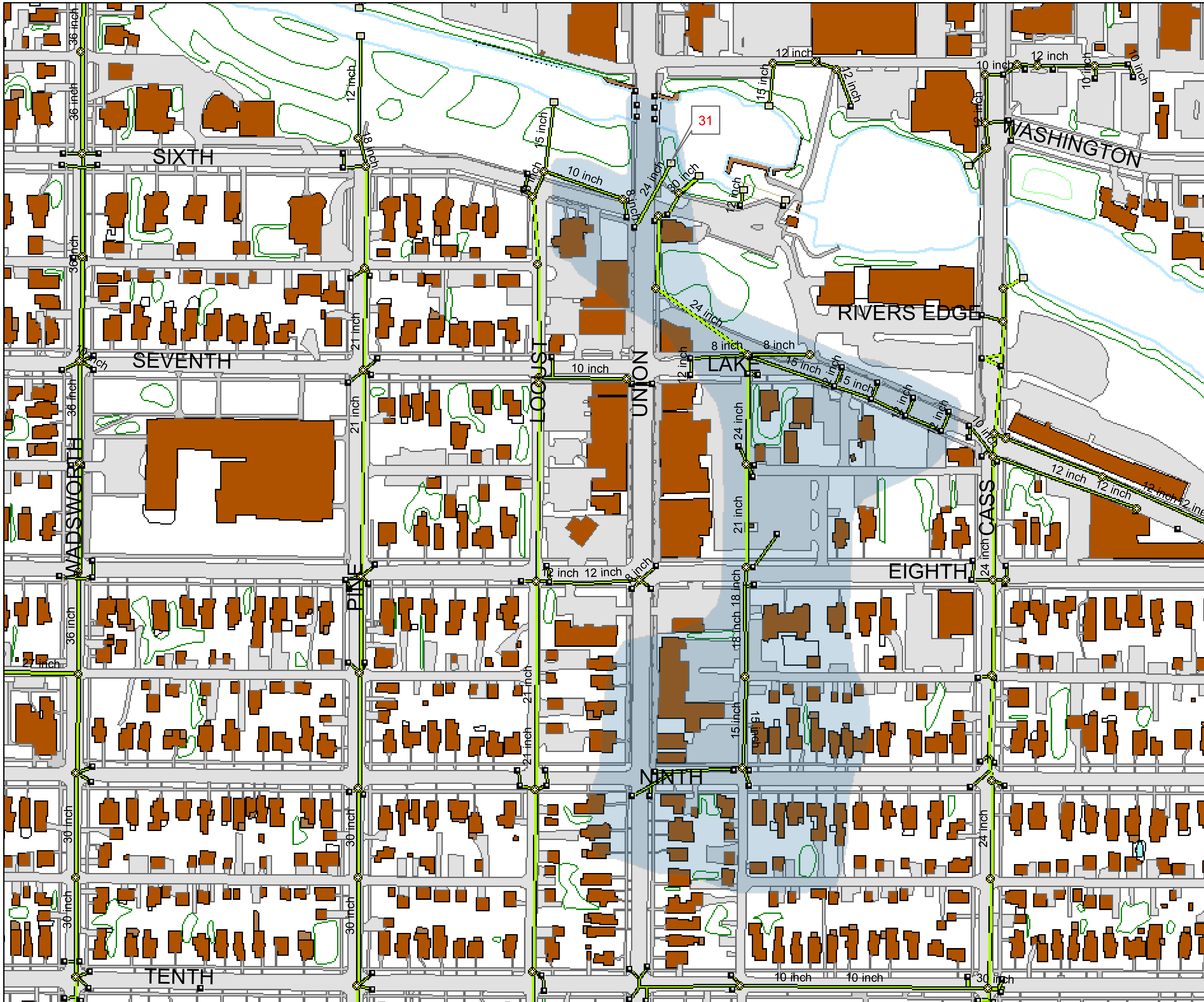

Boundary C Outfall #31

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

1 inch equals 200 feet

0 140 280 420 560 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 31

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
031001	606.40	031002	605.90	0.26	192.00	CONCRETE	15 inch	3.29
031002	605.70	Junction	605.20	0.26	188.78	CONCRETE	18 inch	5.40
Junction	605.70	031003	605.20	1.26	39.77	CONCRETE	18 inch	11.77
031003	605.00	031004	604.40	0.28	215.68	CONCRETE	21 inch	8.35
031004	604.20	Catchbasin 733	603.86	0.18	190.00	CONCRETE	24 inch	9.57
Catchbasin 733	603.75	031005	603.70	0.12	40.08	CONCRETE	24 inch	7.98
031005	603.70	031006	603.54	0.07	236.27	CONCRETE	24 inch	5.88
031006	603.70	031007	600.50	2.12	150.63	CONCRETE	24 inch	32.96
031007	600.40	Catchbasin 1846	597.34	17.78	17.21	CONCRETE	24 inch	95.34
Catchbasin 1846	597.34	031010	597.05	2.90	10.00	CONCRETE	24 inch	38.51

Stormwater System: 31

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
031010	597.05	Junction	0.00	1.30	6.06	ADS	12 inch	4.06
Junction	0.00	031011	597.01	1.30	17.47	ADS	12 inch	4.06
031011	596.91	031008	596.56	1.55	22.53	UNKNOWN	24 inch	28.15
031008	581.40	Outfall 31	579.61	3.48	51.37	CONCRETE	30 inch	76.48

The City of Traverse City
Storm Outlet Evaluation

Page 1 of 1

Project No. ____________ **File:** ____________

Description: ____________ **Field Work by:** CB **Date:** ______

Drainage Systems: C **Checked by:** ____________ **Date:** ______

Available Information: #31

Plans: ☒ Yes ☐ No **Year Built:** 1963

Plan Reference #: Storm 93 **Year Modified:** ____________

Easement: ☐ Yes ☐ No **Pipe Size:** 30"

Outlet Water Course: Boardman River

Field Investigation: #31

Outlet Pipe Size: 30" **Pipe Type:** ☐ Concrete ☒ CMP ☐ Plastic ☐ Other: ____________

Outlet Submerged: ☐ Yes ☐ No ☒ Partial **Depth:** 18"

algae on outside **Sediment Depth:** ____________

Deposits: ☐ Yes Type: sand/silt ☐ No

End Treatment: ☐ Yes Type: ____________ ☒ No

Amount of Pipe Exposed: 3½'

Slope Protection: ☒ Yes Type: ☐ Rip Rap ☐ Pave Spillway ☐ No

☐ Armor Stone ☐ Cobble

☒ Other: rock slabs

Scour: ☐ Yes Depth: ____________ ☒ No

High Water Mark/Watercourse: ____________

Depth from Invert: 24" **High Watermark Pipe:** 28"

Evidence of Flooding: ☐ Yes ☒ No

Photographs: ☒ Yes ☐ No Numbers: 3

Comments: ____________

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North Easterly

Boundary CA Outfall #27

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

1 inch equals 50 feet

0 40 80 120 160
Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 27

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
027002	0.00	027003	0.00	0.00	9.26	CONCRETE	18 inch	0.00
027003	597.11	027004	596.52	0.52	112.40	CONCRETE	18 inch	7.61
027004	596.24	Catchbasin 376	595.63	0.26	235.48	CONCRETE	18 inch	5.34
Catchbasin 376	595.60	Catchbasin 2084	595.39	0.56	37.77	CONCRETE	18 inch	7.83
Catchbasin 2084	595.16	Catchbasin 377	595.03	0.30	43.88	CONCRETE	18 inch	5.71
Catchbasin 377	594.97	027005	594.82	1.09	13.81	CONCRETE	18 inch	10.94
027005	594.77	027007	0.00	0.72	24.32	CONCRETE	18 inch	8.91
027007	594.90	Outfall 27	587.38	17.61	42.71	CONCRETE	18 inch	44.05

The City of Traverse City
Storm Outlet Evaluation

Project No. ______________________ **File:** ______________________

Description: ______________________ **Field Work by:** CB **Date:** 5/16/06

Drainage Systems: CA **Checked by:** ______________________ **Date:** ________

Available Information: #27

Plans: ☒ Yes ☐ No **Year Built:** 1953

Plan Reference #: Storm 25 **Year Modified:** ______________________

Easement: ☐ Yes ☐ No **Pipe Size:** 15"

Outlet Water Course: Boardman River

Field Investigation: #27

Outlet Pipe Size: 12" **Pipe Type:** ☐ Concrete ☐ CMP ☒ Plastic PVC

☐ Other: ______________________

Outlet Submerged: ☐ Yes ☒ No
4' off river

☐ Partial Depth: ____________

Sediment Depth: ____________

Deposits: ☒ Yes Type: brown stain ☐ No

End Treatment: ☒ Yes Type: rip rap 8-12" ☐ No

Amount of Pipe Exposed: 2'

Slope Protection: ☒ Yes Type: ☒ Rip Rap ☐ Pave Spillway ☐ No
☐ Armor Stone ☐ Cobble
☐ Other: ______________________

Scour: ☒ Yes Depth: 1' ☐ No

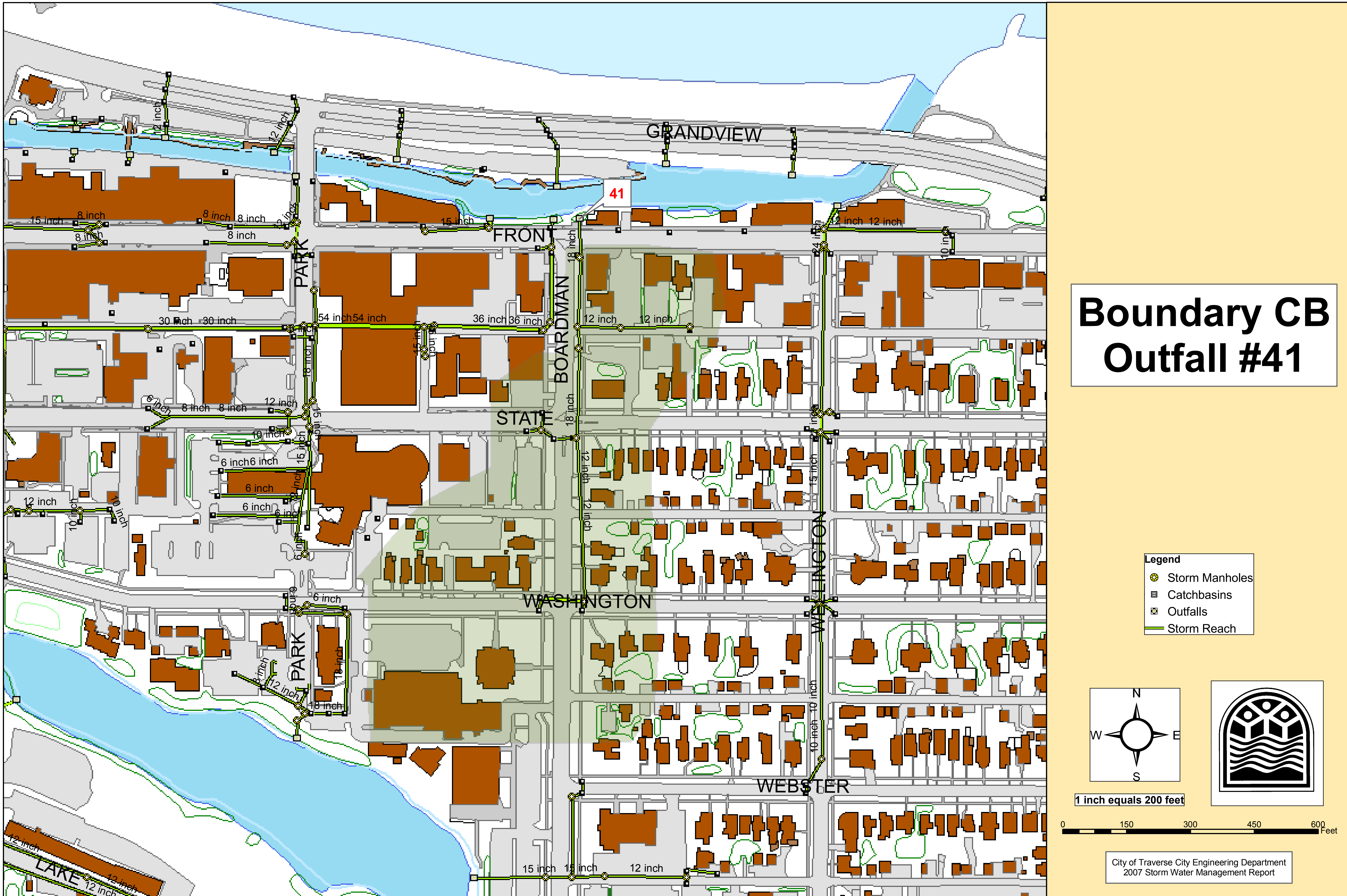
High Water Mark/Watercourse: 1'

Depth from Invert: 1" **High Watermark Pipe:** Ø

Evidence of Flooding: ☐ Yes ☒ No

Photographs: ☒ Yes ☐ No Numbers: 100_2447

Comments: ______________________


Boundary CB
Outfall #41
41
GRANDVIEW
FRONT
PARK
BOARDMAN
STATE
WASHINGTON
WELLINGTON
WEBSTER
LAKE
54 inch
36 inch
30 inch
24 inch
18 inch
15 inch
12 inch
10 inch
8 inch
6 inch
Legend
Storm Manholes
Catchbasins
Outfalls
Storm Reach
N
S
E
W
1 inch equals 200 feet
0
150
300
450
600
Feet
City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 41

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
041001	592.78	041004	586.91	1.53	384.23	VC	12 inch	4.40
041004	586.51	041006	584.44	0.98	211.41	VC	18 inch	10.39
041006	584.44	041007	584.44	0.00	49.39	VC	18 inch	0.00
041007	584.46	041008	582.86	0.99	162.35	VC	18 inch	10.42
041008	582.91	Outfall 41	581.98	1.03	89.93	VC	18 inch	10.68

The City of Traverse City
Storm Outlet Evaluation

could only find 1 here and not 2

Project No. ______ **File:** ______

Description: ______ **Field Work by:** CB **Date:** ______

Drainage Systems: CB **Checked by:** ______ **Date:** ______

Available Information: #41

Plans: ☒ Yes ☐ No **Year Built:** 1953

Plan Reference #: Storm 23 **Year Modified:** ______

Easement: ☐ Yes ☐ No **Pipe Size:** 18"

Outlet Water Course: Boardman River

Field Investigation: #41 east pipe

Outlet Pipe Size: ______ **Pipe Type:** ☐ Concrete ☐ CMP ☐ Plastic ☐ Other: ______

Outlet Submerged: ☐ Yes ☐ No ☐ Partial Depth: ______

Sediment Depth: ______

Deposits: ☐ Yes Type: ______ ☐ No

End Treatment: ☐ Yes Type: ______ ☐ No

Amount of Pipe Exposed: ______

Slope Protection: ☐ Yes Type: ☐ Rip Rap ☐ Pave Spillway ☐ No
☐ Armor Stone ☐ Cobble
☐ Other: ______

Scour: ☐ Yes Depth: ______ ☐ No

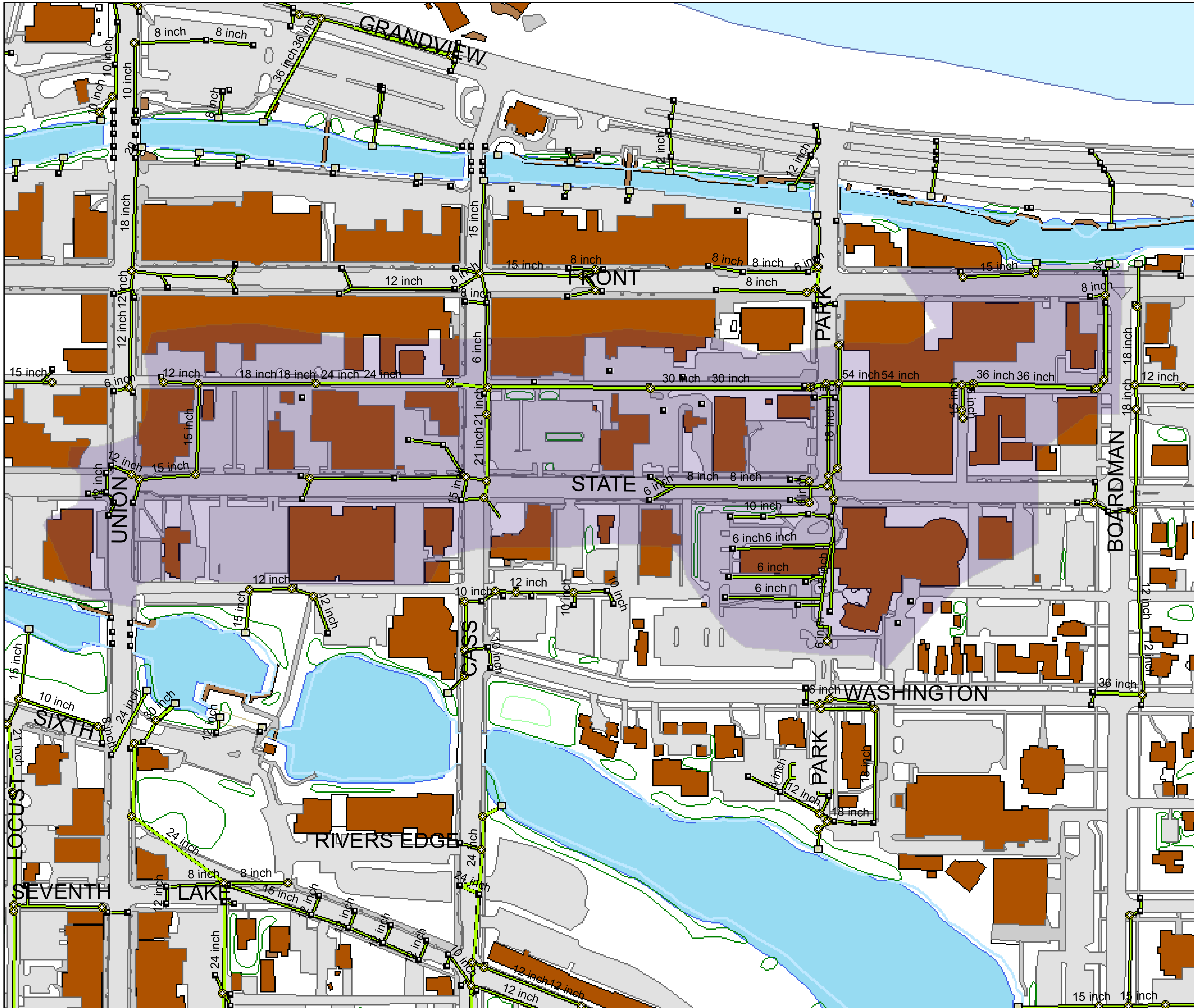
High Water Mark/Watercourse: ______

Depth from Invert: ______ **High Watermark Pipe:** ______

Evidence of Flooding: ☐ Yes ☐ No

Photographs: ☐ Yes ☐ No Numbers: ______

Comments: ______



Outfall #42 Southerly

Outfall #42 South Easterly

Boundary CE Outfall #42

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

1 inch equals 200 feet

0 130 260 390 520 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 42

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
042001	591.60	042002	591.59	0.05	18.65	CONCRETE	15 inch	1.49
042002	591.59	042003	591.21	0.32	117.09	CONCRETE	15 inch	3.68
042003	591.21	042004	590.66	0.29	189.15	CONCRETE	15 inch	3.48
042004	590.66	042005	589.70	0.39	246.28	CONCRETE	18 inch	6.55
042005	589.70	042006	588.92	0.28	276.24	CONCRETE	24 inch	12.02
042006	588.90	042007	588.70	0.25	81.09	CONCRETE	24 inch	11.23
042007	588.70	Junction	587.22	1.56	95.11	CONCRETE	30 inch	51.14
Junction	588.70	042008	587.22	0.61	244.46	CONCRETE	30 inch	31.90
042008	587.22	042009	585.77	0.44	331.59	CONCRETE	30 inch	27.11
042009	585.77	042010	585.53	0.70	34.24	CONCRETE	30 inch	34.32

Stormwater System: 42

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
042010	585.58	042011	585.53	0.20	25.47	CONCRETE	36 inch	29.53
042011	585.32	042012	584.90	0.16	255.74	CONCRETE	54 inch	79.65
042012	584.90	042013	584.69	0.80	26.15	CONCRETE	54 inch	176.13
042013	584.69	042014	583.29	0.55	255.79	CONCRETE	36 inch	49.32
042014	583.29	042015	583.20	0.36	24.69	CONCRETE	36 inch	40.24
042015	583.20	042016	581.64	0.88	176.60	CONCRETE	36 inch	62.66
042016	581.54	Catchbasin 1595	581.40	0.32	44.22	CONCRETE	Unknown	0.00
Catchbasin 1595	581.40	Outfall 42	580.89	2.46	20.71	CONCRETE	36 inch	104.61

Stormwater System: 146

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
146001	585.45	146002	0.00	0.00	148.50	CONCRETE	15 inch	0.00
146002	0.00	Outfall 146	0.00	0.00	23.00	CONCRETE	54 inch	0.00

The City of Traverse City
Storm Outlet Evaluation

Project No. ______________________ **File:** ______________________

Description: ______________________ **Field Work by:** LL + CB **Date:** 5/5/06

Drainage Systems: CE **Checked by:** ______________________ **Date:** ________

Available Information: #42

Plans: ☒ Yes ☐ No **Year Built:** 1953

Plan Reference #: Storm #24-2 **Year Modified:** ______

Easement: ☒ Yes 26 C 31 E ☐ No **Pipe Size:** 36"

Outlet Water Course: Boardman River

Field Investigation: #42 west pipe

Outlet Pipe Size: 36" **Pipe Type:** ☒ Concrete ☐ CMP ☐ Plastic

Flowing water (no rain in 4 days) ☐ Other: ______

Outlet Submerged: ☐ Yes ☒ No ☐ Partial Depth: ______

Sediment Depth: ______

Deposits: ☐ Yes Type: ______ ☒ No

End Treatment: ☐ Yes Type: bulkhead concrete ☐ No

Amount of Pipe Exposed: ______

Slope Protection: ☒ Yes Type: ☒ Rip Rap ☐ Pave Spillway ☐ No

☐ Armor Stone ☒ Cobble 12-16" rocks

☐ Other: ______

Scour: ☐ Yes Depth: ______ ☒ No

High Water Mark/Watercourse: 3'

Depth from Invert: 30" **High Watermark Pipe:** 1'

Evidence of Flooding: ☐ Yes ☒ No

Photographs: ☒ Yes ☐ No Numbers: 7, 13 5/11/06 #2

Comments: Small tide pool looking thing made from rocks

5/11/06 Storm event – 4" invert => water flow. Water cloudy with white streaks

The City of Traverse City
Storm Outlet Evaluation

Project No. ______ **File:** ______

Description: ______ **Field Work by:** LL + CB **Date:** 5/5/06

Drainage Systems: CE **Checked by:** ______ **Date:** ______

Available Information: #146

Plans: ☐ Yes ☐ No **Year Built:** ______

Plan Reference #: ______ **Year Modified:** ______

Easement: ☒ Yes 38Q 38R + ☐ No **Pipe Size:** ______

Outlet Water Course: Boardman River

Field Investigation: #146

Outlet Pipe Size: 16" Flat bottom

Pipe Type: ☒ Concrete ☐ CMP ☐ Plastic ☐ Other: ______

Outlet Submerged: ☐ Yes ☒ No ☐ Partial Depth: ______ Sediment Depth: ______

Deposits: ☐ Yes Type: ______ ☒ No

End Treatment: ☐ Yes Type: ______ ☒ No

Amount of Pipe Exposed: Ø

Slope Protection: ☒ Yes Type: ☒ Rip Rap 12-14" ☐ Pave Spillway ☐ No
☐ Armor Stone ☐ Cobble
☐ Other: ______

Scour: ☐ Yes Depth: ______ ☒ No

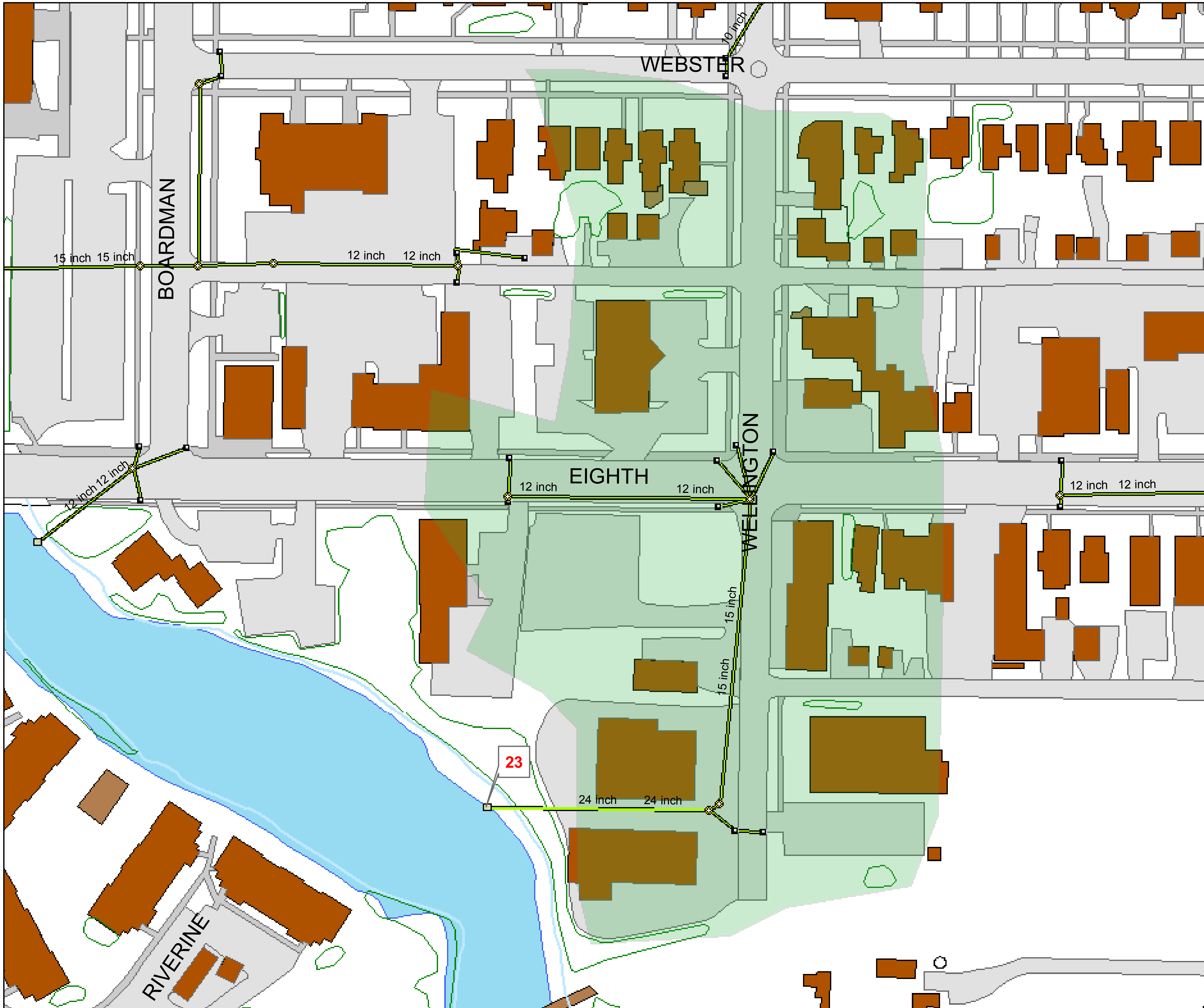
High Water Mark/Watercourse: 3'

Depth from Invert: 4" **High Watermark Pipe:** Ø

Evidence of Flooding: ☐ Yes ☒ No

Photographs: ☒ Yes ☐ No Numbers: 16

Comments: ______



Boundary CF Outfall #23

Legend
- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W
E
S

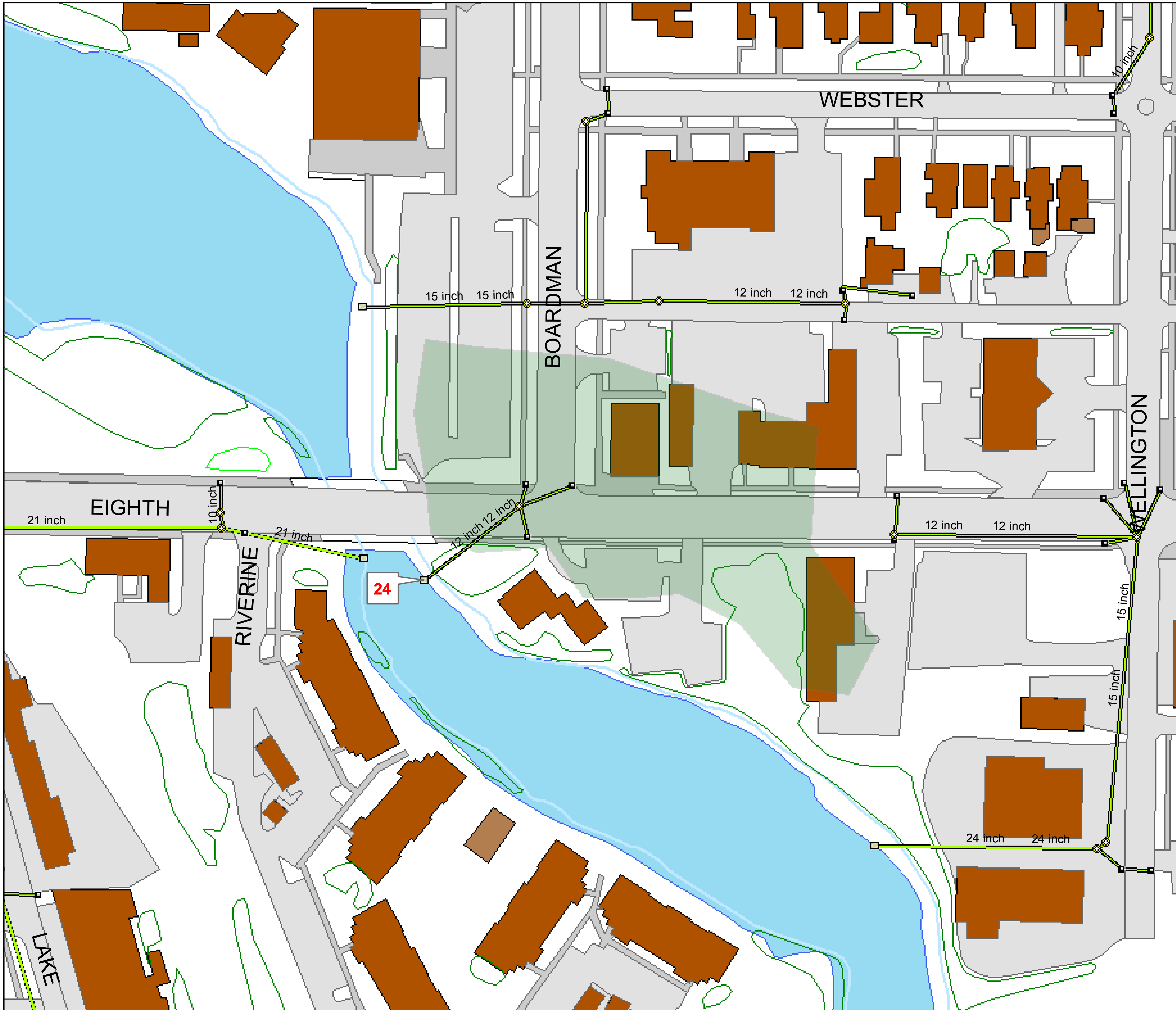
1 inch equals 100 feet

0 60 120 180 240 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 23

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
023001	596.02	023002	595.00	0.40	252.13	CONCRETE	12 inch	2.26
023002	592.98	023003	0.00	0.00	318.76	CONCRETE	15 inch	0.00
023003	0.00	023004	591.19	0.00	12.34	CONCRETE	15 inch	0.00
023004	591.19	Outfall 23	590.12	0.46	231.60	CM	24 inch	15.37



Boundary CG Outfall #24

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

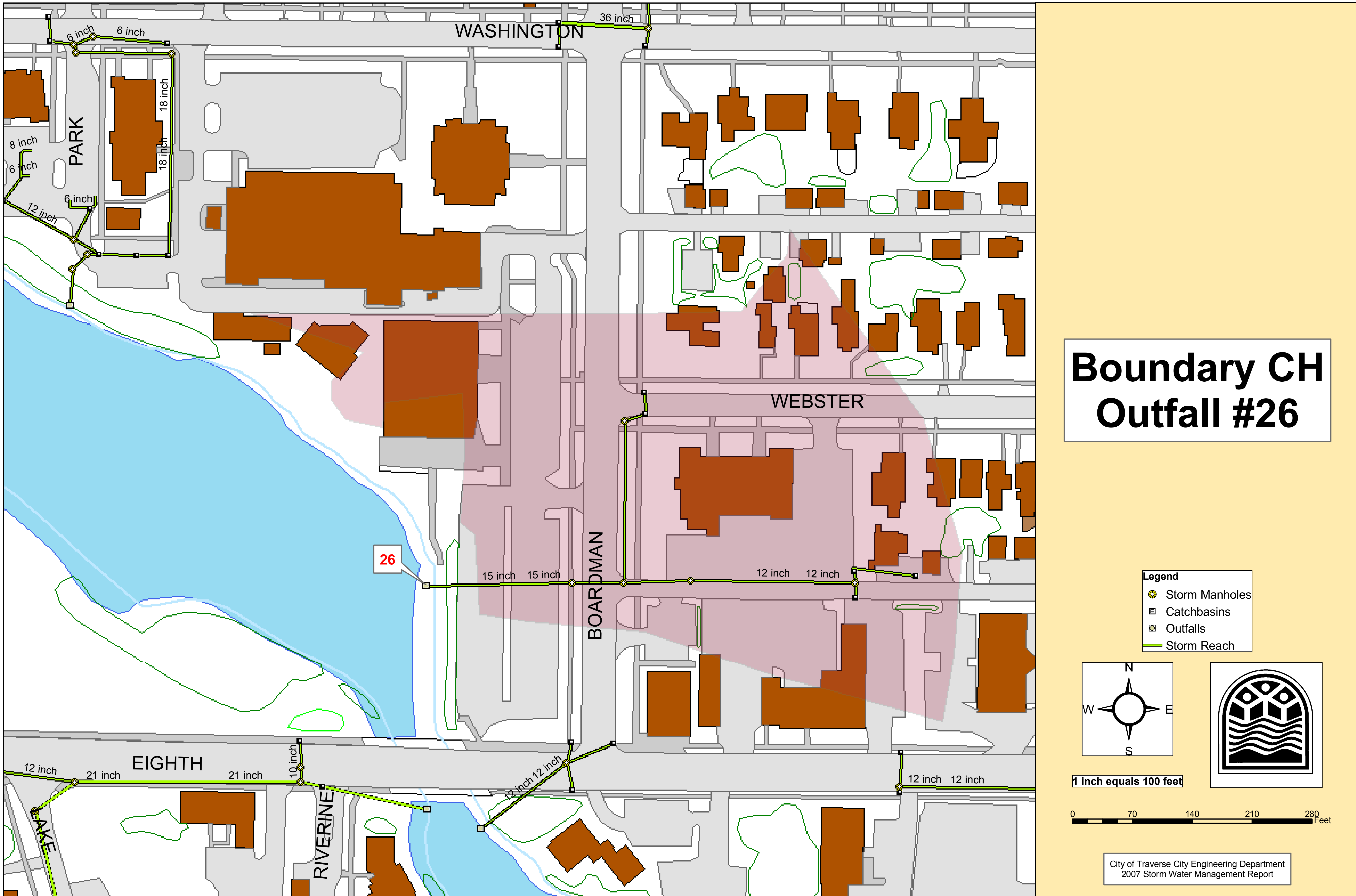
1 inch equals 100 feet

0 60 120 180 240 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 24

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
024001	594.00	Outfall 24	590.00	3.16	126.46	CONCRETE	12 inch	6.33


Boundary CH
Outfall #26
WASHINGTON
PARK
WEBSTER
BOARDMAN
EIGHTH
RIVERINE
LAKE
36 inch
6 inch
6 inch
18 inch
18 inch
8 inch
6 inch
6 inch
12 inch
15 inch
15 inch
12 inch
12 inch
26
12 inch
21 inch
21 inch
10 inch
12 inch
12 inch
12 inch
12 inch
Legend
Storm Manholes
Catchbasins
Outfalls
Storm Reach
N
W
E
S
1 inch equals 100 feet
0
70
140
210
280
Feet
City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 26

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
026001	596.27	026002	595.48	0.41	192.51	CONCRETE	12 inch	2.28
026002	595.48	026003	595.02	0.59	78.30	CONCRETE	15 inch	4.95
026003	595.02	026004	594.82	0.33	60.23	CONCRETE	15 inch	3.72
026004	594.82	Outfall 26	594.00	0.48	171.49	CONCRETE	15 inch	4.46

Boundary Cl Outfall #22

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

1 inch equals 200 feet

0 110 220 330 440 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 22

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
Catchbasin 1865	597.55	Catchbasin 1864	597.35	0.16	127.57	CONCRETE	12 inch	1.41
Catchbasin 1864	597.35	Catchbasin 1863	0.00	0.00	134.72	CONCRETE	12 inch	0.00
Catchbasin 1863	0.00	022001	596.76	0.00	152.95	CONCRETE	12 inch	0.00
022001	596.75	Catchbasin 1450	596.65	0.46	21.82	CONCRETE	12 inch	2.41
Catchbasin 1450	596.65	022002	595.60	4.41	23.78	CONCRETE	12 inch	7.48
022002	595.60	022003	594.94	1.18	56.11	CONCRETE	12 inch	3.86
022004	594.42	022003	594.04	0.89	42.48	CONCRETE	18 inch	9.93
022002	594.03	Catchbasin 2087	593.92	0.10	106.66	CONCRETE	18 inch	3.37
Catchbasin 2087	592.60	022005	591.75	0.86	98.52	CONCRETE	21 inch	14.71
022003	591.75	022004	590.77	0.28	352.22	CONCRETE	24 inch	11.93

Stormwater System: 22

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
022004	590.77	022005	589.79	0.28	350.02	CONCRETE	24 inch	11.96
022005	589.79	022006	589.27	0.24	215.83	CONCRETE	30 inch	20.12
022006	589.27	022019	588.26	0.24	396.20	CONCRETE	30 inch	20.24
022019	588.26	Outfall 22	588.10	0.26	60.75	CONCRETE	30 inch	20.90

The City of Traverse City
Storm Outlet Evaluation

Page 1 of 1

Project No. ______ **File:** ______

Description: ______ **Field Work by:** LL & CB **Date:** 5/5/06

Drainage Systems: CI **Checked by:** ______ **Date:** ______

Available Information: #22

Plans: ☒ Yes ☐ No **Year Built:** 1952

Plan Reference #: Storm# 22 & **Year Modified:** ______

Easement: ☒ Yes Hall Park ☐ No **Pipe Size:** ______

Outlet Water Course: Boardman Lake

Field Investigation: #22

Outlet Pipe Size: 36? **Pipe Type:** ☒ Concrete ☐ CMP ☐ Plastic ☐ Other: ______

Outlet Submerged: ☒ Yes ☐ No ☐ Partial Depth: ______

Sediment Depth: ______

Deposits: ☒ Yes Type: sand ☐ No

End Treatment: ☐ Yes Type: ______ ☒ No

Amount of Pipe Exposed: Ø

Slope Protection: ☒ Yes Type: ☒ Rip Rap ☐ Pave Spillway ☐ No
☐ Armor Stone ☐ Cobble
☒ Other: fabric

Scour: ☐ Yes Depth: ______ ☒ No

High Water Mark/Watercourse: 8"

Depth from Invert: ______ **High Watermark Pipe:** ______

STANDING WATER

Evidence of Flooding: ☐ Yes ☐ No

Photographs: ☐ Yes ☐ No Numbers: 25 & 26

Comments: throat has roughly 3' of sand

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Boundary CJ Outfall #8

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

1 inch equals 200 feet

0 140 280 420 560 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 8

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
008001	593.14	008002	589.84	0.99	333.10	CONCRETE	12 inch	3.54
008002	589.84	008003	588.82	2.53	40.30	CONCRETE	15 inch	10.27
008003	588.82	008004	587.06	0.89	197.19	CONCRETE	15 inch	6.10
008004	587.06	008011	585.34	0.89	154.64	CONCRETE	15 inch	6.08
008005	587.06	008011	585.34	0.89	39.09	CONCRETE	15 inch	6.08
008005	585.34	008006	580.46	1.22	400.58	CONCRETE	18 inch	11.59
008006	579.66	Outfall 8	579.16	0.74	67.26	CONCRETE	30 inch	35.35

The City of Traverse City
Storm Outlet Evaluation

Perfect one to use

Project No. ______ **File:** ______

Description: ______ **Field Work by:** LL + CB **Date:** 5/9/06

Drainage Systems: CJ **Checked by:** ______ **Date:** ______

Available Information: #8

Ed has maritime plans also

Plans: ☒ Yes ☐ No **Year Built:** 1948

Plan Reference #: Storm #8-1 + 8-2 + 29 **Year Modified:** ______

Easement: ☒ Yes Park ☐ No **Pipe Size:** 30" at .5%

Outlet Water Course: Grand Traverse Bay

Field Investigation: #8

Outlet Pipe Size: 30" **Pipe Type:** ☒ Concrete ☐ CMP ☐ Plastic ☐ Other: ______

Outlet Submerged: ☐ Yes ☐ No ☒ Partial Depth: 10"

Sediment Depth: 4"

Deposits: ☒ Yes Type: 1/2 full w/ growth algae ☐ No

End Treatment: ☐ Yes Type: ______ ☒ No

Amount of Pipe Exposed: 6'

Slope Protection: ☐ Yes Type: ☐ Rip Rap ☐ Pave Spillway ☐ Armor Stone ☐ Cobble ☐ Other: ______ ☒ No

Scour: ☒ Yes Depth: 1' ☐ No

High Water Mark/Watercourse: Bay

Depth from Invert: 14" **High Watermark Pipe:** Ø

Evidence of Flooding: ☐ Yes ☒ No

Photographs: ☒ Yes ☐ No Numbers: 15 - 18 5/11/06 #1

Comments: garbage all over, sludge?, sticks, leaves
last concrete joint broken

5/11/06 Storm event – 12" invert → water flow cloudy + dark brown

Boundary CK Outfall #9

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

W S N E

1 inch equals 300 feet

0 200 400 600 800 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 9

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
009001	606.00	009002	604.20	0.39	456.07	CONCRETE	12 inch	2.24
009002	604.20	009003	602.40	0.41	438.77	CONCRETE	15 inch	4.14
009003	602.40	009004	596.17	1.39	447.25	CONCRETE	12 inch	4.20
009004	593.82	009005	588.50	1.22	435.77	CONCRETE	15 inch	7.13
009005	589.84	009006	588.82	3.05	33.40	CONCRETE	15 inch	11.28
009006	588.50	009007	587.18	0.48	276.87	CONCRETE	21 inch	10.94
009007	587.18	009008	586.68	0.42	118.34	CONCRETE	21 inch	10.29
009008	586.68	009009	586.14	1.60	33.79	CONCRETE	21 inch	20.02
009009	586.68	009010	582.49	1.56	267.84	CONCRETE	21 inch	19.81
009010	582.49	009011	579.69	2.17	129.29	CONCRETE	21 inch	23.31

Stormwater System: 9

FromMH	*From Elev. (FT)*	*ToMH*	*To Elevation (FT)*	*SLOPE (%)*	*Length (FT)*	*Material*	*Diameter (IN)*	*Max Flow (CFS)*
009011	576.60	Outfall 9	573.19	1.31	261.00	CM	21 inch	18.10

Boundary CL Outfall #11

Legend
- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

1 inch equals 650 feet

0 470 940 1,410 1,880 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 11

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
011001	611.23	011002	610.41	0.31	268.43	CONCRETE	15 inch	3.57
011002	610.31	011003	609.75	0.30	183.92	UNKNOWN	15 inch	3.56
011003	609.70	011004	609.58	0.52	23.24	UNKNOWN	15 inch	4.64
011004	609.34	011005	608.11	0.28	432.77	CONCRETE	15 inch	3.44
011005	608.11	011006	607.13	0.22	441.47	CONCRETE	18 inch	4.95
011006	607.13	011007	606.40	0.20	371.24	CONCRETE	24 inch	10.03
011007	606.40	011008	606.26	0.18	77.41	CONCRETE	24 inch	9.62
011008	606.56	011009	606.05	0.45	113.29	CONCRETE	27 inch	20.77
011009	606.02	011010	605.80	0.18	123.09	CONCRETE	24 inch	9.56
011010	605.81	011011	605.26	0.22	255.01	CONCRETE	24 inch	10.50

Stormwater System: 11

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
011011	605.26	011012	604.99	0.22	122.62	CONCRETE	24 inch	10.61
011012	604.99	011013	604.53	0.24	192.92	CONCRETE	24 inch	11.04
011013	604.53	011014	604.10	0.20	211.02	CONCRETE	24 inch	10.21
011014	604.17	011015	603.66	0.24	226.40	CONCRETE	30 inch	20.08
011015	603.66	011064	603.36	0.24	125.00	CONCRETE	30 inch	20.08
011064	603.36	011016	603.17	0.24	98.52	CONCRETE	30 inch	20.08
011016	603.17	011017	602.59	0.16	358.63	CONCRETE	36 inch	26.81
011017	602.59	011018	601.97	0.17	375.21	CONCRETE	36 inch	27.10
011018	601.97	011019	601.33	0.16	395.26	CONCRETE	36 inch	26.83
011019	601.33	011020	600.38	0.16	378.58	CONCRETE	36 inch	26.67
011020	600.38	011021	599.73	1.08	60.18	CONCRETE	36 inch	69.28

Stormwater System: 11

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
011021	599.73	011022	598.99	0.22	342.49	CONCRETE	36 inch	30.99
011022	598.99	011023	598.81	0.16	112.97	CONCRETE	36 inch	26.61
011023	598.81	011024	598.63	0.21	89.87	CONCRETE	36 inch	30.55
011024	598.63	011025	598.18	0.21	210.02	CONCRETE	36 inch	30.86
011025	598.18	011026	596.08	1.56	134.69	CONCRETE	30 inch	51.19
011026	596.08	011027	595.21	0.57	152.45	CONCRETE	30 inch	30.97
011027	595.21	011028	592.40	1.15	288.51	CONCRETE	30 inch	44.01
011028	592.40	011029	589.29	1.08	287.33	CONCRETE	30 inch	42.65
011029	589.29	011030	588.52	1.16	66.34	CONCRETE	30 inch	44.17
011030	588.32	011031	587.96	0.92	83.06	CONCRETE	30 inch	39.32
011031	587.96	011032	584.61	0.93	360.42	CONCRETE	30 inch	39.52

Stormwater System: 11

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
011032	584.61	011033	581.78	0.92	305.06	CONCRETE	30 inch	39.31
011033	581.78	011063	580.22	0.97	177.46	CONCRETE	30 inch	40.34
011063	580.14	Catchbasin 775	579.70	0.97	60.00	CONCRETE	30 inch	40.34
Catchbasin 775	575.70	Outfall 11	573.00	1.77	366.08	CM	24 inch	30.10

The City of Traverse City
Storm Outlet Evaluation

Project No. ______________________ **File:** ______________________

Description: ______________________ **Field Work by:** CB **Date:** ________

Drainage Systems: CL **Checked by:** ______________ **Date:** ________

Available Information: #11

Plans: ☒ Yes ☐ No **Year Built:** 1950

Plan Reference #: Storm 20-1 + 66 **Year Modified:** ______________

Easement: ☒ Yes Bryant Park ☐ No **Pipe Size:** 24"

Outlet Water Course: Bay

Field Investigation: #11 South pipe

Outlet Pipe Size: ________ **Pipe Type:** ☐ Concrete ☐ CMP ☐ Plastic

☐ Other: ______________

Outlet Submerged: ☐ Yes ☐ No ☐ Partial Depth: ________

Sediment Depth: ________

Deposits: ☐ Yes Type: ____________ ☐ No

End Treatment: ☐ Yes Type: ______________ ☐ No

Amount of Pipe Exposed: ____________

Slope Protection: ☐ Yes Type: ☐ Rip Rap ☐ Pave Spillway ☐ No

☐ Armor Stone ☐ Cobble

☐ Other: ____________

Scour: ☐ Yes Depth: ____________ ☐ No

High Water Mark/Watercourse: ______________________

Depth from Invert: ______________________ **High Watermark Pipe:** ________

Evidence of Flooding: ☐ Yes ☐ No

Photographs: ☐ Yes ☐ No Numbers: ____________

Comments: ____

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Southerly

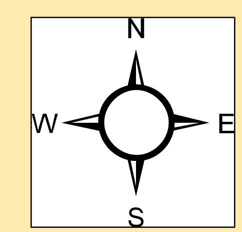
K:\CITYENG\Projects\2005\Storm Grants\319\05-09-06\20.jpg

Northerly

Boundary CM Outfall #10

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach



1 inch equals 400 feet

0 290 580 870 1,160 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 10

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
010001	609.39	010002	608.88	0.31	166.64	UNKNOWN	12 inch	1.97
010002	608.88	010003	608.27	0.32	249.49	CONCRETE	12 inch	2.01
010003	608.23	010004	607.00	0.28	365.68	CONCRETE	18 inch	5.56
010004	606.80	010005	605.87	0.28	334.07	CONCRETE	21 inch	8.36
010005	605.67	010006	604.46	0.28	321.82	CONCRETE	21 inch	8.38
010006	604.44	010007	603.81	0.36	198.15	CONCRETE	21 inch	9.50
010007	603.81	010008	603.18	0.36	152.96	CONCRETE	21 inch	9.50
010008	603.18	010009	602.33	0.40	249.10	CONCRETE	27 inch	19.58
010009	602.33	010010	600.46	0.41	458.73	CONCRETE	27 inch	19.76
010010	600.46	010011	597.20	0.77	425.80	CONCRETE	27 inch	27.09

Stormwater System: 10

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
010011	597.20	010012	592.62	1.29	400.12	CONCRETE	27 inch	35.20
010012	592.62	010013	586.84	1.36	424.68	CONCRETE	27 inch	36.11
010013	586.84	010014	585.32	1.51	100.56	CM	30 inch	50.40
010014	585.32	010015	579.65	1.26	450.25	CM	30 inch	46.01
010015	575.80	Outfall 10	573.60	1.36	192.83	CM	30 inch	47.81

The City of Traverse City
Storm Outlet Evaluation

Project No. ____________ **File:** ____________

Description: ____________ **Field Work by:** LL & CB **Date:** 5/9/06

Drainage Systems: CM **Checked by:** ____________ **Date:** ________

Available Information: #10

Plans: ☒ Yes ☐ No **Year Built:** 1948

Plan Reference #: Storm #11-3 + 12-1 **Year Modified:** ____________

Easement: ☒ Yes Rose St. ☐ No **Pipe Size:** 30" at 1.36%

Outlet Water Course: Bay

Field Investigation: #10

Outlet Pipe Size: 30" **Pipe Type:** ☐ Concrete ☒ CMP ☐ Plastic ☐ Other: ____________

Outlet Submerged: ☒ Yes ☐ No ☐ Partial Depth: ____________

veg. growing on pipe

Sediment Depth: 26"

Deposits: ☒ Yes Type: Sand/rust ☐ No

End Treatment: ☐ Yes Type: ____________ ☒ No

Amount of Pipe Exposed: 134'

Slope Protection: ☐ Yes Type: ☐ Rip Rap ☐ Pave Spillway ☐ Armor Stone ☐ Cobble ☐ Other: ____________ ☒ No

Scour: ☐ Yes Depth: ____________ ☒ No

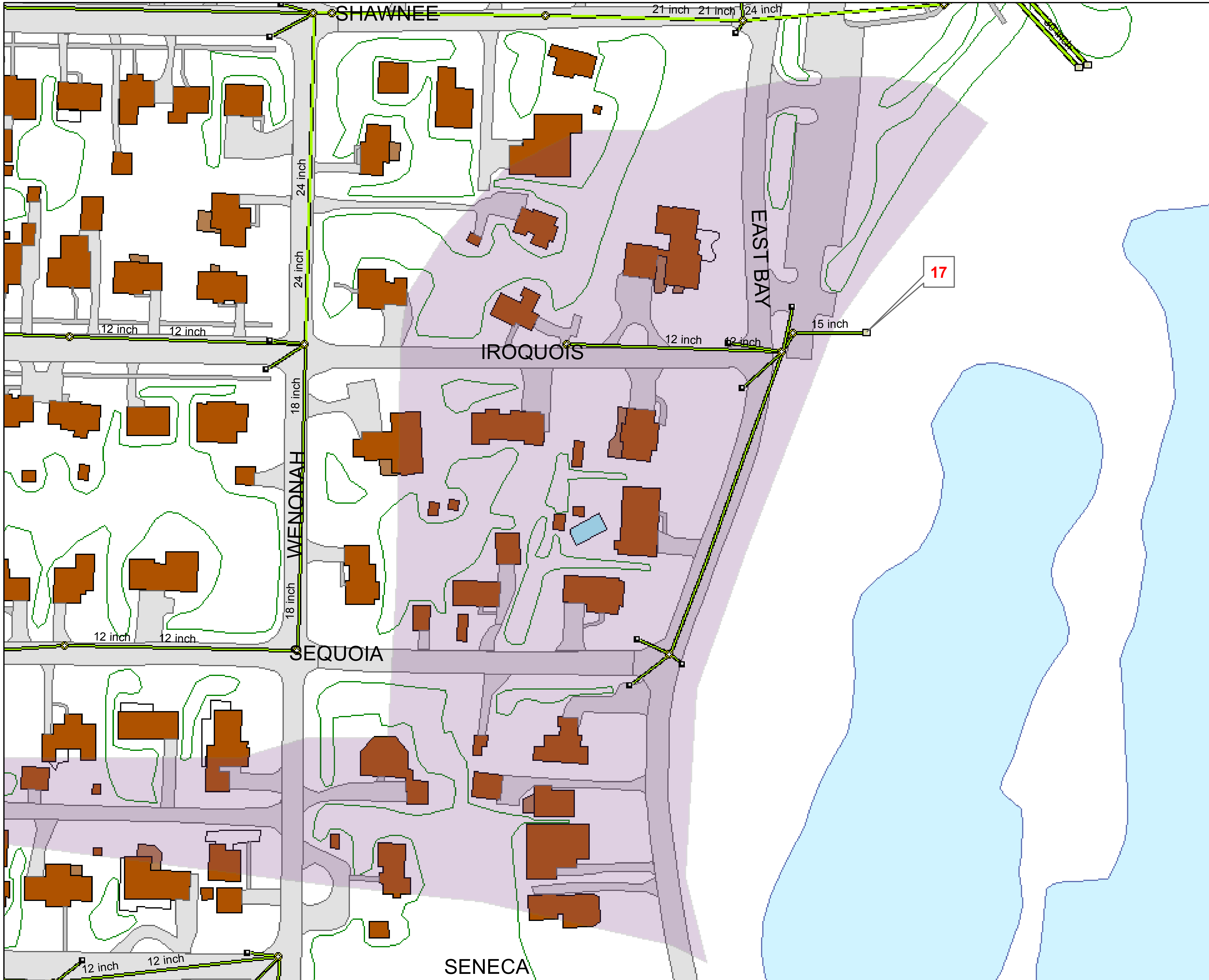
High Water Mark/Watercourse: Bay

Depth from Invert: Ø **High Watermark Pipe:** Ø

Evidence of Flooding: ☐ Yes ☒ No

Photographs: ☒ Yes ☐ No **Numbers:** 19-22

Comments: (extra length of random pipe ±10')
pipe exposed under water from shore w/sand
1/2 way up to 3/4 covering; sand higher on west side



Boundary CN Outfall #17

Legend
- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N W E S

1 inch equals 100 feet

0 70 140 210 280 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 17

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
017001	581.48	017002	580.10	0.40	343.42	CONCRETE	12 inch	2.26
017002	580.10	017003	579.40	2.96	23.63	CONCRETE	15 inch	11.11
017003	579.40	Outfall 17	579.09	0.40	77.34	CONCRETE	15 inch	4.08

The City of Traverse City
Storm Outlet Evaluation

Project No. ____________ **File:** ____________

Description: ____________ **Field Work by:** LL + CB **Date:** 5/11/06

Drainage Systems: CN **Checked by:** ____________ **Date:** ______

Available Information: #17

Plans: ☒ Yes ☐ No **Year Built:** 1967

Plan Reference #: Storm 130 **Year Modified:** ____________

Easement: ☐ Yes East Bay ☐ No **Pipe Size:** 30"

Outlet Water Course: East Bay

Field Investigation: #17

Outlet Pipe Size: 24" **Pipe Type:** ☒ Concrete ☐ CMP ☐ Plastic ☐ Other: ______

Outlet Submerged: ☐ Yes ☐ No ☒ Partial Depth: 12" Sediment Depth: 15"

Deposits: ☒ Yes Type: leaves/dirt ☐ No

End Treatment: ☐ Yes Type: ______ ☒ No

Amount of Pipe Exposed: 3'

Slope Protection: ☐ Yes Type: ☐ Rip Rap ☐ Pave Spillway ☒ No ☐ Armor Stone ☐ Cobble ☐ Other: ______

Scour: ☐ Yes Depth: ______ ☒ No

High Water Mark/Watercourse: Bay

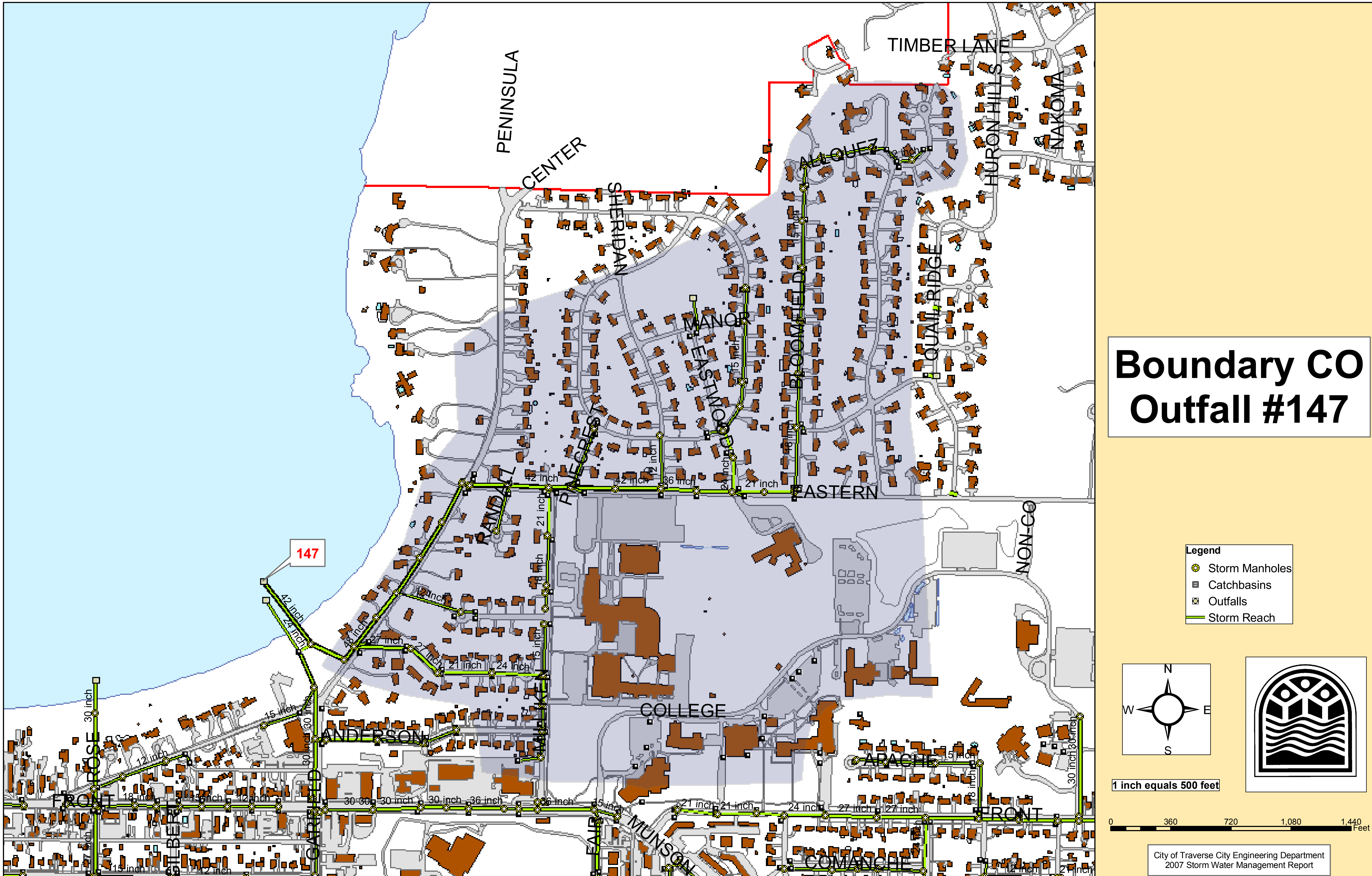
Depth from Invert: 12" **High Watermark Pipe:** 12"

Evidence of Flooding: ☐ Yes ☒ No

5/11/06 Storm event

Photographs: ☒ Yes ☐ No Numbers: 15 & 16

Comments: not flowing / clogged


Boundary CO
Outfall #147
147
TIMBER LANE
PENINSULA
CENTER
SHERIDAN
ALLOUEZ
HURON HILLS
NAKOMA
MANOR
EASTWOOD
BLOOMFIELD
QUAIL RIDGE
PARKCREST
RANDALL
EASTERN
NON-CO
COLLEGE
ANDERSON
APACHE
FRONT
ROSE
GILBERT
GARFIELD
FAIR
MUNSON
COMANCHE
42 inch
36 inch
24 inch
21 inch
48 inch
27 inch
30 inch
15 inch
18 inch
12 inch
Legend
Storm Manholes
Catchbasins
Outfalls
Storm Reach
N
S
E
W
1 inch equals 500 feet
0
360
720
1,080
1,440
Feet
City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 147

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
Catchbasin 1821	709.52	147001	701.87	8.81	86.85	CONCRETE	12 inch	10.57
147001	701.87	Catchbasin 1087	701.05	0.87	94.08	CONCRETE	12 inch	3.32
Catchbasin 1087	701.05	Catchbasin 1820	699.01	2.16	94.31	CONCRETE	12 inch	5.24
Catchbasin 1820	699.01	147002	693.43	6.37	87.64	CONCRETE	12 inch	8.99
147002	693.43	147003	675.79	8.90	198.28	CONCRETE	12 inch	10.62
147003	675.79	147004	665.33	8.87	117.92	CONCRETE	12 inch	10.61
147004	665.33	147005	656.63	7.90	110.15	CONCRETE	12 inch	10.01
147005	656.63	147006	652.87	2.81	134.03	CONCRETE	15 inch	10.81
147006	652.87	147007	646.66	3.19	194.80	CONCRETE	15 inch	11.53
147007	646.66	147008	641.26	1.92	281.57	CONCRETE	15 inch	8.94

Stormwater System: 147

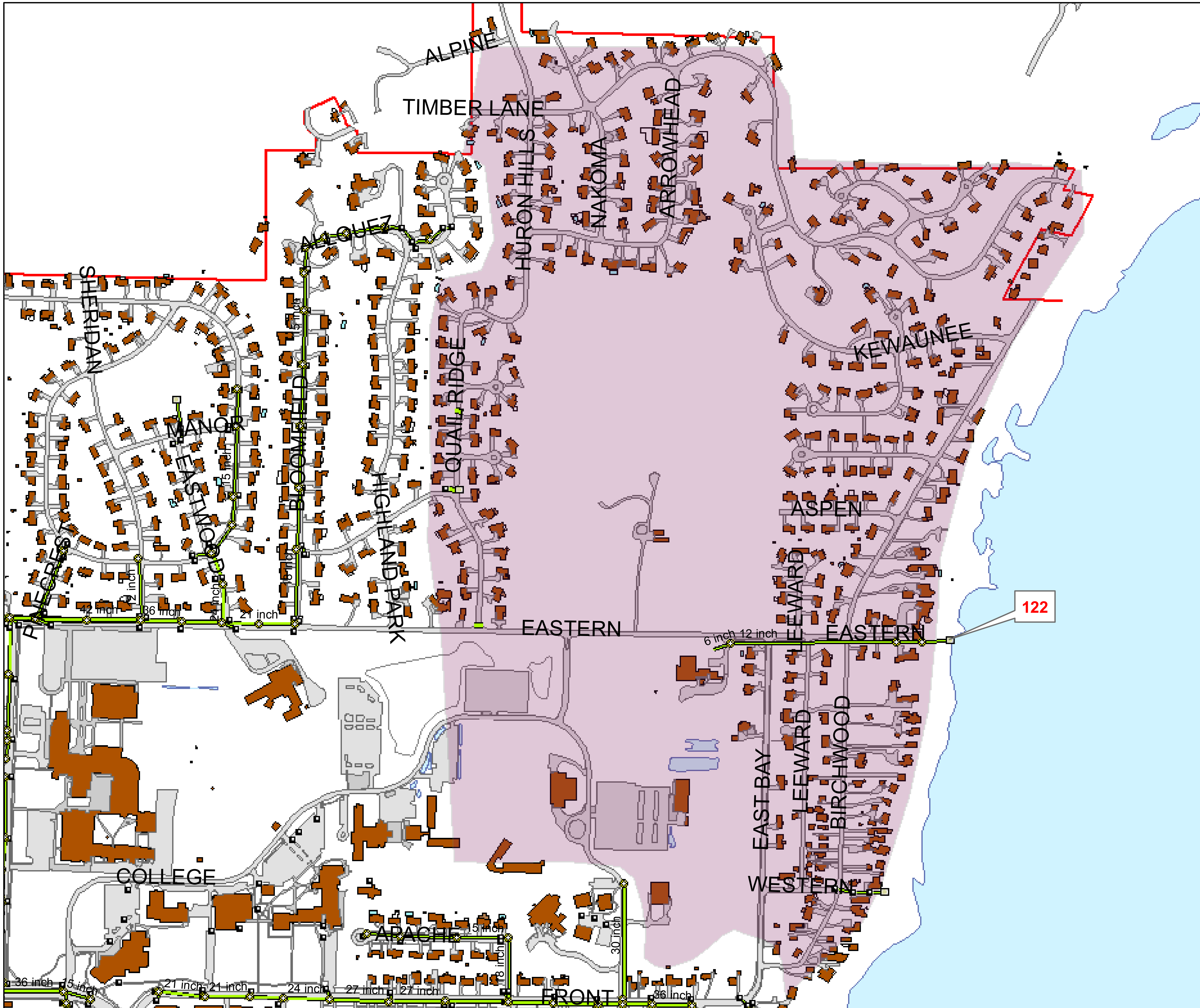
FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
147008	641.26	147009	631.57	3.00	323.27	CONCRETE	15 inch	11.18
147009	631.57	147010	623.64	2.52	315.29	CONCRETE	15 inch	10.24
147010	623.64	147011	614.50	2.85	321.18	CONCRETE	18 inch	17.71
147011	614.50	147012	609.54	1.27	389.15	CONCRETE	18 inch	11.85
147012	609.54	147013	601.55	4.32	184.75	CONCRETE	21 inch	32.93
147013	601.55	147014	599.67	0.99	190.75	CONCRETE	21 inch	15.72
147014	599.07	147015	597.81	0.60	211.66	CONCRETE	30 inch	31.63
147015	597.81	147016	596.95	0.40	213.91	CONCRETE	36 inch	42.27
147016	596.55	147017	595.74	0.29	277.32	CONCRETE	42 inch	54.35
147017	595.74	147018	594.94	0.30	265.13	CONCRETE	42 inch	55.24
147018	594.94	147019	594.42	0.39	133.14	CONCRETE	42 inch	62.85

Stormwater System: 147

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
147019	594.42	147020	593.15	0.51	248.46	CONCRETE	42 inch	71.89
147020	593.15	147021	591.99	0.52	221.13	CONCRETE	42 inch	72.83
147021	591.99	147022	591.80	0.38	50.53	CONCRETE	42 inch	61.66
147022	591.80	147023	590.37	0.54	262.94	CONCRETE	42 inch	74.16
147023	590.37	147024	588.94	0.57	250.75	CONCRETE	42 inch	75.94
147024	588.94	147025	584.98	1.58	250.83	CONCRETE	42 inch	126.35
147025	584.98	147026	583.72	0.65	192.59	CONCRETE	42 inch	81.34
147026	583.32	147027	582.44	0.40	219.16	CONCRETE	48 inch	90.98
147027	582.44	147028	581.02	1.46	97.55	CONCRETE	48 inch	173.22
147028	581.02	147029	580.05	0.44	218.83	CM	48 inch	94.93
147029	580.05	Outfall 147	0.00	0.00	477.98	STEEL	36 inch	0.00

Stormwater System: 147

FromMH	*From Elev. (FT)*	*ToMH*	*To Elevation (FT)*	*SLOPE (%)*	*Length (FT)*	*Material*	*Diameter (IN)*	*Max Flow (CFS)*



Boundary CP Outfall #122

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

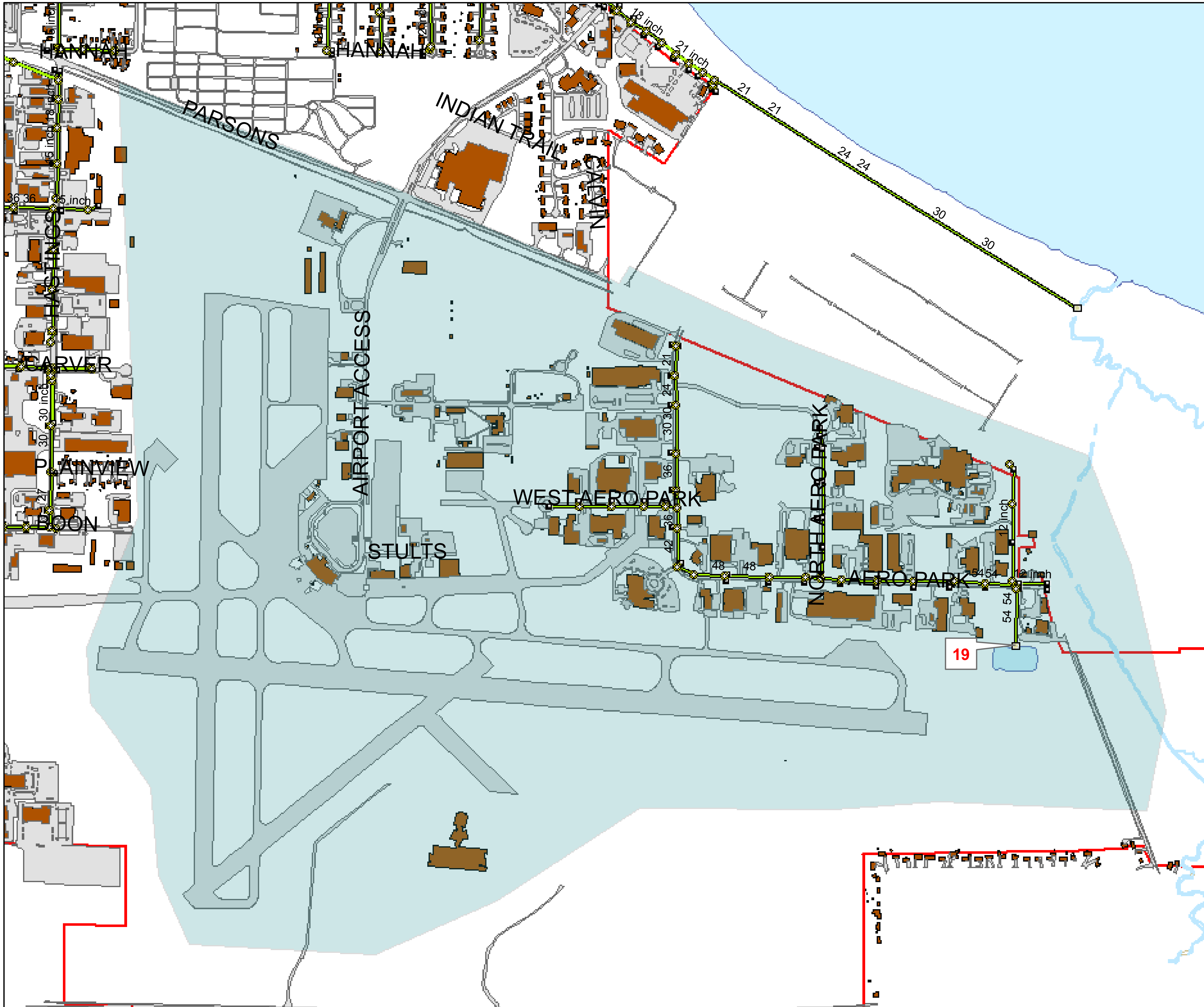
1 inch equals 500 feet

0 360 720 1,080 1,440 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 122

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
Open Channel	0.00	122001	0.00	0.00	100.52	UNKNOWN	6 inch	0.00
122001	0.00	122002	0.00	0.00	856.45	CM	12 inch	0.00
122002	0.00	122003	0.00	0.00	137.13	CM	12 inch	0.00
122003	0.00	Outfall 122	0.00	0.00	136.46	CM	12 inch	0.00



Boundary CQ Outfall #19

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W
E
S

1 inch equals 800 feet

0 590 1,180 1,770 2,360 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 19

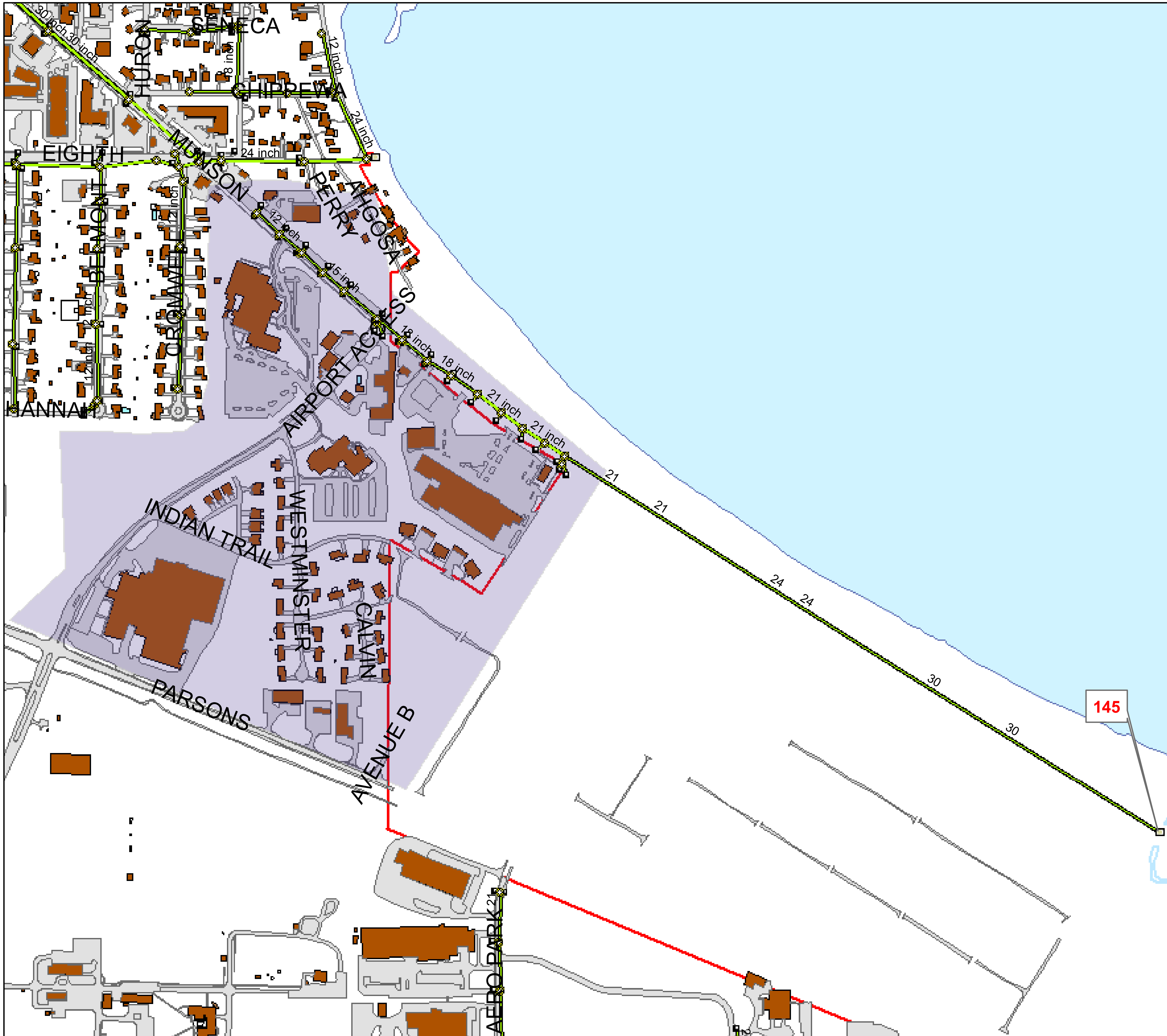
FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
019001	603.40	019002	603.00	0.16	255.14	UNKNOWN	21 inch	6.27
019002	603.00	019003	602.55	0.18	244.76	UNKNOWN	24 inch	9.70
019003	602.55	019004	601.83	0.18	401.25	UNKNOWN	30 inch	17.37
019004	601.83	019005	601.53	0.10	303.56	UNKNOWN	36 inch	20.96
019005	601.53	019006	601.32	0.15	143.45	UNKNOWN	36 inch	25.51
019006	601.32	019007	600.89	0.25	174.43	UNKNOWN	36 inch	33.10
019007	600.89	019008	600.51	0.12	312.85	UNKNOWN	42 inch	35.05
019008	600.51	019009	600.23	0.18	155.58	UNKNOWN	48 inch	60.91
019009	600.23	019010	599.67	0.22	254.51	UNKNOWN	48 inch	67.34
019010	599.67	019011	598.97	0.19	370.40	UNKNOWN	48 inch	62.41

Stormwater System: 19

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
019011	598.97	019012	598.31	0.22	296.18	UNKNOWN	48 inch	67.77
019012	598.21	019013	598.15	0.05	130.02	UNKNOWN	48 inch	30.84
019013	598.15	019014	597.65	0.29	171.80	UNKNOWN	48 inch	77.45
019014	597.65	019015	596.93	0.24	301.70	UNKNOWN	48 inch	70.14
019015	596.93	019016	596.21	0.24	297.09	UNKNOWN	54 inch	96.76
019016	596.21	019017	595.78	0.13	343.07	UNKNOWN	54 inch	69.58
019017	595.78	019018	595.36	0.16	257.87	UNKNOWN	54 inch	79.32
019018	595.36	Junction	598.00	-1.18	223.48	UNKNOWN	54 inch	#Error
Junction	594.95	019019	594.67	0.48	58.61	UNKNOWN	54 inch	135.86
019019	593.93	Outfall 19	594.67	-0.16	476.06	PVC	54 inch	#Error

Stormwater System: 19

FromMH	*From Elev. (FT)*	*ToMH*	*To Elevation (FT)*	*SLOPE (%)*	*Length (FT)*	*Material*	*Diameter (IN)*	*Max Flow (CFS)*



Boundary CS Outfall #145

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

1 inch equals 500 feet

0 425 850 1,275 1,700 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 145

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
145001	589.62	145002	598.10	-5.35	158.46	CONCRETE	12 inch	#Error
145002	589.10	145003	588.72	0.27	142.99	CONCRETE	12 inch	1.84
145003	588.47	145004	588.00	0.32	147.28	CONCRETE	15 inch	3.65
145004	588.00	145005	587.60	0.28	143.14	CONCRETE	15 inch	3.41
145005	587.55	145006	586.91	0.29	220.72	CONCRETE	15 inch	3.48
145006	586.91	145007	586.60	0.19	166.21	CONCRETE	18 inch	4.53
145007	586.60	145008	586.27	0.21	160.18	CONCRETE	18 inch	4.77
145008	586.27	145009	585.93	0.24	144.55	CONCRETE	18 inch	5.09
145009	585.93	145010	585.60	0.21	158.01	CONCRETE	18 inch	4.80
145010	585.60	145011	585.33	0.17	154.43	CONCRETE	21 inch	6.62

Stormwater System: 145

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
145011	585.33	145012	585.09	0.18	134.22	CONCRETE	21 inch	6.70
145012	585.09	145013	584.79	0.23	133.09	CONCRETE	21 inch	7.52
145013	584.79	145014	585.53	-0.60	122.73	CONCRETE	21 inch	#Error
145014	0.00	Junction	0.20	0.15	1,100.00	CONCRETE	24 inch	8.76
Junction	0.00	Junction	0.00	0.15	650.00	CONCRETE	27 inch	11.99
Junction	0.00	Outfall 145	579.00	0.15	1,800.00	CONCRETE	30 inch	15.88

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Outlet 21 looking down into water

Boundary CT Outfall #21

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

1 inch equals 500 feet

0 380 760 1,140 1,520 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 21

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
021056	598.99	021057	598.23	0.33	179.67	CONCRETE	12 inch	2.05
021001	610.59	021002	609.87	0.25	290.01	CONCRETE	12 inch	1.77
021002	609.87	021003	609.17	0.24	297.56	CONCRETE	15 inch	3.13
021003	609.17	021004	608.60	0.24	238.75	CONCRETE	18 inch	5.14
021004	608.59	021005	608.21	0.23	162.48	CONCRETE	18 inch	5.08
021005	608.21	021010	607.33	0.22	402.12	CONCRETE	24 inch	10.58
021010	607.33	021012	606.49	0.32	263.21	CONCRETE	24 inch	12.77
021012	606.49	021014	606.26	0.35	65.12	UNKNOWN	24 inch	13.44
021014	606.26	021017	605.53	0.17	422.06	CONCRETE	30 inch	17.05
021017	605.53	021020	605.17	0.17	206.75	CONCRETE	30 inch	17.11

Stormwater System: 21

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
021020	605.17	021022	604.59	0.18	329.78	CONCRETE	30 inch	17.19
021022	604.59	021025	603.97	0.18	335.17	CONCRETE	30 inch	17.63
021025	603.97	021026	602.26	0.70	243.78	CONCRETE	30 inch	34.33
021026	602.26	021027	600.77	0.66	224.50	CONCRETE	30 inch	33.40
021027	600.77	021030	599.41	0.32	427.28	CONCRETE	36 inch	37.61
021030	599.41	021037	590.06	2.17	431.66	CONCRETE	30 inch	60.34
021037	590.06	021043	588.97	0.52	211.58	CONCRETE	36 inch	47.85
021043	588.97	021045	588.76	0.25	124.34	CONCRETE	Unknown	0.00
021045	588.76	021049	588.24	0.24	171.54	CONCRETE	36 inch	32.53
021049	588.34	021050	588.34	0.00	7.06	CONCRETE	36 inch	0.00
021050	588.34	021051	588.12	0.99	22.15	CONCRETE	36 inch	66.45

Stormwater System: 21

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
021051	588.12	021052	587.78	0.23	150.48	CONCRETE	36 inch	31.69
021052	587.78	021053	587.56	0.23	93.97	CONCRETE	36 inch	32.26
021053	587.56	Outfall 21	587.00	1.20	46.61	CM	30 inch	44.94

Stormwater System: 21.1

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
021023	587.56	Outfall 21.1	587.56	0.00	47.95	CM	18 inch	0.00

The City of Traverse City
Storm Outlet Evaluation

Project No. ______ **File:** ______
Description: ______ **Field Work by:** LL + CB **Date:** 5/9/10
Drainage Systems: CT **Checked by:** ______ **Date:** ______

Available Information: #21

Plans: ☒ Yes ☐ No **Year Built:** 1946
Plan Reference #: Storm #7 **Year Modified:** ______
Easement: ☒ Yes Hall Park ☐ No **Pipe Size:** 36
Outlet Water Course: Boardman Lake

Field Investigation: South pipe #21

Outlet Pipe Size: 30" **Pipe Type:** ☐ Concrete ☒ CMP ☐ Plastic
☐ Other: ______
Outlet Submerged: ☒ Yes ☐ No ☐ Partial Depth: ______
Sediment Depth: ______
Deposits: ☒ Yes Type: veg ☐ No
End Treatment: ☐ Yes Type: ______ ☒ No
Amount of Pipe Exposed: 10'
Slope Protection: ☒ Yes Type: just at outlet ☒ Rip Rap ☐ Pave Spillway ☐ No
☐ Armor Stone ☐ Cobble
☐ Other: ______
Scour: ☒ Yes Depth: 1' ☐ No
High Water Mark/Watercourse: 1'
Depth from Invert: Ø **High Watermark Pipe:** Ø

Evidence of Flooding: ☐ Yes ☒ No
Photographs: ☒ Yes ☐ No Numbers: 23
Comments: growth/algae on outside of pipe

The City of Traverse City
Storm Outlet Evaluation

Project No. ______ **File:** ______

Description: ______ **Field Work by:** LL + CB **Date:** 5/9/06

Drainage Systems: CT **Checked by:** ______ **Date:** ______

Available Information: #21.1

Plans: ☐ Yes ☐ No **Year Built:** ______

Plan Reference #: ______ **Year Modified:** ______

Easement: ☒ Yes Hall Park ☐ No **Pipe Size:** ______

Outlet Water Course: Boardman Lake

Field Investigation: #21.1 North Pipe

Outlet Pipe Size: 16"

Pipe Type: ☐ Concrete ☒ CMP ☐ Plastic ☐ Other: ______

Outlet Submerged: ☒ Yes ☐ No ☐ Partial Depth: ______

Sediment Depth: 4"

Deposits: ☒ Yes Type: veg. rip-rap ☐ No

End Treatment: ☐ Yes Type: ______ ☒ No

Amount of Pipe Exposed: 6'

Slope Protection: ☒ Yes just at outlet Type: ☒ Rip Rap 4-16" ☐ Pave Spillway ☐ No ☐ Armor Stone ☐ Cobble ☐ Other: ______

Scour: ☐ Yes Depth: ______ ☒ No

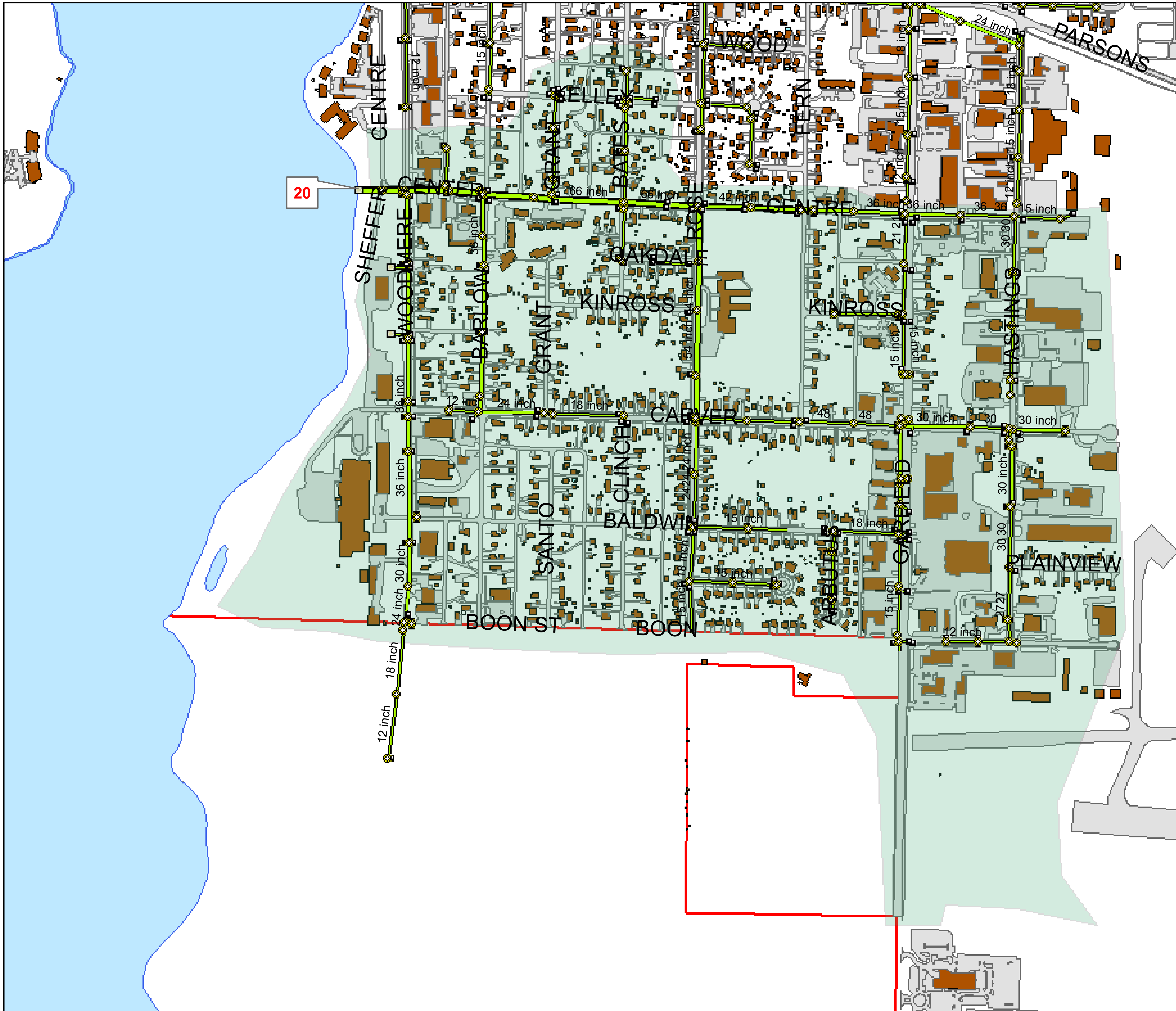
High Water Mark/Watercourse: 1'

Depth from Invert: Ø **High Watermark Pipe:** Ø

Evidence of Flooding: ☐ Yes ☒ No

Photographs: ☒ Yes ☐ No Numbers: 24

Comments: growth / algae on outside of pipe



Boundary CU Outfall #20,

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

1 inch equals 600 feet

0 430 860 1,290 1,720 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 20

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
020001	0.00	020002	0.00	0.00	198.77	CONCRETE	12 inch	0.00
020002	0.00	020003	0.00	0.23	193.22	CONCRETE	15 inch	3.10
020003	0.00	020004	0.00	0.19	139.15	CONCRETE	27 inch	13.49
020004	0.00	020005	0.00	0.00	320.85	CONCRETE	27 inch	0.00
020005	0.00	020006	0.00	0.16	380.72	CONCRETE	30 inch	16.40
020006	0.00	020007	0.00	0.10	372.24	CONCRETE	30 inch	12.96
020007	0.00	020008	0.00	0.10	43.32	CONCRETE	30 inch	12.96
020008	0.00	020009	0.00	0.10	69.59	CONCRETE	30 inch	12.96
020009	0.00	Junction	615.25	0.00	38.21	CONCRETE	30 inch	0.00
Junction	0.00	020010	0.00	0.00	205.27	CONCRETE	30 inch	0.00

Stormwater System: 20

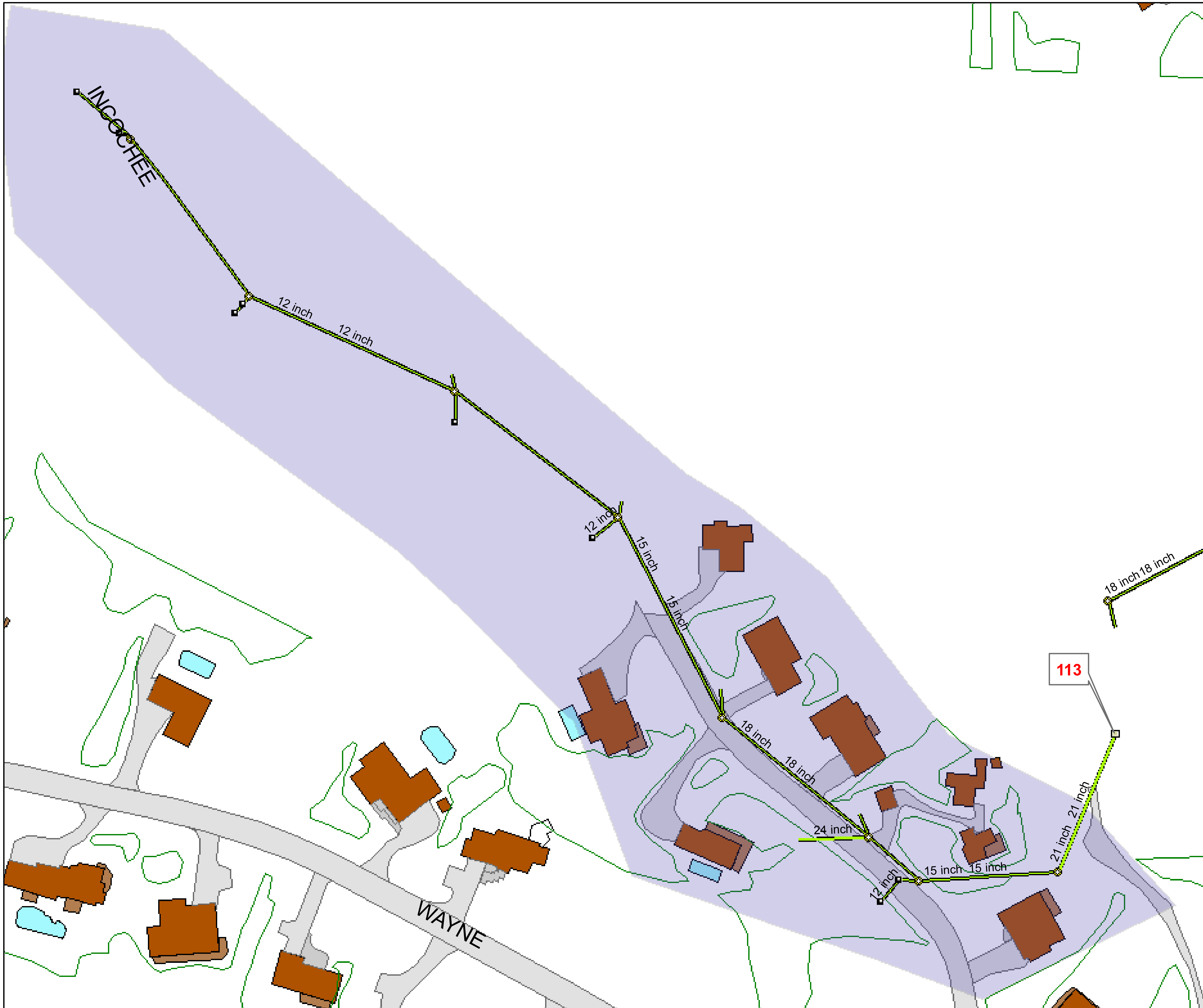
FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
020010	0.00	Junction	0.00	0.00	363.36	CONCRETE	30 inch	0.00
Junction	614.76	020011	613.00	2.30	76.65	CONCRETE	30 inch	62.12
020011	613.00	020012	612.49	0.18	288.98	CONCRETE	48 inch	60.31
020012	612.49	020013	611.87	0.19	333.88	CONCRETE	48 inch	61.87
020013	611.87	020014	611.27	0.18	330.57	UNKNOWN	48 inch	61.17
020014	611.27	020015	610.70	0.18	321.57	CONCRETE	48 inch	60.45
020015	609.36	020016	608.82	0.21	259.19	UNKNOWN	54 inch	89.71
020016	608.82	020017	608.23	0.14	411.27	CONCRETE	54 inch	74.44
020017	608.23	020018	607.23	0.33	301.54	CONCRETE	54 inch	113.19
020018	607.73	020019	607.15	0.17	347.47	UNKNOWN	54 inch	80.30
020019	607.15	Junction	607.10	0.12	42.16	UNKNOWN	66 inch	115.58

Stormwater System: 20

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
Junction	607.15	Junction	606.24	0.59	155.31	UNKNOWN	66 inch	256.91
Junction	607.15	020020	606.24	0.34	270.58	UNKNOWN	66 inch	194.65
020020	606.24	020021	593.00	2.37	559.62	CONCRETE	66 inch	516.26
020021	592.75	020022	592.32	0.13	318.32	UNKNOWN	66 inch	122.96
020022	592.32	Junction	589.87	5.97	43.24	CONCRETE	66 inch	819.81
Junction	590.44	020023	589.87	0.34	165.46	CONCRETE	66 inch	197.00
020023	590.44	020024	589.87	0.20	287.98	CONCRETE	66 inch	149.32
020075	605.67	020024	604.27	4.44	31.56	CONCRETE	36 inch	140.41
020024	589.87	020025	589.61	0.20	130.99	CONCRETE	66 inch	149.54
020025	589.61	Outfall 20	583.68	3.84	154.24	CONCRETE	66 inch	658.12

Stormwater System: 20

FromMH	*From Elev. (FT)*	*ToMH*	*To Elevation (FT)*	*SLOPE (%)*	*Length (FT)*	*Material*	*Diameter (IN)*	*Max Flow (CFS)*



Boundary CV Outfall #113

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

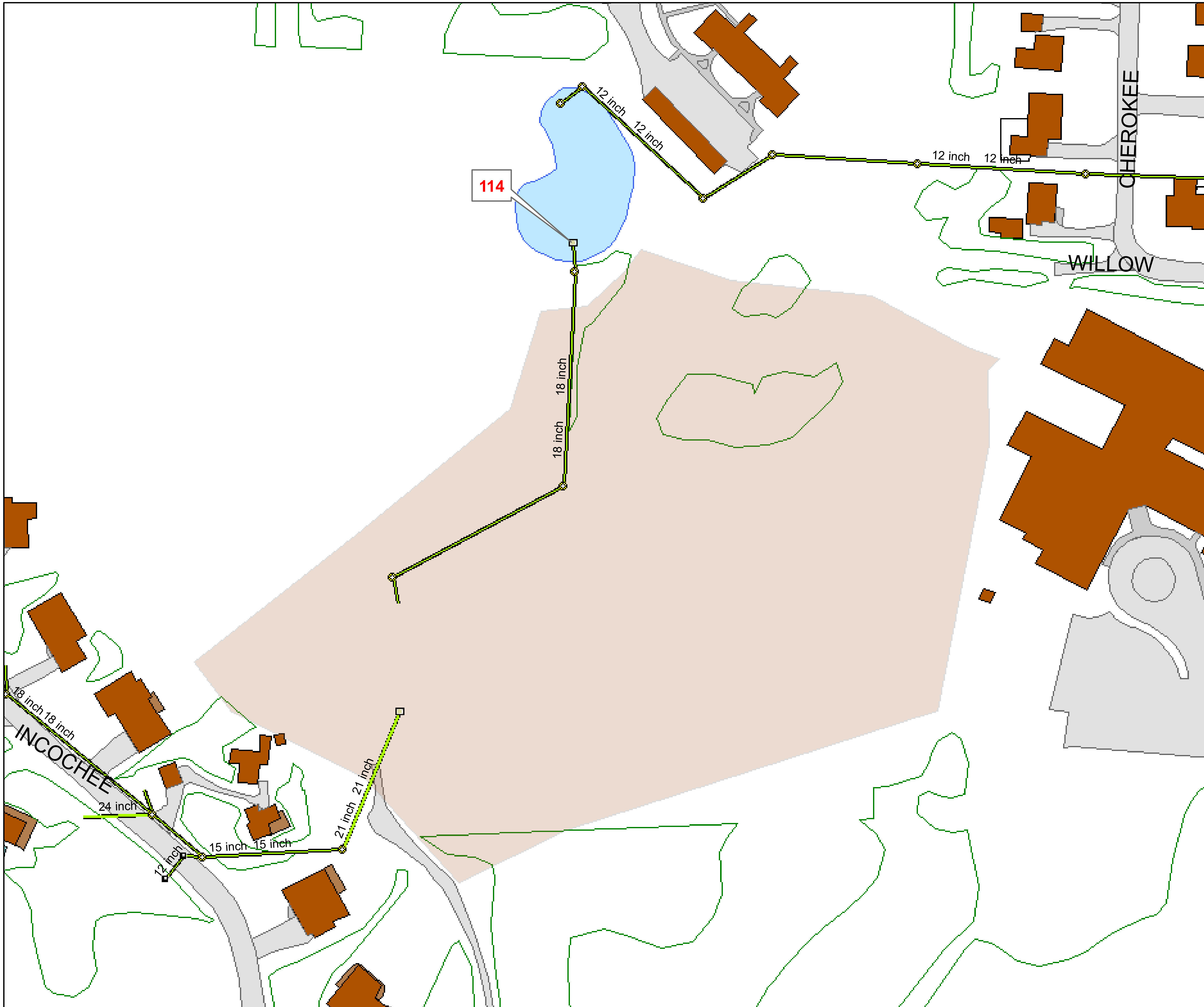
1 inch equals 100 feet

0 75 150 225 300 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 113

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
113001	791.27	113002	615.68	85.46	205.46	CONCRETE	12 inch	32.92
113002	791.27	113003	767.41	10.12	235.75	CONCRETE	12 inch	11.33
113003	767.41	113004	751.46	7.47	213.66	CONCRETE	15 inch	17.64
113004	751.46	113005	736.60	6.34	234.34	CONCRETE	15 inch	16.26
113005	736.00	113006	723.22	6.51	196.45	CONCRETE	18 inch	26.78
113006	723.22	113007	719.04	6.08	68.76	CONCRETE	18 inch	25.89
113007	715.86	113008	690.36	17.59	145.00	CONCRETE	15 inch	27.08
113008	690.60	Outfall 113	686.01	2.97	154.67	CONCRETE	21 inch	27.28



Boundary CW Outfall #114

Legend
- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W
E
S

1 inch equals 100 feet

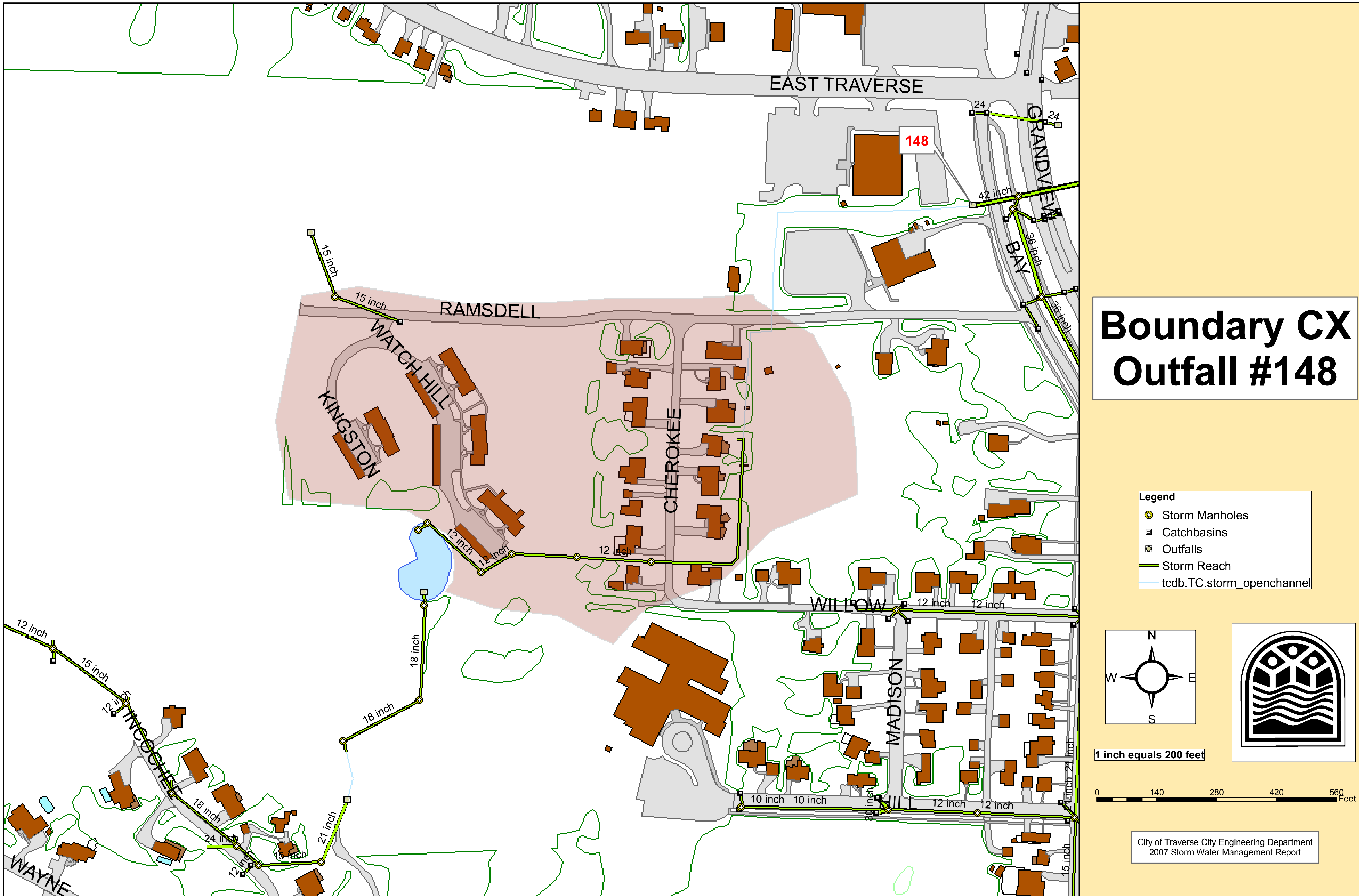
0 70 140 210 280 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 114

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
Open Channel	684.00	114001	681.22	9.89	28.10	CONCRETE	18 inch	33.02
114001	681.22	114002	663.99	8.53	202.04	CONCRETE	18 inch	30.66
114002	663.99	114003	646.03	8.05	223.20	CONCRETE	18 inch	29.78
114003	0.00	Outfall 114	0.00	0.00	29.42	CONCRETE	Unknown	0.00

Boundary CX Outfall #148



Stormwater System: 148

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
148001	644.70	148002	644.00	2.45	28.61	CM	12 inch	5.57
148002	644.00	148003	639.31	2.74	171.07	HD POLY	12 inch	5.90
148003	0.00	Junction	0.00	0.00	65.78	PVC	12 inch	0.00
Junction	0.00	148004	0.00	0.00	196.00	VC	Unknown	0.00
148004	0.00	148005	0.00	0.00	175.43	PVC	12 inch	0.00
148005	0.00	148006	0.00	0.00	149.23	CONCRETE	Unknown	0.00
148006	0.00	Open Channel	0.00	0.00	310.39	CONCRETE	Unknown	0.00

Boundary CY Outfall #1

Legend
- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

1 inch equals 400 feet

0 290 580 870 1,160 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 1

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
Catchbasin 557	583.31	Catchbasin 1589	581.69	4.71	34.36	CONCRETE	Unknown	0.00
Catchbasin 1589	583.31	001001	581.69	4.71	28.91	UNKNOWN	Unknown	0.00
001001	581.69	Catchbasin 1642	579.67	1.46	168.11	CONCRETE	24 inch	27.31
Catchbasin 1642	580.60	Outfall 1	579.35	4.31	29.00	CONCRETE	24 inch	46.95

The City of Traverse City
Storm Outlet Evaluation

Page 1 of 1

Project No. ______ **File:** ______
Description: ______ **Field Work by:** LL + CB **Date:** 5/9/06
Drainage Systems: CY **Checked by:** ______ **Date:** ______

Available Information: #1
Plans: ☒ Yes ☐ No **Year Built:** 1948
Plan Reference #: Storm #105 **Year Modified:** ______
Easement: ☒ Yes ☐ No **Pipe Size:** 48"
Outlet Water Course: Bay

Field Investigation: #1
Outlet Pipe Size: 24"
pretty heavy flow
Pipe Type: ☐ Concrete ☒ CMP ☐ Plastic
☐ Other: ______
Outlet Submerged: ☐ Yes ☒ No
☐ Partial Depth: ______
Sediment Depth: ______
Deposits: ☒ Yes Type: 1/4 full w/sediment + salt ☐ No
End Treatment: ☐ Yes Type: ______ ☒ No
Amount of Pipe Exposed: 4
Slope Protection: ☒ Yes Type: ☐ Rip Rap ☐ Pave Spillway ☐ No
☐ Armor Stone ☐ Cobble
☒ Other: Concrete
Scour: ☒ Yes Depth: 18" ☐ No
High Water Mark/Watercourse: 12"
Depth from Invert: 12" **High Watermark Pipe:** 20"

Evidence of Flooding: ☐ Yes ☒ No
Photographs: ☒ Yes ☐ No Numbers: 1+2+5+6, 7+5/11/06 #12
Comments: alge growing inside + outside

5/11/06 Storm event → not much flow about same as (normal) before event. water is VERY cloudy + white. Major flooding on PKWY

Boundary CZ Outfall #77

Legend
- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

N
W E
S

1 inch equals 100 feet

0 80 160 240 320 Feet

City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 77

FromMH	From Elev. (FT)	ToMH	To Elevation (FT)	SLOPE (%)	Length (FT)	Material	Diameter (IN)	Max Flow (CFS)
077001	601.50	077002	598.92	1.49	172.72	CONCRETE	10 inch	2.68
077002	0.00	Outfall 77	0.00	0.00	25.48	CONCRETE	10 inch	0.00