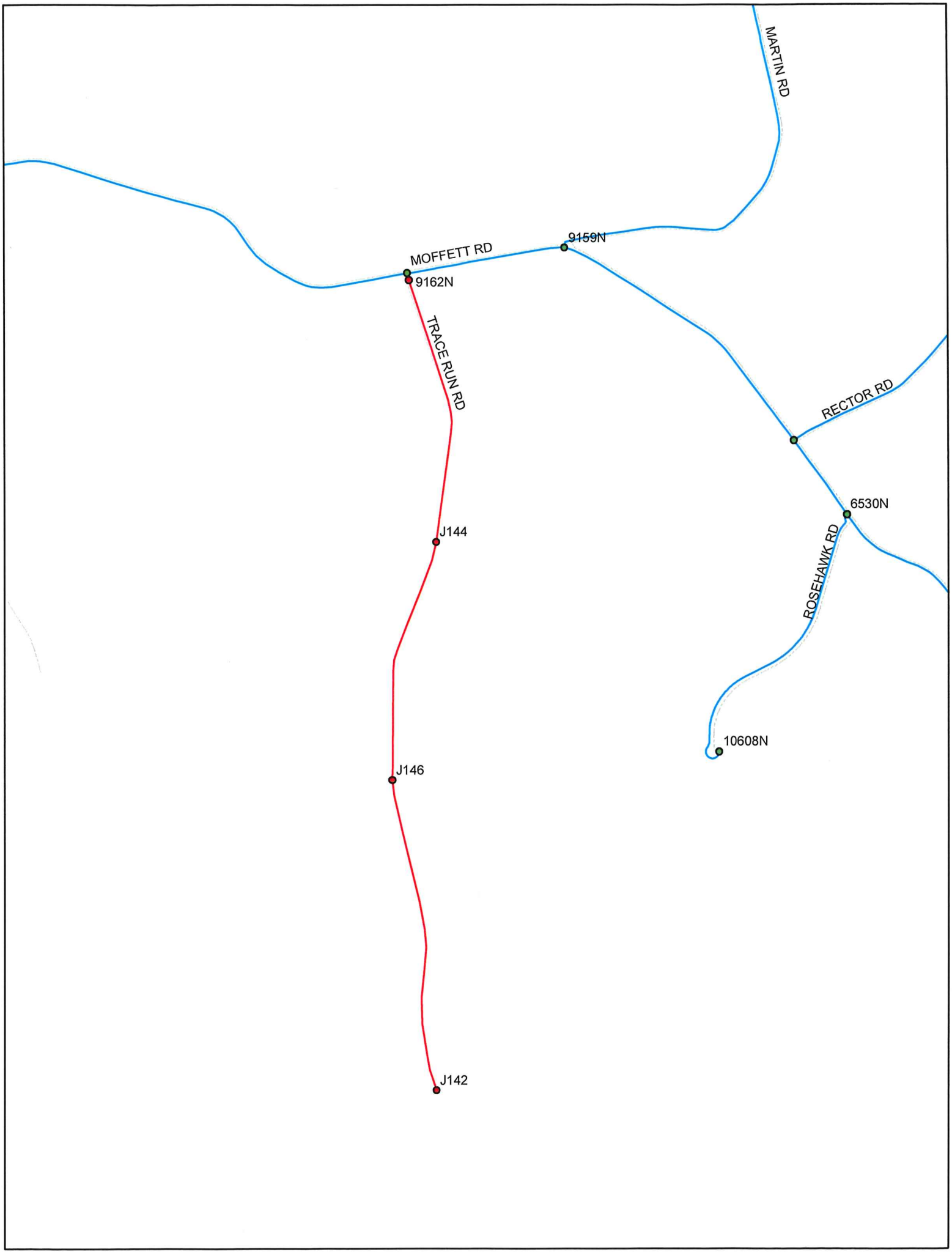

GRAND AVE
7857N
BUDS WAY
HOGAN ST
DROEGE AVE
5336N
FAIRVIEW CT
C08538
WILSON RD
J82
DECOURSEY PIKE
J84
MASON RD
9671N

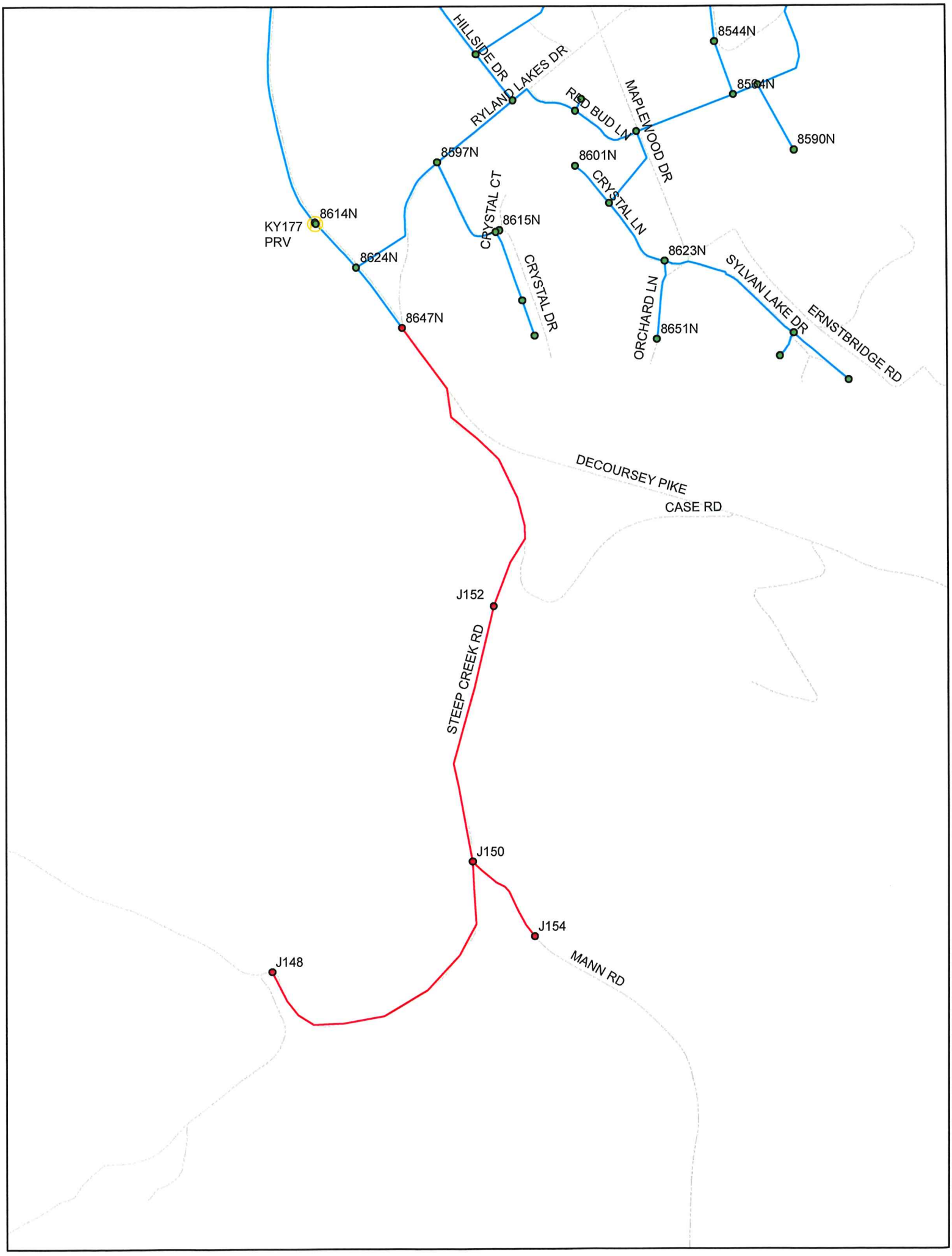

CRUISE CREEK RD
16212
J86
J90
J88
GOSHORN RD
J92
7010N
7109N
FISKBURG RD
J94
J108
J106
2516N
RICH RD
J114
J112
J110
ALEXANDER RD
J104
J98
J102
PFANSTIEL RD
J100
J96
12825
12823
LESTER LN
12819
9239N
J134
ELLIOTT RD
J130
J132
J128
MADISON PIKE
9241N


9428N
LOFTYVIEW PL
SKYE DR
SHIREPEAK WAY
12848
7408N
10451
SHERBOURNE DR
8961N
00764
RICHARDSON RD
WEBSTER RD
J126
J122
J124
Richardson Road
Pump Station
J120
J116
J118


7805N
J136
JUSTICE LN
GARY HALL DR
J138
7725N
BOB KROHMAN DR
7922N
7939N
7944N
7949N
7965N
INDEPENDENCE STATION RD
11298N
HOBART CT
CANBERRA DR
11101N
BRISBANE CT
11098N
MCHUGH LN
LISMORE CT
WEBSTER RD
MEADOWCREST CIR
MEADOWRUN LN
CAIRNS CT


1948N
1954N
1962N
1983N
J140
RIVER HEIGHTS LN
HIGHWATER RD
MACINTOSH LN
2059N
APPLEBLOSSOM DR
2090N
2104N
2110N


MARTIN RD
MOFFETT RD
9159N
9162N
TRACE RUN RD
RECTOR RD
6530N
J144
ROSEHAWK RD
10608N
J146
J142


HILLSIDE DR
RYLAND LAKES DR
RED BUD LN
MAPLEWOOD DR
8544N
8564N
8590N
8597N
8601N
CRYSTAL CT
CRYSTAL LN
8614N
KY177
PRV
8615N
8624N
CRYSTAL DR
8623N
SYLVAN LAKE DR
ERNSTBRIDGE RD
ORCHARD LN
8651N
8647N
DECOURSEY PIKE
CASE RD
J152
STEEP CREEK RD
J150
J154
MANN RD
J148