



April 1, 2014

Mr. Cameron Clapper, City Manager
City of Whitewater
312 West Whitewater Street
Whitewater, WI 53190

Re: Basin 15 Drainage Study

Dear Cameron,

The purpose of this letter is to provide an update to the Basin 15 Stormwater Study that was prepared in December 2002. The Basin 15 storm sewer system drains approximately 196 acres of urbanized lands that is bounded by Prince Street to the west, Main Street to the north, Franklin Street to the east, and Walworth Avenue to the south (refer to Figure 1). The storm sewer system ultimately outfalls to Cravath Lake immediately southeast of West Ann Street.

Based on the results of the 2002 study, the entire system was found to have at least a 5-year storm capacity and the majority of the system had at least a 10-year storm capacity. Note that the City of Whitewater's (City) current storm sewer design standard requires sufficient capacity to convey flows from a 10-year storm event and providing a safe emergency overland flood route.

The 2002 study identified two areas of localized flooding. The two areas included the Highland Street low point located approximately 100 feet west of Whiton Street and an area located immediately northwest of the intersection of Franklin Street and the railroad. In order to mitigate flooding in these areas, drainage improvements to four distinct segments of the Basin 15 storm sewer system were recommended described as follows.

1. Storm sewer main east of Franklin Street near Home Lumber—Replace approximately 310 lineal feet (LF) of 30-inch-diameter storm sewer with 36-inch-diameter storm sewer.
2. Storm sewer main along Franklin Street between Whitewater Street and Janesville Street—Replace approximately 480 LF of 15-inch-diameter storm sewer with 18-inch-diameter storm sewer.
3. Storm sewer main along Summit Street between Peck Street and Highland Street—Replace approximately 420 LF of 12-inch-diameter storm sewer and 190 LF of 10-inch-diameter storm sewer with 15-inch-diameter storm sewer.
4. Storm sewer main along Whiton Street between West Charles Street and Highland Street—Replace approximately 850 LF of 15-inch-diameter storm sewer with 18-inch-diameter storm sewer and remove and replace approximately 100 LF of 12-inch-diameter storm sewer located along Highland Street with 18-inch-diameter storm sewer. Construction of two additional inlets at the Highland Street low point located 100 feet west of Whiton Street was also recommended.

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The location of these drainage improvement projects is depicted in Figure 2. Estimated construction costs in 2002 dollars for these drainage improvement projects are summarized in Table 1.

| Drainage Improvement Project Description | Opinion of Probable Construction Cost (2002 \$) |
|---|--|
| Storm Sewer Improvements East of Franklin Street | \$ 55,200 |
| Franklin Street Storm Sewer Improvements | \$ 48,800 |
| Summit Street Storm Sewer Improvements | \$ 82,000 |
| Whiton and Highland Street Storm Sewer Improvements | \$ 94,000 |
| Subtotal | \$279,000 |
| Engineering and Contingencies | \$ 70,000 |
| Total Opinion of Probable Construction Cost | \$349,450 |

Table 1 Summary of 2002 Basin 15 Study Drainage Improvement Costs (2002 Dollars)

Scope of Basin 15 Study Update

Updates to the study include the following elements:

1. Considers land development projects and changes in the Basin 15 watershed that have occurred since 2002.
2. Updates study exhibits that include topographic, utility, and aerial mapping.
3. Updates previously prepared cost opinions for recommended drainage improvement projects in the 2002 study to 2014 costs.
4. Evaluates flooding that has occurred since 2002 near the Whitewater Street/Church Street intersection, immediately north at the Home Lumber facility, and potential drainage improvements to mitigate this flooding.

Development Since 2002

A summary of land development projects and changes in the Basin 15 watershed that have occurred since 2002 include the following:

1. 499 West Whitewater Street–Home Lumber connection to 36-inch storm sewer with 10-inch private storm sewer.
2. 440 West Ann Street–Wisconsin Dairy Supply connection to 36-inch storm sewer with three 6-inch-diameter private storm sewers.
3. 5-Points Intersection Improvements–Net increase of 0.08 acres of impervious surface.

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4. 100 block of Boone Court and 100 block of South Franklin Street–DLK properties that expanded paved drives and parking areas. Twelve-inch-diameter storm sewer was extended north from the intersection of Boone Court and Center Street to serve the development. Net increase in impervious surface was 0.23 acres.
5. 761 West Main Street–Regent Apartments Expansion and regrading and paving of several parking areas bounded by Main Street, Cottage Street, Center Street, Summit Street, and Conger Street. Development resulted in a net decrease of 0.08 acres of impervious surface.
6. 478 West Ann Street–DLK duplex with parking lot improvements. Net increase in impervious surface was 0.18 acres.
7. 361 Scott Street–Duplex and parking lot improvements that resulted in net increase in impervious surface of 0.17 acres.
8. 510 West Walworth Street–Housing addition and parking lot addition resulting in net increase in impervious area of 0.07 acres.

The cumulative increase in impervious area for each of these development projects is approximately 0.65 acres. Based on a comparison of the extent of this additional impervious area relative to the overall Basin 15 drainage area, impacts to the hydraulic capacity of the receiving storm sewer system are likely limited. However, if relatively small development projects continue to occur within the watershed, the cumulative effect could begin to have a measurable impact on receiving storm sewer capacities. For this reason, Strand Associates, Inc.® (Strand) believes it is prudent for the City to consider a lower land disturbance threshold for providing postconstruction stormwater management (current threshold is 1 acre of land disturbance). Another possibility is to base stormwater management applicability on the net increase of impervious surface (in addition to land disturbance area). Further discussion regarding this topic is recommended with City staff.

Updates to opinions of probable construction cost for each of the projects recommended in the 2002 study are provided in Table 2.

| Drainage Improvement Project Description | Opinion of Probable Construction Cost (2014 \$) |
|---|--|
| Storm Sewer Improvements East of Franklin Street* | \$ 66,400 |
| Franklin Street Storm Sewer Improvements | \$ 55,800 |
| Summit Street Storm Sewer Improvements | \$ 96,500 |
| Whiton and Highland Street Storm Sewer Improvements | \$109,800 |
| Subtotal | \$328,500 |
| Engineering & Contingencies | \$ 82,100 |
| Total Opinion of Probable Construction Cost | \$410,600 |

* If Whitewater St./Church St. Drainage improvements are constructed, project is no longer necessary.

Table 2 Summary of Updated Drainage Improvement Costs from 2002 Study (2014 Dollars)

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Whitewater Street/Church Street Intersection Flooding Evaluation

Since the completion of the 2002 study, the City has experienced rainfall events that Strand believes have exceeded a 10-year storm event. During these extreme storm events, it has become evident that the low point located at the intersection of Whitewater Street and Church Street immediately north of the Home Lumber facility does not have a positive overland flood route and as a result, the Home Lumber building has experienced flooding. Review of available topographic data indicates that the Whitewater Street low point in front of the Home Lumber facility supports this conclusion.

Review of available topographic data indicates that establishment of an overland flood route at this location likely is not feasible or practical. Therefore, in order to reduce flooding at this location, providing storm sewer capacity greater than the currently provided 10-year storm event would be required (i.e., up to a 100-year storm event).

Also note that the alignment of the existing storm sewer main that drains the Whitewater Street and Church Street intersection passes beneath buildings at the Home Lumber facility for several hundred feet before discharging into Cravath Lake located south of West Ann Street. Clearly this is not a desirable situation because there is limited opportunity for City staff to access the storm sewer system for proper inspection and maintenance or in the event of a pipe failure beneath the buildings. For this reason, Strand has developed drainage improvement options that would both provide storm sewer capacity above a 10-year storm event and also place the new alignment of the storm sewer main in public right-of-way or a dedicated utility easement (refer to Figure 3).

Drainage improvements would involve constructing approximately 1,100 feet of new storm sewer main from the intersection of Whitewater Street and Franklin Street to the existing storm sewer outfall into Cravath Lake. A 400-foot storm sewer main would be located along Franklin Street between Whitewater Street and the railroad. At the railroad, the alignment of the storm sewer would extend approximately 300 feet to the southeast across private lands to Ann Street. A permanent utility easement would be required to accommodate this section of storm sewer. The remaining 350 feet of storm sewer main would extend to the northeast along Ann Street.

This new storm sewer main would significantly off-load stormwater flow from the existing 36-inch-diameter pipe that extends beneath the Home Lumber facility. Approximately 165 feet of new storm sewer would extend from the low point at the intersection of Whitewater Street and Church Street to the west and connect into the new storm sewer main mentioned above. Two high capacity curb inlet structures would be required at the intersection of Whitewater Street and Church Street.

The Water Quality Stormwater Management Plan that was updated in 2011 indicated the potential to construct a new wet detention basin located immediately south of Ann Street near the existing storm sewer outfall. This detention basin would provide water quality benefits by removing sediment and stormwater pollutants before entering Cravath Lake. The intent of the basin is not to provide flood control benefits and has little impact on the drainage improvements that are being recommended.

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Opinions of probable construction cost have been developed for two potential drainage improvement options. Option 1 would provide adequate flood capacity at the intersection of Whitewater Street and Church Street for a 25-year storm event. Option 2 would provide sufficient capacity for a 100-year storm event. Opinions of probable construction cost are summarized in Table 3.

| Drainage Improvement Project Description | Opinion of Probable Construction Cost (2014 \$) | |
|--|---|------------------|
| | Option 1-25-YR | Option 2-100-YR |
| Whitewater St./Church St. Storm Sewer | \$375,000 | \$480,000 |
| Engineering & Contingencies | \$ 94,000 | \$120,000 |
| Total Opinion of Probable Construction Cost | \$469,000 | \$600,000 |

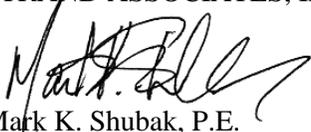
Table 3 Summary of Whitewater Street/Church Street Intersection Storm Sewer Costs

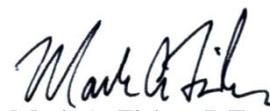
The 36-inch-diameter storm sewer that extends beneath the Home Lumber facility will need to remain in service, so it is recommended that the pipe be televised to inspect the condition of the system and potential presence of debris or blockages.

Once you have had an opportunity to review this information, please call us to set up a meeting to discuss further.

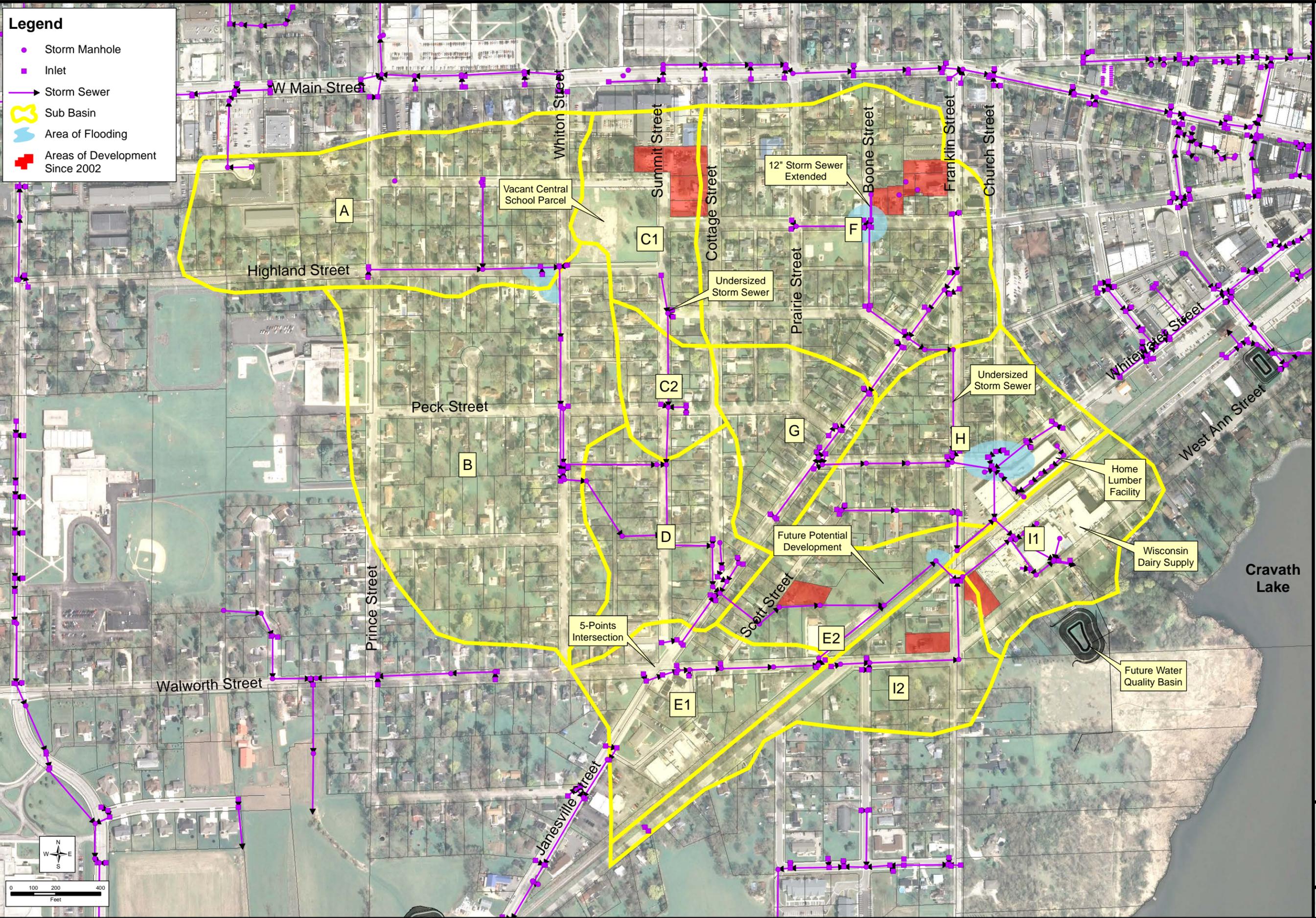
Sincerely,

STRAND ASSOCIATES, INC.®


 Mark K. Shubak, P.E.


 Mark A. Fisher, P.E.

Enclosures

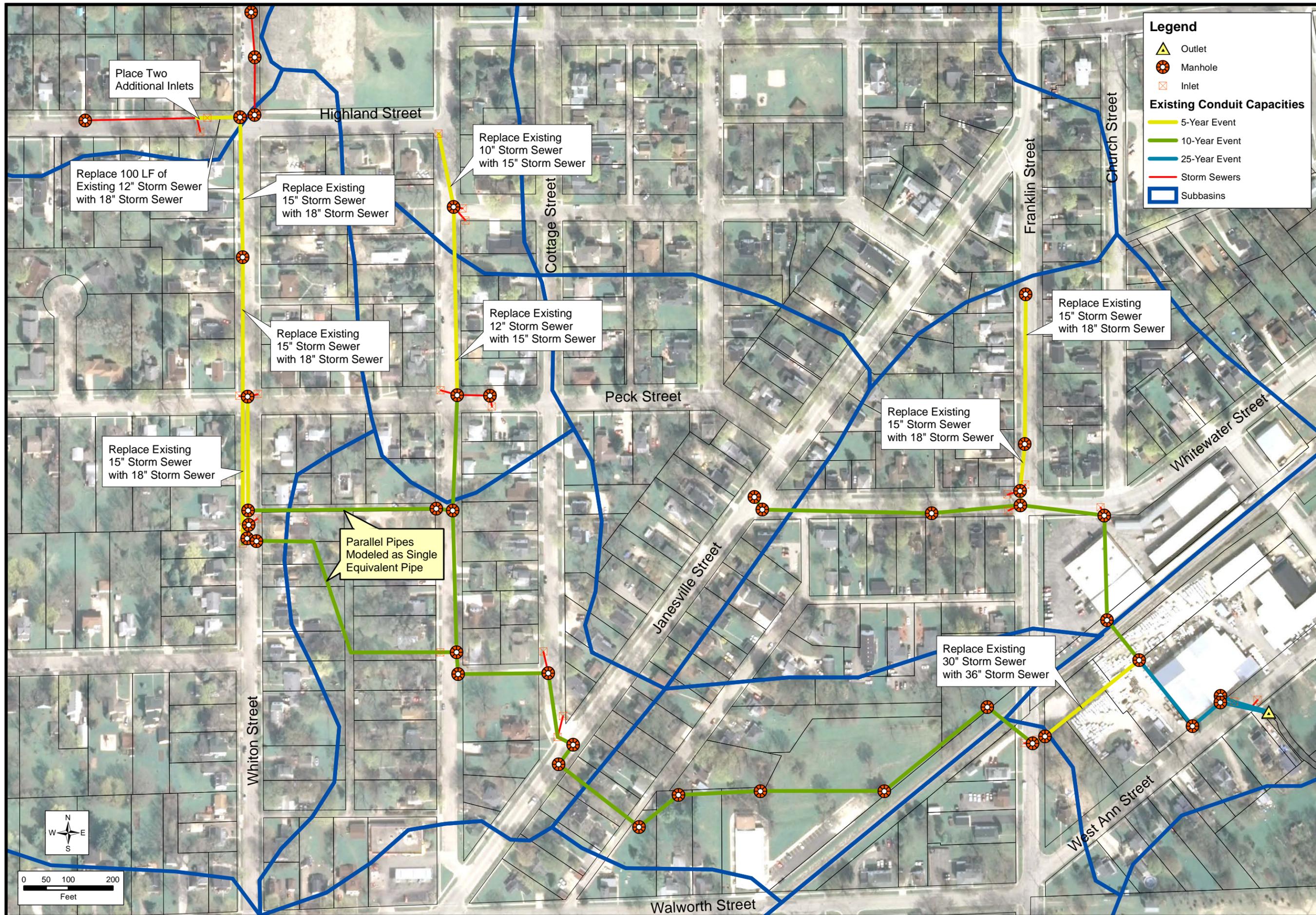


DRAINAGE BASIN MAP

BASIN 15 DRAINAGE STUDY
 CITY OF WHITEWATER
 WALWORTH COUNTY, WISCONSIN



FIGURE 1
 1407.077

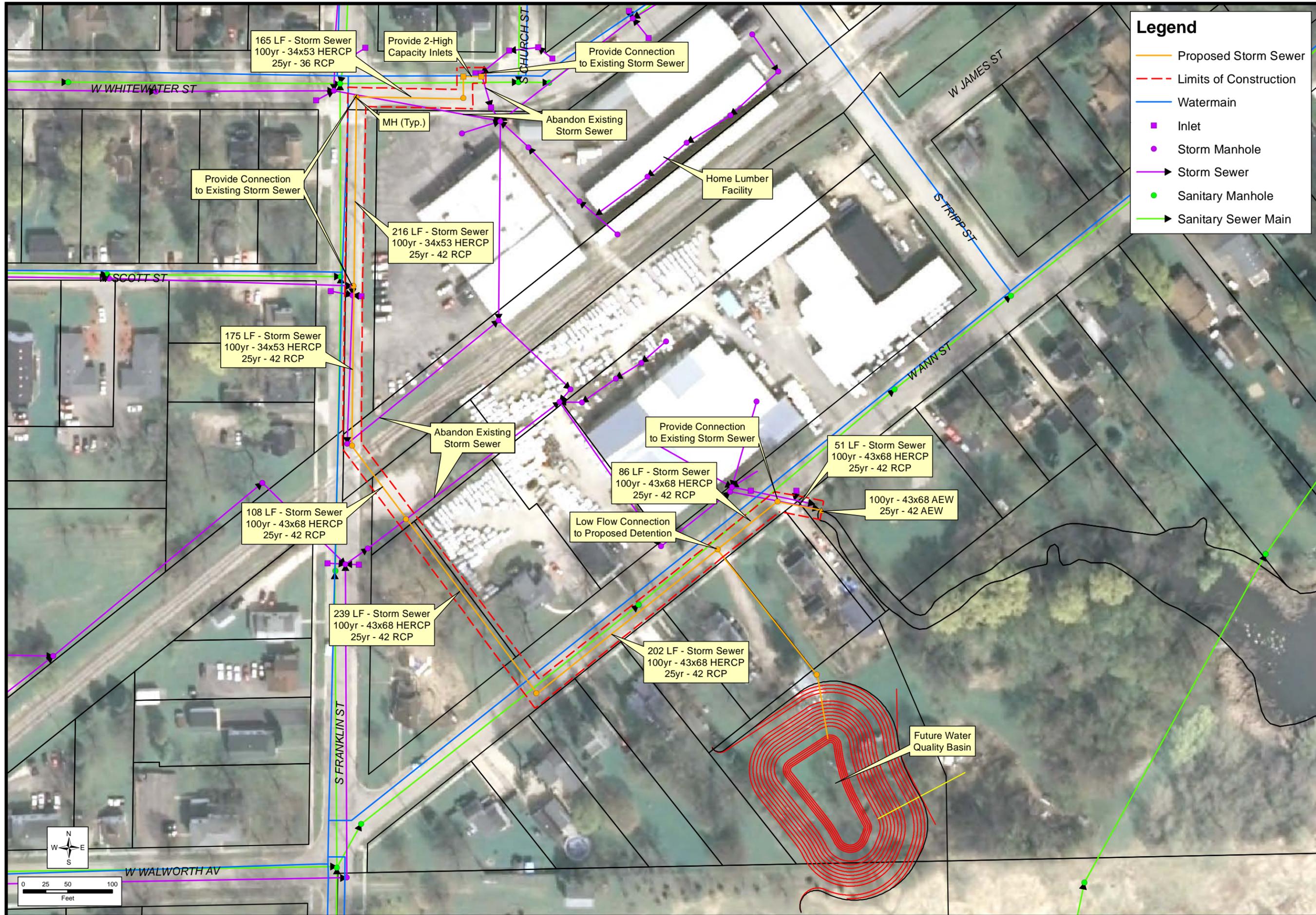


DRAINAGE IMPROVEMENT PLAN FROM 2002 STUDY

BASIN 15 DRAINAGE STUDY
 CITY OF WHITEWATER
 WALWORTH COUNTY, WISCONSIN



FIGURE 2
 1407.077



CONCEPTUAL DRAINAGE PLAN
 WHITEWATER STREET/CHURCH STREET INTERSECTION

BASIN 15 DRAINAGE STUDY
 CITY OF WHITEWATER
 WALWORTH COUNTY, WISCONSIN



FIGURE 3
 1407.077