



# **CHARTER TOWNSHIP OF OSHTEMO SANITARY SEWER EVALUATION**

October 27, 2020

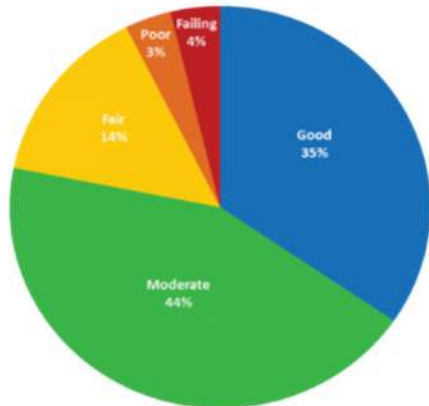
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# ASSET MANAGEMENT IN 4 STEPS

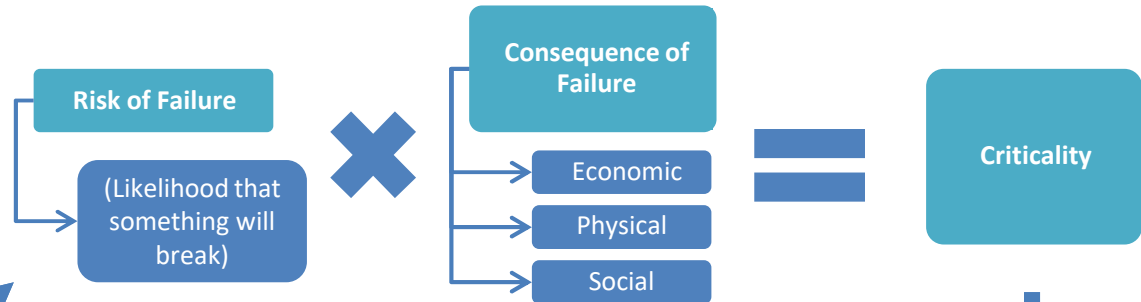
## 1. Inventory – Mapping what we own



## 2. Recording the current conditions of what we own

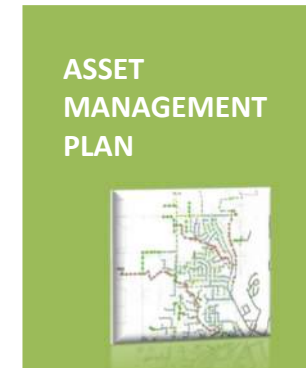


## 3. Criticality – Finding out what needs to be fixed first (Prioritize)



## 4. Asset Management Plan – Putting it all together

<b>Actions</b>	Coordinated with other asset work
<b>Schedule</b>	Proactive maintenance and replacement
<b>Cost</b>	Based on action and schedule
<b>Payment</b>	Master Plans – future service districts or flow increases

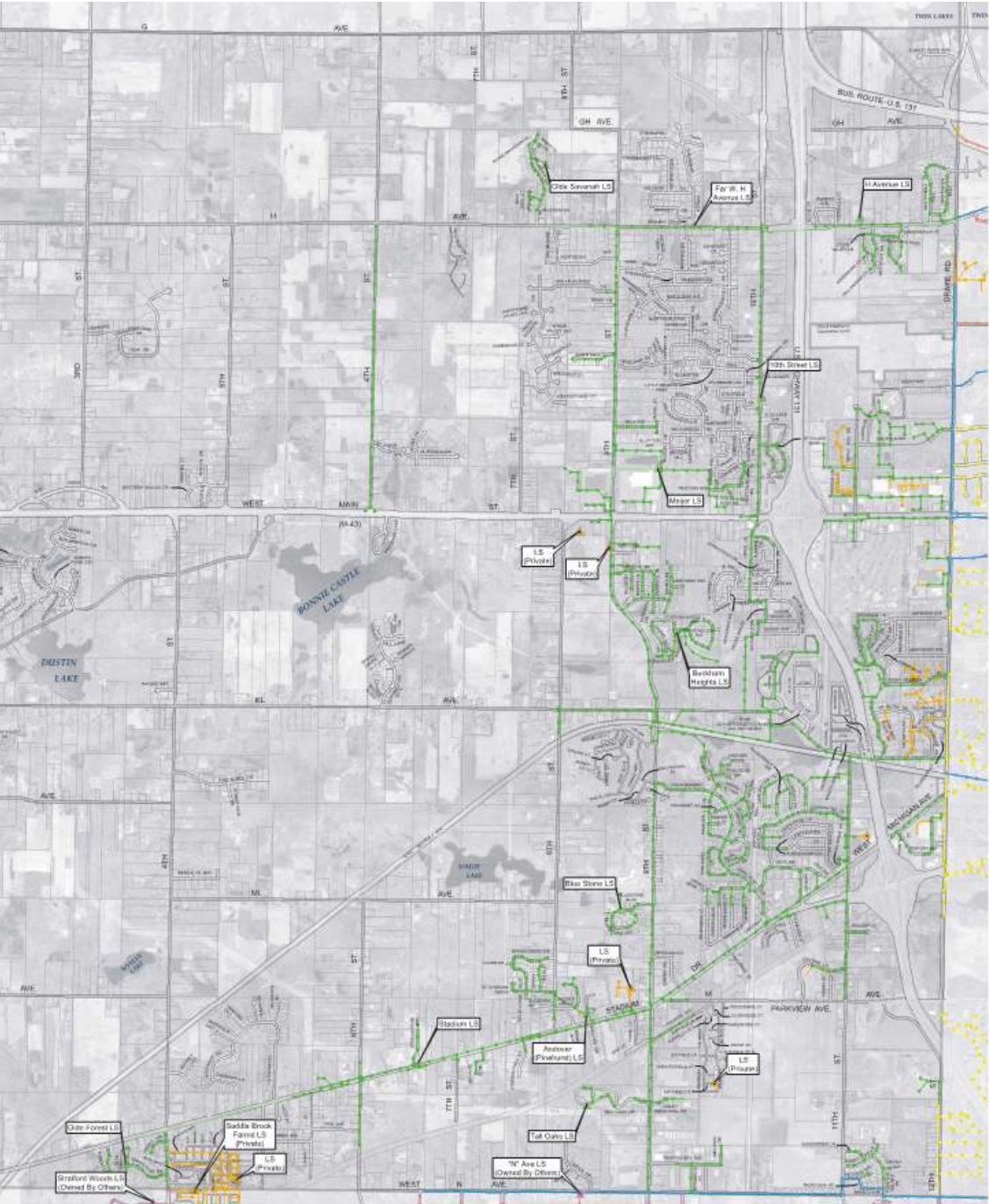


# Charter Township of Oshtemo

Kalamazoo County, Michigan

## Wastewater Collection System Map 1: Ownership

Prein&Newhof



LEGEND	
<b>Gravity Sewer Ownership</b>	<b>Force Main Ownership</b>
Charter Township of Oshtemo	Charter Township of Oshtemo
Multi-Jurisdictional	Multi-Jurisdictional
Charter Township of Texas	Charter Township of Texas
City of Kalamazoo	City of Kalamazoo
Kalamazoo Township	Kalamazoo Township
Private	Private
<b>Sanitary Manhole Ownership</b>	<b>Lift Station Ownership</b>
Charter Township of Oshtemo	Charter Township of Oshtemo
Multi-Jurisdictional	Multi-Jurisdictional
Charter Township of Texas	Charter Township of Texas
City of Kalamazoo	City of Kalamazoo
Kalamazoo Township	Kalamazoo Township
Private	Private

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# Charter Township of Oshtemo

Kalamazoo County, Michigan

## Wastewater Collection System Map 2: Pipe Diameters

Prein&Newhof



**LEGEND**

**Gravity Sewer - Pipe Diameter**

- 6" & 8"
- 10"
- 12"
- 15" & 18"
- 21", 24" & 27"

**Force Main - Pipe Diameter**

- 4"
- 6"
- 8"
- 10" & 12"
- 14" & 16"

- Charter Township of Oshtemo Sanitary Manhole
- ▲ Charter Township of Oshtemo Lift Station
- Sanitary Manhole Owned by Others
- ▲ Lift Station Owned by Others
- Gravity Sewer Owned by Others
- Force Main Owned by Others

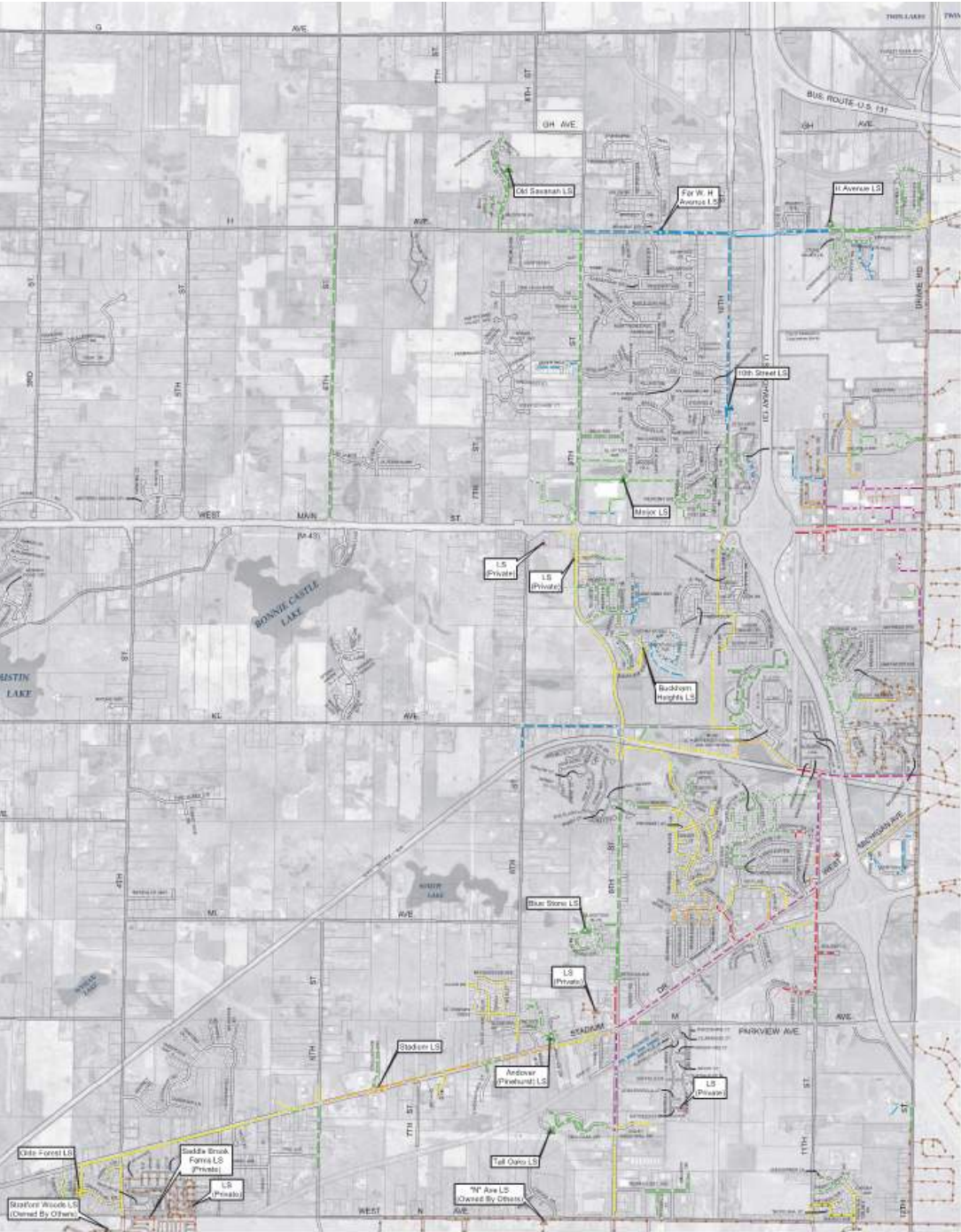
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# Charter Township of Oshtemo

Kalamazoo County, Michigan

## Wastewater Collection System Map 3: Year Installed

Prein&Newhof



**LEGEND**

**Gravity Sewer - Year Installed**

- 1960 - 1969
- 1970 - 1979
- 1980 - 1989
- 1990 - 1999
- 2000 - 2009
- 2010 - Present

**Force Main - Year Installed**

- 1980 - 1989
- 1990 - 1999
- 2000 - 2009
- 2010 - Present

**Lift Station - Year Installed**

- 1980 - 1989
- 1990 - 1999
- 2000 - 2009
- 2010 - Present

- Charter Township of Oshtemo Sanitary Manhole
- Sanitary Manhole Owned by Others
- Lift Station Owned by Others
- Gravity Sewer Owned by Others
- Force Main Owned by Others

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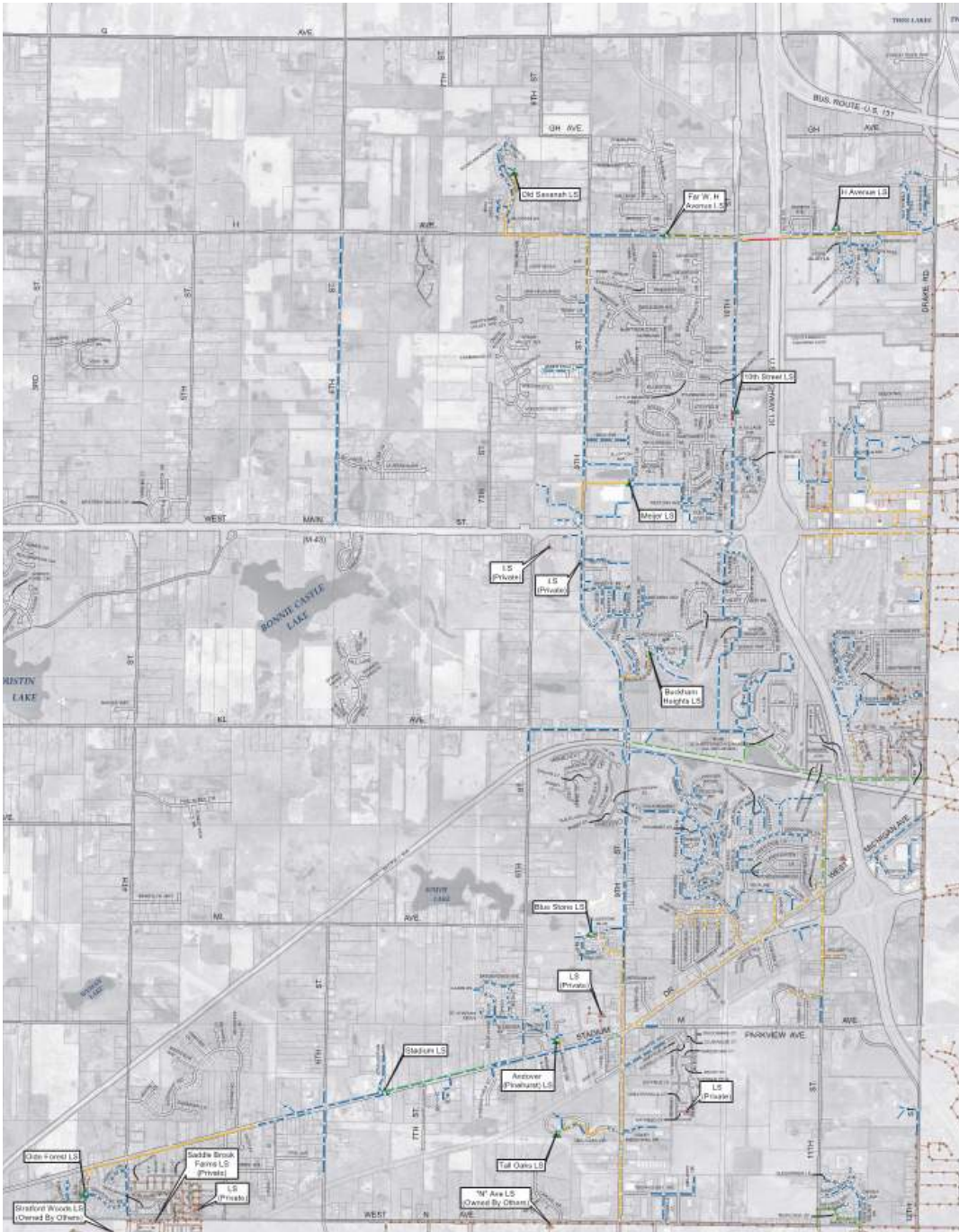
# Charter Township of Oshtemo

Kalamazoo County, Michigan

## Wastewater Collection System

### Map 4: Pipe Material

Prein&Newhof



### **LEGEND**

#### **Gravity Sewer - Pipe Material**

- Cast Iron
- Clay
- Concrete
- PVC

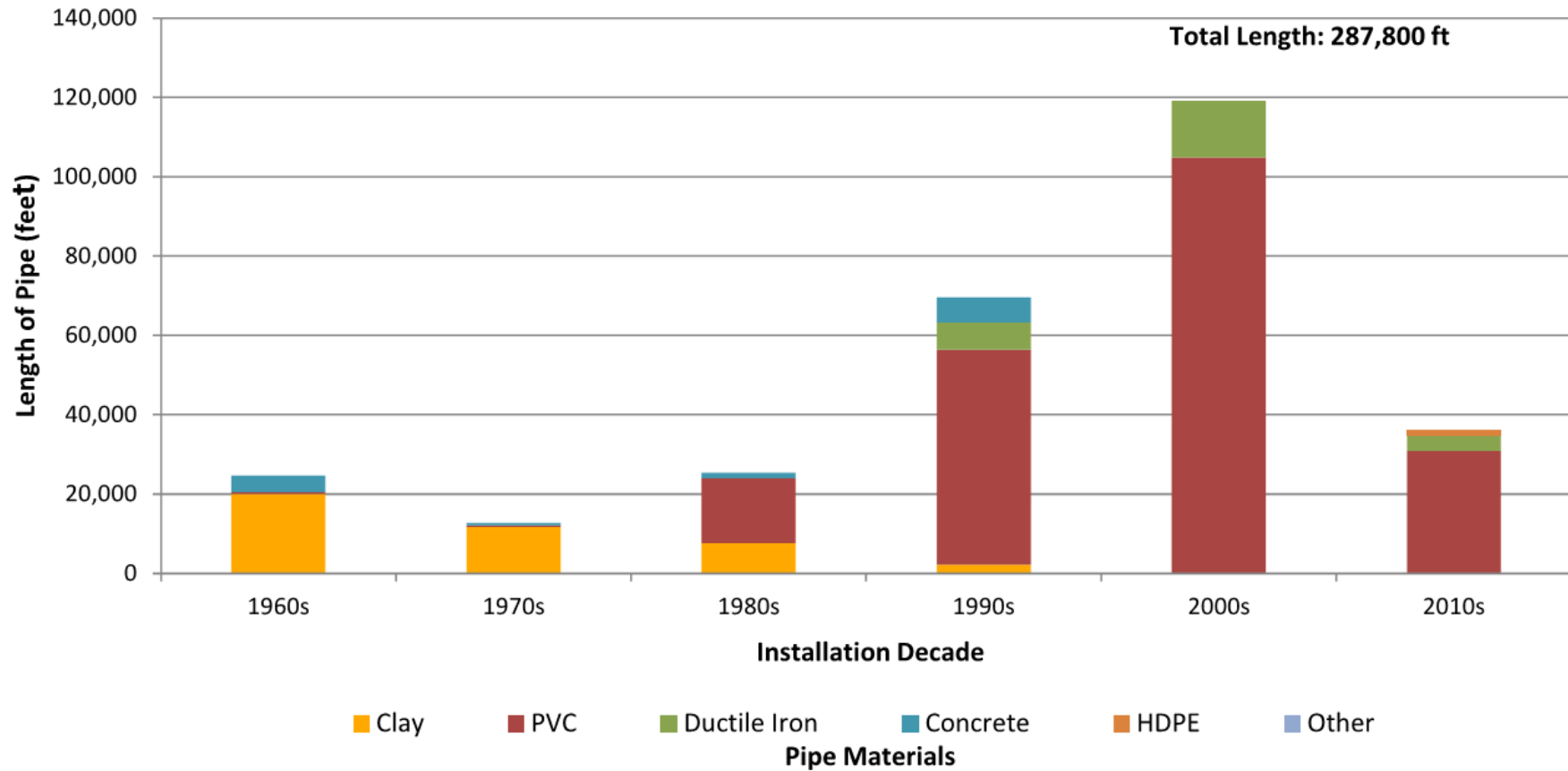
#### **Force Main - Pipe Material**

- HDPE
- Ductile Iron
- PVC

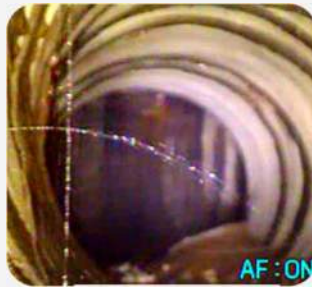
- Charter Township of Oshtemo Sanitary Manhole
- ▲ Charter Township of Oshtemo Lift Station
- Sanitary Manhole Owned by Others
- ▲ Lift Station Owned by Others
- Gravity Sewer Owned by Others
- Force Main Owned by Others

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## Gravity Sewer and Force Main Inventory Summary



# Pipe Condition Ratings



Good

1

Moderate

2

Fair

3

Poor

4

Failed

5



# Pipe Condition Ratings

Pipes are rated **1-5** on several factors:

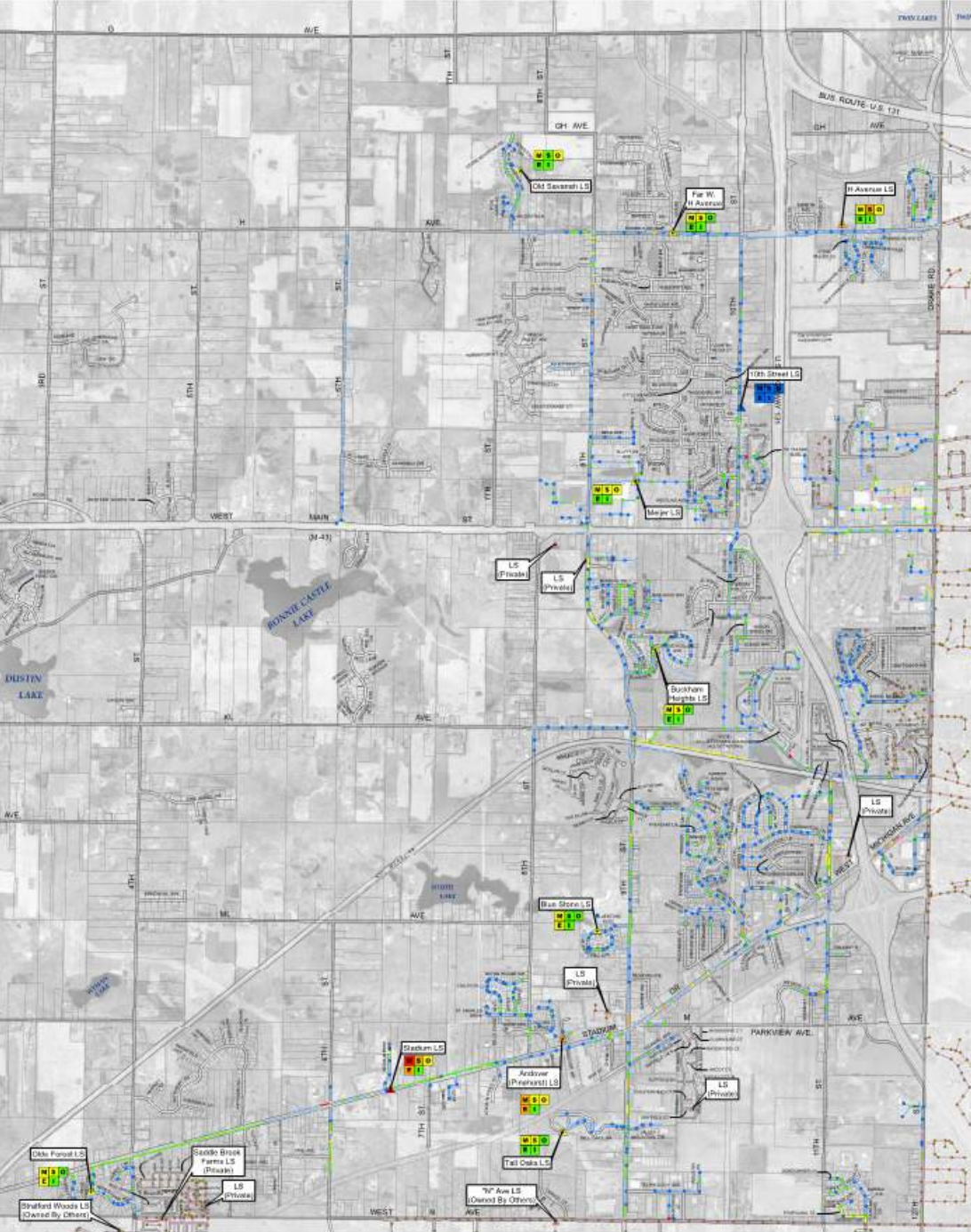
- **Root Intrusion** (are plants growing through the pipe?)
- **Flow Blockage** (amount of clogged-ness)
- **Wall Corrosion** (is the pipe wasting away?)
- **Wall Condition** (is the pipe cracked?)
- **Joint Offset** (is the pipe misaligned to the next pipe?)
- **Infiltration** (is the pipe “poked through” by another pipe?)

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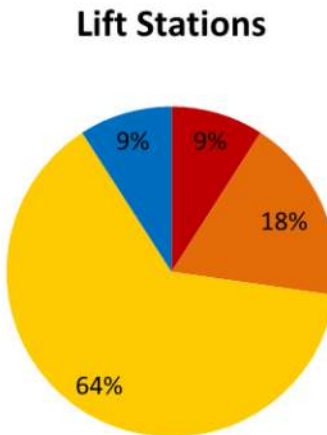
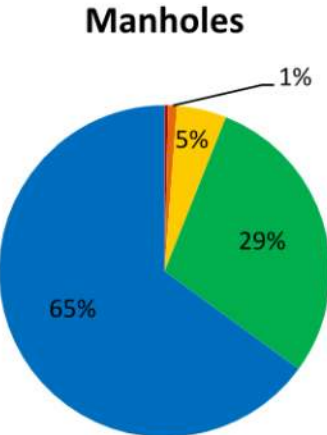
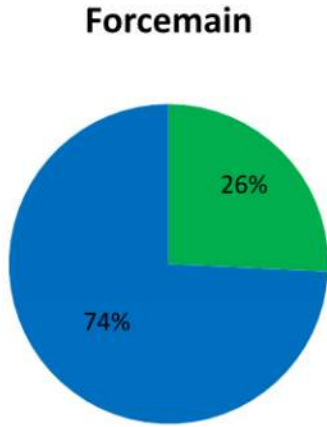
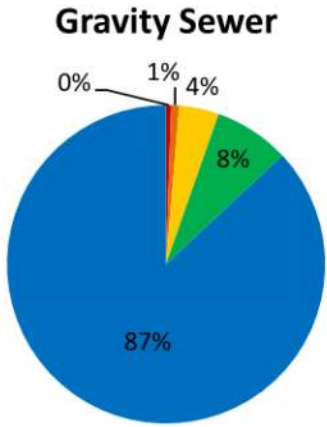
## Wastewater Collection System Map 9: Risk of Failure

Prein&Newhof



LEGEND	
<b>Gravity Sewer - Risk of Failure</b>	<b>Lift Stations - Risk of Failure</b>
1 - Lowest Risk of Failure	▲ 1 - Lowest Risk of Failure
2	▲ 2 M = Mechanical
3	▲ 3 S = Structural
4	▲ 4 O = Other/Site
5 - Highest Risk of Failure	▲ 4 E = Electrical
	▲ 4 I = Instrumentations & Controls
	▲ 5 - Highest Risk of Failure
<b>Force Main - Risk of Failure</b>	● Sanitary Manhole Owned by Others
1 - Lowest Risk of Failure	▲ Lift Station Owned by Others
2	— Gravity Sewer Owned by Others
3	— Force Main Owned by Others
4	
5 Highest Risk of Failure	
○ No Data	
● 1 - Lowest Risk of Failure	
● 2	
● 3	
● 4	
● 5 - Highest Risk of Failure	

# Risk of Failure Rating Summary

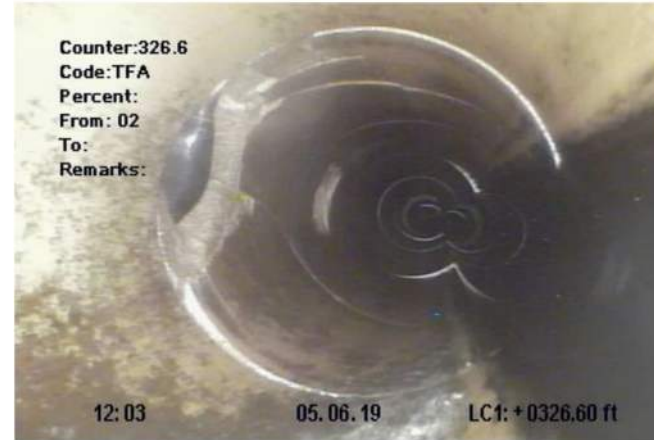


- 5 - Highest Risk of Failure
- 4
- 3
- 2
- 1 - Lowest Risk of Failure





Broken Pipe – 295' Downstream MH 06208  
9<sup>th</sup> Street



Broken Pipe – 328' Downstream MH 06231  
9<sup>th</sup> Street

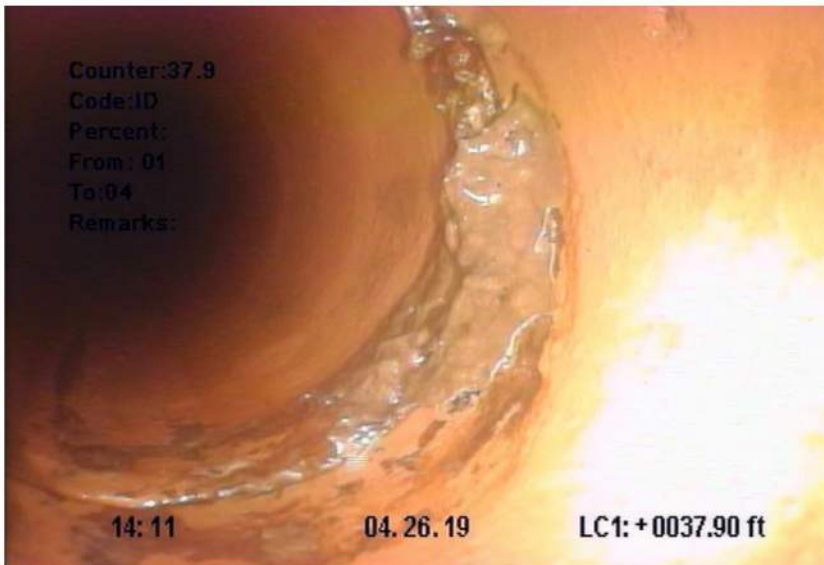


Broken Pipe – 18' Downstream MH 09941  
Andover Drive

### Structural Conditions Examples



Broken Pipe – 73' Downstream MH 06030  
11<sup>th</sup> Street



Infiltration Dripper – 38' Downstream MH 06000  
West Main Street

## Infiltration Observations Examples



Infiltration Runner – 272' Downstream MH 05718  
W KL Avenue

## External Utility Examples



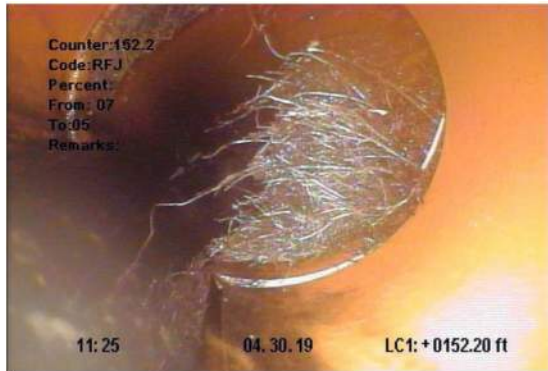
External Utility Penetration – 288' Downstream MH 06522  
Stadium Drive



## Corrosion Examples



Surface Reinforcement Visible – 13' Downstream MH 05990  
Antiqua Circle



Roots (Fine Joint) – 152' Downstream MH 06071  
Drake Road



Roots (Joint) – 170' Downstream MH 05654  
Drake Road

## Root Intrusion Examples



Roots (Ball Barrel) – 257' Downstream MH 05654  
Drake Road





Corrosion of wet well piping



Corrosion of wet well piping, flanges grouted into wall



Signs of infiltration under valve chamber lid





Corrosion of Pump No. 2



Dehumidifier in poor condition

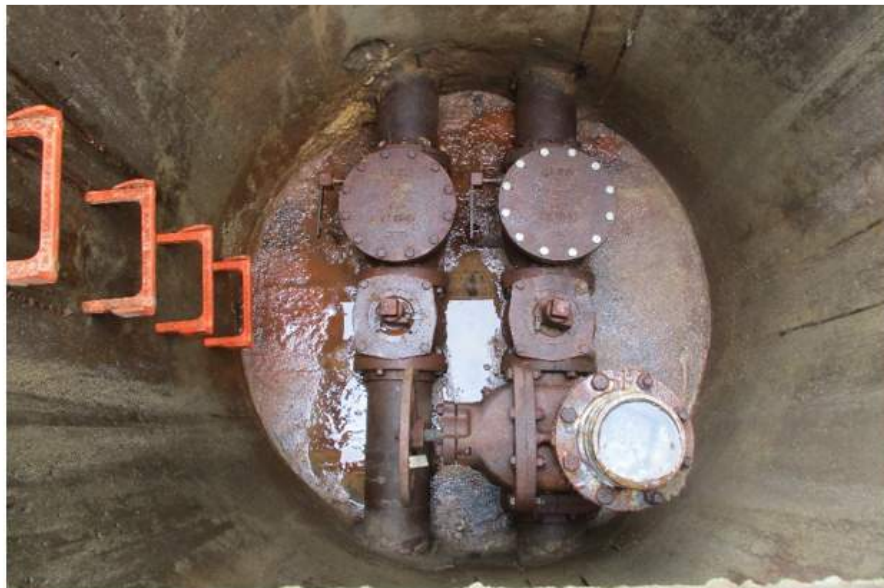


Corrosion of can exterior



Corrosion of can floor, sump pump, and piping





Corrosion of valves and piping in valve chamber



k valve lever arm, corroded valves



Corrosion of valves and piping, accumulation of solids in valve chamber



Corrosion of air release structure piping, valve in poor condition



Broken valve chamber safety grate handle



Grounding electrode not connected to control panel



Intrinsically safe instrumentation cables in same conduit as pump cables



Valve chamber drain pipe partially clogged with roots

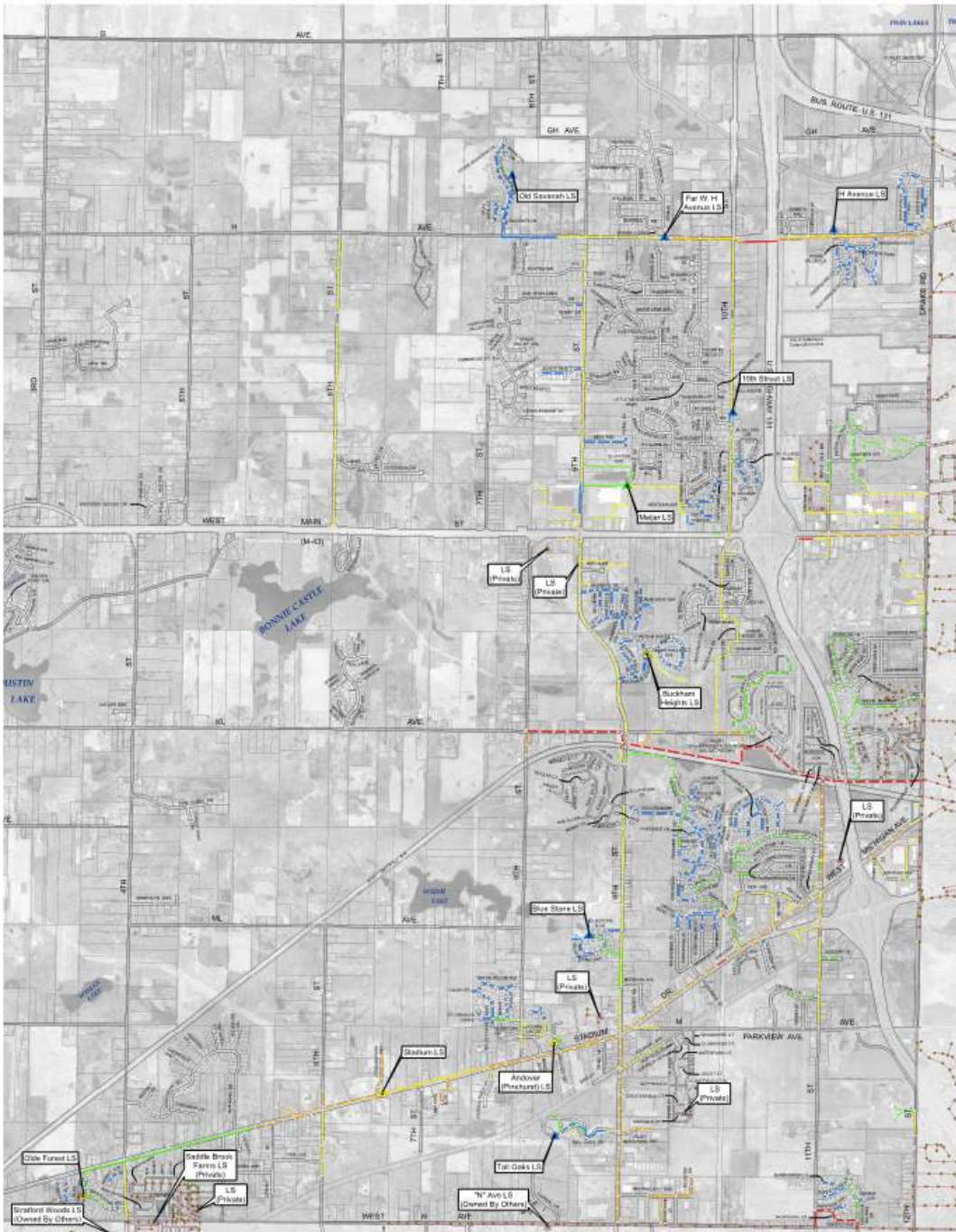


# Charter Township of Oshtemo

Kalamazoo County, Michigan

## Wastewater Collection System Map 10: Consequence of Failure

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### LEGEND

#### Gravity Sewer - Consequence of Failure

- 1 - Lowest Consequence of Failure
- 2
- 3
- 4
- 5 - Highest Consequence of Failure

#### Force Main - Consequence of Failure

- 1 - Lowest Consequence of Failure
- 2
- 3
- 4
- 5 - Highest Consequence of Failure

#### Lift Stations - Consequence of Failure

- 1 - Lowest Consequence of Failure
- 2
- 3
- 4
- 5 - Highest Consequence of Failure

○ Charter Township of Oshtemo Sanitary Manhole

● Sanitary Manhole Owned by Others

▲ Lift Station Owned by Others

— Gravity Sewer Owned by Others

- - - Force Main Owned by Others

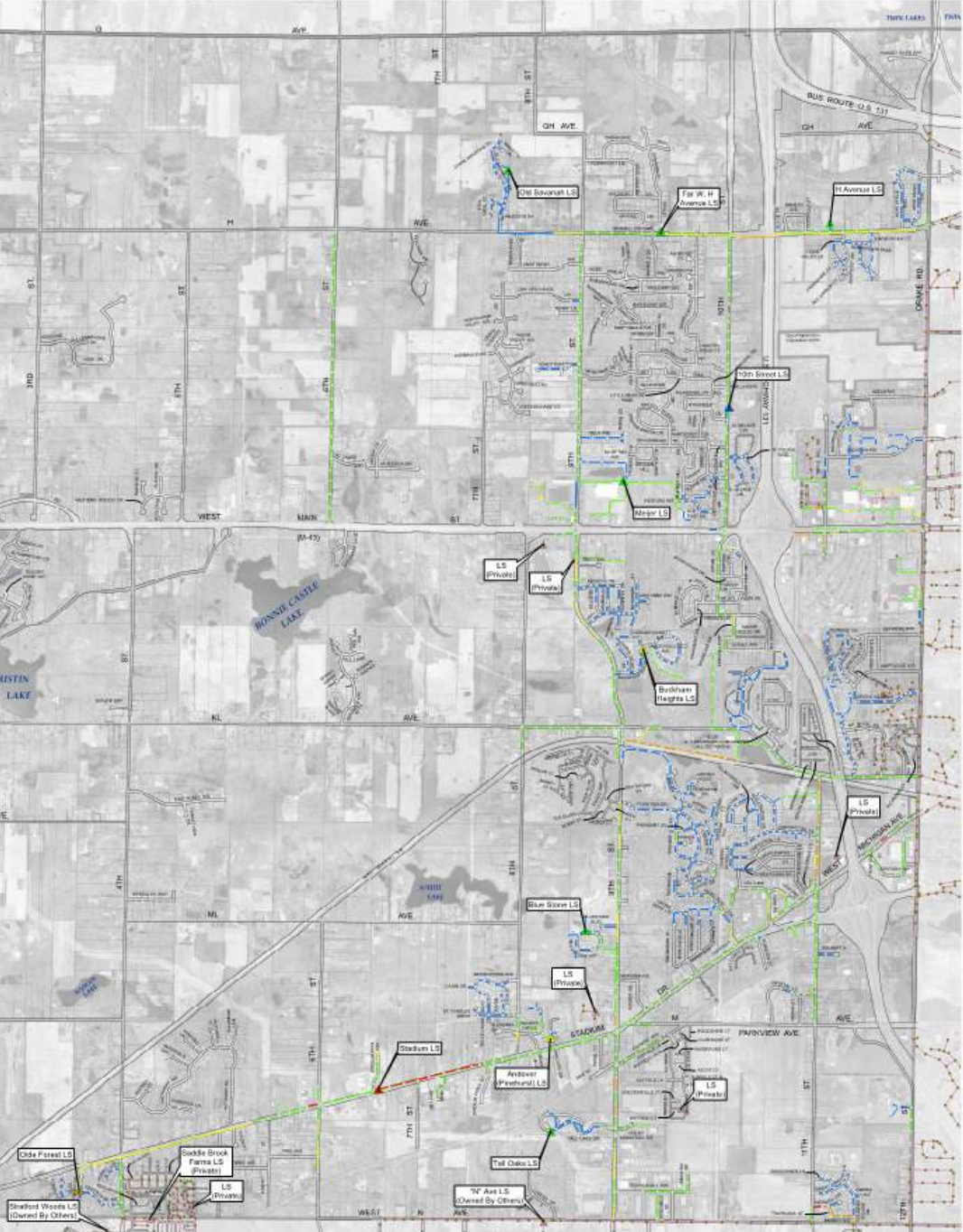
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## Wastewater Collection System Map 11: Criticality

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**LEGEND**

**Gravity Sewer - Criticality**

- Least Critical
- Most Critical

**Force Main - Criticality**

- Least critical
- Most Critical

**Lift Stations - Criticality**

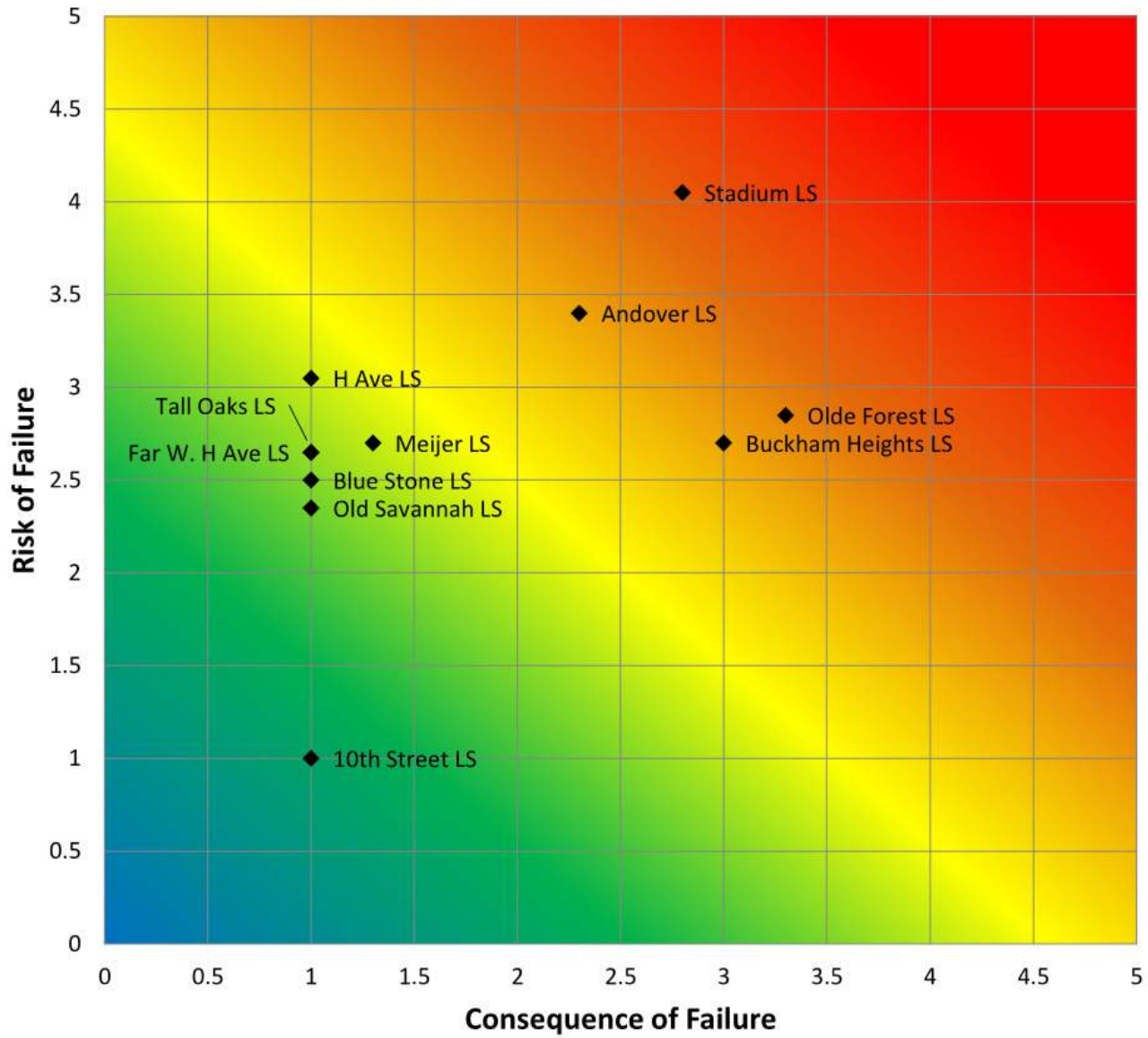
- Least Critical
- Most Critical

- Charter Township of Oshtemo Sanitary Manhole
- Sanitary Manhole Owned by Others
- Lift Station Owned by Others
- Gravity Sewer Owned by Others
- Force Main Owned by Others

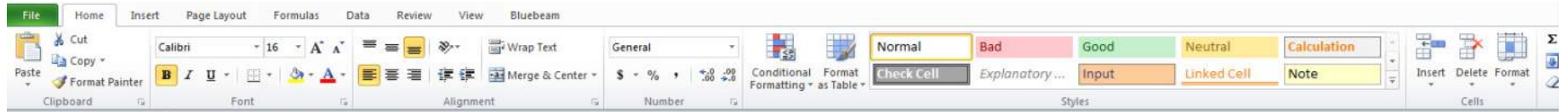
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Criticality Matrix - Lift Stations







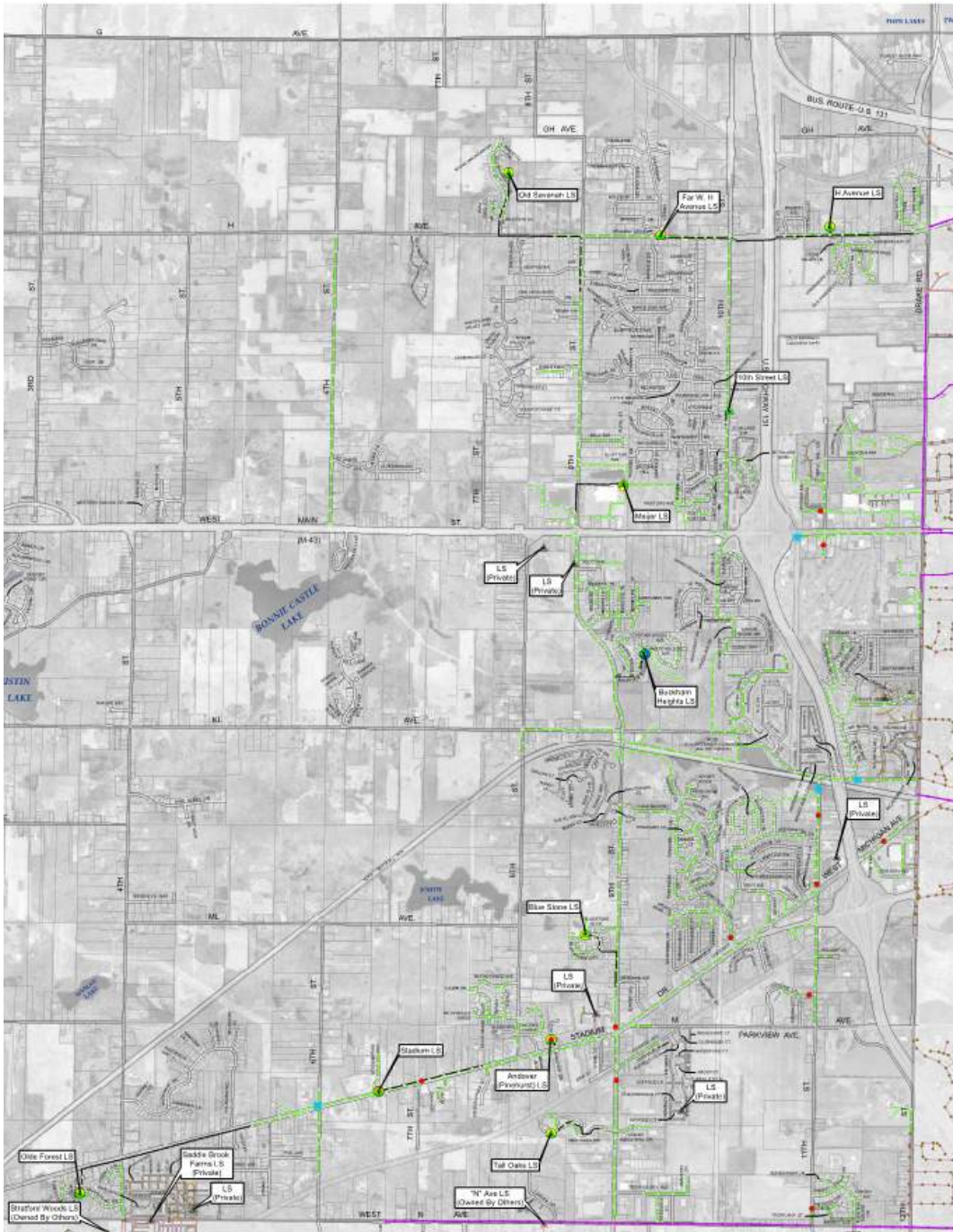
Sanitary Sewer Improvements																										
Pipe ID	Street / Location	From MH	To MH	Type	Length (feet)	Dia	Future Diameter	Sewer Depth	Below Ground Water	Lateral Density	ROF (at time of Cond. Assmt)	COF	Criticality	Install Year	Cond. Assmt Year	Material	Expected Life Cycle (years)	Theoretical Deterioration Rate (ROF increments per year)	Observed Deterioration Rate (ROF increments per year)	Future Deterioration Rate (ROF increments per year)	Max Allowable RoF	Remaining Life (years)	End of Sewer Life Year	Calculated Sewer Adjustment for Road Coordination	Calculated Sewer Replacement Year	Planned Sewer Replacement Year
109	3197 Conrad St	3654	3655		266	10	10	11.33	Yes	High	2	1	2	1970	2015	Truss (Reinforced Plastic)	75	0.05	0.02	0.05	5	55	2071	1	2072	2073
110	3198 Comstock Ave	3655	3656		154	10	10	3.76	Yes	High	1	1	1	1970	2015	Truss (Reinforced Plastic)	75	0.05	0.00	0.05	5	74	2030	1	2031	2088
111	3199 Comstock Ave	5150			5.39	8	8	3.72	Yes	None	5	4	20	1982	2015	Truss (Reinforced Plastic)	75	0.05	0.12	0.12	4	0	2016	0	2016	2016
112	3200 Moline St	4005	4005		252	10	10	10.87	Yes	High	1	1	1	1982	2015	Truss (Reinforced Plastic)	75	0.05	0.00	0.05	5	74	2030	2	2032	2032
113	3220 Moline St	4003	4005		249	10	10	10.94	Yes	High	2	1	2	1982	2015	Truss (Reinforced Plastic)	75	0.05	0.03	0.05	5	55	2071	0	2071	2070
114	3347 N 35th St	1900	1904		377	18	18	16.85	Yes	Low	1	4	4	1975	2015	Concrete	75	0.05	0.00	0.05	4	55	2071	-3	2068	2074
115	3348 N 35th St	1904	1903		75.6	18	18	11.66	Yes	None	3	4	12	1975	2015	Concrete	75	0.05	0.05	0.05	4	16	2034	-2	2032	2032
116	3377 N 26th St	2803			568	10	10	16.81	No	Medium	2	4	8	1997	2015	PVC	75	0.05	0.06	0.06	4	35	2051	1	2052	2052
117	3383 K Ave	2475	2478		351	10	10	12.48	No	Medium	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
118	3384 K Ave	2477	2476		446	10	10	16.34	No	Medium	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
119	3386 K Ave	2471	2472		404	10	10	24.11	No	Medium	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
120	3387 K Ave	2470	2471		318	10	10	25.93	No	Medium	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
121	3439 K Ave	2469	2470		504	10	10	25.93	No	Medium	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
122	3500 K Ave	2468	2469		413	10	10	19.3	No	Medium	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
123	3501 K Ave	2467	2468		410	10	10	11.01	No	Medium	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
124	3502 K Ave	2478	2477		296	10	10	13.4	No	Medium	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
125	3503 Hunt St	3651	3650		348	10	10	13.19	No	Medium	1	4	4	1982	2015	Truss (Reinforced Plastic)	75	0.05	0.00	0.05	4	55	2071	-1	2070	2076
126	3504 Hunt St	3650	3649		373	10	10	12.48	Yes	Medium	1	4	4	1982	2015	Truss (Reinforced Plastic)	75	0.05	0.00	0.05	4	55	2071	2	2073	2075
127	3505 K Ave	2474	2475		267	10	10	11.52	No	Medium	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
128	3506 K Ave	2473	2474		272	10	10	8.96	No	Medium	1	4	4	2003	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
129	3507 E Michigan Ave	3705	3673		284	12	12	13.32	Yes	High	2	5	10	1982	2015	Truss (Reinforced Plastic)	75	0.05	0.03	0.05	4	37	2053	0	2053	2053
130	3508 E Michigan Ave	3706	3705		196	12	12	13.32	Yes	High	1	5	5	1982	2015	Truss (Reinforced Plastic)	75	0.05	0.00	0.05	4	55	2071	2	2073	2066
131	3509 Parcom St	3673	3665		382	12	12	3.95	Yes	High	3	5	15	1982	2015	PVC	75	0.05	0.06	0.06	4	16	2032	-11	2021	2021
132	3511 Parcom St	3661	3660		196	12	12	4.81	Yes	High	2	3	6	1982	2015	Ductile Iron	75	0.05	0.03	0.05	5	55	2071	-4	2067	2068
133	3568	3714	3713		410	18	18	14.46	Yes	Low	1	4	4	2002	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
134	3569	3713			14.4	18	18	14.06	Yes	None	1	4	4	2002	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
135	3576 E Michigan Ave	3626	3625		183	12	12	19.9	No	None	1	5	5	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	-5	2066	2076
136	3577	3625	3624		391	12	12	19.9	No	Low	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
137	3578	3624	3623		394	12	12	13.86	No	Low	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
138	3579	2472	3626		371	12	12	17.68	No	Low	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071
139	3642 Parcom St	3663	3661		162	12	12	3.87	Yes	High	1	3	3	1982	2015	Ductile Iron	75	0.05	0.00	0.05	5	74	2030	-1	2089	2088
140	3643 Parcom St	3665	3663		58.6	12	12	3.65	Yes	High	1	3	3	1982	2015	Ductile Iron	75	0.05	0.00	0.05	5	74	2030	2	2032	2093
141	3644 Gleason St	3649			14.5	10	10	12.79	Yes	None	1	5	5	1982	2015	Concrete	75	0.05	0.00	0.05	4	55	2071	4	2075	2066
142	3679 N 26th St	3331	3682		234	10	10	3.2	No	Medium	1	5	5	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	3	2074	2066
143	3680 N 26th St	3333	3332		423	10	10	10.22	No	Medium	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	3	2074	2067
144	3681 N 26th St	3332	3331		422	10	10	10.22	No	Medium	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	-4	2067	2071
145	3682 N 26th St	3336	3335		293	10	10	15.02	No	Low	2	4	8	1997	2015	PVC	75	0.05	0.06	0.06	4	35	2051	3	2054	2054
146	3683 N 26th St	3335			303	10	10	13.95	No	Low	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	2	2073	2076
147	3684 N 26th St	3334	3333		306	10	10	12.03	No	Low	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	2	2073	2070
148	3685 N 26th St	4875	2800		388	10	10	27.1	No	Low	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2074
149	3686 N 26th St	2800	3337		371	10	10	26.41	No	Low	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	4	2075	2074
150	3687 N 26th St	3337			379	10	10	23.81	No	Low	2	4	8	1997	2015	PVC	75	0.05	0.06	0.06	4	35	2051	3	2054	2054
151	3688 N 26th St	3226	3221		419	10	10	17.96	No	Medium	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	1	2072	2076
152	3689 N 26th St	3221	3219		447	10	10	15.29	No	Low	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	-3	2068	2072
153	3690 N 26th St	3219	3216		451	10	10	18.01	No	Low	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	-5	2066	2071
154	3691 N 26th St	3216	3213		494	10	10	24.83	Yes	Low	3	4	12	1997	2015	PVC	75	0.05	0.11	0.11	4	8	2024	0	2024	2024
155	3692 N 26th St	3213	4875		494	10	10	27.1	Yes	Low	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	1	2072	2073
156	3693	3206	3213		355	10	10	25.12	Yes	Low	1	4	4	1997	2015	PVC	75	0.05	0.00	0.05	4	55	2071	0	2071	2071

# Charter Township of Oshtemo

Kalamazoo County, Michigan

## Wastewater Collection System Map 12: Recommended Improvements

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LEGEND	
<b>Recommended Improvements</b>	
	Eliminate Infiltration
	Utility Penetration Removal
	Point Repair
	Pipe Rehabilitation
	Lift Station - Minor Improvements/Rehabilitation
	Lift Station - Replacement
	Lift Station - Elimination
	Forcemain Replacement
<b>Gravity Sewer System</b>	
	Oshtemo Township Gravity Sewer
	Multiple-Jurisdictional Gravity Sewer
	Gravity Sewer Owned by Others
	Private Gravity Sewer
	Charter Township of Oshtemo Sanitary Manhole
	Multi-Jurisdictional Sanitary Manhole
	Sanitary Manhole Owned by Others
	Private Sanitary Manhole
	Charter Township of Oshtemo Lift Stations
	Lift Station Owned by Others
	Private Lift Station
	Charter Township of Oshtemo Force Main
	Force Main Owned by Others
	Private Force Main

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# **CHARTER TOWNSHIP OF OSHTEMO SANITARY SEWER EVALUATION**

October 27, 2020

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