PROJECT PLAN
FOR THE

Water System Improvement Project

IN THE
CITY OF HOWELL

DWRF PROJECT #_______-____
March 18, 2019 (Draft)

Prepared by:

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Section 1  - Executive Summary

A. Summary

The Project Plan was prepared in accordance with the Michigan Department of Environmental Quality (MDEQ) Drinking Water Revolving Fund Project Plan Preparation Guidance (DWRF) (May 2016). It is based substantially on Water System Master Plan Update and Reliability Study prepared by Hubbell, Roth & Clark, Inc. (HRC) in April 2012 and can be found in Appendix A of this Project Plan. Financial assistance for this project is being sought through the Michigan Department of Environmental Quality (MDEQ). The DWRF provides for financial assistance in the form of low interest loans. DWRF rules call for compliance with basic Federal planning requirements of the National Environmental Policy Act (NEPA). The Final Project Plan serves as a basis for project prioritization by the MDEQ.

The project is submitted as a single project and would require approximately four (4) years to implement and complete, including design, permit acquisition, bidding, financing, construction, and final restoration.

The Study Area consists of the City of Howell. Portions of the City’s water system is undersized and have a considerable amount of water main breaks in areas that are still serviced by 4 and 6-inch lead jointed cast iron mains with suspected lead and galvanized services, which have been in use since the 1950s. Water test results to date do not show signs of problems with lead, but the City would like to be proactive and remove the last known remaining lead components from the water system. This has led to water system reliability uncertainties, water quality concerns and safety concerns. A thorough analysis of the Project Area was prepared for this Project Plan and recommendations for resolving the problems within this area are presented herein. Implementing the recommended improvements will effectively provide the required level of service and improve the water system reliability, and water quality.
B. Conclusions

This Project Plan concludes the following:

1. A portion of the components within the existing distribution system are undersized, have lead joints (possibly lead and galvanized service leads) and have reached their useful design life.

2. Improvements at the water treatment plant are needed to replace components that have reached their useful design life, improve efficiency, improve safety and protect components from corrosion.

3. The City has experienced increased frequency of water main breaks in the system over recent years along Grand River Avenue and Clinton Street.

4. Examination of sections of pipe removed during repairs has revealed the presence of significant scaling and tuberculation.
C. Recommendations

1. Replace approximately 11,500 feet of old lead jointed undersized 4-inch, 6-inch and 8-inch water mains along Grand River Avenue with 8-inch and 12-inch water mains to improve system reliability, water quality, and address safety concerns.

2. Replace approximately 900 feet of 4-inch water main on National Street with 12-inch water main to improve system reliability and water quality.

3. Replace 3,100 feet of 4-inch water main with 8-inch water main along Clinton Street.

4. Remove and replace lead and galvanized water services encountered within the public road right-of-way.

5. Replace approximately 700 feet of 12-inch water main and valves from the North Water Tower in Howell City Park to the existing 12-inch water main in Madison Street to improve system reliability. The existing mains and valves are showing signs of corrosion.

6. Improvements to the Water Plant and wells are needed: Replace the siding with insulated/energy efficient siding to help with heating and improve the corrosion program to extend the life of the cone and new piping that were redone with the 2009 DWRF project; replace the sulfuric acid for pH control with a carbon dioxide system to improve safety; replace the lime slaker and improve the venting to achieve higher temperatures and reduce lime waste; add variable frequency drives at wells 4 & 5 with swing check valves and new 100 Hp motors and upgraded Supervisory Controls and Data Acquisition (SCADA) to eliminate electrical control panel failures.

7. Implement the Project over four (4) years to minimize disruption to the community at large. The project cost estimate is $8,900,000, which includes construction costs, plus 10% construction contingency costs, plus 20% administration, engineering, and legal costs.

8. The City of Howell should apply for a low-interest loan under the State’s DWRF Program for all eligible project costs.
Section 2 - Project Background

A. Project Need

Portions of the City of Howell water system have a significant number of water main breaks in areas that are still serviced by 4-inch, 6-inch and 8-inch cast iron mains and which have been in service for over 50 years. Water test results do not show signs of any lead problems to date, but the City would like to be proactive and remove the last known remaining lead components from the water system. As the system has grown and aged throughout the years, these water mains cannot provide an adequate level of service. Within a water system that is undersized and exhibits lower distribution system flows and breaks, it is conceivable that the quality of water in the distribution system could be compromised. Secondarily, areas of undersized mains within a water system also reduce the system’s level of service as required flows for service and firefighting are usually not available. The City of Howell’s hydraulic model has been updated to evaluate the existing system performance and water main improvements required to meet the City’s desired level of service. A history of the size, location, and year in which recent water main breaks occurred in the City has been cataloged.

A Water Master Plan Update and Reliability Study was completed in April of 2012 for the City of Howell in order to satisfy the requirements of Part 12 of the Michigan Safe Drinking Water Act, 1976 PA 399, as Amended. This master plan update and reliability study confirmed the City staff’s suspicions regarding severe tuberculation in the undersized, aging water mains throughout the City. The undersized mains limits higher flows from passing through the mains; the tuberculation further exacerbates system capacity. The specific locations of these flow restrictions were determined using the hydraulic model and were found to be occurring within the 4- and 6-inch water mains along Grand River Avenue, National Street and Clinton Street. The City of Howell’s Water Master Plan Update and Reliability Study is included in Appendix A for reference.

The improvements at the water plant and wells are required to replace components that are at the end of their useful life, improve efficiency, improve plant safety and improve the overall corrosion protection.
A thorough analysis of the Project Area was prepared for this Project Plan and recommendations for improving system deficiencies within this area are presented herein. Implementing the recommended improvements will effectively address the reliability, quality, and safety concerns. The Project Plan Study Area is shown on Figure 2-1.

1. **Compliance with the Drinking Water Standards**

   Upgrades to the existing City of Howell water system are necessary at this time to fulfill the recommendations expressed in the completed Water System Master Plan Update and Reliability Study. This reliability study was completed to satisfy the Michigan Safe Drinking Water Act, 1976 PA 399, as Amended and substantiates water supply needs and outlines deficiencies that warrant correction.

2. **Orders or Enforcement Actions**

   There are no current or archived court or enforcement orders against the City of Howell.

3. **Drinking Water Quality Problems**

   The City of Howell does not currently experience any drinking water quality issues. However, the City does experience issues with the distribution system during higher flow demands. Consistent delivery and quality of the drinking water can only be achieved with proper operation and maintenance of the existing aging distribution system. When a water main breaks, or a hydrant is opened or gate valve turned, scale and tuberculated matter is dislodged from the main walls and sent through mains in the subject area producing red cloudy water. The City intends to maintain consistent delivery and quality of drinking water and therefore, will address the aforementioned water quality and reliability concerns.

4. **Project Needs for the Next 20 Years**

   The reliability study and hydraulic model recommended replacing the 4-inch and 6-inch diameter water mains with a minimum 8-inch and 12-inch diameter water mains as a viable solution for eliminating water main breaks, and restricted flow during peak demand periods due to pipe size and accumulation of tuberculation. Additionally, this
replacement will also provide necessary capacity to achieve fire flow goals in the study area.

The proposed improvements to the Water Treatment Plant (WTP) and the wells will improve the water system by improving the corrosion protection of cone room, eliminating the use of sulfuric acid and improve lime and well pumping efficiency.

**B. Study Area Characteristics**

1. **Delineation of Study Area**

   The City of Howell is located in the central portion of Livingston County. It is bounded on the north and west by Howell Township, on the east by Oceola and Genoa Townships, and on the south by Marion Township (refer to Figures 2-1 and 2-2). The City consists of approximately 5.3 square miles of land area and approximately 0.4 square miles of surface water, for a total of 5.9 square miles. According to SEMCOG, as of July 2018 the current estimated population for the City of Howell is 9,203.

   Figure 2-1 shows an approximate delineation of the project study area and project service area. Figure 2-2 shows the existing water system and the proposed DWRF improvements.

2. **Land Use**

   The largest three (3) land use types within the City of Howell (excluding open space and utilities) are residential (26.6%), government/institutional (16.0%) and industrial (13.1%). The existing and proposed land use within the City of Howell are shown in Figure 2-3 and 2-4 and summarized as follows:
Table 2-1: Study Area Land Cover

<table>
<thead>
<tr>
<th>Land Cover Type</th>
<th>Acreage</th>
<th>Percent of Total Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>903</td>
<td>26.6%</td>
</tr>
<tr>
<td>Commercial</td>
<td>289</td>
<td>8.5%</td>
</tr>
<tr>
<td>Industrial</td>
<td>446</td>
<td>13.1%</td>
</tr>
<tr>
<td>Institutional</td>
<td>541</td>
<td>16.0%</td>
</tr>
<tr>
<td>Agricultural</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Water/Wetlands</td>
<td>257</td>
<td>7.6%</td>
</tr>
<tr>
<td>Transportation</td>
<td>597</td>
<td>17.6%</td>
</tr>
<tr>
<td>Outdoor Recreation</td>
<td>359</td>
<td>10.6%</td>
</tr>
<tr>
<td>Total</td>
<td>3,392</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

3. Water Demand

Historical total water use and metering records were supplied by the City. A summary of the meter records is provided in Table 2-2.

Table 2-2: Water System Demands

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Day (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>738.4</td>
</tr>
<tr>
<td>2016</td>
<td>756.5</td>
</tr>
<tr>
<td>2017</td>
<td>737.0</td>
</tr>
<tr>
<td>Average</td>
<td>743.9</td>
</tr>
</tbody>
</table>

C. Population Data

Historical population data and projections for the City were obtained from the Southeastern Michigan Council of Governments (SEMCOG) database. Based on July 2018 SEMCOG estimates, the existing population of the City is approximately 9,203 people and the average household size is 2.18 persons per household. As shown in Table 2-3, SEMCOG projects the population to increase by the year 2045.
Table 2-3: Population Projections

<table>
<thead>
<tr>
<th>Year</th>
<th>City of Howell Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>9,489</td>
</tr>
<tr>
<td>2018</td>
<td>9,203</td>
</tr>
<tr>
<td>2040</td>
<td>10,951*</td>
</tr>
<tr>
<td>2045</td>
<td>11,256*</td>
</tr>
</tbody>
</table>

*SEMCOG projections

The 2010 U.S. Census population for the City of Howell was 9,489 persons, which was an increase of 2.8% from the 2000 Census.

The seasonal change of the population in the study area is not large enough to influence the water demand in the City. Also, regions just outside of the current service area are already being provided by the MHOOG water system and should not be considered in the future service area.

For the purposes of the Drinking Water Revolving Fund (DWRF) project plan, a 20-year projection is required for calculations of future system demand and total present worth. Interpolating the data from SEMCOG to the year 2040 results in a population of approximately 10,951 people with an average of 2.27 people per household. A draft copy of the project plan was submitted to SEMCOG for review on March 18, 2019. The correspondence with SEMCOG can be found in Appendix D.

D. Existing Water System

The original water distribution system for the City was constructed in the 1940s through the 1970s and some sections of the original system are still in use today. Over the years, as the City grew, numerous additions and modifications were made to the original system. The existing water distribution system consists of transmission and local distribution mains, varying in size from 4-inches to 16-inches in diameter and totaling over 41 miles, for conveyance of water to its residents.
During the late 1950s a well field and raw water main were installed outside the City, in Marion Township. The City of Howell obtains water from five (5) production wells. Four (4) wells, each with a capacity of 1,000 gallons per minute (gpm), are located approximately two (2) miles southwest of the City in Section 4 of Marion Township. Raw, untreated water is pumped to the City’s WTP from these wells via a 20-inch transmission main along Norton Road. The fifth production well, with a capacity of 350 gpm, is located just east of Pinckney Road and south of Marion Road. There is a sixth well that is reserved for emergency back-up and is located at the City’s WTP. Combined, the wells provide a total capacity of 4,700 gpm with a firm capacity of 3,350 gpm.

In 1992 the current lime softening water treatment plant was completed with a rated treatment capacity of 2,150 gpm or 3.1 MGD. The treated water from the WTP is discharged into a 25,000-gallon clear well which is interconnected with a 630,000-gallon ground storage reservoir. Water from the ground storage reservoir is pumped to the distribution system through four (4) high service pumps. Each pump is rated for 1,100 gpm, at a maximum head of 150 feet. Currently, two (2) pumps are out of service and typically one pump operates at any given time. Occasionally, during peak demand periods, two pumps will operate in parallel to meet system demands. The City also maintains a 300,000-gallon elevated water storage tank in the City of Howell Park referred to as the North Tower.

The City water system has three (3) emergency connections to the Marion, Howell, Oceola, and Genoa Sewer & Water Authority (MHOG) in locations near the edge of the City limits (connection tie-ins: M-59 and Byron Road, Indiana Street and Illinois Drive, East Grand River Avenue and Lucy Road). The MHOG water treatment plant is located three and a half miles west of the City along Norton Road.

Many distribution mains, raw water main, water storage tank and water treatment plant were upgraded to produce a more reliable water system for the residents of the City from 2009 to 2011. Reference can be made to Figure 2-5 for a map of the City’s existing distribution system.
Currently, maintenance of the distribution system is performed on a reactionary basis to problems that may occur as a result of undersized or aging water mains within the distribution system. The section of the main and valves from the elevated storage tank in the City of Howell Park to Madison Street is showing signs of corrosion.

The cone room at the WTP is in need of new siding and insulation to improve the corrosion program and prolong the life of the piping. During the lime softening treatment the City uses sulfuric acid to lower the pH of the water. The use of sulfuric acid possesses a safety risk for the plant personnel and has the potential to damage equipment. The lime slaker is currently run at lower than optimal temperature to avoid clogging of the inlet due to low venting draft and moisture clogging the slaker lime. The City has been experiencing electrical failures at the control panel for wells 4 & 5 due to problems with the switches, solenoids, relays, timer relays and pressure transducers. Many of these components were installed in the 1960s and are in need of replacement. Installation of new variable frequency drives and pumps will reduce the likelihood of electrical failures and emergency service calls.
Legend

- Existing Water Main
- DWRF Water Main
- Future Water Main Improvements
  - Node
  - Booster Station
  - North Tower

City of Howell – DWRF Project Plan

Existing Conditions
2019 Recommended Water Main Improvements

Job No.
20190124

Date
March 2019

Figure No.
2-2
Natural Features

Legend
- Municipal Boundary
- Tax Parcel
- Parks, Recreation, and Open Space
- Water
- Wetlands
- 2 ft Contour

DATE: 3/14/2019
AUTHOR: JLL
CITY OF HOWELL
2020 WATER SYSTEM IMPROVEMENTS
DWRF PROJECT PLAN

ZONING MAP

LEGEND

- B-1 Local Business
- B-2 General Business
- CBD - Central Business District
- H-L Historic Limited
- I-1 Light Industrial
- I-2 General Industrial
- MUX Mixed Use Development
- O-1 Office
- P-1 Parking
- PLU Planned Unit Development
- R-1 Single Family Residential
- R-2 Single Family Residential
- R-M Multiple Family Residential
- T-C Trailer Court
- Township
Legend

- **4” Water Main**
- **6” Water Main**
- **8” Water Main**
- **10” Water Main**
- **12” Water Main**
- **16” Water Main**
- **Node**
- **Booster Station**
- **North Tower**
Section 3 - Analysis of Alternatives

A. Identification of Potential Alternatives

The potential alternatives available to the City of Howell are:

1. “No-Action”
2. Replace Existing System
3. Rehabilitate Existing System
4. Regional Alternatives

1. “No-Action”

For the distribution system replacement this alternative will result in continued use of water system components that are at or near the end of their useful life, unaccounted for water losses, and unnecessary fuel consumption and greenhouse gas emissions. There would still be a potential for water main breaks, low flow conditions, greater energy expended from pumping operations due to greater friction losses, and continued water quality and fire safety concerns for the City of Howell.

For the improvements to water plant and wells this alternative would result in higher heating costs, eventual failure of the treatment plant due to corrosion issues with the cone and piping, continued use of hazardous chemicals for pH control which poses safety risks for personnel and possible damage to equipment, inefficient use of lime and failure of the well pumps & control valves.

The “no-action” alternative is not practical and not considered a favorable option for the proposed sections of the distribution system replacement and the upgrades to the water treatment plant and wells.

2. Replace Existing System

This alternative would consist of replacing the older water main with 8 and 12-inch diameter mains. The total length of water mains to be replaced is 16,100 feet. This water main improvement will reduce friction losses through the distribution system,
decrease costs and energy consumption through reduced pumping, and improve reliability and water quality by reducing potential for breaks. An added benefit to this alternative is improving fire flows at hydrants.

The replacement work at the water plant and wells will replace equipment that has reached its useful life and provide energy efficiency and safety for personnel.

The Replace Existing System alternative is feasible and is the Selected Alternative.

3. Rehabilitation Existing System

This alternative would consist of rehabilitating the existing 4, 6 and 8-inch water main pipes with a structural lining system, such as cured-in-place pipe (CIPP) or close-fit slip lining. The 4-inch pipes would need to be replaced because these lining systems are not practical for small diameter pipes due to difficulty in fully deploying the liner material through the host pipe, and the hydraulic effect due to reduction in diameter from the liner being more pronounced. Preparing the interior pipe surfaces for the lining system is critical to the success of this method. An aggressive cleaning program using multiple passes of metal scrapers and polyurethane pigs is expected to be necessary to prepare the pipes for lining. Where the City has examined the existing pipe sections removed during repairs or for connections, evidence of significant tuberculation in the pipes was found, which is common for unlined cast iron pipes. Furthermore, water systems that historically distributed water from groundwater well sources, such as the case in the City, commonly have significant tuberculation and scaling. The time, effort, and inconvenience to the water customers, whose water service is disrupted during the cleaning process, for pipe cleaning and preparation will add to the cost of this method. The rehabilitation of the existing system using structural lining systems will reduce friction losses through the distribution system, decrease costs and energy consumption through reduced pumping, and improve reliability and water quality by reducing potential for breaks. However, the cost to implement this alternative would not be expected to be less than the system replacement alternative and may result in a longer period of disruption to water customers. The additional benefit of improved fire flows associated with the system replacement alternative would not be realized with the rehabilitation alternative.
The components at the water plant and wells are at the end of their useful life and need replacement. A rehabilitation method does not exist for the proposed improvements.

Therefore, while feasible, the Rehabilitate Existing System is not considered a favorable option.

4. Regional Alternatives

The Regional alternatives examine the potential for the water system to serve outside areas or to be served by neighboring water systems. Under this alternative, the City would most likely rely on the Marion, Howell, Oceola, and Genoa Sewer & Water Authority (MHOG) to provide water to the City of Howell.

The existing MHOG water treatment plant is located three and a half miles west of the City of Howell and has a capacity of 12.0 MGD. Current average day demand for the MHOG plant, per MHOG officials, is 1.81 MGD and the current maximum day demand is 4.52 MGD. Due to the considerable spare capacity at the MHOG WTP, Howell should be able to continue to rely on their system for emergency flow. A permanent reliance on MHOG for the entire City Water Supply, however, is not feasible due to future water demands in the MHOG service area.

B. Analysis of Principle Alternatives

The principle alternative consists of replacing the existing 4- and 6-inch water mains with 8-inch and 12-inch water mains and improving the conditions at the water plant and wells. As previously discussed, the City of Howell’s 2012 Water Reliability Study was updated as part of this DWRF Project Plan preparation. The hydraulic model was updated with all new/replaced water main since 2012. This was done as shown in Figure 3-1; approximately 6,600 linear feet (lft) of 8-inch water main and 400 lft of 12-inch water main were constructed since 2012. Refer to Figure 3-2 for existing water system pipe sizes and Figure 3-3 for with year built (in decades).

In addition to updating the water main, the system demands from 2012 were reviewed against the recent annual WTP daily flows as listed in Table 3-1.
Table 3-1: 2012 Demand Versus Recent Annual WTP Production

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Day Demand (gpm)</th>
<th>Max Day Demand (gpm)</th>
<th>Peak Hour (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>965</td>
<td>1,631</td>
<td>2,804</td>
</tr>
<tr>
<td>2015</td>
<td>738</td>
<td>1,301</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>756</td>
<td>1,314</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>737</td>
<td>1,145</td>
<td></td>
</tr>
</tbody>
</table>

Upon review, the system demands were adjusted to reflect the largest demand from the recent three (3) years of data (specifically to 2016 data).

Calibration of the system (via pipe roughness values) was achieved based on data recorded from 39 hydrant flow tests conducted in 2015. The general calibration process is described in detail in the 2012 Water Reliability Study. Table 3-2 lists the pipe roughness from 2012 and the calibrated 2019 pipe roughness.

Table 3-2: Calibrated Pipe Roughness

<table>
<thead>
<tr>
<th>Size</th>
<th>Pipe Group</th>
<th>Year Built</th>
<th>2012 Calibrated Roughness</th>
<th>2019 Calibrated Roughness</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-8</td>
<td>0</td>
<td>1918-1985</td>
<td>86</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1986-1995</td>
<td>101</td>
<td>108</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1996-2005</td>
<td>122</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>&gt;2005</td>
<td>133</td>
<td>127</td>
</tr>
<tr>
<td>10-12</td>
<td>4</td>
<td>1918-1985</td>
<td>96</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>1986-1995</td>
<td>108</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>1996-2005</td>
<td>124</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>&gt;2005</td>
<td>138</td>
<td>135</td>
</tr>
<tr>
<td>16</td>
<td>8</td>
<td>1918-1985</td>
<td>103</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>&gt;1986</td>
<td>139</td>
<td>136</td>
</tr>
</tbody>
</table>

Figure 3-4 shows the resultant pressure contours for the updated 2019 model and Figure 3-5 shows the required water main sizes in order to provide an adequate level of service under all demand conditions. Figure 3-6 shows the resultant pressure contours based on the proposed water main replacement project.
This alternative includes the following principal items of work and estimated costs:

### Table 3-3: Project Cost Estimate

<table>
<thead>
<tr>
<th>Item</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Plant &amp; Well Improvements</td>
<td>$975,000</td>
</tr>
<tr>
<td>Clinton St, National St &amp; North Tower Water Main Improvements</td>
<td>$1,400,000</td>
</tr>
<tr>
<td>West Grand River Avenue Improvements</td>
<td>$2,675,000</td>
</tr>
<tr>
<td>East Grand River Avenue Improvements</td>
<td>$3,850,000</td>
</tr>
</tbody>
</table>

**TOTAL ESTIMATED PROJECT COSTS**

*Project Costs include Construction Cost, 10% Construction Contingency, and 20% Administration, Engineering & Legal Costs*

Table 3-4 represents a comparison of the estimated capital costs, present worth, and equivalent costs related to the distribution system improvements. Present worth computations are based on a 0.200% EPA discount rate over the 20-year planning period. A salvage value for all structural components was calculated using a 50-year life expectancy and equipment components using a 20-year life expectancy. Salvage value was calculated using straight line depreciation. Operation, maintenance, and replacement (OM&R) costs were estimated from the City of Howell’s Department of Public Works O&M budget.
Table 3-4: Present Worth Costs

<table>
<thead>
<tr>
<th>Present Worth Amt</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Costs</td>
<td>$ 8,900,000</td>
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<tr>
<td>Annual OM&amp;R Costs</td>
<td>$ 42,640</td>
</tr>
<tr>
<td>PW of Salvage Value</td>
<td>$ 3,560,000</td>
</tr>
<tr>
<td>Net Present Worth</td>
<td>$ 5,391,000</td>
</tr>
<tr>
<td>Equiv. Annual Cost of PW</td>
<td>$ 269,550</td>
</tr>
</tbody>
</table>

Notes:
Net Present Worth is the sum of capital costs, OM&R costs, less salvage value.
Present Worth Costs are based on Straight Line Depreciation and no inflation.
Cost is based on a study period of 20 years and a discount rate of 0.200%.
(Estimated ENR CCI = 10532)

C. **Environmental Factors**

The principle alternative presented describes replacement of existing undersized water mains that have reached their design life and have been experiencing numerous breaks in recent years. The proposed replacement methods would include horizontal directional drilling (HDD), and open-cut. While the HDD method is considered to be “trenchless” technologies and the majority of the pipe would be installed without surface disturbance, open-cut excavations are necessary at the daily starting/stoping points during installation, at tees, bends and other fittings, at hydrant locations, utility crossings, and each service connection. The possible replacement method carries the same potential environmental impacts related to open-cut excavation, and the following synopsis of the environmental setting and potential environmental and public health impacts apply to each. Where one method or another poses a unique potential impact, it will be addressed separately.

1. **Cultural Resources**

There are no anticipated permanent impacts on any historical, archeological, geological, cultural or recreational areas due to this construction. The Howell Downtown Historic District is roughly bounded by Clinton Street, Barnard Street, Sibley Street and Chestnut Street. The water main replacement work will not have a permanent effect on the historic nature of this area. The relatively shallow excavations needed to complete the proposed work will be contained within public road rights-of-way and dedicated...
c easements. Water main replacement work generally occurs at the same location as the existing water main or in close proximity for HDD or open-cut methods. Restoration of surface features disturbed by construction will match existing conditions as much as practicable. When construction plans are prepared for work in this area, the appropriate agencies/authorities will be contacted to ensure provisions in the contract documents address restoration efforts to maintain the aesthetic and historic feel of the district.

2. The Natural Environment

Climate

The project area’s climate is controlled by its location with respect to major storm tracks that pass through the Midwest and by the influence of the Great Lakes. The normal winter time storm track is southeast of the Study Area, and most passing storms bring periods of snow or rain. The Great Lakes tend to moderate and smooth out most climate extremes. Precipitation is distributed through all months of the year. The most pronounced effect on the climate by the Great Lakes occurs in the colder part of the winter. Arctic air moving across the lakes is warmed and moistened. Cold waves approaching from the northern plains are reduced in intensity, which lessens the severity of these events. However, there is also an excess of cloudiness and very little sunshine in the winter.

Summers in the Detroit metropolitan area are warm and sunny. Showers usually occur every few days, but often fall on only part of the Metropolitan Detroit area. Extended periods of drought are unusual. Each year, there are two or three series of days with temperatures in the nineties. The highest temperatures are often accompanied by high humidity. In winter, skies are cloudy and temperature averages near the freezing point. Day to day changes typically are not significant. The temperature drops to near or a little below zero once or twice each year. Winter storms may bring rain, snow, or both. Freezing rain and sleet are not unusual. Snowstorms average about three (3) inches of accumulation, but heavier amounts are generally recorded several times each year.

The growing season averages 180 days in length and has ranged from 145 days to 205 days. Average date of the last freezing is April 23; average date of the first freezing
temperature is October 21. A freeze has occurred as late as May 12 and as early as September 23.

Climatological data is collected by the National Oceanic and Atmospheric Administration (NOAA) at Detroit Metropolitan Wayne County Airport. This project, and the alternatives discussed, will have no impact on the climate of the project area.

Air Quality
In general, air quality in Livingston County is in compliance with all applicable standards. This project, and the alternatives discussed will have no impact on the quality of the air in the Project Area.

Wetlands
The major water body in the City of Howell is Thompson Lake, which is fed by natural springs and the local watershed. Thompson Lake is located in the northeast portion of the City. There are localized wetlands associated with the lake and the Marion-Genoa Drain in the southern portion of the City. However, there are not wetlands associated with the proposed limits of work. For final design, any wetlands that may be impacted would be flagged and the appropriate permits will be applied for. However, it is not anticipated to be an issue for this project.

The proposed improvements to wells 4 and 5 will occur at the well field located in Marion Township located outside of the City. This location does not have any wetland within the existing well house.

Wetland maps are shown in Figure 3-7.

Coastal Zones
There are no coastal zones located with the Project Area and therefore no impacts are anticipated.
**Floodplains**

The proposed Project Areas do not fall within any 100-year floodplain; therefore, no impacts are anticipated. This was determined by reviewing the National Flood Insurance Map for the area. Steps will be taken to avoid any work which would affect the floodplain. Any work which does impact the floodplain will only be undertaken after first contacting the MDEQ and obtaining the appropriate permits.

FEMA floodplain areas are shown on Figure 3-7.

**Natural or Wild and Scenic Rivers**

The rivers within the study area have recreational and aesthetic value but are not classified as “Natural” or “Wild and Scenic” by the Michigan Department of Natural Resources (MDNR).

**Major Surface Waters**

Major surface water bodies in the City of Howell include Thompson Lake on the east boundary and other miscellaneous small lakes scattered throughout the City. Other surface water bodies include the southwest branch of the Shiawassee River, the Marion & Genoa Drains, and miscellaneous drains throughout the City.

**Topography**

The terrain within the City of Howell is characterized by rolling topography and scattered small lakes. The lowest elevation is 835 feet (above sea level) and the highest point is 1,070 feet. The largest body of water, Thompson Lake static water level is approximately 904 feet with the majority of the City of Howell between 910 and 950 feet.

**Geology**

Livingston County mainly consists of outwash deposits. This glacial material, referred to as glacial drift, was deposited as the glaciers receded from this area of the continent approximately 18,000 years ago. Underlying the glacial drift is bedrock, which consists of gently to rolling sedimentary rock formation. Four types of bedrock make up the bedrock surface in Livingston County, which include Marshall Sandstone, Coldwater Shale, Michigan Shale, and Saginaw Shale.
Soils
According to the Michigan Geographic System Soils layer, the project area mainly consists of four types of soils, Boyer-Fox-Wasepi, Miami-Conover-Brookston, Miami-Hillsdale-Edwards and Spinks-Houghton-Boyer.

As part of the final design process, soil borings will be taken near the proposed work areas to determine if any special construction methods will be needed.

Agricultural Resources
There is no agricultural land located within the City limits. Marion Township has approximately 5,840 acres of agricultural land. However, the proposed work is all within the City of Howell and within the existing well house in Marion Township. Therefore, the Township agricultural resources will not be impacted by the proposed work.

Existing Plant/Animal Communities
Wildlife within the study area includes animals and birds normally associated with urban or agricultural environments.

The Michigan Natural Feature Inventory and U.S. Fish and Wildlife (USFW) Technical Assistance website was reviewed for federally or state listed threatened and endangered species. According to the USFW website, two (2) endangered species, the Indiana bat and Snuffbox mussel, are listed as being located within Livingston County. The Indiana bat usually lives in wooded areas. The Snuffbox mussel lives in medium sized creeks with swift currents. In addition to the two (2) endangered species, there is also one candidate species, the Eastern Massasagana rattlesnake, known to occur in Livingston County. The usual habitat for this type of snake is wetland areas and prairie fens. As all of the work is to take place on land which is already developed, therefore will be no impacts to these types of habitats.

According to the USFW Technical Assistance website, there is one (1) threatened plant species, the East Prairie Fringed Orchid, known to occur in Livingston County. Again, because all work is proposed on land which is already developed, there will be no
impacts to the plant. The US Fish and Wildlife and the Michigan Natural Features Inventory (MNFI) were contacted regarding endangered species. MNFI has indicated that there is one state-threatened species, the spotted turtle, which may be located in the project area. However, the proposed improvements are all to take place on land that is already developed, and no impacts are anticipated.

All correspondence regarding endangered/threatened plants or animals is included in Appendix D.

Recreational/Unique Features
The City of Howell and surrounding communities has 21 parks which offer a wide selection of activities, including ball fields, a boat launch, tennis courts, and walking/biking trails. In addition to these parks, the City has several other publicly owned facilities including an Aquatic Center, Teen Center, and Senior Center. The water main and valve replacement from the North Tower to Madison Street will occur at the entrance to the Howell City Park. The disturbed area will be restored to its preconstruction condition. No other parks or other publicly owned facilities will be impacted by the proposed work.

D. Implementability
The City of Howell Water System is a stand-alone distribution system. Implementation of the alternative chosen does not require inter-municipal agreements or creation of an operating authority. The City owns and operates the entire system. The work as described in the chosen alternative will take place within the existing road rights-of-way or dedicated easements. The City of Howell is familiar with the technical, financial, legal and administrative aspects of this type of project.

Portions of the proposed project will occur in the road rights-of-way under the jurisdiction of the City and the Michigan Department of Transportation (MDOT). MDOT jurisdiction includes Grand River Avenue. When construction plans are prepared, the necessary MDOT permit for working in their right-of-way will be applied for.
The implementation of the alternative is predicated on receipt of DWRF funding for all proposed items of work. Should funds not be made available for the City of Howell to pursue the improvements, the City would likely choose to delay until a DWRF loan is obtained or divide the project into smaller parts and implement them over a significantly longer duration.

As required by the DWRF guidelines the public will be provided an opportunity to comment on the alternative chosen. The public participation is detailed in Section 7.

E. Technical & Other Considerations

The principle alternative will comply with Act 399 and will be designed to meet the standard recommended guidelines established in the “Recommended Standards for Waterworks” as published by the Great Lakes and Upper Mississippi Board of State Sanitary Engineers (also known as 10-States Standards).

1. Reliability

A Water Master Plan Update and Reliability Study was completed in April of 2012 for the City of Howell in order to satisfy the requirements of Part 12 of the Michigan Safe Drinking Water Act, 1976 PA 399, as Amended. The hydraulic model was updated as part of this project plan and included the proposed water main replacements. Implementation of this alternative will improve reliability of the system because water mains that have experienced 11 breaks since 2010 are designated for replacement. Service interruptions will be reduced as well as the water system’s exposure to soil and groundwater that could possibly affect the quality of the water being supplied to customers. The improvements at the water plant and wells will improve the reliability of the water system supply and treatment.

2. Contamination

The principle alternative includes replacement of water mains in public road rights-of-way that are adjacent to a number of parcels that are included on the current MDEQ RRD Facilities List. During preparation of construction plans in these areas, the potential impact of these facilities will be further investigated. Construction projects will include provisions in the contract documents related to handling and disposal of suspected contaminated soils and groundwater, and precautions for workers and others
to take who may be exposed to the contamination. If the investigation during preparation of the plans confirms the presence of contaminated soil and groundwater in the proposed work area, the nature of the contamination will be characterized and appropriate design measures will be taken, such as selection of water main and gasket materials that are impermeable to the type of contaminants that may be present. MDEQ will be notified of this work as part of the Act 399 permit application process. In either case, the proposed work will not worsen any existing contamination that may be found. Excavated contaminated soils will be segregated, stockpiled, and protected until they can be properly disposed of, such as at a Type II landfill. The listed facilities are shown on Figure 3-8.
Legend

- **Existing Water Main as of 2012**
- **New Water Main since 2012**
- **Node**
- **Booster Station**
- **North Tower**
Legend
- 4” Water Main
- 6” Water Main
- 8” Water Main
- 10” Water Main
- 12” Water Main
- 16” Water Main
- Node
- Booster Station
- North Tower

City of Howell – DWRF Project Plan

2019 Existing Water System Pipe Sizes
Legend

- **4" Water Main**
- **6" Water Main**
- **8" Water Main**
- **10" Water Main**
- **12" Water Main**
- **16" Water Main**
- **Water Treatment Plant**
- **North Tower**

Year Built:
- **≤ 1950**
- **1950 < Year Built ≤ 1960**
- **1960 < Year Built ≤ 1970**
- **1970 < Year Built ≤ 1980**
- **1980 < Year Built ≤ 1990**
- **1990 < Year Built ≤ 2000**
- **2000 < Year Built ≤ 2010**
- **Year Built > 2010**
Average Day Demand

Maximum Day Demand

Peak Hour Demand

Legend

- Pressure (psi) < 20
- 20 < Pressure (psi) < 35
- 35 < Pressure (psi) < 40
- 40 < Pressure (psi) < 45
- 45 < Pressure (psi) < 50
- 50 < Pressure (psi) < 55
- 55 < Pressure (psi) < 60
- Pressure (psi) > 60

- Node
- Pipe
- Booster Station
- North Tower

City of Howell – DWRF Project Plan

2019 Existing Conditions
Pressure Contours
Legend

- Existing Water Main
- DWRF Water Main
- Future Water Main Improvements
- Node
- Booster Station
- North Tower

City of Howell – DWRF Project Plan

Existing Conditions

2019 Recommended Water Main Improvements
Average Day Demand  
Maximum Day Demand

Peak Hour Demand

Legend
- Pressure (psi) < 20
- 20 < Pressure (psi) < 35
- 35 < Pressure (psi) < 40
- 40 < Pressure (psi) < 45
- 45 < Pressure (psi) < 50
- 50 < Pressure (psi) < 55
- 55 < Pressure (psi) < 60
- Pressure (psi) > 60

Node
Pipe
Booster Station
North Tower
Section 4 - Selected Alternative

A. Description

The Replace Existing System alternative is preferred for the implementation of the Water System Improvements. The following improvements are recommended:

**Distribution System:**
- Remove the existing 4-inch, 6-inch and 8-inch water mains along Grand River Avenue and replace with 8-inch and 12-inch mains.
- Remove the existing 4-inch water main on National Street and replace with a 12-inch water main.
- Remove existing 4-inch water main on Clinton Street and replace with 8-inch water main.
- Remove the existing 12-inch water main from the north tower and replace with 12-inch water main to Madison Street and new valves.

**Supply and Treatment System:**
- Replace the siding at the Water Plant with insulated/energy efficient siding.
- Replace the sulfuric acid system for pH control with a carbon dioxide system.
- Replace the lime slaker and install a vent and scrubbing system.
- Install variable frequency drives at wells 4 & 5 with swing check valves and new 100 Hp motors.

Portions of the City of Howell water system have a considerable amount of water main breaks in areas that are still serviced by 4-inch, 6-inch and 8-inch cast iron mains which have been in service for over 50 years. This has led to water system reliability uncertainties, water quality concerns and safety concerns. Within a water system that exhibits water main breaks, it is conceivable that the quality of water in the distribution system could be compromised. Secondly, areas of low flow within a water system also causes safety concerns as required flows for firefighting are usually not available. Implementing the recommended improvements
identified in the 2012 Water Master Plan Update and Reliability Study will effectively address the reliability, quality, and safety concerns.

B. Design Parameters & Project Schedule

Proposed water main will be designed to meet Act 399 requirements. The City of Howell follows their own design standards for their water distribution system, which requires water mains to have a minimum 8-inch diameter in residential areas and 12-inch diameter in commercial and industrial areas (Grand River Avenue and National Street). Implementation of the recommended improvements will achieve this standard. Hydraulic modeling of the water system indicated that replacement of the existing 4 and 6-inch water mains will improve the system flows and confirmed the need for 12-inch mains along Grand River and National Street in the commercial and industrial areas. Results from the water system modeling are presented in the 2012 Water System Master Plan Update and Reliability Study, which is included in Appendix A for reference.

The improvements to the Water Plant and wells will make necessary upgrades to replace components that are beyond their useful life.

1. Installation Methods

The methods for the proposed water main replacement will include horizontal directional drilling (HDD) and open-cut. The site conditions and constraints vary in different parts of the City and may dictate the optimum method of replacement that balances impacts to the public and environment, and construction efficiencies. The City expects that a large portion of the water main replacement will be by HDD method. Open-cut methods may be feasible in areas where the water main replacement is coordinated with street paving activities, where appropriate clearances to other underground utilities is not provided, or when many service connections, tees, bends and other fittings are present along a particular length of main.

2. Pipe Materials

New water main installed by the HDD method will be AWWA C906 HDPE. The pipe wall thickness will be DR11 at a minimum. Water main installed by open-cut methods
will be AWWA C151 ductile iron pipe, thickness class 52 in accordance with City of Howell Standards.

3. Project Phasing & Schedule

Preliminary planning for the project outlines that the proposed water main replacement improvements would be completed in three (3) phases and the water plant improvements in a separate phase. Following approval for the DWRF loan, the City would begin design of the water plant and well improvements. The City would proceed with a similar design and construction schedule for the water main replacements in the following years. Table 4-1 shows the proposed DWRF project plan schedule and Table 4-2 outlines the expected timeline and expenditures for design and construction of each phase.

### Table 4-1: Proposed DWRF Project Schedule

<table>
<thead>
<tr>
<th>Task</th>
<th>Complete On or Before</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Hearing Notice</td>
<td>March 17, 2019</td>
</tr>
<tr>
<td>Place Draft Project Plan on Public Record</td>
<td>March 18, 2019</td>
</tr>
<tr>
<td>Formal Public Hearing</td>
<td>April 22, 2019</td>
</tr>
<tr>
<td>Council Resolution of Project Plan Adoption</td>
<td>April 22, 2019</td>
</tr>
<tr>
<td>Submit Final Project Plan to MDEQ for DWRF Consideration</td>
<td>May 1, 2019</td>
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</tbody>
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### Table 4-2: Project Phasing

<table>
<thead>
<tr>
<th></th>
<th>Design</th>
<th>Const</th>
<th>DWRF</th>
<th>Project Cost by Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year</td>
<td>Year</td>
<td>FY</td>
<td></td>
</tr>
<tr>
<td>Phase 1 – Water Plant</td>
<td>2019</td>
<td>2020</td>
<td>Q3 2020</td>
<td>$ 975,000</td>
</tr>
<tr>
<td>Phase 2 – Clinton St</td>
<td>2020</td>
<td>2021</td>
<td>Q3 2021</td>
<td>$ 1,400,000</td>
</tr>
<tr>
<td>Phase 3-West Grand River</td>
<td>2021</td>
<td>2022</td>
<td>Q3 2022</td>
<td>$ 2,675,000</td>
</tr>
<tr>
<td>Phase 4-East Grand River</td>
<td>2022</td>
<td>2023</td>
<td>Q3 2023</td>
<td>$ 3,850,000</td>
</tr>
<tr>
<td>Total Project</td>
<td></td>
<td></td>
<td></td>
<td>$ 8,900,000</td>
</tr>
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</table>

The design period for each phase would likely start in October of the year noted and be completed by February of the next calendar year. The project would be advertised and bid upon receipt of all necessary permits, with contract award expected by May. Construction would start by June and be completed by November. Specific dates would
be adjusted to meet the DWRF Financing and Milestone Schedules adopted for each year of the project.

C. Monetary Cost Estimate

The capital cost estimate for the replacing the water mains as presented herein was based on sound engineering judgment and past project experience. The estimated project cost breakdown of each construction phase in this Project Plan is listed in Table 4-2.

Along with the DWRF Project Plan for this project, the City of Howell will be applying for Green Project Reserve credit. The project presented herein is considered to be a Water Efficient Project by replacing aging pipes with higher occurrences of leaks and breaks. The Pipe Replacement Business Case for this project is included in Appendix B. The estimated capital costs provided herein do not include any potential credits this project may be eligible for. The City would use the award of any credits to reduce the amount of the DWRF loan required to complete the project as presented.

D. User Costs

User costs will be developed to recover the additional costs necessary to implement the Project Plan. Actual user charges are developed and adopted by the City of Howell on an annual basis, and may vary with such factors as:

- The availability and receipt of a Drinking Water Revolving Fund (DWRF) loan.
- Actual operational maintenance costs experienced by the upgraded water systems.
- Actual future increases in wholesale water prices.
- Additional charges to establish a fund for future replacement of the system.

Estimates of user costs have been developed based on the capital cost estimates for the Project presented herein, and current flat rate user charges for existing facilities. Note that annual operating costs are not included because they will not be more than the current costs to the City for operating the distribution system. The entire amount of debt retirement will be allocated to the water rate charged to customers based on their units of water (1,000 gallons) consumed. Fixed charges and other non-flow related fees associated with the utility are not changed due to
this project. The annual equivalent cost for the project is $544,295 (20-year DWRF loan amount of $8,900,000, with an annual interest rate of 2.00%).

The City’s residential customer base currently represents approximately 62.7% of the billed sales with 2,458 residential accounts. The user cost estimate is presented below in Table 4-3.

<table>
<thead>
<tr>
<th>Total Yearly Project Cost</th>
<th>$544,295</th>
</tr>
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<tbody>
<tr>
<td>Total Yearly Project Cost – Residential</td>
<td>$341,273</td>
</tr>
<tr>
<td>Estimated Monthly Cost – Residential</td>
<td>$11.57</td>
</tr>
</tbody>
</table>

**Table 4-3: Estimated User Costs**

E. **Disadvantaged Community Information**

The City of Howell is not considered a disadvantaged community.

F. **Ability to Implement Selected Alternative**

The City of Howell DWRF Project Plan is made up of basic water infrastructure and maintenance projects in which no foreseeable problems are attributable. Any adverse impacts will be minimized through enforcement of contract provisions and the beneficial impacts of the improvements encourage implementation. Additionally, there is no opposition within the City to the improvements associated with Selected Alternative. Therefore, the City of Howell has the ability to implement this Project Plan without difficulty.

Portions of the proposed project will occur in the road rights-of-way under the jurisdiction of the Michigan Department of Transportation (MDOT). MDOT jurisdiction includes Grand River Avenue. When construction plans are prepared, the necessary MDOT permit for working in their rights-of-way will be applied for.
Section 5 - Evaluation of Environmental Impacts

A. General

Following is a comprehensive overview and evaluation of potential impacts that may occur as a result of the selected alternative. Beneficial and adverse impacts for both the long and short term are discussed, as well as the direct and indirect impacts.

B. Beneficial Long Term Impacts

The principal beneficial long-term impacts resulting from the replacement of existing water mains will be: attained minimum pipe sizing standards (8-inch diameter residential and 12-inch diameter commercial/industrial), reduced frequency of water main breaks and increased water quality, system reliability and flow consistency. The long-term benefit for the improvements to the water plant and wells will result in protection from corrosion, increased efficiency and safety. This will strengthen consumer confidence, enhance the quality control of the drinking water and minimize potential water quality problems for the residents of the City of Howell.

C. Adverse Long Term Impacts

No significant adverse long term impacts have been identified. No new facilities or impervious pavements will be installed as a part of this project and impacts due to actual construction of the project will be short term.

D. Beneficial Short Term Impacts

The principal beneficial short term environmental impacts that will result from this project are similar to the long term; see beneficial long term impacts list in Section 5B above.

E. Adverse Short Term Impacts

Short term adverse environmental impacts of the water main replacements are similar to those of any construction project and include noise, dust, traffic disruption, and soil erosion; however, all
replacements of the water mains as part of this project will be within existing structures, road rights-of-way and easements. In this way the replacement of the water main itself will not add significantly to these impacts. In addition, adverse impacts due to the construction process will be minimized by enforcement of the contract provisions for noise, dust, traffic, and soil erosion control.

Due to the nature of water main replacement projects, isolated excavations for drilling pits and open cut pipe trenches are expected. As was described in Section 2, floodplains, wetlands and river or lake crossings do not exist within the project limits. Therefore, no long-term impacts will result from the water main replacement project.

Any short term negative impacts of both aspects of this project will by far be surpassed by the long term environmental benefits.

**F. Direct Impacts**

Direct impacts are environmental impacts directly attributed to the construction and operation of the project. This may include impacts to: historically, archaeologically, geologically, culturally or recreationally significant areas; existing and future air quality, waste management and contaminations; land-water interfaces; sensitive ecosystems; agricultural land; and the economy and human society.

1. **Historical/Archaeological/Tribal Resources**

The Tribal Historical Preservation Officers and State Historic Preservation Office were contacted, requesting reviews of the project area and notification of impacts of the water main replacement project on historically, archaeologically, geologically, culturally or recreationally significant areas in the project vicinity. As of Friday, March 15, 2019 no response has been received regarding any impacts of the project on any historically, archaeologically, geologically, culturally or recreationally significant areas. However, when available, all correspondence with these offices will be found in Appendix D.

The National Register of Historic Places lists the Howell Downtown Historic District as a historic area. The proposed water main replacement work will occur adjacent to this area. The historic district is roughly bounded by Chestnut Street on the west, Clinton Street on the north, Barnard Street on the east, and Sibley Street on the south. The water
main replacement work will not have a permanent effect on the historic nature of this area. The relatively shallow excavations needed to complete the proposed work will be contained within public road rights-of-way and dedicated easements. Water main replacement work generally occurs in close proximity for HDD or open-cut methods. Restoration of surface features disturbed by construction will match existing conditions as much as practicable. When construction plans are prepared for work in this area, the appropriate agencies/authorities will be contacted to ensure provisions in the contract documents address restoration efforts to maintain the aesthetic and historic feel of the district.

2. Air Quality/Soil & Groundwater Contamination

The Michigan Department of Environmental Quality’s (MDEQ) National Emissions Standard for Hazardous Air Pollutants (NESHAP) Asbestos Program, Office of Waste Management and Radiological Protection Division, and Remediation and Redevelopment Division were contacted, requesting reviews of the project area and notification of impacts of the water main replacement project on the air quality, disposal of waste materials and contaminated sites, respectively. As of Friday, March 15, 2019 no response has been received regarding any impacts of the project on air quality, disposal of waste materials and contaminated sites. However, when available, all correspondence with these offices will be found in Appendix D.

The proposed project includes replacement of water mains in public road rights-of-way that are adjacent to a number of parcels that are included on the current MDEQ RRD Facilities List. During preparation of construction plans in these areas, the potential impact of these facilities will be further investigated. Construction projects will include provisions in the contract documents related to handling and disposal of suspected contaminated soils and groundwater, and precautions for workers and others to take who may be exposed to the contamination. If the investigation during preparation of the plans confirms the presence of contaminated soil and groundwater in the proposed work area, the nature of the contamination will be characterized and appropriate design measures will be taken, such as selection of water main and gasket materials that are impermeable to the type of contaminants that may be present. MDEQ will be notified of this work as part of the Act 399 permit application process. In either case, the proposed
work will not worsen any existing contamination that may be found. Excavated contaminated soils will be segregated, stockpiled, and protected until they can be properly disposed of, such as at a Type II landfill. The listed facilities are shown on Figure 3-8.

3. Land/Water Interface

The MDEQ’s Lansing District Office and the DNR Fisheries Division were contacted, requesting a review of the project area and notification of impacts of the water main replacement project on wild and scenic rivers, inland lakes and streams, 100-year floodplains, wetlands, Great Lakes shorelands, navigable waters and Army Corps of Engineers Regulated Activities in the project vicinity. As of Friday, March 15, 2019 no response has been received regarding any impacts of the project on any wild and scenic rivers, lakes and streams, 100-year floodplains, wetlands, Great Lakes shorelands, navigable waters and Army Corps of Engineers Regulated Activities. However, when available, all correspondence with these offices will be found in Appendix D.

The proposed project area does not fall within any 100-year floodplains, wetlands and any major surface waters; therefore no direct impacts to any water interfaces are anticipated.

4. Endangered Species

The U.S. Fish and Wildlife Service Office and the Michigan Natural Features Inventory (MNFI) Office were contacted, requesting a review of the project area and notification of impacts of the water main replacement project on any sensitive ecosystems, protected plants and animals in the project vicinity. See Appendix D for the correspondence with this office. If specific mitigation techniques are recommended by the MNFI to protect the identified species, they will be reviewed and applied when necessary. Additionally, all required endangered species permits will be obtained before the commencement of any construction.

5. Agricultural Land

The USDA Natural Resources Conservation Service and the Michigan Department of Agriculture & Rural Development were contacted, requesting a review of the project
area and notification of impacts of the water main replacement project on any significant farmland or agricultural lands in the project vicinity. As of Friday, March 15, 2019, no response has been received regarding any impacts of the project to agricultural land. When available, all correspondence with these offices will be found in Appendix D.

6. Social/Economic Impact

The Michigan Department of Transportation (MDOT) Bureau of Aeronautics, Livingston County Health Department, Howell Township, Marion Township and Southeast Michigan Council of Governments (SEMCOG) were contacted, requesting a review of the project area and notification of impacts of the water main replacement project on any airports; on-site septic systems; local development plans; or regional development plans, area wide waste treatment management plans and regional water quality management plans, respectively. As of March 15, 2019 no response has been received regarding impacts of the project on any airports; on-site septic systems; local development plans; or regional development plans, area wide waste treatment management plans and regional water quality management plans; or other impacts on the economic and human society. However, when available, all correspondence with these offices will be found in Appendix D.

7. Construction/Operational Impact

Additionally, human society can be impacted in the form of inconvenience to residents and business owners. This is possible as construction and drilling pits for the pipe replacements may be located within road rights-of-way and existing traffic flow. Traffic will be redirected accordingly. The environmental disruption that could occur during the replacements of undersized mains would include increased traffic, noise, soil erosion, fumes, etc. due to typical construction activity. This will have minimal effect on air quality, water quality or residents as all water main replacements included in this project are within existing utilities and road rights-of-way and easements. After construction of the water mains no additional adverse impacts to the environment are expected.

Materials and energy consumption will be similar to any construction project and will be minimized during the replacements of undersized water main. All installations as part of
this project are a replacement of existing facilities and/or are located on or within existing roadways or structures, therefore no additional land consumption or disturbance of previously undisturbed areas will result.

G. Indirect Impacts

Indirect impacts are those caused by the proposed project which may be removed in time. Indirect impacts are often secondary in nature and are generally caused by residential and/or commercial development made possible by the project. The following discusses possible indirect impacts that may be caused by the proposed project. All work to replace the water mains as part of this project will be within existing structures and road rights-of-way and easements.

No long-term adverse changes to historically, archaeologically, geologically, culturally or recreationally significant areas; air quality, waste management or contaminations; land-water interfaces; or agricultural land are expected. Water quality is expected to increase as a result of the project.

Wildlife populations that inhabit the immediate construction areas of the undersized water main replacement work may flee from the increased traffic, noise, fumes, and dust typical to construction activity. This may result in the temporary displacement of some species from the area which may then impact the aesthetics and natural setting. As long as the appropriate mitigation measures for this wildlife are applied, this displacement will only be temporary. All short-term impacts will be indirect in nature, and duration of water main replacement work will be minimized to reduce the total disruption in the immediate construction areas. The project is not expected to permanently affect any natural habitats or sensitive ecosystems within, or the development of, the community and therefore should cause no secondary impacts.

The increased traffic, noise, fumes and dust may also decrease commercial and residential convenience within the City of Howell but will only be temporary and will not cause secondary impacts. In addition, because all water main replacements are within existing structures and existing road rights-of-way and easements this impact should be minimal.
There are no plans for any significant future development; land within the City of Howell is almost fully utilized. The land use within the City is established and drastic land use changes or undirected growth are not anticipated as a result of this project.
Section 6 - Mitigation

This section describes structural and non-structural measures that can be taken to avoid, eliminate or mitigate adverse impacts on the environment. Structural measures relate to the specific design and construction of the project. Non-structural measures relate to regulatory, institutional, governmental, or private plans, policies, and regulations, or phasing of the project construction over the planning period.

A. Mitigation of Short Term Impacts

Environmental disruption that will occur as a result of replacements of the water mains will be minimal as most construction will take place within existing structures, road rights-of-way and easements in developed areas. Mitigation techniques that will be used to minimize construction impacts will be standard procedures included in construction contracts. Guidelines will be established for cover, vegetation removal, dust reduction, maintaining traffic and accident prevention. Construction traffic from the replacements of water mains will primarily be confined to the existing easement areas where the work will be taking place. Once construction is completed these short term effects will cease and the area will be returned, as much as practical, to its original conditions.

OSHA has strict standards that must be followed for noise control on work sites. Noise control will be primarily achieved on the water main replacement sites through proper equipment maintenance, restricted work times according to the City of Howell noise ordinances and staging of work to eliminate the need for several loud pieces of machinery to run simultaneously. During construction, sites will be maintained to minimize the aesthetic impacts on the surrounding area. Litter will be collected regularly.

As described above in Section 5 isolated excavations for drilling pits will be installed away from land-water interfaces, wetlands, 100-year floodplains or wild and scenic rivers; however, if these excavations must be located near or within these areas, mitigation measures and soil erosion efforts will be undertaken to protect these areas. These measures and efforts include but are not limited to silt fences, turbidity curtains, stone check dams, gravel access drives, rip-rap, etc.
Additionally, excavations will be filled with appropriate backfill materials, compacted and restored to existing grade with surface restoration matching existing vegetation.

Soil erosion impacts will be mitigated through the Contractor’s required compliance with a program for control of soil erosion and sedimentation, as specified in Michigan Act 347, P.A. of 1972. The Michigan Department of Environmental Quality will also review design plans to ensure compliance with the Acts 346 and 347, P.A. of 1972.

B. Mitigation of Long Term Impacts

No new above ground facilities or impervious pavement are being constructed as a part of this project with the exception of the carbon dioxide tanks and controls at the existing Water Treatment Plant. The proposed tanks are consistent with other uses on the property. The proposed project entails the replacement of existing facilities in which the site locations have been established for over 50 years. No damage to sensitive features is anticipated. Any construction related impacts will be short-term.

C. Mitigation of Indirect Impacts

The indirect environmental impacts recognized in the previous section are short-term in nature and require the minimal mitigation features shown in “Mitigation of Short-Term Impacts”. No new development or change in existing land use is expected as a result of this project. Additionally, growth within the vicinity is not expected nor would be attributable to the proposed project.
Section 7 - Public Participation

A. Opportunities for Public Input

The availability of the Draft Project Plan was advertised in the March 17, 2019 Livingston Daily Press & Argus newspaper and beginning on March 18th at the City bulletin board. Copies of the Plan were placed with the City Clerk at the City of Howell City Hall, Howell Carnegie District Library and online at cityofhowell.org (PDF version) for public review beginning on March 18, 2019.

A public hearing was held on Monday, April 22, 2019 to review the information in the Project Plan and to receive public comments. The hearing was held at a City of Howell Council Regular Meeting at the City of Howell Council Chambers.

B. Public Hearing

The following information relative to the Public Hearing is included in this Section:
- Public notification and affidavit of publication from the Livingston Daily Press & Argus.
- Public Hearing sign-in sheets (containing names and addresses).
- Agenda for the City of Howell Council Regular Meeting held on Monday, April 22, 2019 at 7:00pm.
- Copy of the slide presentation of the April 22, 2019 Public Hearing (audio tape recording and verbatim transcript of hearing recorded by a stenographer of Public Hearing enclosed separately).
- Copy of the resolutions by the City of Howell formally adopting the Project Plan and designating an Authorized Project Representative.
- The addresses of the residents that will be directly affected by this project.
- Description of changes made to the project as a result of the Public Participation process.
- Written comments received during the public comment period by the City.
- The applicant’s responses to the comments received.
Appendix A

Reference Reports:

Water Reliability Study for the City of Howell

(HRC Report dated April 2012, Appendices available upon request)
2012 WATER MASTER PLAN UPDATE
&
RELIABILITY STUDY
FOR
CITY OF HOWELL

FINAL
April, 2012

Prepared by:

HUBBELL, ROTH & CLARK, INC.
Consulting Engineers
105 West Grand River Avenue
Howell, MI 48843
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<td>Table 4-3:</td>
<td>2032 Future System Demand</td>
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<td>2032 Future Conditions Fire Flow Improvements (in 2032 Dollars)</td>
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Abbreviations and Glossary

Abbreviations

ADD Average Day Demand
AWWA American Water Works Association
DPW Department of Public Works
DWRF Drinking Water Revolving Fund
EPS Extended Period Simulation
gals gallons
GIS Geographical Information System
gpm gallons per minute
HG Hydraulic Grade
HRC Hubbell, Roth & Clark, Inc.
ISO Insurance Services Office
ft lineal feet
MDD Maximum Day Demand
MDEQ Michigan Department of Environmental Quality
mgal million gallons
MGD Million gallons per Day
MOR Monthly Operating Report
NFF Needed Fire Flow
PHD Peak Hour Demand
PIV Position Indicator Valve
psi pounds per square inch
PRV Pressure Reducing Valve
SEMCOG Southeastern Michigan Council of Governments
UFW Unaccounted-for Water
WTP Water Treatment Plant
**Glossary**

<table>
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<tr>
<th>Term</th>
<th>Definition</th>
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<tr>
<td>Available fire flow</td>
<td>The flow the water system can produce at any specific location without causing pressures in the system to drop below 20 psi.</td>
</tr>
<tr>
<td>Calibration</td>
<td>To compare against actual measured data to determine any correction factors</td>
</tr>
<tr>
<td>Demand</td>
<td>The consumption or use of water.</td>
</tr>
<tr>
<td>Elevations</td>
<td>Are shown in feet unless otherwise noted.</td>
</tr>
<tr>
<td>Firm Capacity</td>
<td>The capacity of a water system with its largest production well out of service.</td>
</tr>
<tr>
<td>ISO</td>
<td>A service organization that provides risk-management and insurance rating services and sets regulatory standards for insurance company use including hazard insurance and fire ratings.</td>
</tr>
<tr>
<td>Ten States Standards</td>
<td>A guide for design criteria and the preparation of plans and specifications for public water supply systems to establish some uniformity of practice developed by the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers.</td>
</tr>
</tbody>
</table>
Frequently Asked Questions

Q: Why should the City study the performance of its water system?
A: The MDEQ Safe Drinking Water Act requires that the water system operators evaluate the performance of their systems every five years. Furthermore, prudent planning would dictate that the City evaluate the operation and performance of its water system every ± five years. The driving force behind this concept is that water usage varies over time (trending either upwards or downwards).

Q: Does the City’s water distribution system currently meet MDEQ’s requirements/standards?
A: Yes.

Q: Did City of Howell staff have input into the preparation of this Master Plan?
A: Yes, City administrative staff and WTP personnel had extensive input into the preparation of this water Master Plan.

Q: By accepting this plan does it bind us to spending the money to build the recommended improvements?
A: No. The primary purpose of this Master Plan is to provide a tool for future infrastructure planning and improvements. Also, by having a Master Plan in place, it will identify improvements that new developments will have to make if/when they hook into the City’s water system.

Q: Do we have to spend $4 million right away to improve our system?
A: To improve pressures in the system, no. To improve fire flow, yes.
Section 1 - Executive Summary

The City of Howell retained Hubbell, Roth & Clark, Inc. (HRC) to perform a hydraulic analysis on the City’s water distribution system and to develop a Water System Master Plan that will provide the City a guide for future water system improvements. The City proactively commissioned the study so that they can understand their existing and future system needs. Also, the Michigan Department of Environmental Quality (MDEQ) Safe Drinking Water Act requires owners of water treatment and distribution systems to complete a master planning document every five years.

A computer model was created to represent the City’s water distribution system and determine its performance under existing and future conditions. The model results indicate that the existing 2012 system and the future 2032 system generally operates adequately in terms of minimum pressures and fire flow requirements. However, various upgrades are required over the next 20 years for improved fire flow capabilities. Currently the existing system storage and treatment plant capacity are adequate. However, it is estimated that the future 2032 system will require upgrades to storage and treatment plant capacity to accommodate future build-out conditions. Refer to Figure 1-1 for existing and future water main improvements and Figure 1-2 for an overview of water main improvements through various years.

The following lists the recommendations of this Master Plan (listed in order of priority):

1. Existing System Water Main Upgrades
Under the fire flow analysis it was determined that approximately $4 million of water main upgrades are recommended, primarily within the commercial area of the service district.

2. Update and Maintain GIS Data
The City’s GIS information is out of date, and in some cases is inaccurate. This initially resulted in difficulties in creating the hydraulic model. It is recommended that the City consider updating their GIS database, even if the improvements were completed on an incremental basis (such as updating the GIS within a yearly budget allowance).
3. **Future 2032 System Water Main Upgrades**

Under the future fire flow analysis it was determined that approximately $10 million of water main upgrades are required to provide adequate fire flow protection. These improvements are recommended primarily within the commercial and industrial area of the service district.

4. **Future Storage and Treatment Plant Capacity Upgrades**

The future built-out system will likely require an additional 350,000 gallons (gals) upgrade to the City’s storage facilities. In addition to the storage volume increase, the total capacity of the Water Treatment Plant (WTP) will need to be increased to at least 3.28 million gallons per day (MGD). The WTP is currently it is permitted to 3.1 MGD. The future demands, and corresponding estimated upgrades, will be monitored and revised routinely (roughly every five years) as required by the MDEQ’s Safe Drinking Water Act.

5. **Replace all Remaining 4” and 6” Water Main**

In general, it is recommended to replace all the remaining water main that is less than 8” diameter with at least 8” pipe. Exclusive of the water main upgrades made as part of the recent road improvement project and the proposed mains to be upgraded as part of this Master Plan, there will still remain approximately 25,000 ft of 4” and 6” water main throughout the system.

The improvements, including estimated budget range, are listed in Table 1-1.

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Estimated Budget Range</th>
<th>Priority</th>
<th>Time Frame</th>
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<tbody>
<tr>
<td>1. Existing System Upgrades</td>
<td>$3,500,000 - $4,500,000</td>
<td>High</td>
<td>2012 - 2017</td>
</tr>
<tr>
<td>2. Update and Maintain GIS Data</td>
<td>$5,000 - $10,000</td>
<td>High</td>
<td>On-Going</td>
</tr>
<tr>
<td>3. Future 2032 Water Main Upgrades</td>
<td>$10,000,000 - $15,000,000</td>
<td>Low</td>
<td>2017 - 2032</td>
</tr>
<tr>
<td>4. Future Storage and Treatment Upgrades</td>
<td>Unknown</td>
<td>Low</td>
<td>2017 - 2032</td>
</tr>
<tr>
<td>5. Replace all 4- and 6-inch Water Main</td>
<td>$5,000,000 - $10,000,000</td>
<td>Low</td>
<td>2012 - 2032+</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$18,505,000 - $29,510,000</strong></td>
<td></td>
<td></td>
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</table>
Legend
- Existing Water Main
- Existing Water Main Improvements
- Future Water Main Improvements
- 4-inch and 6-inch Water Main
- Booster Station
- North Tower

City of Howell – 2012 Water Master Plan Update & Reliability Study

Existing and Future Water Main Improvements

Job No.
20100377

Date
April, 2012

Figure No.
1-1
Where We Were (Pre HMY ~ 2008)  
Fire Flow Deficiencies Shown in Red

Where We Are (Post HMY ~ 2012)  
Improved Water Main in Red

Where We Are Going Short-Term (~ 2017)  
Fire Flow Deficiencies Shown in Red  
Improved/New Water Main in Red

Where We Are Going Long-Term (~ 2032)  
Fire Flow Deficiencies Shown in Red  
Improved/New Water Main in Red

Legend
- Red: Fire Flow < Required
- Green: Fire Flow > Required
- Blue: Water Main
- Orange: Water Main Improvements

City of Howell 2012 Water Master Plan and Reliability Study
Overview of Water Main Improvements

City of Howell
Genoa City
Marion City
Howell City
Oceola City

Figure 1-2
Section 2 - Introduction

This Water Master Plan serves as a guide for reviewing existing system pressures and available flows, prioritizing short-term water improvement needs and estimating future water system upgrades.

The primary purpose of this project is to update the City’s Water Master Plan. It will also serve as the City’s Reliability Study which is required to be completed by the MDEQ every five years. The model projects the City’s short-term water system improvement needs through 2017, and provides an estimate on the City’s future water system needs through 2032. The goals of this study are to:

- Develop hydraulic model to represent existing conditions.
- Determine existing pressure conditions, fire flow supply and storage volume requirements.
- Determine any short-term water system improvement needs.
- Develop accurate results with comprehensive data table of node info so that City staff can readily look up information as needed.
- Estimate the 20-year demand projection for future conditions.
- Estimate the 2032 future pressure conditions, fire flow supply and storage volume requirements.
- The City intends to keep the model up to date by adding new developments and system changes so that the model can be utilized on a continual basis.

The City of Howell is located in the central portion of Livingston County. It is bounded on the north and west by Howell Township, on the east by Oceola and Genoa Townships, and on the south by Marion Township (see Figures 2-1 and 2-2). The City consists of approximately 5.5 square miles of land area and approximately 0.4 square miles of surface water, for a total of 5.9 square miles. According to SEMCOG, as of July 2011 the current estimated population for the City of Howell is 9,527.
City of Howell Location
Section 3 - Existing Conditions

The City of Howell obtains water from five production wells. Four wells, each with a capacity of 1,000 gpm, are located approximately two miles southwest of the City in Section 4 of Marion Township. Raw, untreated water is pumped to the City’s WTP from these wells via a 16” transmission main along Norton Road. The fifth production well, with a capacity of 350 gpm, is located just east of Pinckney Road and south of Marion Road. There is a sixth well that is reserved for emergency back-up and is located at the City’s WTP. Refer to Figure 3-1a for a location map. Combined, the wells provide a total capacity of 4,700 gpm with a firm capacity of 3,350 gpm.

The WTP is located at 150 Marion Street, just east of Michigan Avenue. The WTP was built in 1992 with a rated treatment capacity of 2,150 gpm, or 3.1 MGD. The treated water from the WTP is discharged into a 25,000 gallon clear well which is interconnected with a 630,000 gallon ground storage reservoir.

Water from the ground storage reservoir is pumped to the distribution system through four high service pumps. Each pump is rated for 1,100 gpm, at a maximum head of 150 feet. Currently, two pumps are out of service and typically only one pump operates at any given time. Occasionally, during peak demand periods, two pumps will operate in parallel to meet system demands.

The City also maintains a 300,000 gallon elevated storage tank, known as the north tower, located off of Thompson Street.

The City’s water distribution system is comprised of 4” to 16” diameter water main as shown in Figure 3-1. A summary of the approximate water main inventory is also listed in Table 3-1.

Table 3-1: 2011 Water Main Inventory

<table>
<thead>
<tr>
<th>Water Main Diameter (in)</th>
<th>Total Length (ft)</th>
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<tbody>
<tr>
<td>4</td>
<td>31,000</td>
</tr>
<tr>
<td>6</td>
<td>25,900</td>
</tr>
<tr>
<td>10</td>
<td>8,000</td>
</tr>
<tr>
<td>8</td>
<td>85,000</td>
</tr>
<tr>
<td>12</td>
<td>61,900</td>
</tr>
<tr>
<td>16</td>
<td>9,800</td>
</tr>
<tr>
<td>Private</td>
<td>34,600</td>
</tr>
<tr>
<td>TOTAL (excluding Private)</td>
<td>221,600</td>
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</table>
Presently, the majority of the City’s land area is developed. Approximately 73% of the City is currently developed as residential, commercial or industrial land use. Approximately 16% of the City is used for recreation, City parks or is undeveloped land such as surface water/wetlands. There is approximately 11% of the City remaining that could be considered developable.

The following sub-sections discuss; how the model was created, water demand assumptions, model calibration, existing system performance, additional system considerations and existing system improvements.

3.1 Existing Model Development

3.1.1 Model Selection
The City of Howell’s water distribution system was hydraulically modeled using Pipe2010 developed by the University of Kentucky (formerly known as KYPipe).

3.1.2 GIS Information
A majority of the pipes included in the model are 8” diameter piping and larger. Some of the 4” and 6” pipes were included, but not all. Private water mains were not included in the model with the exception for the high school area south of Highland Road.

The City’s GIS data was utilized as much as possible to help build the hydraulic model. Initially, the piping was drawn in the model using the GIS data as a background. However, since the existing GIS data is not current or complete, and sometimes not accurate; changes to the piping information were required before it could be utilized in the hydraulic model. The City has upgraded several water mains as part of Phases 1 & 2 of a three Phase multi-year road improvement project. See Appendix A for map of all the proposed water main replacements associated with the road improvement program. The piping in the hydraulic model was updated to reflect all the proposed improvements contained in all 3 phases of the road program. Several meeting occurred with City staff to ensure the hydraulic model schematic of the existing distribution system was accurate. Refer to Figure 3-2 for a map of the existing water distribution network.
It is important to note that since the current GIS information is somewhat unreliable, it initially resulted in difficulties in creating the hydraulic model. It is recommended that the City consider updating their GIS data.

3.1.3 **Node and Pipe Naming**
A node, junction, or junction point/node occurs at the intersection of pipes, where there is a change in pipe size and/or where it is necessary to assign a water demand. Nodes and pipes were numbered sequentially with a prefix of “J-” and “P-”, respectively. Refer to Appendix B for model schematic with node and pipe node labels.

3.1.4 **Elevation Data**
Node elevations were assumed as the existing ground elevation at the node location. Ground elevations are required for all junction nodes within the hydraulic model. They were determined by using the ground elevations from 5 foot contour data. Figure 3-3 shows the elevation contours used in the model.

3.1.5 **Pipe Material, Age and Pipe Roughness**
Pipes were entered in the model to include size, material and installation year. The City staff provided pipe material information based on historical knowledge of the system. The installation year of the existing water main was taken from GIS data, when available. Using the pipe size, material and age, an initial pipe roughness was assigned to each pipe. Refer to Figure 3-4 for pipe size and age information.

3.1.6 **Water Supply Configuration and Assumptions**
While the City of Howell’s water system consists of multiple major components (well sites, a WTP, a ground storage tank, system pumps and elevated storage tank), in order to reduce complexities with our analysis the system was statically modeled with the two storage facilities and one or two pumps in parallel depending on demand scenario. This means that the modeled water elevation in the storage tank would remain constant under various demand conditions, and duration considerations were not considered as part of the modeling process. This is known as steady state simulations. This type of analysis represents a “snapshot” in time and are used to determine the operating behavior of a system under static conditions. System duration considerations can be evaluated under an EPS analysis. EPSs are used to model the functioning of various appurtenances and
components under varying demand conditions (i.e. regulating valves opening & closing, tanks filling & draining, pressures/flow rates changing throughout the system, etc.). Should the City start to experience difficulties with tank draining or filling, or other component functionality issues, then it is recommended to use the model prepared in this Master Plan as the foundation to prepare an EPS analysis.

The elevated storage tank is a key control component to the operation of the water system. For static conditions, the initial tank level was set to 1039. Other notable elevations and distances are summarized below. Refer to Figure 3-5 for a schematic of the elevated storage tank.

942’ = ground surface elevation at the base of the tank
1015’ = the elevation of the base of the tank
1039’ = pumps turn on
1043’ = pumps turn off
1047’ = maximum water surface elevation in tank
105’ = distance between max water surface and ground surface (45.5 psi)
73’ = distance between base of tank and ground surface (31.6 psi)
32’ = maximum depth within the storage tank
4’ = tank depth between when the pumps turn on and pumps turn off

3.1.7 Water Demand

The consumption of water from the water distribution system is known as the water demand of the system. The water demand is the driving force behind the hydraulic dynamics occurring in water distribution systems.

Various City-supplied data sources were reviewed to determine system demand. These same data sources were utilized to estimate the percentage of UFW.

The first source used was the billing records per account between July 2009 and June 2010. Originally, it was anticipated that the records could be imported into the GIS database for spatial distribution and subsequent nodal delineation. Unfortunately, this was not possible because there wasn’t a unique parameter (such as the parcel ID number) that could be used to link the billing data with the parcel data. It is
recommended that if possible, future billing records include a unique parameter such that the information can be imported into the GIS database.

The second source was the totalized billing records per usage class per month for the same time period. Graphs of this data per quarter per usage class are included in Appendix A. As well, Appendix A also includes the monthly and annual production totals for each source, including water purchased from MHOG, and the annual usage totals for each customer class as determined by the City of Howell. The City of Howell does not supply water to other public water supplies.

The third source was the treatment plants MORs. This data includes daily totals of raw water, treated water and raw water that goes to Pepsi. Pepsi receives raw water upstream of the water treatment plant directly from the wells. The water that goes to Pepsi is metered independently. MOR data from 1993 through 2010 was reviewed. It was determined that there are some meter inconsistencies as the treated water plus the Pepsi water do not equal the raw water meter (refer to Appendix A).

**Unaccounted-For Water**

As previously mentioned, reviewing these multiple data sources were done, in part, to help calculate the City’s UFW. UFW can increase operation costs for a municipality if it is left unchecked. UFW is comprised of losses that occur from leakage from water mains & appurtenances, errors in water meters and unmetered usage. UFW was attempted to be estimated by comparing the billed usage data to the MOR data for the time period of July 2009 through June 2010. It was subsequently discussed with City staff that this comparison is difficult because of the way that the billed data is collected/billed and the timeframe of the billing. Essentially, the majority of the residential users and some lower demanding commercial users get their water meter read every other month. Since the City is broken into two districts for the meter reads, it is difficult to compare the data directly (i.e. January’s monthly billing report will include November and December meter reads from District #1, and February’s monthly billing report will include December and January meter reads from District #2). However, not all accounts are read in this manner as some accounts are read every month. Consequently, performing quarterly water comparisons between the billed data and treatment plant data is not possible. Therefore, determining the UFW is a difficult
calculation with the information obtained for this hydraulic study. Fortunately, the City is up to date on their water audit and City staff has determined that their UFW is approximately 11%. The industry standard for acceptable UFW is around 10%. Therefore, the City’s UFW appears to be within an acceptable range.

**System Demand**

Through discussions with City staff, it was determined that the data collected at the WTP is more accurate and detailed than the billed data. Therefore, the WTP data was utilized to determine system demand in this Master Plan.

In review of the MOR data, it was apparent that the system demand numbers from the most recent five years of data (2006 through 2010) may be too low. This was due to several months throughout that time period when the City was utilizing MHOG as a water supply source. Currently, there are three emergency interconnections with the MHOG system. Occasionally when there are emergencies within the City (i.e. when the wells, WTP or storage facilities needs to be taken off-line) the City utilizes the MHOG interconnections to supply water to the City’s distribution system. These three interconnections are unmetered. Through the existing agreement with MHOG, the volume of water used through these emergency connections is estimated. From discussions with the City, it was decided that the average system demand for the years 2003, 2004, 2005, 2007 and 2008 should be used to establish the system’s average demand since they do not include any estimated flows.

The ADD is defined as the total annual quantity of water utilized over a 365 day period. Therefore, using the five years listed, the ADD was determined to be 965 gpm, or 1.39 MGD.

MDD is defined as the highest water demand of the year that occurs over any 24-hour period. Utilizing the daily operator logs, the MDD was determined from the average of the max days that occurred during the five years listed. For this Master Plan the MDD is 1,631 gpm or 2.35 MGD.

PHD is defined as the highest water demand of the year that occurs over any 1-hour period. Typically, the PHD is expected to occur during the maximum day. The PHD
was determined as the average of each peak hour that occurred during the five years listed. For this Master Plan the PHD is 2,804 gpm or 4.04 MGD. Refer to Table 3-2 below for a summary of the demand rates.

### Table 3-2: System Demand

<table>
<thead>
<tr>
<th></th>
<th>ADD</th>
<th>MDD</th>
<th>PHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPM</td>
<td>965</td>
<td>1,631</td>
<td>2,804</td>
</tr>
<tr>
<td>MGD</td>
<td>1.39</td>
<td>2.35</td>
<td>4.04</td>
</tr>
<tr>
<td>Peaking factors from ADD</td>
<td>1.00</td>
<td>1.69</td>
<td>2.91</td>
</tr>
</tbody>
</table>

#### 3.1.8 Water Demand Distribution

One of the most important tasks in developing a hydraulic model is determining the appropriate distribution of water demand around the entire system. Typically, this task involves delineating an area around a junction point and assigning a demand at that point that represents all users within said delineated area. The demand at a junction point is a function of zoning, density per zoning, population per unit and the water demand factor per person. Typically, boundaries are drawn around a node and the number of residential lots are counted, or the square-footage of the area is determined and assigned a particular usage rate per square-foot, or acre.

Using the City’s GIS data, boundaries were drawn around and assigned to nodes in the model. The boundaries were delineated per user class such that each demand node in the model represents a specific type of user in the general area of the node location. The City groups the users into one of seven classes: churches, commercial, government, industrial, multi-residential, residential and school. This information is included with the parcel information in the City’s GIS database and was used to assign a demand type number in *Pipe2010* as listed in Table 3-3.
Table 3-3: Demand Type Number & User Class

<table>
<thead>
<tr>
<th>Demand Type Number</th>
<th>User Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Churches</td>
</tr>
<tr>
<td>2</td>
<td>Commercial</td>
</tr>
<tr>
<td>3</td>
<td>Government</td>
</tr>
<tr>
<td>4</td>
<td>Industrial</td>
</tr>
<tr>
<td>5</td>
<td>Multi-Residential</td>
</tr>
<tr>
<td>6</td>
<td>Residential</td>
</tr>
<tr>
<td>7</td>
<td>School</td>
</tr>
</tbody>
</table>

The GIS data also includes information regarding whether a parcel is vacant or occupied. Therefore, the area per node was separated into occupied and vacant so that vacant parcels will be applied to the future conditions model and not included in the existing conditions model. Appendix C includes a map with the delineated nodal districts. Nodes comprised of vacant parcels are denoted with an “f”.

The area per node district was exported to Microsoft Excel and a usage rate per demand type per acre was determined. This was done using an apportionment methodology whereby the total demand determined from the MOR data was apportion into per usage class based on the billing data (i.e. commercial usage based on billing data accounts for approximately 17% of the demand within the system and therefore, 17% of the demands listed in Table 3-2 were applied to the commercial users). The total per usage class was further distributed similarly using area to apportion the demand to each node. For example, the entire commercial acreage is approximately 440 acres and for a particular commercial node with 44 acres, which represents 10% of 440, it would be assigned 10% of 17% of the system demand. Essentially this allows for a determination of a water usage rate per usage class on a per acre basis. This information can be applied to vacant parcels for future demand calculations. Table 3-4 lists the ADD per usage class per acreage.
Table 3-4: ADD Per Usage Class Per Acreage

<table>
<thead>
<tr>
<th>Usage Class</th>
<th>2009-2010 Average Billed Usage (gpm)</th>
<th>2009-2010 Average Usage Percentage</th>
<th>Assigned ADD Usage* (gpm)</th>
<th>Area** (ac)</th>
<th>ADD Per Acreage (gpm/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Churches</td>
<td>3</td>
<td>0%</td>
<td>3</td>
<td>47</td>
<td>0.065</td>
</tr>
<tr>
<td>Commercial</td>
<td>174</td>
<td>17%</td>
<td>197</td>
<td>437</td>
<td>0.450</td>
</tr>
<tr>
<td>Government</td>
<td>19</td>
<td>2%</td>
<td>18</td>
<td>498</td>
<td>0.035</td>
</tr>
<tr>
<td>Industrial</td>
<td>464</td>
<td>45%</td>
<td>431</td>
<td>345</td>
<td>1.248</td>
</tr>
<tr>
<td>Multi-Residential</td>
<td>123</td>
<td>12%</td>
<td>114</td>
<td>27</td>
<td>4.260</td>
</tr>
<tr>
<td>Residential</td>
<td>232</td>
<td>22%</td>
<td>180</td>
<td>629</td>
<td>0.286</td>
</tr>
<tr>
<td>School</td>
<td>24</td>
<td>2%</td>
<td>23</td>
<td>285</td>
<td>0.080</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1039</strong></td>
<td><strong>100%</strong></td>
<td><strong>965</strong></td>
<td><strong>2268</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Based on Average MOR Data from 2003-2005, 2007 & 2008 and adjusted for Top 20 Users

** Based on GIS usage class data assigned to each parcel

All demand nodes were delineated in this manner such that the system demand was distributed throughout the system. A final check on the distribution is to ensure that the top 20 water users are being adequately represented. This involved locating the top 20 users and ensuring that the demand at the node is equal to or higher than the actual average day billed usage. Increasing the demand at one node required decreasing the demand at the remaining nodes so that the total system demand is not exceeded. This was done by subtracting the top 20 user area from the usage class area so that the remaining demand can be distributed to the remaining users. Table 3-5 lists the top 20 users and their general location assigned in the model as shown in Figure 3-6. It is important to note that while Pepsi is included in Table 3-5 (and shown in Figure 3-6), it was not included in the top 20 user demand adjustments. This is due to the fact that Pepsi receives untreated water directly from the City’s wells and therefore its usage is independent from the system demands and can be excluded.
Table 3-5: Top 25 Users

<table>
<thead>
<tr>
<th>No.</th>
<th>Customer Name</th>
<th>7/1/09 - 6/30/10 Usage (gals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pepsi</td>
<td>178,871,500</td>
</tr>
<tr>
<td>2</td>
<td>Howell Estates/Chateau</td>
<td>27,790,000</td>
</tr>
<tr>
<td>3</td>
<td>Chem Trend</td>
<td>12,802,500</td>
</tr>
<tr>
<td>4</td>
<td>St Joseph Mercy Livingston</td>
<td>12,582,700</td>
</tr>
<tr>
<td>5</td>
<td>Howell Public Schools</td>
<td>11,515,400</td>
</tr>
<tr>
<td>6</td>
<td>Burwick Farms</td>
<td>10,078,000</td>
</tr>
<tr>
<td>7</td>
<td>Medilodge</td>
<td>9,750,000</td>
</tr>
<tr>
<td>8</td>
<td>Yorkshire Apts</td>
<td>7,749,800</td>
</tr>
<tr>
<td>9</td>
<td>Pine Hill</td>
<td>7,255,000</td>
</tr>
<tr>
<td>10</td>
<td>Livingston County</td>
<td>7,220,900</td>
</tr>
<tr>
<td>11</td>
<td>Key Plastics</td>
<td>6,638,000</td>
</tr>
<tr>
<td>12</td>
<td>Grand Plaza</td>
<td>5,481,000</td>
</tr>
<tr>
<td>13</td>
<td>VCF</td>
<td>4,186,700</td>
</tr>
<tr>
<td>14</td>
<td>Town Commons LLC</td>
<td>3,854,000</td>
</tr>
<tr>
<td>15</td>
<td>Oakhaven Manor</td>
<td>3,837,500</td>
</tr>
<tr>
<td>16</td>
<td>Wash World</td>
<td>3,315,000</td>
</tr>
<tr>
<td>17</td>
<td>Ogihara</td>
<td>3,050,900</td>
</tr>
<tr>
<td>18</td>
<td>Citizens Insurance</td>
<td>2,790,500</td>
</tr>
<tr>
<td>19</td>
<td>Howell Soft Cloth</td>
<td>2,752,000</td>
</tr>
<tr>
<td>20</td>
<td>Sam Cassar (Greenwich)</td>
<td>2,729,700</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>324,251,100</td>
</tr>
</tbody>
</table>

3.1.9 Other Assumptions/Model Selections

It is important when developing a water system hydraulic model to customize the model based on the purpose of the study. Depending on the magnitude of the study, certain assumptions and simplifications are necessary. Based on the purpose and magnitude of this particular study, the following additional assumptions/model selections were made:

- Model selection: Hazen-Williams equation was used for calculations.
- Assumption: initial Hazen-Williams roughness value (c-value) for each pipe segment was based on pipe age and material. The calibration process refines the c-values.
- Assumption: losses occurring at bends and elbows were ignored.
3.2 Model Calibration

Model calibration is a very important step in creating a usable and realistic model. This step is important to determine if the assumptions and inputs that were used to create the model realistically represent the real life water system that is being modeled. It is this phase of model development that can take a considerable amount of time and resources to accomplish. The more complex and detailed the model is, the more time it may take to calibrate.

For this model there are two types of calibration; macro and micro. They are both necessary to calibrate the system that is being analyzed. Generally, for this type of study, there are two different parameters that can be calibrated; nodal demand values and c-values. For this study, the c-value was the target parameter that was calibrated.

3.2.1 Macro Level Calibration

The first calibration step is to calibrate the system on a macro level. This involves comparing a measured variable with values predicted by the model. If the difference between the two are excessive (greater than 30%, or in the case of comparing static pressures, greater than 20 psi), then the calibration focus should remain on the basic structure of the model including pipe layouts, elevations and assumptions. The measured variable for this study that was field verified was the static pressure determined from 35 fire flow field tests conducted by the City staff between August 25 and 29, 2011. The onsite fire flow test involved two adjacent hydrants (labeled A and B for ease of explanation). The first step involves determining the static pressure at hydrant A. Then, hydrant B is opened and its flow rate is recorded while at the same time hydrant A’s resultant pressure is also documented. The resultant pressure at hydrant A is referred to as the residual pressure. Additional hydrants are opened if the pressure differential between the static and the residual is not equal to or greater than 10 psi. Refer to Appendix A for fire flow testing data collected from the onsite field tests.

The macro level calibration was accomplished by comparing the static pressures predicted by the model and the static pressures reported in the fire flow field tests. It was concluded that macro level adjustments were not necessary as the differences between the model predicted and field measured values were within the acceptable range. This confirms that the basic set up and organization of the hydraulic model was
properly prepared and only model intricacies, such as roughness values or water demand, may require adjusting.

3.2.2 Micro Level Calibration

Micro level calibration is an involved process. The pipes are categorized into several pipe groups. Pipe grouping is necessary to perform the implicit/optimized calibration technique and run the calibration module in Pipe2010. Pipes are grouped based on installation age, pipe material, and/or pipe size. The main objective of the calibration process is to determine the optimal c-values for each pipe group. Therefore, the pipe groups that were developed for this project were first based on age and second by pipe size. A total of 10 pipe groups were identified for the calibration process.

The results from the onsite fire flow field tests are calibration module inputs consisting of; static pressures, fire flow rates and residual pressures. With these inputs the calibration module predicts the optimal c-value and residual pressure for each pipe group. It is required that the model predicted residual pressure be within approximately 3 psi of the actual observed residual pressure from the fire flow test data. The model allows the user to set up tolerances on variables; the following tolerances were used:

- **The Demand Tolerance**
  ADD was applied to the system and a demand tolerance of 40% was used which means that during the calibration calculations, the system demand can be fluctuated by ± 40% for the analysis of each fire flow test.

- **Fire flow Tolerance**
  A fire flow tolerance of ± 10% was applied to the field collected fire flow rate to account for potential inaccuracies with the testing equipment and human error.

- **Pipe Roughness**
  The roughness bounds per pipe group were selected based on reference materials and are listed in Table 3-6.
Table 3-6: Roughness Tolerance Per Pipe Group

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Pipe Group</th>
<th>Year Built</th>
<th>Roughness Bounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-8</td>
<td>0</td>
<td>1918-1985</td>
<td>81 - 106</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1986-1995</td>
<td>100 - 133</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1996-2005</td>
<td>106 - 133</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>&gt;2005</td>
<td>123 - 133</td>
</tr>
<tr>
<td>10-12</td>
<td>4</td>
<td>1918-1985</td>
<td>95 - 112</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>1986-1995</td>
<td>106 - 138</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>1996-2005</td>
<td>112 - 138</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>&gt;2005</td>
<td>128 - 138</td>
</tr>
<tr>
<td>16</td>
<td>8</td>
<td>1918-1985</td>
<td>100 - 117</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>&gt;1986</td>
<td>117 - 140</td>
</tr>
</tbody>
</table>

The initial simulation resulted in several tests with residual pressure differences of more than 3 psi. These tests were eliminated from the calibration process one at a time starting with the test with the largest difference between the model residual pressure and field collected residual pressure. The reason certain model-predicted residual pressures did not converge with field-collected residual pressures is likely a result of “real world” conditions of the system at the time of the test that are not accounted for in the model. Table 3-7 lists the hydrant flow test data collected in the field as well as the corresponding model data.

3.2.3 Calibrated Hazen-Williams Roughness Values

Upon completing the calibration procedure described above, the calibrated Hazen-Williams roughness values were finalized and are tabulated in Table 3-8.

3.3 Existing System Performance

With City of Howell’s water distribution system modeled and the calibration process completed, the existing conditions model was prepared. Figure 3-7 shows the demand contours for ADD, MDD and PHD. Figure 3-8 shows the resultant pressure contours for ADD, MDD and PHD. See Appendix D for a complete print out of the models existing conditions input and output data. The pressure contour results shown in Figure 3-8 assumed one pump on and the tank level at 1042’ which is the average operating conditions based on water treatment plant information. The resultant system pressures under all three demand conditions are adequate. The lowest pressures of 38.7 psi occurred during PHD in higher ground elevation area near Braeview and Tompkins and McPherson Park Drive.
Table 3-7: Hydrant Flow Test Data and Corresponding Model Data

<table>
<thead>
<tr>
<th>Page</th>
<th>Test Location</th>
<th>Model Node</th>
<th>Field Static</th>
<th>Model Static</th>
<th>Field Residual</th>
<th>Model Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5</td>
<td>J-81</td>
<td>50</td>
<td>51</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>J-77</td>
<td>53</td>
<td>51</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>J-63</td>
<td>54</td>
<td>52</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>22</td>
<td>J-325</td>
<td>54</td>
<td>52</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>24</td>
<td>J-74</td>
<td>46</td>
<td>51</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>J-147</td>
<td>44</td>
<td>51</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>J-153</td>
<td>50</td>
<td>51</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>21</td>
<td>J-2</td>
<td>45</td>
<td>51</td>
<td>26</td>
<td>36.5</td>
</tr>
<tr>
<td>1</td>
<td>31</td>
<td>J-316</td>
<td>60</td>
<td>56</td>
<td>52</td>
<td>45.5</td>
</tr>
<tr>
<td>1</td>
<td>32</td>
<td>J-96</td>
<td>60</td>
<td>58</td>
<td>44</td>
<td>38.9</td>
</tr>
<tr>
<td>1</td>
<td>35</td>
<td>J-6</td>
<td>50</td>
<td>51</td>
<td>30</td>
<td>38.7</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>J-67</td>
<td>54</td>
<td>53</td>
<td>46</td>
<td>41.2</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>J-326</td>
<td>60</td>
<td>58</td>
<td>50</td>
<td>43.4</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>J-327</td>
<td>50</td>
<td>49</td>
<td>38</td>
<td>25.8</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>J-234</td>
<td>56</td>
<td>55</td>
<td>44</td>
<td>48.9</td>
</tr>
<tr>
<td>5</td>
<td>23</td>
<td>J-328</td>
<td>50</td>
<td>49</td>
<td>38</td>
<td>44.7</td>
</tr>
<tr>
<td>5</td>
<td>33</td>
<td>J-330</td>
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<td>51</td>
<td>28</td>
<td>41.8</td>
</tr>
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<td>6</td>
<td>3</td>
<td>J-220</td>
<td>58</td>
<td>61</td>
<td>38</td>
<td>53.1</td>
</tr>
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<td>6</td>
<td>8</td>
<td>J-196</td>
<td>50</td>
<td>52</td>
<td>40</td>
<td>46.2</td>
</tr>
<tr>
<td>6</td>
<td>30</td>
<td>J-166</td>
<td>57</td>
<td>56</td>
<td>37</td>
<td>48.6</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>J-19</td>
<td>50</td>
<td>51</td>
<td>40</td>
<td>39.7</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
<td>J-85</td>
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<td>43.9</td>
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<td>50</td>
<td>48.2</td>
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<td>2</td>
<td>11</td>
<td>J-323</td>
<td>54</td>
<td>55</td>
<td>42</td>
<td>41.7</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>J-280</td>
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<td>49</td>
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<td>4</td>
<td>27</td>
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<td>47</td>
<td>38</td>
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</tr>
<tr>
<td>5</td>
<td>1</td>
<td>J-265</td>
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<td>47</td>
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<td>30.1</td>
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<tr>
<td>5</td>
<td>6</td>
<td>J-315</td>
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<td>49</td>
<td>36</td>
<td>38.3</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>J-123</td>
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<td>51</td>
<td>48</td>
<td>46.4</td>
</tr>
<tr>
<td>5</td>
<td>19</td>
<td>J-308</td>
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<td>47</td>
<td>38</td>
<td>39.4</td>
</tr>
<tr>
<td>5</td>
<td>28</td>
<td>J-329</td>
<td>48</td>
<td>48</td>
<td>38</td>
<td>39.6</td>
</tr>
<tr>
<td>5</td>
<td>29</td>
<td>J-122</td>
<td>56</td>
<td>51</td>
<td>48</td>
<td>46.6</td>
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<tr>
<td>5</td>
<td>34</td>
<td>J-318</td>
<td>56</td>
<td>56</td>
<td>42</td>
<td>44.5</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>J-184</td>
<td>60</td>
<td>58</td>
<td>50</td>
<td>51.1</td>
</tr>
<tr>
<td>6</td>
<td>17</td>
<td>J-322</td>
<td>55</td>
<td>56</td>
<td>45</td>
<td>41</td>
</tr>
</tbody>
</table>

Dark grey shaded rows were not used for calibration as the difference between Field Static and Field Residual pressures is less than 10 psi. Light grey shaded rows were eliminated from the calibration process as the difference between Field Residual Pressure and Model Residual Pressure was greater than ~3 psi.
Table 3-8: Calibrated Pipe Roughness

<table>
<thead>
<tr>
<th>Size</th>
<th>Pipe Group</th>
<th>Year Built</th>
<th>Roughness Bounds</th>
<th>Calibrated Roughness</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-8</td>
<td>0</td>
<td>1918-1985</td>
<td>81 - 106</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1986-1995</td>
<td>100 - 133</td>
<td>101</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1996-2005</td>
<td>106 - 133</td>
<td>122</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>&gt;2005</td>
<td>123 - 133</td>
<td>133</td>
</tr>
<tr>
<td>10-12</td>
<td>4</td>
<td>1918-1985</td>
<td>95 - 112</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>1996-2005</td>
<td>112 - 138</td>
<td>124</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>&gt;2005</td>
<td>128 - 138</td>
<td>138</td>
</tr>
<tr>
<td>16</td>
<td>8</td>
<td>1918-1985</td>
<td>100 - 117</td>
<td>103</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>&gt;1986</td>
<td>117 - 140</td>
<td>139</td>
</tr>
</tbody>
</table>

3.3.1 Existing Conditions ADD

According to Section 8.2.1 of the Ten States Standards, it indicates the following:

All water mains, including those not designed to provide fire protection, shall be sized after a hydraulic analysis based on flow demands and pressure requirements. The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow. The normal working pressure in the distribution system should be approximately 60 to 80 psi and not less than 35 psi.

The Ten States Standards does not explicitly define the demand conditions of “normal working pressures”. Therefore it can be argued that ADD constitutes normal working pressures, while MDD & PHD conditions fall outside of the normal working pressure range. However, in order to be conservative, this statement was interpreted to mean that during ADD, MDD and PHD conditions the operational pressures should be greater than 35 psi, and never less than 20 psi during any condition.

In terms of adequate minimum pressures, the results shown in Figure 3-8 indicate that the entire service area experience pressures greater than 35 psi under ADD conditions. The average system pressure is 53.3 psi with a range of 41.5 to 62.0 psi.
3.3.2 **Existing Conditions MDD**
As with ADD, the modeled results indicate that the entire service area experiences pressures greater than 35 psi during MDD conditions. Therefore, under existing MDD conditions the system pressure supply is adequate. The average system pressure is 52.7 psi with a range of 40.8 to 61.7 psi.

3.3.3 **Existing Conditions PHD**
As with ADD and MDD, the modeled results indicate that the entire service area experiences pressures greater than 35 psi during PHD conditions. Therefore, under existing PHD conditions the system pressure supply is adequate. The average system pressure is 50.7 psi with a range of 38.7 to 60.0 psi.

3.4 **Existing Conditions – Fire Flow Evaluation**
One final check on the adequacy of the system is the ability to provide NFF at maximum day demand while maintaining a pressure of at least 20 psi.

Fire flow analysis can be a tedious and time consuming process as it usually involves an iterative procedure. *Pipe2010* has a fire flow module to aid in this analysis. The module provides for many options in terms of evaluating adequate fire flow protection. The simple, more conservative evaluation option is to assume a fire flow at each node and set the allowed minimum pressure. Then during the fire flow analysis, the computer model evaluates each node separately and determines the resultant flow rate that could be achieved at MDD, while maintaining a minimum pressure. The fire flow output then reports the resultant flows at each node. The reported flows are compared to minimum flow rates based on zoning. Typical fire flow requirements have been developed by organizations such as AWWA and ISO. The NFF for City of Howell is listed in Table 3-9.

<table>
<thead>
<tr>
<th>Needed Fire Flow (gpm)</th>
<th>Category</th>
<th>Demand Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500</td>
<td>Single-Family Residential*</td>
<td>6</td>
</tr>
<tr>
<td>2000</td>
<td>Multi-Family Residential</td>
<td>5</td>
</tr>
<tr>
<td>3000</td>
<td>Commercial**</td>
<td>1, 2, 3, 7</td>
</tr>
<tr>
<td>4000</td>
<td>Industrial</td>
<td>4</td>
</tr>
</tbody>
</table>

*NFF can be less based on spacing between houses
**Includes churches, government and schools uses
Except for the single-family residential, the NFF rates were selected per the City’s previous Water Master Plan update. At the time that study was completed, the NFF rates were reviewed and accepted by the City. Reference materials tend to provide single-family residential NFF rates, while other NFF rates are generally provided as a range and are dependent upon several variables such as; construction materials, size of the building and occupancy. The rates presented in Table 3-9 are generally consistent with rates used in other communities in Southeast Michigan.

The ISO provides guidance on NFF for two or less story single-family residential structure as listed in Table 3-10.

<table>
<thead>
<tr>
<th>Distance Between Buildings (ft)</th>
<th>NFF (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 100</td>
<td>500</td>
</tr>
<tr>
<td>31 - 100</td>
<td>750</td>
</tr>
<tr>
<td>30-11</td>
<td>1,000</td>
</tr>
<tr>
<td>Less than 11</td>
<td>1,500</td>
</tr>
</tbody>
</table>

Prior to simulating fire flow conditions, the model was modified to include the water main improvements proposed as part of Phase 3 of the City’s currently ongoing road improvement program. Refer to Figure 3-9. It was also assumed that during extreme fire flow conditions, the City would operate two of its high lift pumps. Refer to Appendix E for a map with available fire flows at each node at MDD with pressure contour results.

The fire flow results and recommended improvements are as follows:

- Single-Family Residential – NFF = 1,500 gpm (or less based on house spacing)
  - Refer to Figure 3-10.
  - Fire flows in the Galloway and Inverness area are around 870 gpm. Based on existing house spacing, at least 1,000 gpm is required. Replace approximately 950 ft of existing 4” main with new 8” water main. The City DPW staff confirmed that the improvements are needed in this area as they have experienced multiple water main breaks on this section of main.
  - Fire flows at the north end of Tompkins to the intersection of Sibley are between 285 and 735 gpm. At least 1,000 gpm is required based on current house spacing. Replace approximately 850 ft of 4” main with 8” water main.
Additionally, it is recommended, to loop Tompkins with Grand River as dead-end mains are undesirable.

- **Multi-Family Residential – NFF = 2,000 gpm**
  - Refer to Figure 3-11.
  - Fire flow in the apartment complex at the southwest corner of M-59 and Bower Street is approximately 1800 gpm. It can be improved either by replacing the existing 6” main with 8” from Curzon Road, or along the east end of the complex from just north of Cumberland Street, whichever is easier to construct (see to Figure 3-12).

- **Commercial – NFF = 3,000 gpm**
  - Refer to Figure 3-13.
  - Several improvements were required to provide adequate commercial fire flow protection. The majority were along the Grand River corridor, as well as the north end of Highlander Way. These deficiencies can be eliminated by upgrading the existing 4” and 6” water mains in the Grand River and Clinton area to 8” and 12”. In addition, other recommended improvements include a water main extension along M-59 between Byron and Highlander Way.

- **Industrial – NFF = 4,000 gpm**
  - Refer to Figure 3-14.
  - Deficiencies were noted along McPherson Park Drive and Catrell Drive and Pinckney Road.
  - The fire flow deficiencies along McPherson Park Drive and Catrell Drive are eliminated with the improvements recommended in the commercial fire flow analysis above.
  - Pinckney Road deficiency will be eliminated with the future Loop Road Development (see Section 4.1.2). Currently it is planned for future development to install a 16-inch water main connecting Pinckney Road to National Street.

Overall, approximately 20,500 ft of water main, between 8” and 16” are needed to provide adequate fire flow protection throughout the entire City. Refer to Figure 3-15 for the recommended improvements and Figure 3-16 shows the updated fire flows after the
improvements are made. The estimated cost for water main improvements are approximately $4.5 million as shown in Table 3-11. The required improvements were entered in the model with an assumed install year of 2017.

Table 3-11: Existing Conditions (2017) Fire Flow Improvements

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SINGLE-FAMILY RESIDENTIAL IMPROVEMENTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Replace 6” water main with 8” main along Inverness between Galloway and Bower</td>
<td>950</td>
<td>ft</td>
<td>$100</td>
<td>$95,000</td>
</tr>
<tr>
<td>2. Replace 4” water main with 8” main along Tompkins between Sibley and Grand River</td>
<td>850</td>
<td>ft</td>
<td>$100</td>
<td>$85,000</td>
</tr>
<tr>
<td><strong>MULTI-FAMILY RESIDENTIAL IMPROVEMENTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Replace 6” water main with 8” main in Apartment Complex SW of M-59 and Bower Street</td>
<td>350</td>
<td>ft</td>
<td>$100</td>
<td>$35,000</td>
</tr>
<tr>
<td><strong>COMMERCIAL IMPROVEMENTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Replace 4” water main along East Clinton Street with 8” main</td>
<td>1800</td>
<td>ft</td>
<td>$100</td>
<td>$180,000</td>
</tr>
<tr>
<td>5. Replace 4”, 6” and 8” water main along Grand River with 12” main</td>
<td>10000</td>
<td>ft</td>
<td>$150</td>
<td>$1,500,000</td>
</tr>
<tr>
<td>6. Install new 12” water main along M-59 between Highlander Way and Byron</td>
<td>4300</td>
<td>ft</td>
<td>$180</td>
<td>$774,000</td>
</tr>
<tr>
<td><strong>Total Estimated Project Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td>$2,669,000</td>
</tr>
<tr>
<td>25% Engineering and Legal</td>
<td></td>
<td></td>
<td></td>
<td>$667,250</td>
</tr>
<tr>
<td>20% Contingency</td>
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<td></td>
<td></td>
<td>$533,800</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td>$3,870,050</td>
</tr>
</tbody>
</table>
In general, it is recommended to replace all water mains that are 4” and 6” diameter with at least 8” pipe. Excluding the pipes that are proposed to be improved, there will still be approximately 11,000 ft of 4” and 17,000 ft of 6” water main in the City’s distribution system (refer to Figure 3-17). It is estimated that it would cost an additional $3,000,000 to replace these remaining 4” and 6” mains.

3.5 Emergency Connections

There are three emergency connections with the MHOG system as shown in Figure 3-18. Discussions with the MHOG indicated the following regarding the current status of these emergency connections:

- MHOG’s distribution system HG is generally higher than the City of Howell’s in the areas where they interconnect.
- Byron Road Connection:
  - The Byron Road connection is the most reliable of the three emergency connections.
  - The pressure range at this connection is approximately 50 psi to 80 psi.
- Indiana Ave Connection:
  - The Indiana Ave connection is through a 6” pipe.
  - There is a PRV on the MHOG side of this line that reduces the pressure to the MHOG side of the connection.
  - MHOG personnel estimated that utilizing this emergency connection alone would not serve any supply benefit beyond the immediate local area in the City of Howell.
- Lucy Road Connection:
  - The Lucy Road connection is in close proximity to an industrial booster station on the MHOG side. When the pumps turn on, the pressure in the upstream mains drops drastically (down to 25 to 30 psi).
  - This station runs regularly. One of the main water users on the MHOG system is in this industrial park.
  - MHOG personnel estimated that utilizing this emergency connection alone would result in low pressure issues at this location.
A model run was made with the Byron Road emergency connection only, assuming the pump station and north tower were off-line, and the supply from M Hog set at 50 psi. Under this scenario, the pressure supply from M Hog is adequate under ADD and MDD conditions. Under PHD conditions there is localized area near Isabel and the CSX Rail Road where pressures drop to 34 psi (refer to Figure 3-19). Under emergency conditions where the City’s facilities are off-line, this level of service would be acceptable. Also, fire flows were reviewed and there is adequate supply from the Byron Road emergency connection to provide adequate fire protection.

There is an addition internal emergency connection between a private subdivision and the City of Howell located at the Howell Estates trailer park area south of Mason Road and west of Pinckney Road. There is PIV near the south end of the development that is typically kept in the ‘OFF’ position. Except for emergency conditions, the Howell Estates development is not directly connected to the 12” water main on Pinckney Road.

3.6 System Storage

The current system storage capacity consists of a 300,000 gallon elevated storage tank and a 630,000 gallon ground storage tank, totaling 930,000 gals. Storage tanks are generally sized large enough to provide equalization storage and the higher of fire flow storage or emergency storage. Equalization storage is the volume of water required under MDD conditions that exceed the maximum day rate of production. In order to determine the equalization storage, a diurnal curve pattern needs to be established that represents the City’s maximum day water needs. The maximum day diurnal curve must also include the differential peak hour component. The volume of water is determined by calculating the area under the curve and above the maximum day production rate.

Therefore, the diurnal curve used to determine the required peak hour storage volume is shown in Figure 3-20. The curve is a typical daily usage pattern supplied by the AWWA. The required equalization volume calculated is 140,000 gals.

In addition to the equalization volume, the storage facility must also be sized to contain the NFF. ISO defines various required durations based on the required fire flow rates which translate to a required volume based on NFF as follows;
• Single-Family Residential = 1,500 gpm for 2 hours = 180,000 gals
• Multi-Family Residential = 2,000 gpm for 2 hours = 240,000 gals
• Commercial = 3,000 gpm for 3 hours = 540,000 gals
• Industrial = 4,000 gpm for 4 hours = 960,000 gals

According to ISO, fires requiring 3,500 gpm or less are referred to as receiving “public fire suppression” and those requiring greater than 3,500 gpm are classified as receiving “individual property fire suppression”. Therefore, the total storage required is 540,000 gals for commercial fire flow plus 140,000 gals for equalization which equals 680,000 gals. The total available system storage is 930,000 gals which is currently adequate.

3.7 Previous Recommendations

Numerous hydraulic studies were conducted in the past by previous consultants. The most recent study the City of Howell commissioned was dated August 9, 2005. That study was an update to the previous May, 2001 Water System Study. The August 9, 2005 study was the foundation for the DWRF Project Plan the City submitted to MDEQ in April 2008. Various improvements were recommended in that Project Plan, and the City wanted to know if the current model supports the implementation of the proposed improvements. The previous improvements were attempted to be validated using the current model by changing the pipe size and age back to the original size and age. The pipe roughness assumed was the roughness determined from the calibration process as previously listed in Table 3-8.

This evaluation is somewhat difficult because of the potential differences in assumptions and variables, most notably, the roughness values assumed between models. It should be noted that the 2005 and 2008 studies were not calibrated. Rather, the roughness values determined from an older March 1994 Water Master Plan were assumed. It is unknown how this 1994 study was calibrated. Additionally, all of the water mains noted in the Project Plan to be replaced were not actually replaced. An exhibit showing the comparison of proposed main replacement vs. actual mains replaced as part of the road improvement program is shown in Appendix A.

The analysis indicates that of the nearly 30,000 ft of water main improvement as shown in Figure 6 of the Project Plan, approximately only 20,000 ft would be required using the assumptions for this current analysis (see Appendix A). It is important to note, however, that replacing 4” and 6” water main with 8” or larger main is part of this study’s general
recommendations. Therefore, the improvements constructed through the road improvement project can only benefit the City.

3.8 5-Year Projection
As required by the MDEQ’s Safe Drinking Water Act, the reliability study is to identify consumption trends for both the 5-year and 20-year planning periods. It is assumed that no significant growth will occur within the next five years; however, the recommended water main improvements were assumed to be constructed within the next five years with essentially a 2017 construction date.
Legend

- Blue: 4" Water Main
- Green: 6" Water Main
- Yellow: 8" Water Main
- Blue: 10" Water Main
- Pink: 12" Water Main
- Purple: 16" Water Main
- Gray: Private Water Main
- Red Circle: Production Well
- Circle: Emergency Well

Well Location Address and Capacity

<table>
<thead>
<tr>
<th>Well #</th>
<th>Address</th>
<th>Capacity (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>150 Marion Street</td>
<td>350</td>
</tr>
<tr>
<td>4</td>
<td>3145 Norton Road</td>
<td>1,000</td>
</tr>
<tr>
<td>5</td>
<td>3255 Norton Road</td>
<td>1,000</td>
</tr>
<tr>
<td>6</td>
<td>3147 Norton Road</td>
<td>1,000</td>
</tr>
<tr>
<td>7</td>
<td>601 Henry Street</td>
<td>350</td>
</tr>
<tr>
<td>8</td>
<td>3175 Norton Road</td>
<td>1,000</td>
</tr>
</tbody>
</table>

Total Well Pumping Capacity: 4,700
Firm Well Pumping Capacity: 3,350
Legend

- 4” Water Main
- 6” Water Main
- 8” Water Main
- 10” Water Main
- 12” Water Main
- 16” Water Main
- Private Water Main
- Fire Hydrant
- WTP: Water Treatment Plant
- North Tower

* GIS representation was modified to show correct pipe size info through 2011
Legend

- Elevation ≤ 915
- 915 < Elevation ≤ 920
- 920 < Elevation ≤ 925
- 925 < Elevation ≤ 930
- 930 < Elevation ≤ 935
- Elevation > 935

Water Main
Node
Booster Station
Water Tank

City of Howell – 2012 Water Master Plan Update & Reliability Study
Job No. 20100377
Date April, 2012
Figure No. 3-3

Elevation Contours
Legend

- **4” Water Main**
- **6” Water Main**
- **8” Water Main**
- **10” Water Main**
- **12” Water Main**
- **16” Water Main**
- **Private Water Main**
- **Fire Hydrant**
- **Water Treatment Plant**
- **North Tower**

- Year Built ≤ 1950
- 1950 < Year Built ≤ 1960
- 1960 < Year Built ≤ 1970
- 1970 < Year Built ≤ 1980
- 1980 < Year Built ≤ 1990
- 1990 < Year Built ≤ 2000
- Year Built > 2000

*Pipes without any Year Built shading were not modeled.*
North Tower Schematic

- Elevation = 1047
  Maximum Water Surface Elevation
- Elevation = 1043
  Pumps Off
- Elevation = 1039
  Pumps On
- Elevation = 1015
  Base of Tank
- Elevation = 942
  Ground Elevation

Dimensions:
- 40’
- 32’
- 105’
- 73’

City of Howell – 2012 Water Master Plan Update & Reliability Study
Legend
- 4" Water Main
- 6" Water Main
- 8" Water Main
- 10" Water Main
- 12" Water Main
- 16" Water Main
- Node
- Booster Station
- North Tower
- Top 20 User

<table>
<thead>
<tr>
<th>#</th>
<th>Customer Name</th>
<th>#</th>
<th>Customer Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pepsi</td>
<td>11</td>
<td>Key Plastics</td>
</tr>
<tr>
<td>2</td>
<td>Howell Estates/Chateau</td>
<td>12</td>
<td>Grand Plaza</td>
</tr>
<tr>
<td>3</td>
<td>Chem Trend</td>
<td>13</td>
<td>VCF</td>
</tr>
<tr>
<td>4</td>
<td>St Joseph Mercy</td>
<td>14</td>
<td>Town Commons LLC</td>
</tr>
<tr>
<td>5</td>
<td>Howell Public Schools</td>
<td>15</td>
<td>Oakhaven Manor</td>
</tr>
<tr>
<td>6</td>
<td>Burwick Farms</td>
<td>16</td>
<td>Wash World</td>
</tr>
<tr>
<td>7</td>
<td>Medilodge</td>
<td>17</td>
<td>Ogihara</td>
</tr>
<tr>
<td>8</td>
<td>Yorkshire Apts</td>
<td>18</td>
<td>Citizens Insurance</td>
</tr>
<tr>
<td>9</td>
<td>Pine Hill</td>
<td>19</td>
<td>Howell Soft Cloth</td>
</tr>
<tr>
<td>10</td>
<td>Livingston County</td>
<td>20</td>
<td>Sam Cassar (Greenweb)</td>
</tr>
</tbody>
</table>

Top 20 User Location
Existing Conditions Demand Contours

Legend

- Demand (gpm) < 10
- 10 < Demand (gpm) < 20
- 20 < Demand (gpm) < 30
- 30 < Demand (gpm) < 40
- 40 < Demand (gpm) < 50
- Demand (gpm) > 50

- Node
- Pipe
- Booster Station
- North Tower
Average Day Demand

Maximum Day Demand

Peak Hour Demand

Legend

- Pressure (psi) < 20
- 20 < Pressure (psi) < 35
- 35 < Pressure (psi) < 40
- 40 < Pressure (psi) < 45
- 45 < Pressure (psi) < 50
- 50 < Pressure (psi) < 55
- 55 < Pressure (psi) < 60
- Pressure (psi) > 60

Node
Pipe
Booster Station
North Tower
Legend

- **Existing Water Main**
- **2012 Phase 3 Improvements**
- **Node**
- **Booster Station**
- **North Tower**

City of Howell – 2012 Water Master Plan Update & Reliability Study

Existing Conditions
2012 Phase 3 Improvements
Legend

- **4” Water Main**
- **6” Water Main**
- **8” Water Main**
- **10” Water Main**
- **12” Water Main**
- **16” Water Main**
- Node

### NFF Values

- **NFF > 1500 gpm**
- **NFF < 1500 gpm**
  - Acceptable due to spacing b/w homes
- **280 NFF < 1500 gpm**
  - NOT Acceptable

### Nodes

- **Booster Station**
- **North Tower**
Existing Conditions
Multi-Family Residential Fire Flow Analysis
Replace with 8-inch in areas A or B

Replaced under 2012 Phase 3 Project

Legend
- 4” Water Main
- 6” Water Main
- 8” Water Main
- 10” Water Main
- 12” Water Main
- 16” Water Main
Legend

- 4” Water Main
- 6” Water Main
- 8” Water Main
- 10” Water Main
- 12” Water Main
- 16” Water Main
- NFF > 3000 gpm
- NFF < 3000 gpm
- Node
- Booster Station
- North Tower

City of Howell – 2012 Water Master Plan Update & Reliability Study

Existing Conditions
Commercial Fire Flow Analysis

Job No. 20100377
Date
April, 2012
Figure No.
3-13
Legend

- 4” Water Main
- 6” Water Main
- 8” Water Main
- 10” Water Main
- 12” Water Main
- 16” Water Main
- NFF > 4000 gpm
- NFF < 4000 gpm
- Node
- Booster Station
- North Tower

City of Howell – 2012 Water Master Plan Update & Reliability Study

Existing Conditions
Industrial Fire Flow Analysis

Job No. 20100377
Date: April, 2012
Figure No.: 3-14
Legend
- Existing Water Main
- Proposed Water Main
- Node
- Booster Station
- North Tower
**Existing Conditions**

2017 Fire Flow with Improvements

- **Single-Family Residential NFF > 1500 gpm**
- **Multi-Family Residential NFF > 2000 gpm**
- **Commercial NFF > 3000 gpm**
- **Industrial NFF > 4000 gpm**

Legend:
- **NFF > Required**
- **Pipe**
- **Node**
- **Booster Station**
- **North Tower**

Will be improved by future Loop Road Development
Legend

- 4" Water Main
- 6" Water Main
- 8" Water Main
- 10" Water Main
- 12" Water Main
- 16" Water Main
- Node
- Booster Station
- North Tower
- MHOG Emergency Connection

City of Howell – 2012 Water Master Plan Update & Reliability Study

Existing Water System Emergency Connections
Existing Conditions MHOG Emergency Connection Pressure Contours
Max Day Demand Curve

MDD = 2.35 (mgd)

Treatment Plant Capacity = 3.1 (mgd)
Section 4 - Future Conditions

The future conditions model is based on a 20-year projection per the requirements of the MDEQ’s Safe Drinking Water Act. The model was projected to the year 2032 by changing two main variables in the system; the pipe roughness to account for pipe aging and the system demand to account for increase in water usage. The following subsections describe these changes and the corresponding results in detail:

4.1 Future Model Development

4.1.1 2032 Pipe Roughness
Reference materials indicate that pipe roughness, for coated cast iron pipes, generally increases at a steeper rate in the pipe’s first 30 years then somewhat levels off for the next 100 years. In terms of the Hazen-Williams c-factor coefficient, the lower the c-factor the higher the pipe roughness. Using reference materials and the c-factors determined from the calibration process described in Section 3, equations were developed for each of the main pipe size groupings as listed in Table 4-1.

Table 4-1: Pipe Roughness Aging Equations

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>0-30 Years Old</th>
<th>31-100 Years Old</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-8 inch</td>
<td>y = -1.57x + 133</td>
<td>y = -0.23x + 93</td>
</tr>
<tr>
<td>10-12 inch</td>
<td>y = -1.40x + 138</td>
<td>y = -0.23x + 103</td>
</tr>
<tr>
<td>16 inch</td>
<td>y = -1.20x + 139</td>
<td>y = -0.23x + 110</td>
</tr>
</tbody>
</table>

where y = pipe roughness and x = pipe age

Therefore, in order to age the pipes to the year 2032, the pipe roughness for the various pipe groupings were estimated using the formulas as listed in Table 4-1. See Table 4-2 for 2032 estimated pipe roughness values.

4.1.2 Future Water Distribution
Changes to the water distribution system network include adding the 16” water main in the southeast corner of the City along the proposed Loop Road route (see Figure 4-1)
Table 4-2: 2032 Estimated Roughness

<table>
<thead>
<tr>
<th>Size</th>
<th>2032 Pipe Group</th>
<th>Year Built</th>
<th>General Age</th>
<th>2032 Estimated Roughness</th>
</tr>
</thead>
<tbody>
<tr>
<td>4”-8”</td>
<td>0</td>
<td>1918-1985</td>
<td>50</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1986-1995</td>
<td>40</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1996-2005</td>
<td>30</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2005-2012</td>
<td>20</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>2017</td>
<td>15</td>
<td>110</td>
</tr>
<tr>
<td>10”-12”</td>
<td>5</td>
<td>1918-1985</td>
<td>50</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>1986-1995</td>
<td>40</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>1996-2005</td>
<td>30</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>2005-2012</td>
<td>20</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>2017</td>
<td>15</td>
<td>117</td>
</tr>
<tr>
<td>16”</td>
<td>10</td>
<td>1918-1985</td>
<td>50</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>1986-2012</td>
<td>20</td>
<td>115</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>2017</td>
<td>15</td>
<td>121</td>
</tr>
</tbody>
</table>

4.1.3 Future Water Demand

As previously mentioned, the GIS data includes information regarding whether a parcel is vacant or occupied. Under the existing demand conditions development, the vacant parcels were separated out from the occupied parcels for the nodes to which they were tributary. The demand per user class per acreage, as listed in Table 3-4, was applied to the identified vacant lots and added to the nodes in the model. The resultant 2032 future conditions ADD, MDD and PHD are listed in Table 4-3.

Table 4-3: 2032 Future System Demand

<table>
<thead>
<tr>
<th></th>
<th>ADD</th>
<th>MDD</th>
<th>PHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPM</td>
<td>1,349</td>
<td>2,279</td>
<td>3,924</td>
</tr>
<tr>
<td>MGD</td>
<td>1.94</td>
<td>3.28</td>
<td>5.65</td>
</tr>
<tr>
<td>Peaking factors from ADD</td>
<td>1.00</td>
<td>1.69</td>
<td>2.91</td>
</tr>
</tbody>
</table>

4.2 Future System Performance

Figure 4-2 shows the demand contours for ADD, MDD and PHD demands. Figure 4-3 shows the resultant pressure contours for ADD, MDD and PHD demands. See Appendix F for a complete print out of future conditions input and output data. The pressure contour results shown in Figure 4-2 assumed one pump on and the tank level at 1042’ which is the average operating conditions based on water treatment plant information. The resultant pressures under
ADD and MDD conditions are adequate with the lowest pressures of 40.1 psi occurring during MDD in higher elevation area near Braeview and Tompkins and McPherson Park Drive. During PHD conditions the pressure in the same area drops to 34.2 psi. However, given the margin of error with the modeling assumptions combined with the fact that the City is likely to be operating at least two pumps during peak hour demand conditions, the pressures provided are adequate. It is recommended to monitor pressures in this area in the future.

4.3 Future Conditions – Fire Flow Evaluation

As was assumed during the existing condition fire flow analysis that the City would operate two pumps in extreme flow conditions. Therefore, two pumps in parallel were assumed under future conditions fire flow analysis.

The resultant fire flow results and recommended improvements are as follows:

- **Single-Family Residential** – NFF = 1,500 gpm (or less based on house spacing)
  - Refer to Figure 4-4.
  - Fire flows are adequate
  - No improvements are necessary for single-family residential areas.

- **Multi-Family Residential** – NFF = 2,000 gpm
  - Refer to Figure 4-5.
  - Fire flow in the apartment complex at the southwest corner of M-59 and Bower Street is approximately 1,700 gpm and can be improved by replacing the remaining 6” and older 8” mains in the area with a 12” main.

- **Commercial** – NFF = 3,000 gpm
  - Refer to Figure 4-6.
  - Approximately 1,200 ft of miscellaneous 4” and 6” water main improvements are required to improve the commercial fire flows in the downtown business district.
  - Fire flows are low in the school area north of Grand River, east of Highlander Way. As this water main is private, no changes to the water main were included. However, replacing the 2,600 ft of 6” water main with 8” main would improve fire flows in this area.
• Industrial – NFF = 4,000 gpm
  - Refer to Figure 4-7.
  - Deficiencies were noted along McPherson Park Drive, Isbell Street and along the CSX Rail Road just west of Dearborn Street.
  - The fire flow deficiencies along McPherson Park Drive and Isbell Street are eliminated by replacing approximately 5,000 ft of old 12” and 16” water main with new 16” main.
  - The Dearborn Street area is improved by replacing approximately 550 ft of 8” water main with 12” main.

Overall, approximately 8,000 ft of water main, between 8” and 16” diameter, are needed to provide adequate fire flow protection for the projected 2032 future conditions. Additionally, the Loop Road water main is estimated to be an additional 9,000 ft of 16” main. Therefore, total 2032 future water main improvement is approximately 17,000 ft. Refer to Figure 4-8 for a map of the recommended improvements and Figure 4-9 for updated resultant fire flows. The estimated cost for water main improvements is approximately $10,000,000 (in 2032 dollars). See the estimate in Table 4-4. The required improvements were entered in the hydraulic model with an assumed install year of 2032.

4.4 2032 Future System Storage
The diurnal curve used to determine the 2032 future peak hour storage volume is shown in Figure 4-10. The required equalization volume was calculated as 740,000 gals. Therefore, the total storage volume is the equalization volume of 740,000 gals plus the commercial fire flow volume of 540,000 gals, which equals 1,280,000 gals. The City currently has 930,000 gals of storage. This means that approximately 350,000 gals of additional storage will be needed in the future. It is recommended that the additional storage facility be an elevated tank sited near the higher elevation area in the City located near the Tompkins/Isbell and CSX Rail Road area (refer to Figure 3-3 for elevation contours).

Additionally, with MDD estimated at 3.28 MGD, and the WTP firm capacity at 3.10 MGD, means that the production capacity of the WTP will also need to be expanded in the future.
Table 4-4: 2032 Future Conditions Fire Flow Improvements (in 2032 Dollars)

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MULTI-FAMILY RESIDENTIAL IMPROVEMENTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Replace 6” and older 8” water main with 12” main in Apartment Complex SW of M-59 and Bower Street</td>
<td>1100</td>
<td>ft</td>
<td>$275</td>
<td>$302,500</td>
</tr>
<tr>
<td><strong>COMMERCIAL IMPROVEMENTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Replace 4” and 6” water main along McCarthy and Walnut with 8” main</td>
<td>650</td>
<td>ft</td>
<td>$200</td>
<td>$130,000</td>
</tr>
<tr>
<td>3. Replace 4” water main along National Street with 12” main</td>
<td>550</td>
<td>ft</td>
<td>$275</td>
<td>$151,250</td>
</tr>
<tr>
<td><strong>INDUSTRIAL IMPROVEMENTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Replace 4” water main with 8” main along CSX Rail Road west of Dearborn</td>
<td>100</td>
<td>ft</td>
<td>$200</td>
<td>$20,000</td>
</tr>
<tr>
<td>5. Replace 8” water main with 12” main along Marion and Dearborn near CSX Rail Road</td>
<td>600</td>
<td>ft</td>
<td>$275</td>
<td>$165,000</td>
</tr>
<tr>
<td>6. Replace 12” and 16” water main with 16” main along McPherson Park, Mason and Isbell</td>
<td>5000</td>
<td>ft</td>
<td>$325</td>
<td>$1,625,000</td>
</tr>
<tr>
<td><strong>SYSTEM IMPROVEMENTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Install new 16” in Loop Road Area</td>
<td>9000</td>
<td>ft</td>
<td>$500</td>
<td>$4,500,000</td>
</tr>
<tr>
<td><strong>Total Estimated Project Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$ 6,893,750</strong></td>
</tr>
<tr>
<td>25% Engineering and Legal</td>
<td></td>
<td></td>
<td></td>
<td><strong>$ 1,723,438</strong></td>
</tr>
<tr>
<td>20% Contingency</td>
<td></td>
<td></td>
<td></td>
<td><strong>$ 1,378,750</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$ 9,995,938</strong></td>
</tr>
</tbody>
</table>
2032 Future Conditions Demand Contours

Legend

- Demand (gpm) < 10
- 10 < Demand (gpm) < 20
- 20 < Demand (gpm) < 30
- 30 < Demand (gpm) < 40
- 40 < Demand (gpm) < 50
- Demand (gpm) > 50

- Node
- Pipe
- Booster Station
- North Tower
2032 Future Conditions Pressure Contours

Legend
- Pressure (psi) < 20
- 20 < Pressure (psi) < 35
- 35 < Pressure (psi) < 40
- 40 < Pressure (psi) < 45
- 45 < Pressure (psi) < 50
- 50 < Pressure (psi) < 55
- 55 < Pressure (psi) < 60
- Pressure (psi) > 60
- Node
- Pipe
- Booster Station
- North Tower
2032 Future Conditions
Multi-Family Residential Fire Flow Analysis
Figure 4-6

Legend

- 4" Water Main
- 6" Water Main
- 8" Water Main
- 10" Water Main
- 12" Water Main
- 16" Water Main
- NFF > 3000 gpm
- NFF < 3000 gpm
- Node
- Booster Station
- North Tower

2032 Future Conditions
Commercial Fire Flow Analysis
Legend

- 4" Water Main
- 6" Water Main
- 8" Water Main
- 10" Water Main
- 12" Water Main
- 16" Water Main
- NFF > 4000 gpm
- NFF < 4000 gpm
- Node
- Booster Station
- North Tower

2032 Future Conditions
Industrial Fire Flow Analysis
Legend

- **Existing Water Main**
- **Future Water Main Improvements**
- **Node**
- **Booster Station**
- **North Tower**
2032 Future Conditions
2032 Fire Flow with Improvements

Legend
- NFF > Required
- Pipe
- Node
- Booster Station
- North Tower
2032 Future Conditions Maximum Day Diurnal Curve

Max Day Demand Curve
MDD = 3.28 (mgd)
Treatment Plant Capacity = 3.1 (mgd)
Section 5 - Conclusions and Recommendations

Under existing demand conditions, the City of Howell’s water distribution system currently:

- Supplies water at adequate pressures to its users under ADD, MDD and PHD scenarios.
- The existing storage facilities provide adequate volume of storage, meeting Ten States Standards.
- Fire flows are generally adequate, except for in very few minor isolated locations.

Approximately $4,000,000 of water main upgrades are required within the next five years to provide adequate fire flow projection throughout the entire City.

Under future 2032 demand conditions, it is projected that the City of Howell’s water distribution system will:

- Supply water at adequate pressures to its users under ADD, MDD and PHD scenarios.
- The capacity of the storage facilities will need to be increased by 350,000 gallons.
- The WTP capacity will need to be expanded to at least a total of 3.28 MGD.

Approximately $10,000,000 in water main upgrades will be required between 2017 and 2032. The future demands and corresponding estimated upgrades should be routinely revised every five years, as required by the MDEQ, to ensure their accuracy.
Appendix B

Green Project Reserve Business Case
Pipe Replacement

Summary

- Replacement of approximately 5,400 feet of 4-inch, 5,400 feet of 6-inch, 2,000 feet of 8-inch and 700 feet of 12-inch pre-1960 cast iron water main with 9,100 feet of 8-inch and 5,300 feet of 12-inch HDPE or ductile iron (DI) water main
- Total DWRF Loan Amount = $8,900,000
- Water Main Replacement (green) portion of loan = $7,925,000 (89% of total loan)
- Annual water savings = 2.5 million gallons (MG)

Background

- A comprehensive history of the size, location and year of water main breaks has been catalogued for the last 8 years. This history indicates that 11 water main breaks have occurred in the 4-inch, 6-inch, 8-inch and 12-inch mains to be replaced.
- This history indicates that the 4-inch, 6-inch, 8-inch and 12-inch mains to be replaced incurred a disproportionately high percentage of breaks compared to the overall system.
- The 4-inch, 6-inch, 8-inch and 12-inch mains to be replaced account for 8% (3.3 miles) of the 41.5 miles of distribution pipe. This project will replace 13,500 feet of 4-inch, 6-inch, 8-inch and 12-inch cast iron pipe with 8-inch or 12-inch HDPE or ductile iron pipe.

Results

- The water system had 33 total water main breaks from 2010 – 2018.
- The water system had 11 water main breaks from 2010 – 2018 in the 4-inch, 6-inch, 8-inch and 12-inch lines to be replaced as part of this project.
- The percentage of breaks in the lines to be replaced = 11/33 = 33%
- Average volume of water lost per water main break is estimated at 1.8 MG.

To Calculate Water Loss

- To calculate the amount of water that has been lost in the lines to be replaced, multiply the number of breaks by the water lost per break.
  
  \[(11 \text{ breaks}) \times (1.8 \text{ MG/break}) / (8 \text{ years}) = 2.5 \text{ MGY}\]

- To calculate overall system water loss per year, subtract the water billed and filter wash water from the water pumped. Using billing records from 2017/2018 to illustrate:
  
  \[(539 \text{ MG pumped}) - (13.6 \text{ MG filter wash}) - (454.8 \text{ MG billed}) = 70.6 \text{ MG lost}\]

- The average 2.5 MG of water loss from the mains to be replaced represents 3.5% of the total water loss of the system: 2.5/70.6 = 3.5%

Conclusion

- By replacing 14,400 feet of 4-inch, 6-inch, 8-inch and 12-inch pipes the system anticipates saving 2.5 MGY. The cost to purchase water is $4.41 per 1,000 gallons. Annual cost savings from replacement is estimated at 2.5 MG * $4.41/1,000 gallons = $11,025.

- Additional benefits include increased flow efficiency through new mains, reduction in maintenance expenses, reduction in energy use and gas use, and elimination of health hazards associated with waterborne pathogens entering the system.
Drinking Water Revolving Fund
Green Project Reserve Qualification Template

Applicant: ____________________________  Project No: ________________
Project Name: ________________

Identify by page number from the project plan, or attach excerpts, where water efficiency or energy efficiency improvement justification is provided or discussed to support the need for the recommended green project reserve component: Pages _________________.

Please ensure all requested information is provided to enable an assessment by the Michigan Department of Environmental Quality (DEQ) of whether the project or project component can qualify for funding from the green project reserve.

Meter Replacements with Conventional Meters

1. Over the last five years, water lost or unaccounted for in the system has averaged _______ gallons per year and is _________ percent of the water produced each year.

2. Identify the source of this information (i.e. water audit, water conservation study, production and billing records): ________________

3. Identify the portion of the water loss that is likely due to inaccurate meters: ________________

4. The expected reduction in water loss by installing replacement traditional water meters in all or a portion of the system is _______ gallons per year, reducing the water loss percentage to _________.

5. It takes _________ kilowatt hours (kWh) of electricity to produce and distribute 1,000 gallons of water. At a cost of $___________ per kWh, the estimated annual electrical cost for the water loss due to inaccurate meters based on the five-year average is $_______________.

6. Based on the average cost per year for the loss and the estimated cost of___________ for replacing the meters, the project will pay for itself in _________ months/years.

7. Attached all relevant data and calculations that were used to provide answers to these questions.

Water Main Replacement

1. Over the last ten years, _______ water main breaks have occurred on the water mains that are proposed for replacement, an average of _______ breaks/mile/year.

2. Identify the length, diameter, age and type of pipe to be replaced: _______.

3.__________
5,400 ft of 6", 2,000 ft of 8", 700 ft of 12" pre-1960 cast iron water main million

3. Each break is estimated to result in the average loss of 1.8 million gallons of water, calculated to total 2.5 million gallons/year of water lost for those water mains.

4. Present the data indicating how this is a significant source of water loss in the system and how the pipes proposed for replacement are likely to generate the greatest return in leak reduction. Please see attached

5. The energy savings from pumping/delivering water through the new water mains versus the old ones is estimated at 2,650 KwH/year.

6. Describe the condition of the replaced mains with respect to friction/head loss etc from tuberculation or other deterioration issues. As appropriate, identify if the soils are corrosive and contributing to the deterioration/breaks or leaks in the mains, and how the replacement mains are designed to address future corrosion: Please see attached

7. Total projects costs for the water main replacement component of the project are $7,925,000.

8. Identify the source of data used for these calculations: City of Howell Water Dept billing data & DPW water main records

Submitted by:

Michael P. Darga, P.E. March 14, 2019
Name Date
Hubbell, Roth & Clark, Inc.
Associate
Title
City of Howell
DWRF Water Main Replacement Project

Supplemental Information

Water Main Replacement Section

Item #4: The 4-inch, 6-inch, 8-inch and 12-inch water mains proposed for replacement constitute approximately 8% of the 41.52 miles of total distribution mains in the City of Howell.

During the period from 2010 to 2018, 33 water main breaks occurred in the distribution mains. Of these breaks, 11 (or 33%) occurred on the 4-inch, 6-inch, 8-inch and 12-inch mains proposed for replacement as part of this project. The rate of breaks per mile per year for the mains included in the project is more than five times that of the remainder of the system (0.41 breaks/mile/year compared to 0.07 breaks/mile/year).

Assuming that an average of 1.8 MG of water is lost per water main break. Therefore, for the 11 breaks on the 4-inch, 6-inch, 8-inch and 12-inch water mains proposed to be replaced as part of this project, approximately 19.8 MG of water has been lost over the last 8 years.

This history indicates that a disproportionately high percentage of breaks have occurred on the 4-inch, 6-inch, 8-inch and 12-inch water mains that are proposed to be replaced as part of this project over the last 8 years. Replacement of these pipes would prevent the greatest amount of breaks and would therefore generate the greatest return in leak reduction.

Item #6: The water mains proposed for replacement are 4-inch, 6-inch, 8-inch and 12-inch cast iron pipes that have been in service for over 50 years. As a result, the City of Howell has experienced issues with the distribution system reliability. The scale build-up and tuberculation of these old pipes have reduced the cross-sectional area of the mains and increase friction/head-loss. Examination of sections of pipe removed during repairs in recent years has confirmed that the scale/tuberculation condition described is present.

The new water mains will be HDPE pipe or ductile-iron with cement lining, and will not have the same scaling and deterioration issues as the old unlined cast iron pipe. The minimum size for new mains is 8-inch diameter, which will reduced friction/head-losses for the same flows through the pipe network.
Appendix C

Public Participation Documentation
PUBLIC NOTICE
CITY OF HOWELL
LIVINGSTON COUNTY, MICHIGAN

NOTICE OF PUBLIC HEARING

The City of Howell will hold a public hearing on the application to the Michigan Department of Environmental Quality for funding assistance through the Drinking Water Revolving Fund (DWRF) Program for the proposed Water System Improvement Program. The public hearing is being held for the purpose of receiving comments from interested persons. The hearing will be held at 7:00 p.m. on Monday, April 22, 2019 during the City Council Regular Meeting at the City Hall Council Chambers, 611 East Grand River Avenue, Howell, Michigan, 48843.

The proposed Water System Improvement Program description and details are organized into a comprehensive 20-year Project Plan. If the DWRF application is successful, the project construction will include replacement of the existing 4-inch and 6-inch water mains along sections of Grand River Avenue, Clinton Street and National Street with new 8-inch and 12-inch water mains. Improvements to the Water Plant and Wells are also proposed.

Impacts of the proposed project include:

- **Noise**: Noise due to construction activities such as construction equipment, machinery, generators, compressors, etc. will be kept to a minimum, as practicable. The work hours will be maintained in accordance with local ordinances.
- **Traffic Disturbance**: Traffic control devices and temporary lane closures will be necessary during construction to safely replace the water main. This will impact traffic flow patterns. Construction activities will be coordinated by location to mitigate any cumulative impacts.
- **Increased User Rates**: An increase in user rates will be necessary to fund these improvements. By choosing the replacement approach to correcting the deterioration and undersized pipes and spreading out the costs over the entire district, the rate increases have been minimized. The “Do Nothing” approach would increase the risk of water main breaks and the potential for water quality issues and require more costly construction in the future.

The total cost of the improvements project is estimated to be $8.9 million. The repayment of the DWRF loan, if approved, will be apportioned to City water customers based on water consumption. The estimated user costs to finance the proposed project have been determined assuming DWRF financing with a 2.0% interest rate (current DWRF interest rate) and a 20-year debt retirement. The apportionment costs are based on an annual average over a 20-year period to provide an estimate for user charges per 1,000 gallons of water consumption. The approximate City of Howell user rate increase necessary to retire the debt incurred from the construction of the proposed project is $1.45 per 1,000 gallons or $11.57 per month for the average user.

Copies of the Water System Improvement Program Draft Project Plan detailing the proposed project are available for review beginning on Monday, March 18, 2019 at:

- Howell City Hall, 611 East Grand River Avenue, Howell, MI 48843
- Howell Carnegie District Library, 314 West Grand River Avenue, Howell, MI 48843
- Cityofhowell.org (PDF version)

Written comments received before the public hearing record closes on Monday, April 22, 2019 will receive responses in the Final DWRF Project Plan. Written comments should be sent to:

Jane Cartwright, Howell City Clerk, 611 East Grand River Avenue, MI 48843

In compliance with the Americans with Disabilities Act, individuals with a disability requesting accommodations should contact the City of Howell at least seventy-two (72) hours in advance of the Public Hearing.

Jane Cartwright, MMC
Howell City Clerk

(03-17-2019 DAILY 349906)
Appendix D

Project Plan Correspondence
February 26, 2019

MDOT Bureau of Aeronautics
2700 Port Lansing Road
Lansing, MI 48906-2160

Attn: Ms. Molly Lamrouex, Aeronautics Environmental Specialist

Re: Impact Review
Water System Improvement Program
City of Howell

Dear Ms. Lamrouex:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts on airspace and airports in the vicinity of the project.

On behalf of the City of Howell, we are requesting information regarding the impacts of the above referenced proposed project upon Federal Aviation Administration (FAA) regulations and the Michigan Tall Structure Act (1950 PA 327). The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street.
- Exterior improvements at the Water Plant Building located at 150 Marion Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the replacement work required for the project. Since the proposed project involves improvements to existing facilities, no impacts are expected from the proposed project upon any airspace and airports. On behalf of the City
of Howell, we are requesting a review to confirm that the above referenced project will not cause an impact to any airspace or airports in the project vicinity.

We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, PE

Attachments
Project Location Map

pc: MDEQ; E. Pocan
    City of Howell; S. Charles, E. Suida, M. Davis
    HRC; N. Faught, A. Malczewski, File
February 26, 2019

Michigan Department of Environmental Quality
Water Resources Division
Lansing District Office
PO Box 30242
Lansing, MI 48909

Attn: Ms. Christe Alwin

Re: Regional Environmental Planning Review  HRC Job No. 20190124
Water System Improvement Program
City of Howell

Dear Ms. Alwin:

The City of Howell, Michigan is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts on land-water interfaces, including Inland Lakes and Streams, Floodplains, Wetlands, Great Lakes Shorelands, Navigable Waters and Army Corps of Engineers (ACE) Regulated Activities.

On behalf of the City of Howell, we are requesting information regarding the impacts of the above referenced proposed project upon the previously detailed land-water interfaces in the vicinity of the project. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street.
- Exterior improvements at the Water Plant Building located at 150 Marion Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The project site covers mainly urban areas. We have identified that this reconstruction should have no impact on any of the land-water interfaces listed above, due to the location of the project area. Please see attached figure for concurrence with this determination.

Horizontal directional drilling (HDD) of the proposed watermain is anticipated to take place for the majority of the watermain West of West Street and East of State Street,
while open cut construction of the watermain is anticipated to take place between West Street and State Street. Excavation will still need to take place in areas of HDD for boring pits, installation of hydrants and gate valves, connections to existing mains, and procedures to abandon existing mains. In conclusion, no drains or rivers should be impacted by the above referenced project since the project occurs within the road right of way. On behalf of the City of Howell, we are requesting a review to confirm that the above referenced project will not cause an impact to any Inland Lakes and Streams.

On behalf of the City of Howell, we have identified that the water treatment plant is within floodplain limits based on the FEMA Floodplain Maps. Attached is a figure of the exact location. The isolated excavation locations will be planned to not occur near the floodplains so as to not impact the floodplains. However, if isolated excavations must be located within the 100-year floodplain, mitigation measures and soil erosion efforts will be undertaken to protect the floodplains influenced by the project, including but not limited to silt fences, turbidity curtains, stone check dams, gravel access drives, rip-rap, etc. Additionally, excavations will be filled with appropriate backfill materials, compacted and restored to existing grade. Since the majority of the work will be completed within existing structures, no impacts to any existing floodplain areas are expected. On behalf of the City of Howell, we are requesting a review to confirm that the above referenced project will not cause an impact to any floodplains in the project vicinity.

Sections of the existing watermain between Highlander Way and Prospect Street are located in areas that appear to be out of the road right-of-way. One property is 1330 W. Grand River Avenue, while the others are Howell Public School properties. An in-depth review of existing rights-of-way will need to take place during the design phase to determine if an existing easement is already in place or if easement acquisition will be necessary. There are also portions of the project that will require temporary access rights for performing service lead work. Since the majority of the work will be within existing structures in these easements, no impacts to any existing wetland areas are expected. Attached is a map of the known wetlands in the project area. However, if project work is required within an existing wetland, necessary mitigation measures will be undertaken to protect the wetlands influenced by the project. On behalf of the City of Howell, we are requesting a review to confirm that the above referenced project will not cause an impact to any wetlands in the project vicinity.

Since the proposed project involves improvements to existing facilities that are not located along a shoreline or within navigable waters of the United States, no impacts are expected from the proposed project upon Great Lakes Shorelands, Navigable Waters or ACE Regulated Activities. On behalf of the City of Howell, we are requesting a review to confirm that the above referenced project will not cause an impact to any Great Lakes Shorelands, Navigable Waters or ACE Regulated Activities.

If not already obtained, the appropriate joint permit applications will be completed and the necessary permits obtained prior to any construction activities in this project area.

We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.
If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.
Associate

Attachments:
Overview Project Area Map
FEMA Floodplain Project Area Map
Wetlands Project Area Map
Site Photos

pc: MDEQ; E. Pocan
    City of Howell; S. Charles, E. Suida, M. Davis
    HRC; N. Faught, A. Malczewski, M. Corona File
CITY OF HOWELL
WATER SYSTEM IMPROVEMENT PROGRAM
FEMA Floodplains Map

NORTON RD

City Park
Water Tower

LEGEND

Project Area
1% Annual Chance Flood Hazard
0.2% Annual Chance Flood Hazard
Regulatory Floodway

Well 4 & 5

LEGEND

Project Area
1% Annual Chance Flood Hazard
0.2% Annual Chance Flood Hazard
Regulatory Floodway
CITY OF HOWELL
WATER SYSTEM IMPROVEMENT PROGRAM

National Wetlands Inventory Map

LEGEND

Project Area

City Park Water Tower

Wells 4 & 5
February 26, 2019

Farmland Preservation Program
USDA Natural Resources Conservation Service
3001 Coolidge Road, Suite 250
East Lansing, MI 48823-6362

Re: Impact Review
Water System Improvement Program
City of Howell

Dear Sir or Madam:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts on prime and unique farmland in the vicinity of the project.

We are requesting information regarding the impacts of the above referenced proposed project upon the Farmland Protection Policy Act regulations. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the replacement work required for the project. The wells are located in Public Land, see zoning map. However, improvements will only be made to the well itself and will not impact the surrounding area. Since the proposed project involves improvements to existing facilities, no conversions of farmland to nonagricultural uses are expected. Please see attached zoning map which shows a lack of existing significant farmlands and agricultural zones within the project area. We are...
requesting a review to confirm that the above referenced project will not cause an impact to any significant farmland or agricultural lands in the project vicinity.

We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map
County Zoning Map

pc: MDEQ; E. Pocan
    City of Howell; S. Charles, E. Suida, M. Davis
    HRC; N. Faught, A. Malczewski, File
February 26, 2019

Michigan Department of Agriculture & Rural Development
Farmland Preservation Program
Environmental Stewardship Division
P.O. Box 30499
Lansing, MI 48909

Re: Impact Review
Water System Improvement Program
City of Howell

Dear Sir or Madam:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts on significant farmland or agricultural lands in the vicinity of the project.

We are requesting information regarding the impacts of the above referenced proposed project upon The Farmland and Open Space Preservation Act (Part 361 of the NREPA) or PA 116. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street.
- Exterior improvements at the Water Plant Building located at 150 Marion Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the replacement work required for the project. Since the proposed project involves improvements to existing facilities, no impacts are expected from the proposed project upon any significant farmland or agricultural lands. Please see attached aerial images and zoning maps which show a lack of existing significant farmlands in the project area. Both the City of Howell and Howell Township zoning maps from their websites are referenced. We are requesting a review to confirm...
that the above referenced project will not cause an impact to any significant farmland or agricultural lands in the project vicinity.

We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map
Project Area Zoning Map
City of Howell Zoning Map
Project Area Aerial Images

pc:    MDEQ; E. Pocan
       City of Howell; S. Charles, E. Suida, M. Davis
       HRC; N. Faught, A. Malczewski, File
Dear Sir/Madam:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts to on-site septic systems in the vicinity of the project.

We are requesting information regarding the acceptability of the proposed action as it relates to on-site septic systems. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
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- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the replacement work required for the project. Since the proposed project involves improvements to existing facilities, no impacts are expected from the proposed project upon any on-site septic systems. We are requesting a review to confirm that the above referenced project will not cause an impact to any on-site septic systems.

We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.
If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map

pc: MDEQ; E. Pocan
City of Howell; S. Charles, E. Suida, M. Davis
HRC; N. Faught, A. Malczewski, File
February 26, 2019

Michigan Natural Features Inventory
P.O. Box 30444
Lansing, MI 48909-7944

Re: Protected Plants and Animals Review [HRC Job No. 20190124]
Water System Improvement Program
City of Howell, Michigan

Dear Endangered Species Specialist:

The City of Howell, Michigan is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts on protected plants and animals in the vicinity of the project.

On behalf of the City of Howell, we are requesting information regarding the impacts of the above referenced proposed project upon protected plants and animals. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street.
- Exterior improvements at the Water Plant Building located at 150 Marion Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are located in Sections 35 and 36 of Howell, Michigan and Section 4 of Marion Township, T3N R4E. The City of Howell is located in Livingston County, Michigan. The existing water system service area for the City encompasses almost the entire area within the boundaries of the City. The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the repair work required for the project. Please see attached figure of the Project Area.

On behalf of the City of Howell, we have completed the U.S. Fish and Wildlife Service streamlined review process which indicates this proposed project would have “no effect” on any endangered species in the project vicinity, please see attached documentation. On behalf of the City of Howell, we are requesting a review to confirm that the above referenced project will not cause an impact to any protected plants and animals in the project vicinity.
We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.
Associate

Attachments:
Overview of Project Area Map
Documentation of review process
Site Images

pc: MDEQ; E. Pocan
City of Howell; S. Charles, E. Suida, M. Davis
HRC; N. Faught, A. Malczewski, M. Corona File
## Lenawee

<table>
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<tr>
<th>Species</th>
<th>Status</th>
<th>Habitat Description</th>
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<tr>
<td><strong>Pitcher's thistle</strong>&lt;br&gt;&lt;i&gt;(Cirsium pitcheri)&lt;/i&gt;</td>
<td>Threatened</td>
<td>Stabilized dunes and blowout areas</td>
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<tr>
<td><strong>Whooping cane</strong>&lt;br&gt;&lt;i&gt;(Grus americanus)&lt;/i&gt;</td>
<td><strong>Non-essential</strong>&lt;br&gt;experimental population</td>
<td>Open wetlands and lakeshores</td>
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<td><strong>Indiana bat</strong>&lt;br&gt;&lt;i&gt;(Myotis sodalis)&lt;/i&gt;</td>
<td>Endangered</td>
<td>Summer habitat includes small to medium river and stream corridors with well developed riparian woods; woodlots within 1 to 3 miles of small to medium rivers and streams; and upland forests. Caves and mines as hibernacula.</td>
</tr>
<tr>
<td><strong>Northern long-eared bat</strong>&lt;br&gt;&lt;i&gt;(Myotis septentrionalis)&lt;/i&gt;</td>
<td>Threatened</td>
<td>Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests during spring and summer.</td>
</tr>
<tr>
<td><strong>Eastern massasauga</strong>&lt;br&gt;&lt;i&gt;(Sistrurus catenatus)&lt;/i&gt;</td>
<td>Threatened</td>
<td>Wet prairie and fens</td>
</tr>
<tr>
<td><strong>Poweshiek skipperling</strong>&lt;br&gt;&lt;i&gt;(Oarisma poweshiek)&lt;/i&gt;</td>
<td>Endangered</td>
<td>Critical Habitat</td>
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## Livingston

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<tr>
<th>Species</th>
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<tr>
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<td>Endangered</td>
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<td>Endangered</td>
<td>Critical Habitat</td>
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<tr>
<td><strong>Snuffbox</strong>&lt;br&gt;&lt;i&gt;(Epioblasma triquetra)&lt;/i&gt;</td>
<td>Endangered</td>
<td>Small to medium-sized creeks and some larger rivers, in areas with a swift current</td>
</tr>
<tr>
<td><strong>Eastern prairie fringed orchid</strong>&lt;br&gt;&lt;i&gt;(Platanthera leucophaea)&lt;/i&gt;</td>
<td>Threatened</td>
<td>Mesic to wet prairies and meadows</td>
</tr>
</tbody>
</table>
February 26, 2019

Howell Township
3525 Byron Road
Howell, MI 48855

Attn: Mr. Mike Coddington, Supervisor

Re: Project Notification

Water System Improvement Program

City of Howell

Dear Mr. Coddington:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts on planning or local development plans in the area.

We are requesting information regarding the impacts of the above referenced proposed project upon any planning or local development plans in the vicinity of the project. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street.
- Exterior improvements at the Water Plant Building located at 150 Marion Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the replacement work required for the project. Since the proposed project involves improvements to existing facilities, no impacts are expected from the proposed project upon any planning or local developments. We are requesting a review to confirm that the above referenced project will not cause an impact to any planning or local development plans.
We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map

pc: MDEQ; E. Pocan
    City of Howell; S. Charles, E. Suida, M. Davis
    HRC; N. Faught, A. Malczewski, File
February 26, 2019

Marion Township
2877 W Coon Lake Road
Howell, MI 48855

Attn: Mr. Bob Hanvey, Supervisor

Re: Project Notification
Water System Improvement Program
City of Howell

Dear Mr. Hanvey:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts on planning or local development plans in the area.

We are requesting information regarding the impacts of the above referenced proposed project upon any planning or local development plans in the vicinity of the project. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street.
- Exterior improvements at the Water Plant Building located at 150 Marion Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the replacement work required for the project. Since the proposed project involves improvements to existing facilities, no impacts are expected from the proposed project upon any planning or local developments. We are requesting a review to confirm that the above referenced project will not cause an impact to any planning or local development plans.
We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map

pc:  MDEQ; E. Pocan
     City of Howell; S. Charles, E. Suida, M. Davis
     HRC; N. Faught, A. Malczewski, File
Dear Mr. Eagle:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts to contaminated sites in the vicinity of the project.

On behalf of the City of Howell, we are requesting information regarding the impacts of the above referenced proposed project upon contaminated sites based on Part 201 and Part 213 of Michigan’s Natural Resources and Environmental Protection Act (NREPA). The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street.
- Exterior improvements at the Water Plant Building located at 150 Marion Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the replacement work required for the project. Since the proposed project involves improvements to existing facilities, no impacts are expected from the proposed project upon any NREPA regulations. We are requesting a
review to confirm that the above referenced project will not cause an impact to Part 201 or Part 213 of the NREPA.

We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map

pc: MDEQ; E. Pocan
    City of Howell; S. Charles, E. Suida, M. Davis
    HRC; N. Faught, A. Malczewski, File
February 26, 2019

NESHAP Asbestos Program
Department of Environmental Quality – Air Quality
P.O. Box 30260
Lansing, MI 48909-7760

Attn: Ms. Karen Kajiya-Mills, Program Manager

Re: Impact Review
Water System Improvement Program
City of Howell

Dear Ms. Kajiya-Mills:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts due to removal of building materials containing asbestos in the vicinity of the project.

On behalf of the City of Howell, we are requesting information regarding the impacts of the above referenced proposed project upon National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street.
- Exterior improvements at the Water Plant Building located at 150 Marion Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the replacement work required for the project. Since the proposed project does not plan for the removal of any building materials containing asbestos, no impacts are expected from the proposed project upon any...
NESHAP regulations. On behalf of the City of Howell, we are requesting a review to confirm that the above referenced project will not cause an impact to NESHAP regulations in the project vicinity.

We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map

pc: MDEQ; E. Pocan
    City of Howell; S. Charles, E. Suida, M. Davis
    HRC; N. Faught, A. Malczewski, File
February 26, 2019

Michigan Department of Environmental Quality
Office of Waste Management and Radiological Protection Division
P.O. Box 30242
Lansing, MI 48909

Re: Impact Review
Water System Improvement Program
City of Howell

Dear Sir or Madam:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts to the disposal of waste materials in accordance with Michigan’s Natural Resources and Environmental Protection Act (NREPA) as a result of the project.

On behalf of the City of Howell, we are requesting information regarding the potential impacts of the above referenced project based on Part 111, Part 115 and Part 121 of Michigan’s Natural Resources and Environmental Protection Act (NREPA) and the Hazardous Materials Transportation Act. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street.
- Exterior improvements at the Water Plant Building located at 150 Marion Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the replacement work required for the project. The proposed project involves replacement of existing facilities. No removal or disposal of building materials which contain lead, mercury, PCBs, or similar contaminants is expected. Therefore, there are no anticipated impacts from the proposed project upon any
NREPA regulations. We are requesting a review to confirm that the above referenced project will not impact Part 111, Part 115, or Part 121 of the NREPA.

Additionally, since all replacements and pipe cleaning will be performed on the water system throughout the City, liquid industrial waste (LIW) is not an anticipated byproduct of the project. Therefore, knowledge of proper transportation and disposal requirements for LIW is not expected for this project.

We request, on behalf of the City of Howell, your explanation and concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map

pc: MDEQ; E. Pocan
City of Howell; S. Charles, E. Suida, M. Davis
HRC; N. Faught, A. Malczewski, File
February 26, 2019

Southeast Michigan Council of Governments
1001 Woodward Avenue, Suite 1400
Detroit, MI 48226-1927

Re: Regional Environmental Planning Review
Water System Improvement Program
City of Howell

Dear Sir/Madam:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts on any local development plans, area wide waste treatment management plans and/or regional water quality management plans.

We are requesting information regarding the impacts of the above referenced proposed project upon any local development plans, area wide waste treatment management plans and/or regional water quality management plans in the vicinity of the project. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street.
- Exterior improvements at the Water Plant Building located at 150 Marion Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

All population figures and projections referenced in the project plan will be collected from the Southeast Michigan Council of Governments (SEMCOG) Community Profiles, which can be found at the following web address: (http://www.semcog.org/Data-and-Maps/Community-Profiles#People).

We request, on behalf of the City of Howell, notification if an alternative source for the population data is recommended.
The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the replacement work required for the project. Since the proposed project involves improvements to existing facilities, no impacts are expected from the proposed project upon local development plans, area wide waste treatment management plans and/or regional water quality management plans. We are requesting a review to confirm that the above referenced project will not cause an impact to any local development plans, area wide waste treatment management plans and/or regional water quality management plans.

We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

Additionally, a copy of the Project Plan Draft will be sent to your office upon completion for your review and approval.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map
Site Images

pc: MDEQ; E. Pocan
City of Howell; S. Charles, E. Suida, M. Davis
HRC; N. Faught, A. Malczewski, File
February 26, 2019

State Historic Preservation Office
Cultural Resources Management and Planning Section
735 East Michigan Avenue
P.O. Box 30044
Lansing, MI 48909-7944

Re: Historic Review
Water System Improvement Program
City of Howell, Michigan

Dear Sir/Madam:

The City of Howell, Michigan is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts on any historic properties with religious and/or cultural significance in the vicinity of the project.

On behalf of the City of Howell, we are requesting information regarding the impacts of the above referenced proposed project upon any historic properties with religious and/or cultural significance in the vicinity of the project. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street.
- Exterior improvements at the Water Plant Building located at 150 Marion Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are located in Sections 35 and 36 of the City of Howell and Section 4 of Marion Township, T3N R4E, located in Livingston County, Michigan. The existing water system service area for the City encompasses almost the entire area within the boundaries of the City. The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the repair work required for the project. Please see attached figure map for Project Area.

Since the proposed project involves replacement of existing facilities, no impacts are expected that could cause irreparable loss or destruction of significant scientific, prehistorical, historical, or archeological data in the vicinity of the project. In order to
comply with the Archeological and Historic Preservation Act of 1974, your office must be notified as part of the development of the Project Plan. Attached is an application for Section 106 review and all its necessary attachments to fulfill this obligation. On behalf of the City of Howell, we are requesting your determination of the potential for irreparable loss or destruction of significant scientific, prehistorical, historical, or archeological data that may be caused by this project.

We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.
Associate

Attachments:
Project Location Map
Localized USGS Topo Map with APE
Copy of Application for Section 106 Review
Photographs for Section V. of Application
Register of Historic Places Map
Historic District Photographs

pc: MDEQ; E. Pocan
    City of Howell; S. Charles, E. Suida, M. Davis
    HRC; N. Faught, A. Malczewski, File
I. GENERAL INFORMATION

☐ THIS IS A NEW SUBMITTAL  ☑ THIS IS MORE INFORMATION RELATING TO ER#

a. Project Name: WATER SYSTEM IMPROVEMENT PROGRAM
b. Project Address (if available): See Project Area Map for entire project location.
c. Municipal Unit: City of Howell County: Livingston County
d. Federal Agency, Contact Name and Mailing Address (If you do not know the federal agency involved in your project please contact the party requiring you to apply for Section 106 review, not the SHPO, for this information.): Ms. Olivia Velzy, Project Manager, Michigan Department of Environmental Quality, Drinking Water & Municipal Assistance Division, State Office Building 4th Floor, 301 East Louis B. Glick Hwy, Jackson, MI 49201-1556, (p) (517)740-6219, (o) (517)780-7690, velzyo@michigan.gov
e. State Agency (if applicable), Contact Name and Mailing Address: Ms. Olivia Velzy, Project Manager, Michigan Department of Environmental Quality, Drinking Water & Municipal Assistance Division, State Office Building 4th Floor, 301 East Louis B. Glick Hwy, Jackson, MI 49201-1556, (p) (517)740-6219, (o) (517)780-7690, velzyo@michigan.gov
f. Consultant or Applicant Contact Information (if applicable) including mailing address: Michael Darga, P.E., Associate, Hubbell, Roth & Clark, Inc., 555 Hulet Drive, Bloomfield Hills, MI 48303, (o) (517)292-1485, (p) 248-535-3350, mdarga@hrc-engr.com

II. GROUND DISTURBING ACTIVITY (INCLUDING EXCAVATION, GRADING, TREE REMOVALS, UTILITY INSTALLATION, ETC.)

DOES THIS PROJECT INVOLVE GROUND-DISTURBING ACTIVITY? ☑ YES ☐ NO (If no, proceed to section III.)

Exact project location must be submitted on a USGS Quad map (portions, photocopies of portions, and electronic USGS maps are acceptable as long as the location is clearly marked).

a. USGS Quad Map Name: Howell, Michigan
b. Township: 3N Range: 4E Section: 35-36
c. Description of width, length and depth of proposed ground disturbing activity: Varies depending on which rehabilitation construction method is used. Overall the project will cover a total of about 14,000 linear feet of water main rehabilitation. Mainly trenchless horizontal directional drilling (HDD) will be utilized. The area of disruption during HDD will be underground where the water main is located and a trench that is 10 feet wide and 6 feet deep may need to be excavated as an access point to begin trenchless rehabilitation. In areas where open-cut installation is necessary, such as intersections or problem areas encountered during construction, the area of disruption would also be 10-ft wide and 6-ft deep.
d. Previous land use and disturbances: Location includes an existing Water Treatment Plant and public right-of-way/easements where water main and public utilities exist on the side of roadways.
e. Current land use and conditions: The land use is zoned as mainly central business district and utility use. The location of water main construction is in current right-of-way/ easements used for public utilities and roadway.
f. Does the landowner know of any archaeological resources found on the property? ☐ YES ☑ NO

Please describe:

III. PROJECT WORK DESCRIPTION AND AREA OF POTENTIAL EFFECTS (APE)
Note: Every project has an APE.

a. Provide a detailed written description of the project (plans, specifications, Environmental Impact Statements (EIS), Environmental Assessments (EA), etc. cannot be substituted for the written description): Removal and replacement by horizontal directional drilling of 14,000 feet of 4 inch-21 inch diameter water mains with new 8 inch-12 inch diameters on the northside of Grand River from Highlander Avenue to Lucy Road. Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street. Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street. Improvements at the Water Plant Building located at 150 Marion Street. Exterior improvements at the City Park water tower located across from the intersection of Thompson and Barnard Street. Additional improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township will also be executed.

b. Provide a localized map indicating the location of the project; road names must be included and legible.

c. On the above-mentioned map, identify the APE.

d. Provide a written description of the APE (physical, visual, auditory, and sociocultural), the steps taken to identify the APE, and the justification for the boundaries chosen. The Areas of Potential Effects at the site locations defined for work as part of this project would consist of trenchless horizontal directional drilling water main installation. However, where necessary, it will also consist of traditional water main construction using open-cut trench installation, also in the right-of-way/easements. Current depths of the existing water mains are on average 6 feet deep. Small excavation sites would be required near areas for valves, fittings, and restraints. Additional room for construction equipment and safe passage for construction personnel within existing facility easements. The work performed within existing facilities and road easements which would minimize APE. The proposed project will result in temporary impacts inherent to construction, which include noise, dust, traffic congestion, and views that the public may consider unsightly due to the presence of equipment and operating engines.
IV. IDENTIFICATION OF HISTORIC PROPERTIES

a. List and date all properties 50 years of age or older located in the APE. If the property is located within a National Register eligible, listed or local district it is only necessary to identify the district: The proposed watermain project is separated into two sections along Grand River Avenue. The project purposely avoids the Howell Downtown Historical District, National Reference #86003363, located in the downtown area along Grand River bounded between Clinton, Barnard Sibley & Chestnut St., please see attached historical data map in reference to the project areas. This being said, the Historic District is going to be included in the application due to the fact that it is located in near proximity to the project area. However, the project will not have any adverse effects on the nearby historic properties. The undertaking will not alter, directly or indirectly, any of the characteristics of the historic properties. The project will not diminish the integrity of any property's location, design, setting, materials, workmanship, feeling, or association. There are no foreseeable effects caused by the undertaking that may occur later in time.

b. Describe the steps taken to identify whether or not any historic properties exist in the APE and include the level of effort made to carry out such steps: Research was performed to determine the location of historical features. This included using the National Register's website to map all State and Federally-registered sites. (https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466)

c. Based on the information contained in "b", please choose one:

- [ ] Historic Properties Present in the APE
- [ ] No Historic Properties Present in the APE

d. Describe the condition, previous disturbance to, and history of any historic properties located in the APE: The Howell Downtown Historic District is primarily a commercial historic district and was added to the National Register of Historic Places in 1987. Significant building include the First Presbyterian Church designed in 1915, the Carnegie Library (1906), McPherson Oil Company, Opera House (1881), Livingston County Courthouse (1889), and the Howell Theater (1912). Disastrous fires in the district destroyed some earlier buildings in the late 1800s, but newer structures were installed. The Historic Preservation Commission in the City of Howell was established for the purposes of creating a Historic District to preserve the Howell Opera House in the downtown and support its rehabilitation. See the attached maps and images of the Historic District Places.

V. PHOTOGRAPHS

Note: All photographs must be keyed to a localized map.

a. Provide photographs of the site itself.

b. Provide photographs of all properties 50 years of age or older located in the APE (faxed or photocopied photographs are not acceptable).

VI. DETERMINATION OF EFFECT

- [ ] No historic properties affected based on [36 CFR § 800.4(d)(1)], please provide the basis for this determination.

- [ ] No Adverse Effect [36 CFR § 800.5(b)] on historic properties, explain why the criteria of adverse effect, 36 CFR Part 800.5(a)(1), were found not applicable.

- [ ] Adverse Effect [36 CFR § 800.5(d)(2)] on historic properties, explain why the criteria of adverse effect, [36 CFR Part 800.5(a)(1)], were found applicable.

*Please print and mail completed form and required information to:
State Historic Preservation Office, Cultural Resources Management and Planning Section, 735 East Michigan Avenue, P.O. Box 30044, Lansing, MI 48909*
Summary:
No Historic Properties were discovered using National Park Service National Register of Historic Places, per submission of the State Historic Preservation Office Application, Section 106 Review.

However, the Howell Downtown Historic District is close in proximity to the proposed project site. This being said, precaution will be taken into account during construction to not disturb the nearby Historic District.
Summary:
No Historic Properties were discovered using National Park Service National Register of Historic Places, per submission of the State Historic Preservation Office Application, Section 106 Review.

CITY OF HOWELL
GRAND RIVER WATER MAIN REPLACEMENT PROJECT
National Register of Historic Places

HRC Job #: 20190124
Date: February 2019

LEGEND
- Project Area
- Historic District
- Historic Place

Legend:
- Project Area
- Historic District
- Historic Place
Howell Downtown District Historical Marker

Historic Livingston County Courthouse

CITY OF HOWELL
WATER SYSTEM IMPROVEMENT
PROGRAM

Historical Site Photographs

http://www.waymarking.com/gallery/default.aspx?f=1&guid=c8e6acdc-06b3-486b-933a-10c0015d7494&gid=2

HRC Job #: 20190124

Date: February 2019
First Presbyterian Church - Howell

McPherson Oil Company Building

CITY OF HOWELL
WATER SYSTEM IMPROVEMENT PROGRAM
Historical Site Photographs

HRC Job #: 20190124
Date: February 2019
CITY OF HOWELL
GRAND RIVER WATER MAIN REPLACEMENT
PROJECT
Areas of Potential Effect - USGS Topo Map

HRC Job #: 20190124
Date: February 2019

LEGEND

- Project Area
- APE

APE: Right of Way/Easements of the portion of designated road and exist. water main locations.

Water Treatment Plant
City Park Water Tower
Wells 4 & 5
National Register of Historic Places

Public, non-restricted data depicting National Register spatial data processed by the Cultural Resources GIS facility. Data last updated in April, 2014.

Howell Downtown Historic District

Water Treatment Plant

CITY OF HOWELL
GRAND RIVER WATER MAIN REPLACEMENT PROJECT

LEGEND

Project Area

# Photo #

HRC Job #: 20190124

Date: February 2019

Site Photos
1. Grand River Ave. & Lucy St. - Water Main Replacement on North Side of Road (see hydrant).

2. Grand River Ave. & National St. - Water Main Replacement on North Side of Road (see hydrant).
3. National St., North of Grand River Ave. - Water Main Replacement on West Side of Road.

4. Grand River Ave., West of National St. - Water Main Replacement on North Side of Road (see hydrant).
5. Grand River Ave. & Elm St. - Water Main Replacement on North Side of Road (see hydrant).

6. Grand River Ave. & Almon St. - Water Main Replacement on North Side of Road (see hydrant).
7. Grand River Ave., North of Fowler - Water Main Replacement on North Side of Road (see hydrant).

8. Grand River Ave. & Barnard St. - Water Main Replacement on North Side of Road.

10. Grand River Ave. & Chestnut St. - Water Main Replacement on North Side of Road (see hydrant).
11. Grand River Ave. & Byron Rd. - Water Main Replacement on North Side of Road (see hydrant).

12. Grand River Ave. & N Thompkins St. - Water Main Replacement on North Side of Road (see hydrant).
13. Grand River Ave., South of Howell High. - Water Main Replacement on North Side of Road (see hydrant).

14. S Highlander Way & Grand River Ave. - Water Main Replacement on North Side of Road (see hydrant).
15-16. Water Treatment Plant - Exterior Improvements
17. City Park Water Tower
18. Clinton Street - Water Main Replacement on South Side Easement.
February 26, 2019

Bay Mills Indian Community
12140 W Lakeshore Drive
Brimley, MI 49715

Attn: Ms. Paula Carrick, THPO

Re: Notice and Opportunity to Comment

Water System Improvement Program
City of Howell, Livingston County

Dear Ms. Carrick:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires fulfillment of a review process through Section 106 of the National Historic Preservation Act. During this process a federal agency or applicant is required to consult with Tribal Historic Preservation Officers (THPO) and federally recognized Indian tribes to determine the potential impacts on any historic properties with religious and/or cultural significance in the vicinity of the project.

On behalf of the City of Howell, we are requesting information regarding the impacts of the above referenced proposed project upon any historic properties with religious and/or cultural significance in the vicinity of the project. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street.
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The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

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If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map

pc: MDEQ; E. Pocan
   City of Howell; S. Charles, E. Suida, M. Davis
   HRC; N. Faught, A. Malczewski, File
February 26, 2019

Grand Traverse Band of Ottawa and Chippewa Indians
2605 NW Bayshore Drive
Peshawbetown, MI 49682

Attn: Ms. Cindy Winslow

Re: Notice and Opportunity to Comment
Water System Improvement Program
City of Howell, Livingston County

Dear Ms. Winslow:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires fulfillment of a review process through Section 106 of the National Historic Preservation Act. During this process a federal agency or applicant is required to consult with Tribal Historic Preservation Officers (THPO) and federally recognized Indian tribes to determine the potential impacts on any historic properties with religious and/or cultural significance in the vicinity of the project.

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Project Location Map

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City of Howell; S. Charles, E. Suida, M. Davis
HRC; N. Faught, A. Malczewski, File
February 26, 2019

Hannahville Potawatomi Indian Community
N-14911 Hannahville B-1 Road
Wilson, MI 49896

Attn: Mr. Earl Meshigaud

Re: Notice and Opportunity to Comment
Water System Improvement Program
City of Howell, Livingston County

Dear Mr. Meshigaud:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires fulfillment of a review process through Section 106 of the National Historic Preservation Act. During this process a federal agency or applicant is required to consult with Tribal Historic Preservation Officers (THPO) and federally recognized Indian tribes to determine the potential impacts on any historic properties with religious and/or cultural significance in the vicinity of the project.

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Project Location Map

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    City of Howell; S. Charles, E. Suida, M. Davis
    HRC; N. Faught, A. Malczewski, File
February 26, 2019

Keweenaw Bay Indian Community
16429 Beartown Road
Baraga, MI 49908

Attn: Mr. Gary Loonsfoot, Jr., THPO

Re: Notice and Opportunity to Comment

Water System Improvement Program
City of Howell, Livingston County

Dear Mr. Loonsfoot, Jr:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires fulfillment of a review process through Section 106 of the National Historic Preservation Act. During this process a federal agency or applicant is required to consult with Tribal Historic Preservation Officers (THPO) and federally recognized Indian tribes to determine the potential impacts on any historic properties with religious and/or cultural significance in the vicinity of the project.

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    City of Howell; S. Charles, E. Suida, M. Davis
    HRC; N. Faught, A. Malczewski, File
February 26, 2019

Lac Vieux Desert Band of Lake Superior Chippewa Indians
PO Box 249
Watersmeet, MI 49969

Attn: Mr. Giiwegiizhigookway Martin, THPO

Re: Notice and Opportunity to Comment
Water System Improvement Program
City of Howell, Livingston County

Dear Mr. Martin:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires fulfillment of a review process through Section 106 of the National Historic Preservation Act. During this process a federal agency or applicant is required to consult with Tribal Historic Preservation Officers (THPO) and federally recognized Indian tribes to determine the potential impacts on any historic properties with religious and/or cultural significance in the vicinity of the project.

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Attachments
Project Location Map

pc: MDEQ; E. Pocan
    City of Howell; S. Charles, E. Suida, M. Davis
    HRC; N. Faught, A. Malczewski, File
February 26, 2019

Little River Band of Ottawa Indians
2608 Government Center Drive
Manistee, MI 49660

Attn: Mr. Jay Sam, Director

Re: Notice and Opportunity to Comment
Water System Improvement Program
City of Howell, Livingston County

Dear Mr. Sam:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires fulfillment of a review process through Section 106 of the National Historic Preservation Act. During this process a federal agency or applicant is required to consult with Tribal Historic Preservation Officers (THPO) and federally recognized Indian tribes to determine the potential impacts on any historic properties with religious and/or cultural significance in the vicinity of the project.

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Project Location Map

pc: MDEQ; E. Pocan  
City of Howell; S. Charles, E. Suida, M. Davis  
HRC; N. Faught, A. Malczewski, File
February 26, 2019

Little Traverse Bay Band of Odawa
7500 Odawa Circle
Harbor Springs, MI 49740

Attn: Mr. Wes Andrews

Re: Notice and Opportunity to Comment
Water System Improvement Program
City of Howell, Livingston County

Dear Mr. Andrews:

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HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map

pc: MDEQ; E Pocan
City of Howell; S. Charles, E. Suida, M. Davis
HRC; N. Faught, A. Malczewski, File
February 26, 2019

Match-e-be-nash-shee-wish Gun Lake Band of Potawatomi Indians
2872 Mission Drive
Shelbyville, MI 49344

Attn: Ms. Heather Bush

Re: Notice and Opportunity to Comment

Water System Improvement Program
City of Howell, Livingston County

Dear Ms. Bush:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires fulfillment of a review process through Section 106 of the National Historic Preservation Act. During this process a federal agency or applicant is required to consult with Tribal Historic Preservation Officers (THPO) and federally recognized Indian tribes to determine the potential impacts on any historic properties with religious and/or cultural significance in the vicinity of the project.

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Attachments
Project Location Map

pc: MDEQ; E. Pocan
    City of Howell; S. Charles, E. Suida, M. Davis
    HRC; N. Faught, A. Malczewski, File
February 26, 2019

Nottawaseppi Band of Huron Potawatomi
1485 Mno-Bmadzewen Way
Fulton, MI 49052

Attn:     Mon-ee Zapata, Cultural Specialist

Re:        Notice and Opportunity to Comment

Water System Improvement Program
City of Howell, Livingston County

Dear Mon-ee Zapata:

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Attachments
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pc: MDEQ; E. Pocan
City of Howell; S. Charles, E. Suida, M. Davis
HRC; N. Faught, A. Malczewski, File
February 26, 2019

Pokagon Band of Potawatomi
58620 Sink Road
Dowagiac, MI 49047

Attn: Mr. Marcus Winchester, THPO

Re: Notice and Opportunity to Comment
Water System Improvement Program
City of Howell, Livingston County

Dear Mr. Winchester:

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Attachments
Project Location Map

pc: MDEQ; E. Pocan
    City of Howell; S. Charles, E. Suida, M. Davis
    HRC; N. Faught, A. Malczewski, File
February 26, 2019

Saginaw Chippewa Indian Tribe of MI
6650 E. Broadway
Mt Pleasant, MI 48858

Attn: Mr. William Johnson, Interim THPO

Re: Notice and Opportunity to Comment
Water System Improvement Program
City of Howell, Livingston County

Dear Mr. Johnson:

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Attachments
Project Location Map

pc: MDEQ; E. Pocan
   City of Howell; S. Charles, E. Suida, M. Davis
   HRC; N. Faught, A. Malczewski, File
February 26, 2019

Sault Ste. Marie Tribe of Chippewa
523 Ashmun
Sault Ste Marie, MI 49783

Attn: Ms. Colleen Medicine

Re: Notice and Opportunity to Comment
HRC Job No. 20190124
Water System Improvement Program
City of Howell, Livingston County

Dear Ms. Medicine:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires fulfillment of a review process through Section 106 of the National Historic Preservation Act. During this process a federal agency or applicant is required to consult with Tribal Historic Preservation Officers (THPO) and federally recognized Indian tribes to determine the potential impacts on any historic properties with religious and/or cultural significance in the vicinity of the project.

On behalf of the City of Howell, we are requesting information regarding the impacts of the above referenced proposed project upon any historic properties with religious and/or cultural significance in the vicinity of the project. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along Clinton Road from State Street to National Street.
- Exterior improvements at the Water Plant Building located at 150 Marion Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

The proposed project site covers mostly urban areas and will utilize existing roads, easements, and right of way to complete the replacement work required for the project.
Since the proposed project involves replacement of existing facilities, no impacts are expected from the proposed project upon any historic properties with religious and/or cultural significance.

On behalf of the City of Howell, we are providing you with the opportunity to comment on the above referenced project to assure that it will not cause an impact to any historical properties with religious and/or cultural significance in which you may be aware. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map

pc:  MDEQ; E. Pocan
     City of Howell; S. Charles, E. Suida, M. Davis
     HRC; N. Faught, A. Malczewski, File
February 26, 2019

U.S Fish and Wildlife Service
East Lansing Field Office
2651 Coolidge Road
Lansing, MI 48823-6360

Re: Protected Plants and Animals Review
Water System Improvement Program
City of Howell

Dear Endangered Species Specialist:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts on protected plants and animals in the vicinity of the project.

We are requesting information regarding the impacts of the above referenced proposed project upon protected plants and animals. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Removal and replacement of 13,000 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
- Exterior improvements at the Water Plant Building located at 150 Marion Street.
- Water main and valve replacements at the City Park water tower located across from the intersection of Thompson and Barnard Street to Madison Street.
- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the replacement work of entirely existing utilities required for the project. We have reviewed the U.S. Fish and Wildlife Service streamlined review process and determined that "suitable habitat may be present, and no other data indicate species or critical habitat are absent." Therefore, we are requesting a review from the U.S. Fish and Wildlife Service to indicate if the above referenced project will cause an impact to any protected plants and animals in the project vicinity. Please
see attached documentation from the Environmental Conservation Online System for more information for this review.

We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map
ECOS Endangered Species Documentation
Site Images

pc: MDEQ; E. Pocan
City of Howell; S. Charles, E. Suida, M. Davis
HRC; N. Faught, A. Malczewski, File
### Species By County Report

The following report contains species that are known to or are believed to occur in this county. Species with range unrefined past the state level are now excluded from this report. If you are looking for the Section 7 range (for Section 7 Consultations), please visit the iPAC application.

**County: Livingston, Michigan**

Need to contact a FWS field office about a species? Follow [this link](#) to find your local FWS Office.

<table>
<thead>
<tr>
<th>Group</th>
<th>Name</th>
<th>Population</th>
<th>Status</th>
<th>Lead Office</th>
<th>Recovery Plan</th>
<th>Recovery Plan Action Status</th>
<th>Recovery Plan Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clams</td>
<td>Snuffbox mussel (<em>Epioblasma triqueta</em>)</td>
<td>Wherever found</td>
<td>Endangered</td>
<td>Ohio Ecological Services Field Office</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flowering Plants</td>
<td>Eastern prairie fringed orchid (<em>Platanthera leucophaea</em>)</td>
<td>Wherever found</td>
<td>Threatened</td>
<td>Chicago Ecological Service Field Office</td>
<td>Eastern Prairie Fringed Orchid</td>
<td>Implementation</td>
<td>Final</td>
</tr>
<tr>
<td>Insects</td>
<td>Poweshiek skipperling (<em>Oarsma poweshiek</em>)</td>
<td>Wherever found</td>
<td>Endangered</td>
<td>Minnesota-Wisconsin Ecological Services Field Office</td>
<td>Indiana Bat (<em>Myotis sodalis</em>) Draft</td>
<td>Implementation</td>
<td>Progress</td>
</tr>
<tr>
<td>Mammals</td>
<td>Indiana bat (<em>Myotis sodalis</em>)</td>
<td>Wherever found</td>
<td>Endangered</td>
<td>Indiana Ecological Services Field Office</td>
<td></td>
<td>Implementation</td>
<td>Draft</td>
</tr>
<tr>
<td>Mammals</td>
<td>Northern Long-Eared Bat (<em>Myotis septentrionalis</em>)</td>
<td>Wherever found</td>
<td>Threatened</td>
<td>Minnesota-Wisconsin Ecological Services Field Office</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reptiles</td>
<td>Eastern Massasauga (=rattlesnake) (<em>Sistrurus catenatus</em>)</td>
<td>Wherever found</td>
<td>Threatened</td>
<td>Chicago Ecological Service Field Office</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 7 Consultation Technical Assistance
Step-by-Step Instructions - Step 1

Step 1. Based on your project type (listed below), either contact the appropriate Ecological Services Field Office or proceed to Step 2:

- For wind energy projects, contact the Ecological Services Field Office located in the state where the project would occur for assistance.
- For projects installing towers that use guy wires or are over 200 feet in height, contact the Ecological Services Field Office located in the state where the project would occur for assistance.
- For all other projects, continue with Step 2.

Previous - Next (Step 2)
Step 2. Determine whether a listed or proposed species or designated or proposed critical habitat may be present within the action area.

A. Check the species list to determine whether any species or critical habitat may be present in the county(ies) of the proposed project.
   - If no species or critical habitat is listed, conclude "no species present" and document your finding. No further consultation required.
   - If any species or critical habitat is listed, print the species list and continue to B.

B. If a listed/proposed species or critical habitat is in the county where your project is located and your project is any of the following:
   - within a developed area,
   - a HUD project,
   - a pipeline project,
   - a buried utilities project,
   - a telecommunication project, or
   - a request for a Conditional Letter of Map Revision (CLOMR) from FEMA,
   then follow this link for instructions specific to those types of projects.

If your project type is not listed above, continue to C.

C. Go to the pertinent species information pages, define your action area, and cross-reference the species information with your knowledge of the project site.
   - If suitable habitat is not present in the action area, conclude "species and critical habitat not present" and document your finding. No further consultation is required.
   - If suitable habitat is present, but data (e.g., surveys) indicate species and critical habitat are absent from the action area, conclude "species and critical habitat not present" and document your finding. No further consultation required.
   - If suitable habitat is present, and no other data indicate species or critical habitat are absent, conclude "species or critical habitat may be present" and proceed to Step 3.
   - If suitable habitat is present, and no other data indicate species or critical habitat are absent, you may conduct a survey to determine whether listed species or critical habitat are present. Please contact the Ecological Services Field Office located in the state where the project would occur for more information.
S7 Consultation Technical Assistance
Decision Process for "No Effect" Determinations

Certain projects nearly always warrant a "No Effect" determination. This website is intended to assist project proponents in determining whether their project qualifies as one of these types of projects, and if so, to provide a streamlined mechanism for documenting their "No Effect" finding. If your project does not meet the criteria below (and associated pages), your action requires further review. To assist with this more detailed review, you will be linked back to Step 2 of our S7 Technical Assistance website.

Step 3*. Click on the type of project to continue with the "no effect" decision process:

- HUD Project
- Pipeline or Buried Utilities Project
- Telecommunication Project
- Conditional Letter of Map Revision (CLOMR) request to FEMA
- Project within a Developed Area (project type is not one of the 4 listed above). A developed area is already paved or supports structures and the only vegetation is limited to frequently mowed grass or conventional landscaping.

* In Step 2 you determined that listed species or critical habitat may be present in the county(ies) of the proposed project.

Back to S7 Consultation Technical Assistance
Back to S7 Consultation page
S7 Consultation Technical Assistance
Decision Process for "No Effect" Determinations

Pipeline or Buried Utilities Projects - Step 4

**Step 4.** Is your project located entirely within existing, fenced, gravelled/mowed, and maintained facility yards?

- **Yes** - Click here to continue with the "no effect" determination process.
- **No** - Your project requires further review. Click here to return to Step 2 of the S7 Technical Assistance web pages.

[Back]
Endangered Species
Midwest

S7 Consultation Technical Assistance
Decision Process for “No Effect” Determinations
Pipeline or Buried Utilities Projects - Step 5

Step 5. Is the Karner blue butterfly on the county list?

Yes - Your project requires further review. Click here to return to Step 2 of the S7 Technical Assistance web pages.

No - Click here to continue with the "no effect" determination process.

Back
Home - "No Effect" Determination Process
Step 6. "No Effect" Determination and Documentation

A "No Effect" determination is appropriate for your project. As it is located entirely within existing, fenced, graveled, mowed, and maintained facility yards and the Karner blue butterfly is not on the county list, your project will not affect suitable habitat for any listed species. Therefore, no listed species or designated critical habitat is anticipated to be directly or indirectly affected by this action.

To document your section 7 review and "no effect" determination, we recommend that you print this page (go to File<Print Preview), fill-in the project name and date, attach your species list, and file in your administrative record.

Pipeline Project Name: CITY OF HOWELL: Water Main Replacement Project
Date: February 13, 2019
February 26, 2019

Natural River Administration
DNR Fisheries Division
PO Box 30446
Lansing, MI 48909-7946

Re: Wild and Scenic Rivers Review
Water System Improvement Program
City of Howell

Dear Sir/Madam:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts on state or federally-designated wild, scenic, or natural rivers or tributaries in the vicinity of the project.

We are requesting information regarding the impacts of the above referenced proposed project upon protected state or federally-designated wild, scenic, or natural rivers or tributaries. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
- Removal and replacement of 800 feet of 6 inch diameter water main with new 8 inch diameter along National Street from Clinton to Sibley Street.
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- Improvements to wells 4 and 5 located at 3145 and 3255 Norton Road in Marion Township.

The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

The proposed project site covers mostly urban areas and will utilize existing road right of way and easements to complete the replacement work required for the project. According to the Nationwide Rivers Inventory on the National Park Service Website, the Huron River watershed runs through Livingston County but has no impact on the City of Howell. The City of Howell also doesn’t contain any rivers that are considered a state-designated river segments. Please see attached documentation of the Nationwide Rivers Inventory and the National Wild Fish Healthy Survey Database Map for more information.
conclusion, it does not appear that the project will interface with any impact on local rivers.

We are requesting a review to confirm that the above referenced project will not cause an impact to any state or federally designated wild, scenic, or natural rivers or tributaries.

We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map
National River Inventory Documentation
Wild Fish Healthy Survey Database Map

pc: MDEQ; E. Pocan
    City of Howell; S. Charles, E. Suida, M. Davis
    HRC; N. Faught, A. Malczewski, File
February 26, 2019

USDA Forest Service
1400 Independence Ave, SW
Washington, DC 20250-1111

Re: Federal Wild and Scenic Rivers Review
Water System Improvement Program
City of Howell

Dear Sir/Madam:

The City of Howell is submitting a Project Plan to the Michigan Department of Environmental Quality (MDEQ) for acceptance into the Drinking Water Revolving Fund (DWRF) Loan Program. The Project Plan requires a review to determine any potential impacts on state or federally-designated wild, scenic, or natural rivers or tributaries in the vicinity of the project. Michigan’s Department of Natural Resources (DNR), Natural Rivers Program reviewed the proposed project and determined that “the project area is not within any state designated Natural River zoning district [and therefore] a permit is NOT required under Part 305, Natural Rivers, to complete the proposed activities.” The DNR response also referred us to the United States Forest Service (USFS) to determine the impacts of the proposed project on federally-designated wild and scenic rivers.

On behalf of the City of Howell, we are requesting information regarding the impacts of the above referenced proposed project upon protected federally-designated wild, scenic, or natural rivers or tributaries. The project construction will involve the following:

- Removal and replacement of 13,000 feet of 4 inch-12 inch diameter water mains with new 8 inch-12 inch diameters along Grand River from Highlander Avenue to Lucy Road, with the exception of the downtown Howell area from Chestnut Street to Barnard Street.
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The project areas are in Sections 35 and 36 of the City of Howell (Howell Township) and Section 4 of Marion Township, Michigan, T3N, R4E. The location of the water system improvements and the areas of the City of Howell that will be impacted are provided in the attached figures.

The proposed project site covers mostly urban areas and will utilize existing roads, easements and right of way to complete the replacement work required for the project. According to the Nationwide Rivers Inventory on the National Park Service Website, no
rivers run through the project area in Howell. According to the Nation Wild Fish Health Survey Database, the Marion and Genoa Drain run through the City of Howell but will also have no encounter with the project area. Please see attached documentation of the Nationwide Rivers Inventory and the National Wild Fish Health Survey Map for more information. Isolated excavations and trenchless pipe replacement technologies will be used throughout the site to help with the structural replacement of the existing water main. In conclusion, neither the Marion and Genoa Drain nor local rivers should be impacted by the above referenced project.

On behalf of the City of Howell, we are requesting a review to confirm that the above referenced project will not cause an impact to any federally designated wild, scenic, or natural rivers or tributaries.

We request, on behalf of the City of Howell, your concurrence with this determination. We appreciate your review and would be grateful for a response by Friday, March 22, 2019 so that we may meet program deadlines.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Michael P. Darga, P.E.

Attachments
Project Location Map
National River Inventory Documentation
Wild Fish Healthy Survey Database Map

pc: MDEQ; E. Pocan
   City of Howell; S. Charles, E. Suida, M. Davis
   HRC; N. Faught, A. Malczewski, File