

Village of Deerfield Stormwater Management Plan

March 2021

(Revised June 2021)



Prepared for:

Village of Deerfield

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Deerfield, IL 60015



THE VILLAGE OF
DEERFIELD

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LIST OF ABBREVIATIONS, ACRONYMS AND DEFINITIONS

Acre-Feet (ac-ft) – Flood volumes are typically quantified in acre-feet. One acre-foot is the volumetric equivalent of an acre of land that is flooded one foot deep.

Base Flood Elevation (BFE) – The BFE is the water surface elevation of the 1% annual chance flood.

Capacity – The design storm associated with the elevation at which the system begins to surcharge.

Design Storm Event – The term “10-year storm” is used to define a rainfall event recurrence interval that statistically has the same 10% chance of occurring in any given year. **Table 1** shows the recurrence and statistical probability of a storm happening in a given year.

Table 1. Design Storm Statistics

Recurrence Interval in Years	Probability of Occurrence in any Given Year	Percent Chance of Occurrence in any Given Year
100	1 in 100	1
10	1 in 10	10
5	1 in 5	20

Hydraulic Grade Line (HGL) – The HGL is the profile of water flowing in a storm sewer system. The HGL represents the piezometric head of a flowing fluid. If a pipe is under pressure, the hydraulic grade line is the elevation that the water rises to on the ground surface or the line that the water level would rise to in a small, vertical tube connected to the pipe.

Level of Flood Protection – The design storm associated with the elevation at which a structure begins to flood.

Level of Service – The design storm associated with the elevation at which the less than 6-inches of street ponding occurs within the system.

RCBC – Reinforced Concrete Box Culvert

RCP – Reinforced Concrete Pipe

Regulatory Floodway - The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Tailwater – The water surface in the receiving downstream system of an outlet pipe.

XP-SWMM – XP-Software Stormwater and Wastewater Management Model (XP-SWMM) is an unsteady flow, dynamic modeling program that determines the hydrologic response (runoff mode) from a storm event and routes the runoff through a storm sewer network (hydraulic mode).

Zone A – Special Flood Hazard Area – FEMA defines Zone A as a SFHA subject to inundation by the 1% annual chance flood with no defined elevation.

Zone AE – Special Flood Hazard Area – FEMA defines Zone AE as a SFHA subject to inundation by the 1% annual chance flood with a defined elevation.

Zone X – Other Flood Areas – A Zone X is defined as an area of 0.2% chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected by levees from 1% annual chance flood.

EXECUTIVE SUMMARY

Due to localized surface flooding in numerous locations during moderate to heavy rain fall events, the Village of Deerfield (Village) initiated the development of a Village-Wide Stormwater Management Plan (Plan) to identify and develop proposed flood reduction projects to address drainage problems throughout the residential portions of the Village.

The methodology for analyzing the storm sewer system for the Plan included a comprehensive review of the storm sewer system, resident meetings, hydrologic and hydraulic modeling of the drainage system, identification of system limitations, and development of proposed drainage improvements. The proposed drainage improvements in this Plan can be incorporated into the Village's infrastructure projects, green infrastructure planning, and long-term capital improvement plan.

Public input was a significant component of the development of the Plan. A virtual open house and an online flood questionnaire was made available to residents in the summer of 2020 through the Village website. In the month prior to the public input portion of the analysis, the Village experienced two significant storm events: May 13-17, 2020, and May 23, 2020. CBBEL staff was in the Village during these storm events and collected site-specific photos and additional public input relative to this storm event. The outreach effort generated over 150 total responses and numerous one-on-one resident meetings.

CBBEL identified 42 Flood Study Areas (FSA) where detailed drainage analyses were completed. CBBEL developed and calibrated hydrologic and hydraulic models for each FSA using flow monitoring data and detailed accounts and pictures from residents. The modeling was verified based on the high-water marks observed during the May 2020 storm events and flow monitoring data. The drainage systems in some of the FSAs have less than a 1-year level of service before street flooding begins, which is less than the design standard of a 10-year level of service. This is due largely to the fact that these portions of the Village were developed prior to modern stormwater management practices.

CBBEL developed proposed drainage improvements to provide a minimum 10-year level of service (with a maximum of 6-inches of ponding in the street) in the storm sewer systems and a minimum 100-year level of protection for residential structures. The 6-inches of depth is typically along the curb line and a car can safely pass through 6-inches of standing water. A conceptual engineer's estimate of probable cost for each of the proposed drainage improvement alternatives was prepared. These long-term capital improvements projects range in cost from \$54,000 to \$16.8 Million and total approximately \$90 Million.

Numerous reports of flooding on private property throughout the residential portions of the Village were received through the data collection process. There were approximately 141 reported instances of yard flooding on private property. The proposed capital improvement projects will be designed to accept this water, but it is our recommendation that the residential drainage improvements be the responsibility of the landowners and that any drainage improvement made on an individual property must not cause adverse impacts other properties. One option for the Village to consider is the possibility of providing design assistance to property owners that wish to implement drainage improvements on their property when the runoff on their property comes from neighboring properties.

CHAPTER 1 PROJECT OVERVIEW

1.1 INTRODUCTION

The Village of Deerfield (Village) has historically experienced street, yard, and structure flooding throughout the residential areas of the Village resulting from a wide range of storm events with varying degrees of intensity and duration. To effectively address the stormwater and flooding issues in the residential portions of the Village, Christopher B. Burke Engineering, Ltd. (CBBEL) was retained by the Village to develop a Village-Wide Stormwater Management Plan (Plan) to identify and develop proposed flood reduction projects. This Plan presents the results of an extensive stormwater management investigation of the storm sewer system throughout the Village.

The Village is located in both the Middle Fork North Branch Chicago River (Middle Fork) and the West Fork North Branch Chicago River (West Fork) watersheds. The watershed divide runs through the middle of the Village, generally parallel to the railroad (Metra), as seen in **Figure 1**. Runoff from the land west of the watershed divide flows to the West Fork and runoff east of watershed divide flows to the Middle Fork. The West Fork and the Middle Fork both generally drain from north to south through the Village.

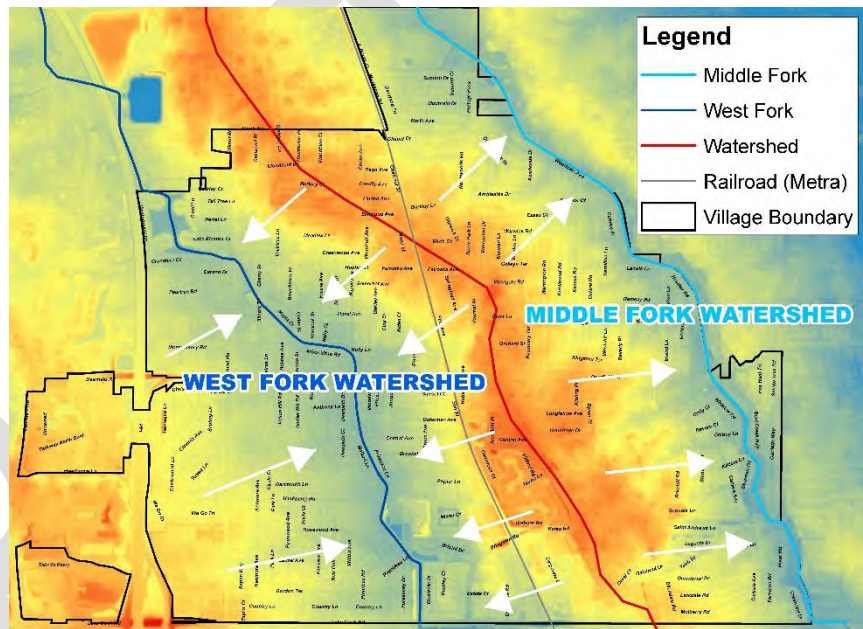


Figure 1. Village of Deerfield Existing Topography

1.2 PURPOSE AND SCOPE

The purpose of this Plan is to present the findings of the detailed analyses and provide recommended improvements in a prioritized manner. This Plan identifies capital improvement projects, opportunities for green infrastructure, and provides homeowner guidance to reduce the risk of future flooding. The recommended improvements are designed to:

- Reduce existing flood/drainage problems, including structure and street flooding,
- Provide infrastructure for private property drainage systems to connect,
- Provide homeowner guidance for private property flooding, and
- Help preserve and enhance stormwater quality.

This Plan includes detailed hydrologic and hydraulic modeling of specifically targeted study areas to identify flood damages and bottlenecks in the stormwater conveyance system serving residential areas. The detailed modeling was used to identify locations and sizes for capital drainage improvement projects. The scope of the

Plan includes the identification of projects that provide 10-year level of service for street flooding (with an allowance of a maximum of 6-inches of ponding) and 100-year level of protection for structure flooding in each of the targeted areas. The 6-inches of depth is typically along the curb line and a car can safely pass through 6-inches of standing water.

All background discussion for the study development, assumptions, modeling techniques, and proposed drainage improvements occur in the beginning of this report. The background discussion is followed by detailed discussions of each of the Flood Study Areas (FSAs). The detailed discussions are included as separate sections for each FSA that include modeling results and associated exhibits.

CHAPTER 2 STUDY DEVELOPMENT

During the initial phase of the study, the Village experienced two significant storm events: May 13-17, 2020, and May 23, 2020. Over 5.7 and 2.2 inches of precipitation was recorded between the two storm events, respectively, resulting in village-wide street and yard flooding. Within these storm events, a high intensity burst of 1.71 inches in an hour was recorded at the United States Geological Service (USGS) precipitation gage located at Deerfield Road on the West Fork, which is equivalent to approximately a 10-year design storm event. The design storm determination was based on rainfall depths published in Bulletin 75 (effective March 2019). It should be noted that these design rainfall depths are approximately 30% higher than the previous design standard (Bulletin 70, 1989).

Table 2. Summary of May 2020 Storm Events

Date	Total Rainfall Depth (in)	Duration (hr)	Approximate Design Storm Event
May 13-17, 2020	5.71	92	10-Year
May 23, 2020	2.25	5	10-Year

While significant, the May 2020 storm events were not a 100-year storm event. However, the storm events did allow CBBEL staff to better understand the Village’s drainage system. CBBEL observed street flooding that was determined to be a result of limited conveyance capacity in the Village’s storm sewer system. Yard flooding was also prevalent due to drainage deficiencies on private property. This was followed by a rise in water surface elevations along the Middle Fork and West Forks causing overbank yard flooding within the regulatory floodplain. The focus of this study will target the structure, street, and yard flooding due to localized storm sewer, overland flow, and storage limitations. Overbank flooding is not addressed within the Plan.

2.1 DATA COLLECTION

Participation from Village staff and the public were essential to understanding the flooding and drainage issues. This input is necessary to identify the extent and type of flooding problems (overland flow, street flooding, yard flooding, seepage, etc.). The extent and nature of known stormwater conditions and concerns in the Village were identified through various means, including discussions with the Village Engineering staff, Public Works staff, as well as resident flood questionnaire responses, and 1-on-1 site visits to residential properties.

2.1.1 Village Staff and Public Involvement

Due to the pandemic, the planned open house with residents at Village Hall had to be canceled. Therefore, a virtual resident open house presentation was posted on the Village website in summer of 2020. In addition, an online flood questionnaire was made available to every resident/property owner through the Village website. CBEL staff conducted field inspections to observe flooding during various rain events, interviewed residents, took pictures, and collected data, such as High-Water Marks (HWM), during the May 2020 storm events and subsequent months.

CBEL reviewed numerous accounts, videos, and photographs of flooding from Village staff and residents, as well as reviewed applicable Village plans, codes, GIS data, previous studies, and construction documents. The information shown in **Figure 2** is a representation of the information compiled from the resident questionnaires, emails and one-on-one site visits. **Overall, the outreach effort generated over 155 total responses.** It is noted that flooding is widespread and not limited to only the information obtained from resident questionnaires. As noted throughout this Plan, detailed consideration has been taken to attempt to quantify the full extent of the flooding problems throughout the Village.

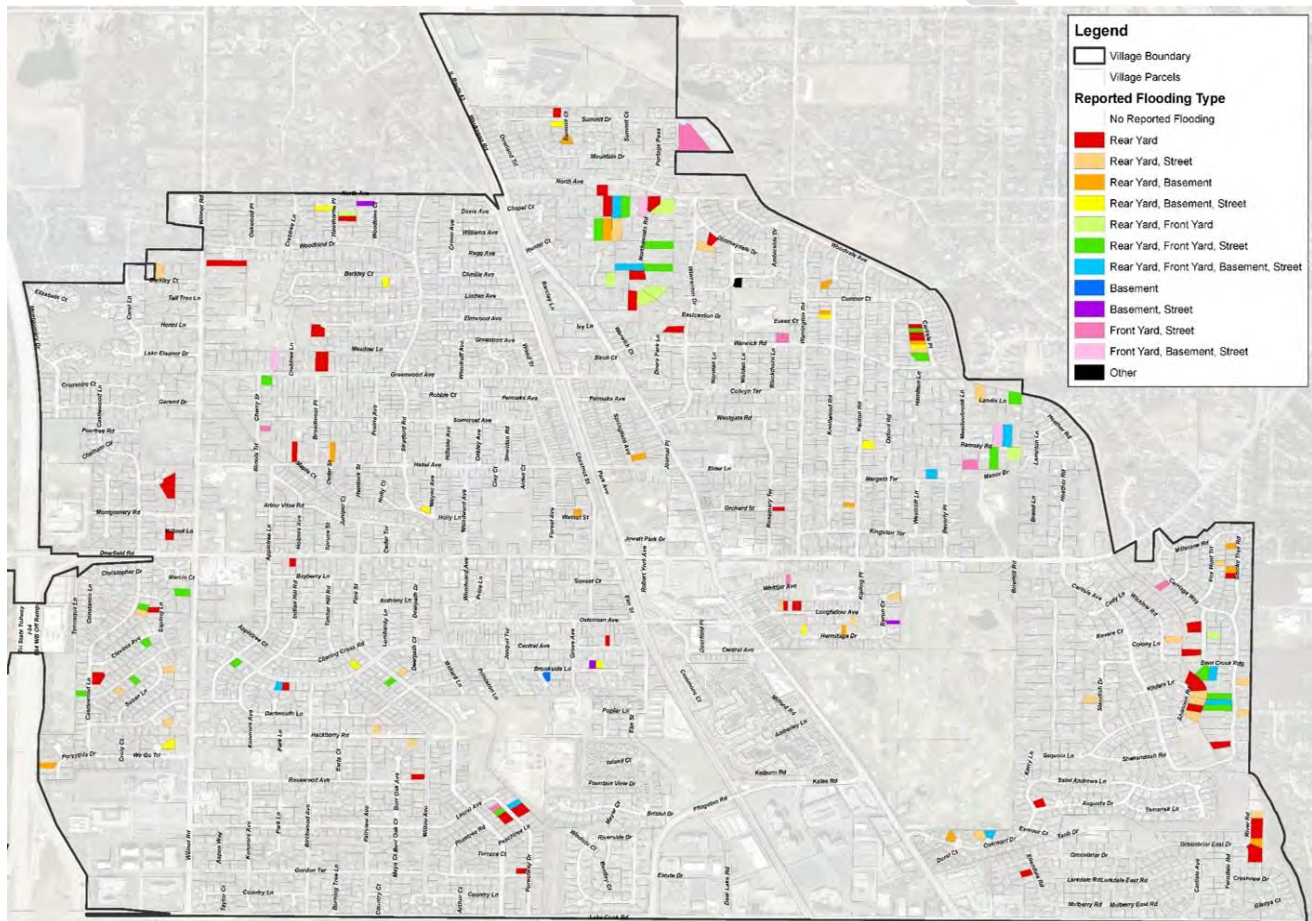


Figure 2. Compilation of Questionnaire Data (Representation)

2.1.2 Storm Sewer Data Collection

The Village maintains a database of storm sewer, sanitary sewer, and watermain information. The Village also maintains engineering plans of major roadway and storm sewer improvements and other detailed information that is readily available. CBBEL collected field survey to supplement missing storm sewer information. This information was compiled into a GIS database and used for detailed model development.

2.1.3 Flow Monitoring

Stormsensor flow monitors were installed in six (6) locations throughout the Village (**Figure 3**). The flow monitors, installed in February 2020, have been continuously collecting data, including both velocity and depth of flow. An additional 29 flow monitors were installed in October and November of 2020 for use in the development of the Stormsensor data quality analysis and for the continued flow monitoring throughout the Village. Because there have not been any significant storm events since the additional 29 sensors were installed, these were not used for additional calibration.

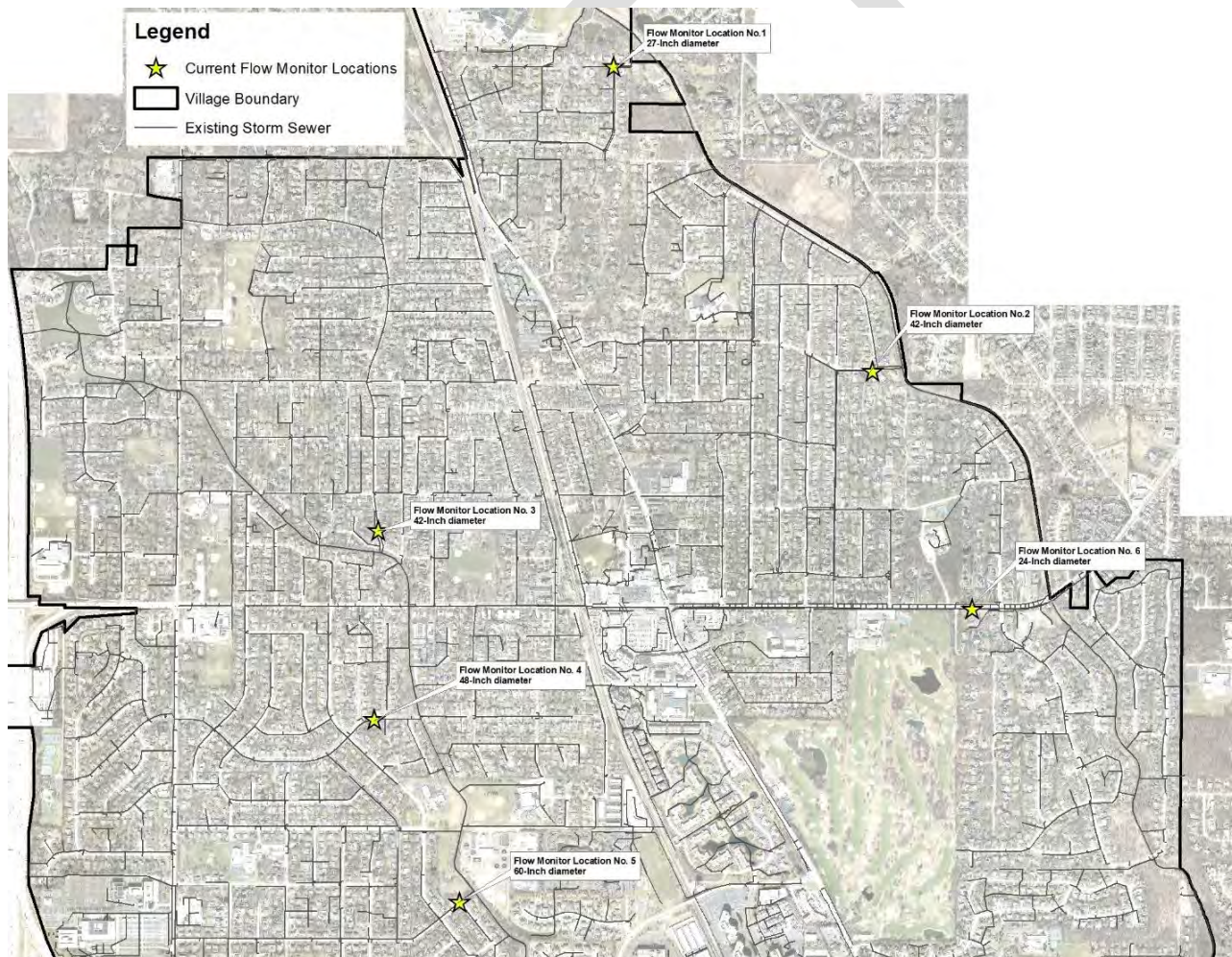


Figure 3. Deerfield Flow Monitoring Locations

2.1.4 Floodplain Maps

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panels 267, 286, and 287 for Lake County and Incorporated areas, effective September 18, 2013, the residential portions of the Village are bounded by Zone AE Special Flood Hazard Areas (SFHAs) and Zone X (Other Flood Areas) associated with the Middle Fork on the east and the West Fork on the west (**Figure 4**). FEMA defines Zone AE as a SFHA subject to inundation by the 1% annual chance flood with a defined elevation.

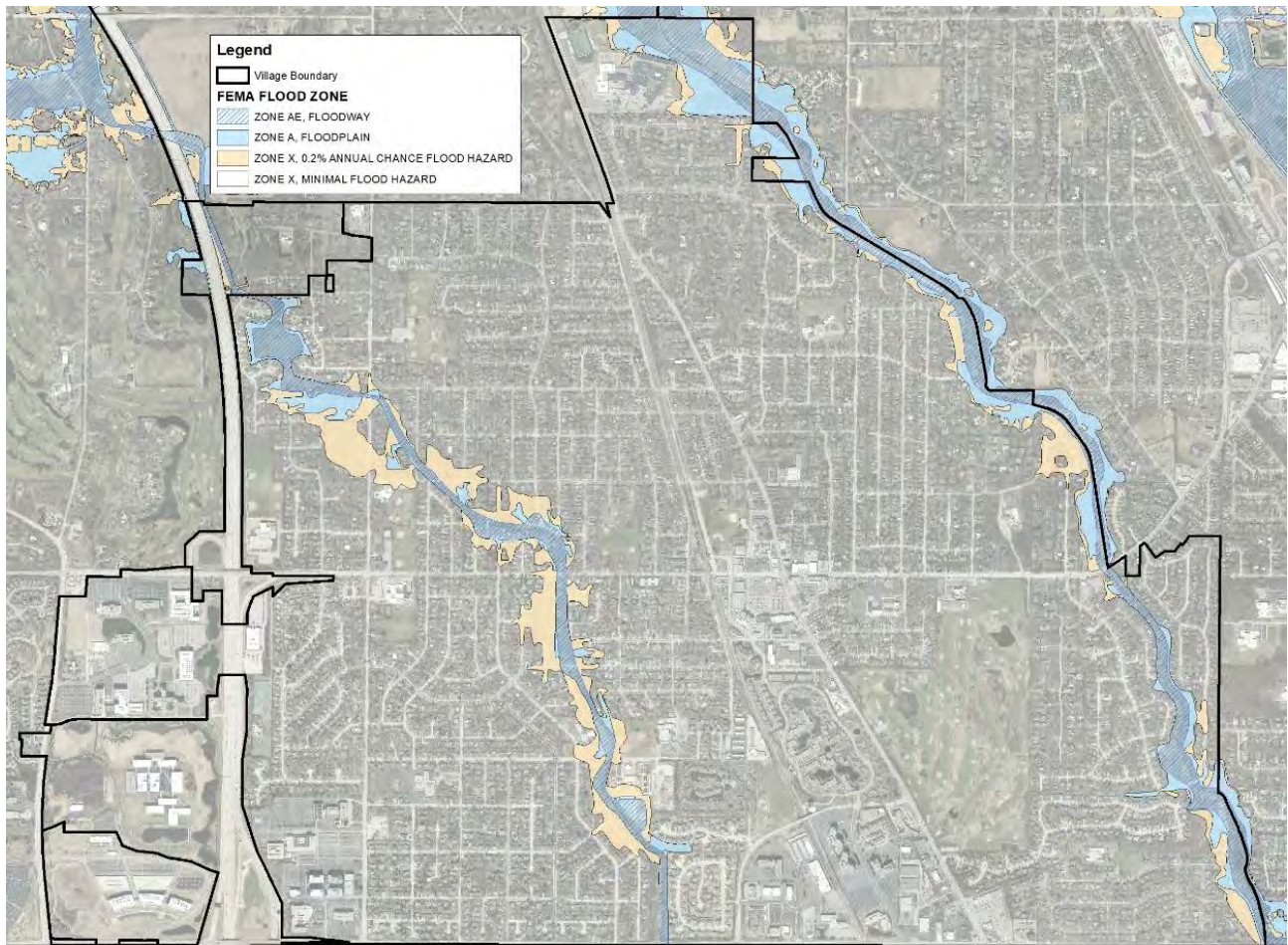


Figure 4. Adapted from the Lake County FEMA FIRM – Deerfield Study Area

The Village is susceptible from overbank flooding in low areas along the Middle Fork and West Fork, specifically those areas shown in the Zone AE floodplain and floodway. Most of these areas were developed prior to implementation of the National Flood Insurance Program (NFIP) that established floodplain and floodway boundaries and rules governing development within them. The National Flood Insurance Program (NFIP) program was developed by FEMA to help reduce the impact of flooding on private and public structures by providing affordable insurance by encouraging communities to adopt and enforce floodplain management regulation. The NFIP was created as a result of the passage of the National Flood Insurance Act of 1968.

2.2 IDENTIFICATION OF FLOOD STUDY AREAS

To identify Flood Study Areas (FSA) within the Village, CBEL combined the Village storm sewer and utility database with the questionnaire data to create a GIS database. The GIS database was used as a tool to display the flooded areas, the type of flooding experienced, and to identify where areas of concentrated flooding was occurring. Utilizing the GIS database, along with meetings with Village staff and the results of the existing conditions drainage analysis, 42 FSAs were identified throughout the Village. These study areas were configured with respect to the stormwater management system and numbered with respect to the outfall serving each system. There are 17 FSAs on the west side of the Village that outlet to the West Fork (“W”) and 25 FSAs on the east side of the Village that outlet to the Middle Fork (“E”). The FSAs are shown on **Figure 5** below.

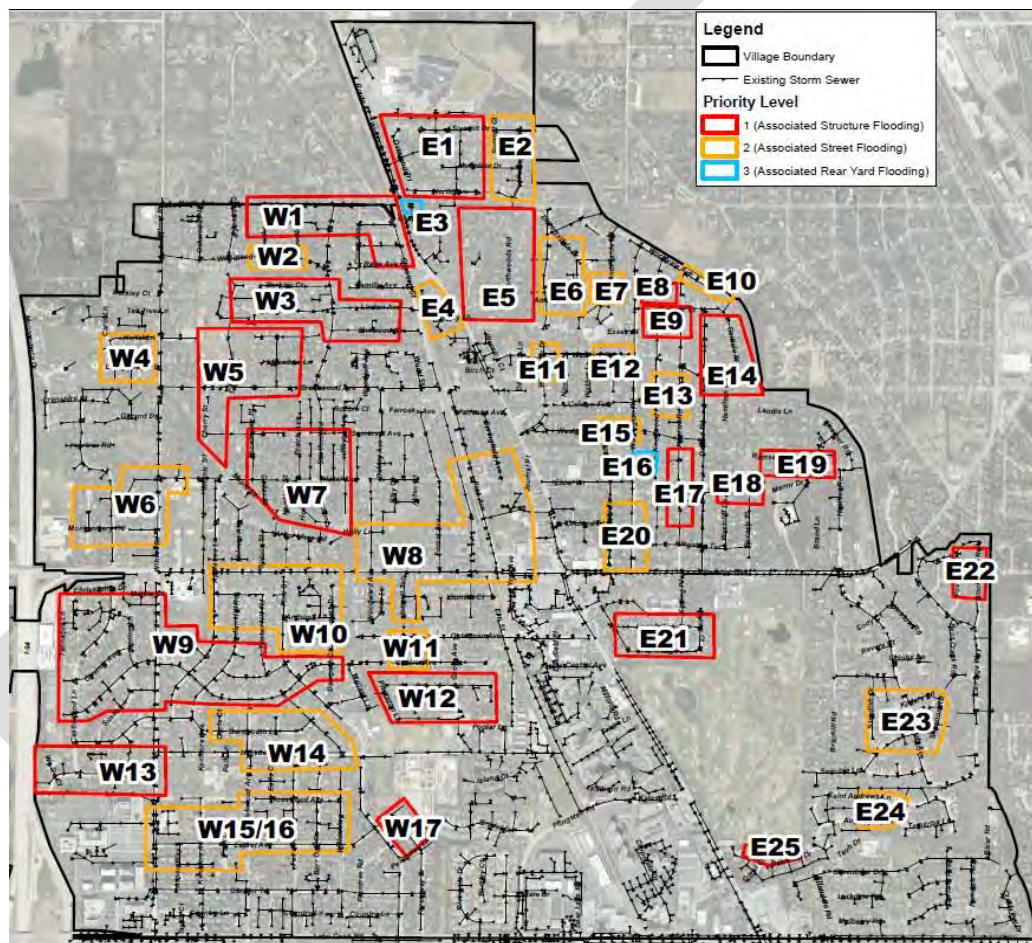


Figure 5. Deerfield Flood Study Areas

The naming convention for the FSAs are intended to be a general location description of the roadways that bound areas and should not be considered the limits of the detailed study for flood reduction measures. The methodology for analyzing the stormwater management system for each FSA follows a holistic approach to capture interactions with adjacent drainage basins and the total tributary areas to each FSA. This process included the collection of the storm sewer system plans, supplemental storm sewer survey collection, resident meetings, firsthand accounts, detailed hydrologic and hydraulic modeling of the existing drainage system, identification of system limitations, and development of proposed drainage improvements.

CHAPTER 3 EXISTING CONDITION XP-SWMM MODEL ANALYSIS

3.1 DEERFIELD DEVELOPMENT OVER TIME

The land use throughout the Village is comprised of low- to medium-density residential areas and a commercial downtown district. Storm events that exceed a few inches of rain in a short time period cause significant street, yard, and residential structure flooding. These problem areas are compounded by the high demand for residential lots in older sections of the Village and teardowns that are common during the redevelopment process. The newer homes are generally larger than the previous homes, and typically generate more runoff. Fortunately the Village revised their standards for teardowns and many of the newer homes off-set the increase runoff by providing detention. The problem with many of the newer homes is that they also have deep basements compared to the older homes. The basements can be 2 feet to 5 feet deeper and the sump pumps contribute more flow to the system.

Much of the Village was developed prior to 1992 when the first county stormwater management ordinance was adopted. The same conditions that cause the significant flooding experienced by the Village during severe storm events also makes it difficult to retrofit the existing system to reduce the risk of future flooding. There are very few open spaces where excess runoff can be directed and stored, and any drainage improvement cause adverse impacts offsite.

In the areas that experience flooding, there are insufficient overland flow routes and the storm sewer system was not designed based on current rainfall standards. In addition, the older residential structures were not constructed sufficiently high in comparison to the streets, leading to increasing the risk of flooding once the flood depth in the street exceeds the curb. There are also reverse-sloped driveways where once the flood depth exceeds the sidewalk elevation, water flows into the structure below grade. The flooding can result from water entering basement window wells, stairwells, first floor openings, footing drains, or excessive seepage from severely saturated ground adjacent to the home. From review of the county aerial topography, CBBEL developed an overall overland flow route exhibit to depict where stormwater would naturally flow. The exhibit is included as **Appendix 7**.

3.2 TREE PRESERVATION

The Village has standards in the Municipal Code of the Village of Deerfield (Village Code) to protect and maintain trees within the Village. The tree preservation policy represents a commitment to natural resource preservation and responsible stewardship to land development throughout the Village. The preservation of trees as an important public resource not only enhances the quality of life and the general welfare of the Village, but it also promotes infiltration of stormwater. Trees within the Village aid in the control of stormwater runoff, the stabilization of soil, and the replenishment of ground water supplies. The tree preservation policy applies generally and uniformly to all residential areas within the Village. Therefore, it is unlawful to damage or remove public or protected trees on private property without a tree removal permit and an approved tree replacement plan to mitigate the removal of (or damage to) trees.

3.3 DETENTION BASINS, STORMWATER STORAGE, AND PRIVATE PROPERTY

The Village maintains a GIS database of detention facilities and stormwater management areas within its municipal limits. According to the GIS database, there are 61 stormwater management areas located within the Village. Of the 61 stormwater management areas, 22 areas are located in the residential areas of the Village, the remaining areas are located in commercial areas. Storm sewer inlets in the street that flow to stormwater facilities can get clogged with debris, such as mulch in the spring and leaves in the fall, which may limit the flow into the facility resulting in ponding in the streets.

A review of the 22 stormwater management areas located within the residential areas of the Village can be organized into the following two categories:

- Designed stormwater detention basins on private property (17 areas)
 - A detention facility or stormwater management area with a specific outlet and design elevation located on private property.
- Natural stormwater storage areas on private property (5 areas)
 - Poorly drained areas on private property that typically occur within a conservancy easement or alongside or in rear yards on private property.

CHAPTER 4 EXISTING CONDITION XP-SWMM MODEL ANALYSIS

4.1 EXISTING CONDITION HYDROLOGIC AND HYDRAULIC MODEL DEVELOPMENT

An XP-Software Stormwater and Wastewater Management Model (XP-SWMM) was created for each FSA. The XP-SWMM software is a dynamic hydrologic and hydraulic modeling program that determines the hydrologic response (runoff mode) from a storm event and routes the runoff through a storm sewer network (hydraulic mode). The XP-SWMM software was chosen for the analyses for its ability to simulate overland flows and surface storage in combination with a storm sewer network to identify localized flooding problems.

4.1.1 Subbasin Delineation

The Village's utility database, additional pick-up survey areas, and plan information was combined with the 2017 Lake County 1-foot aerial topography and digital terrain model (DTM) in the GIS database. The DTM is derived from aerial LIDAR captured at a 3.28 foot-pixel resolution. The total study tributary area of approximately 2,430 acres was delineated and subdivided into 598 subbasins ranging in size from 0.4 acres to 42 acres based on storm sewer data, land use, and aerial topography. More specific detail was used in areas where drainage boundaries were required to capture known drainage problems identified by Village staff and residents on a block-by-block basis.

4.1.2 Land Use

Hydrologic parameters including area, impervious percentage, and subbasin slope were calculated based on topography and land use using current aerial photography for each of the subbasins. The impervious percentage was calculated per subbasin using a combined land use cover shapefile provided by Lake County.

4.1.3 Data Entry

The hydrologic parameters and storm sewers network were entered into the XP-SWMM model. In addition to the storm sewer network, overland flow paths and depressional storage areas were entered into the model using Lake County 1-foot aerial topography. The tailwater for the design storm events was the pipe full at the outfall. For the calibration storms, the elevation hydrograph of the West Fork and Middle Fork was entered as the tailwater at the respective outfall locations.

4.1.4 Existing Condition Modeling Calibration

The purpose of the XP-SWMM analysis is to simulate the storm sewer system, overland flow system, storage areas, and the interactions between these components to identify system bottlenecks and evaluate proposed drainage system improvements. Prior to completing these analyses, it is important that the model be calibrated to known storm events. Firsthand accounts and photographs collected from the May 13-17, 2020 and May 23, 2020 storm events proved to be an invaluable tool during the calibration process. Flow monitoring data was used as additional verification of the model calibration.

The simulated high-water marks throughout the Village were compared to observed high water marks. As part of the calibration process, the hydrologic input parameters were modified until the peak of the output hydrographs from the XP-SWMM analysis reasonably matched the observed high-water mark.

The elevations of the high watermarks used for calibration were determined through comparing flow monitor data, resident and staff photographs, and the Lake County 1-foot aerial topography. Debris lines in photographs and videos were identified and the elevation either calculated from the aerial topography or surveyed in the field.

4.2 CRITICAL DURATION AND DESIGN STORMS

Following the calibration process, a critical duration analysis was completed using the XP-SWMM model for each FSA. The critical duration was determined utilizing rainfall depths published in Bulletin 75 – Frequency Distributions of Heavy Precipitation in Illinois by the Illinois State Water Survey (ISWS) and adopted by the Lake County Stormwater Management Commission (SMC) March 10, 2020. The critical duration refers to the duration of a storm that produces maximum water surface elevations, flood depths or flow rates. For example, the 100-year critical duration analysis included executing the XP-SWMM model for the 0.5-hour through 48-hour duration storm events. The storm event producing the highest flood elevation is the critical duration storm event, and all proposed improvements are then designed for the critical duration storm. The critical duration for the Village varies, depending on various factors, including drainage area. The design critical duration storm event used for these analyses is the 30-minute duration.

The rainfall depths published in Bulletin 75 are the design standards recently adopted throughout northeast Illinois to design stormwater infrastructure and are now referenced in most local and county ordinances. The new rainfall depths published in Bulletin 75 are in response to the observed increases in precipitation since the original publication in 1989. The resulting design rainfall depths in Bulletin 75 are approximately 30% higher than the Bulletin 70 rainfall depths for Lake County (i.e. 6.50 inches versus 8.57 inches over 24 hours). The higher, Bulletin 75 design rainfall depths have been used in the development of this Plan.

4.3 MODEL RESULTS

A distinction has been made to define the level of service and the capacity of the existing storm sewer system. Throughout this Plan, the capacity of a storm sewer refers to the point at which the system begins to surcharge, which means stormwater begins to collect in the streets because the storm sewer is at capacity. Using this criteria, CBBEL determined that many of the storm sewers throughout the FSAs have less than a 1-year capacity. Therefore, the Village's existing storm sewer system can convey runoff from less than 1.3 inches of rain over a 1-hour period before the storm sewer begins to surcharge and stormwater begins to collect on the streets in the lowest areas. The level of service refers to the elevation at which less than 6-inches of ponding in the street occurs within the storm sewer system.

CBBEL used the critical duration water surface elevations from the calibrated XP-SWMM analysis to create existing condition inundation maps for the 10-year design storm for each of the FSAs. The inundation maps were combined with Village flood response maps and flood questionnaire responses to identify specific flooding impacts within each FSA. The existing condition inundation areas for each FSA is discussed further in the Plan for each FSA.

CHAPTER 5 PROPOSED IMPROVEMENTS

Following concurrence and verification of the existing condition inundation areas, CBBEL developed proposed drainage improvements that will allow the storm sewer system to provide a minimum 10-year level of service and 100-year level of protection for each FSA. The proposed 10-year level of service goal will reduce the hydraulic grade line in the storm sewer network such that less than 6-inches of ponding will occur in streets within the FSA during the 10-year critical duration design storm event. The proposed 100-year level of protection goal will reduce water surface elevations below the low entry of residences within the FSAs.

The improvements to achieve these goals include long-term drainage improvement projects that can be supplemented with green infrastructure, recommendations to restore function to existing stormwater management areas, identification of required future maintenance of these areas, and tools for residents to address private property flooding.

5.1 LONG TERM DRAINAGE IMPROVEMENTS

CBBEL identified long term capital improvement projects for FSAs that include increasing storm sewer sizes, adding relief storm sewers, incorporating green infrastructure, and stormwater storage areas to reduce flooding to a maximum of 6-inches of street ponding during the 10-year design storm event and provide residential structure protection for the 100-year design storm event.

A concept plan was prepared for each improvement alternative. These long-term improvements were analyzed with the XP-SWMM model to determine the reduction in peak water surface elevations and to verify that the proposed drainage projects did not negatively impact downstream areas. A delineation of the proposed condition 10-year flood inundation area for the alternatives in each FSA was created to quantify both the reduction of street flooding and overall reduction in flood depths. The proposed condition improvements can be seen in the detailed discussion for each of the FSAs.

5.1.1 Engineer's Estimate of Probable Cost

A conceptual engineer's estimate of probable cost for each of the drainage improvement alternatives was prepared. There are many unknowns including soil conditions, utility conflicts and right-of-way limits that will affect the ultimate design and cost of the improvements. Because of this, the engineer's estimate of probable cost includes a 25% contingency. Permitting, design and construction engineering for each project has also been included in the estimates as a percentage of the total cost of the project.



Figure 6. Typical Storm Sewer Construction

In preparation of the conceptual engineer's estimate of probable cost, CBBEL has completed a unit price analysis utilizing recently submitted bid prices from eleven awarded CBBEL projects in various municipalities in the Chicagoland area to develop applicable unit prices for the proposed improvements in the Village. These eleven projects were used to develop estimated unit prices as they are similar in scope and size to the improvements identified for this Plan.

Average unit prices were adjusted for inflation from each of the respective bid dates to 2021 equivalent values during calculation. Inflation values were based on monthly inflation rates retrieved from www.statbureau.org, which were calculated using the US Consumer Price Index.

CBBEL calculated the quantities for the improvements based on the assumptions below:

- The patching width shall be the width of the storm sewer trench (per the IDOT trench backfill table) plus one additional foot on each side.
- Roadways with proposed storm sewers 60" in diameter and greater are shown to be completely reconstructed. If the proposed storm sewers are smaller than 60" in diameter then we assumed patching and resurfacing on the streets unless additional utilities need to be relocated due to the proposed storm sewer.
- The Surface Course is 1.5-inches, Binder Course is 2-inches, and Aggregate Base Course is 10-inches for roadways to be reconstructed.
- The Surface Course is 1.5-inches, and the Leveling Binder is 0.75-inches for resurfaced roadways.
- Pavement Removal is for reconstructed roadways only; roadways to be resurfaced will receive a 2-inch surface removal.
- Trench backfill was calculated for proposed storm systems only; water/sanitary mains and services are included in those unit prices.
- Roadways with proposed storm sewer larger than 48" will have a parallel sanitary sewer installed.
- Roadways with a proposed box culvert or elliptical storm sewer will have a new water main installed.
- Each roadway intersection with a proposed storm sewer includes 200 feet of concrete curb and gutter removal and replacement, 400 square feet of concrete sidewalk removal and replacement, and the installation of 80 square feet of detectable warnings, 4 inlets (Inlet, Type A, High-Capacity Frame and Grate), and 100 feet of lateral 12" RCP storm sewer.

- Each flared end section of proposed storm sewer includes 10 square yards of riprap with filter fabric.
- Each location where proposed storm sewer crosses a sewer line or water main includes 50 feet of that utility to be removed and replaced during installation.
- Boring pits for augured pipes are assumed to be 30' long x 20' wide.

The detailed engineer's estimates of probable costs developed for each alternative in each study area are included in the corresponding Appendices for each FSA.

5.2 RESIDENTIAL PROPERTY IMPROVEMENTS

To assist with residential property drainage problems, it is recommended that the Village consider enrolling in the Center for Neighborhood Technology (CNT) Rain Ready program. This program can assist property owners reduce their risk of flooding, become more climate resilient, and create healthy buildings and green neighborhoods. Rain-Ready approaches are tailored to the specific needs of each building and community and can supplement the recommendations below for yard and structure drainage improvements.

5.2.1 Residential Rear Yard Drainage Improvements

The vast majority of drainage complaints received were involving yard flooding on private property. There were approximately 140 reported instances of such complaints. Although overland flow paths were likely designed with sufficient slope to adequately drain runoff in a way that prevents standing water, many properties within the Village have been modified over time, including installing landscaping, fencing, sheds, etc. that have obstructed the overland flow path. Many lots also contain low areas that promote standing water and grading changes can often result in unintended consequences such as limiting the overland flow route. Accumulating debris and detritus from the vegetation canopy can exacerbate these issues.

Given the large number of instances where these drainage problems occur and the fact they are on private property, it is recommended that the Village develop a policy that assigns responsibility of drainage improvements and maintenance of yard drainage to the individual property owner. This would be consistent with policies adopted by other communities. It is acknowledged that the drainage problems may be complex and may involve several properties, and therefore some Village guidance could be provided to assist property owners as follows with corresponding examples in **Appendix 5**:

- Develop a web page and handout that clearly defines the Village policy on private property drainage issues that includes development regulations, references to Illinois Drainage Law stating that any improvements must not cause adverse impacts to other properties, etc.
- Allocate a limited amount of staff time to developing recommendations for drainage improvements on private property. This would include contacting multiple property owners where the drainage improvement involves more than one property.
- Provide a list of standard design details and typical cost estimates for green infrastructure and other yard drainage improvement practices such as: yard inlets, underdrains, rain gardens, and vegetation.
- Develop a list of recommended engineering firms with fixed fees for initial drainage investigations.

- Provide a list of recommended landscaping or sewer companies that have successfully completed drainage projects within the Village or surrounding communities.
- Establish a cost share program for private property drainage improvements similar to the Village of Northbrook Overhead Sewer and Private Property Drainage Cost Sharing Program and the Village of Wilmette Stormwater Incentive Program.

5.2.2 Residential Structure Flood Proofing

It is anticipated that the level of structural flood protection in the Village could also be increased through flood-proofing of residential structures by homeowners. Flood-proofing of residential structures is the single most cost-effective measure that can be completed to protect homes from flooding. A few of these measures include:

- Overhead sewer: This can greatly reduce the occurrence of sanitary sewer backup into a structure. An overhead sewer consists of an ejector pit, ejector pump and backflow valve. All plumbing drains in the basement are directed to the new ejector pit and pumped into the building drain. The overhead sewer system reconfigures the existing sanitary plumbing system inside a residence such that the lowest elevation that the main sanitary line leaving the structure is above the ground elevation or above the basement floor, typically along the basement ceiling which is overhead. In this system, the sanitary pit and pump are installed indoors so less maintenance is required, and there is nothing installed in the service line that has potential to get stuck or obstruct the line.
- Sanitary backflow valve: Valve that allows water to flow in one direction, but automatically closes when the direction of flow is reversed. When the HGL in the sanitary sewer line exceeds the adjacent basement floor elevation, the check valve will engage preventing sanitary backup into the basement. Prior to the installation of a valve, it must be confirmed that there are no other connections to the sanitary sewer, including downspouts, sump pumps, drain tiles, etc., on the house side of the valve to prevent backup into the basement from these connections.
- Sump pump with battery backup: In the event of an electrical outage during a flood, a battery backup to provide power to the sump pump is recommended to prevent basement flooding.
- Directing downspouts away from structures: Downspouts that outlet near a structure allows stormwater to infiltrate and collect against the foundation resulting in seepage and/or additional strain on the sump pump. Directing downspouts away from the structure is a simple flood-proofing measure to help reduce the amount of water against the foundation.
- Raising window wells or other low entry points: Raising the window wells and low entry points increases the level of flood protection around a home by blocking overland flood access into the structure (Figure 7).



Figure 7. Window Well Elevation

Completing these flood-proofing measures in homes that are susceptible to flooding can provide a level of freeboard above the street flooding elevation that will significantly improve the effectiveness of the long-term capital improvement projects to be discussed in this report. Additional flood proofing measure and specific details area provided in **Appendix 6**.

5.3 GREEN INFRASTRUCTURE

5.3.1 Green Infrastructure Improvements

Over the last 20 years many communities throughout our region have increased sustainability by adding green infrastructure to their toolkit of approaches for the management of stormwater. Green infrastructure techniques include using vegetation to control stormwater, restoring wetlands to retain floodwater, installing permeable pavement to increase rainfall infiltration, and using or capturing and re-using stormwater more efficiently on site. By attempting to mimic natural hydrologic functions, such as infiltration and evaporation, these approaches prevent stormwater from flowing into surface waters or storm sewer systems already under great stress using natural features. Green infrastructure is typically used to compliment or assist traditional stormwater management practices. Although green infrastructure practices cannot single-handedly mitigate the flooding during extreme storm events, they provide a reduction in stormwater runoff volumes and improve water quality. Green infrastructure should be an integral part of stormwater management strategies given the cost-effectiveness of green approaches across a variety of categories. On a national scale, policies that favor or stimulate the wider adoption of green infrastructure strategies have been gaining notoriety while providing opportunity and available financial resources.

Future Village roadway projects and private property drainage issues throughout the Village present opportunities to implement green infrastructure practices. Recommendations of types are as follows:

- Green roads with bio-swales (Figure 8)
 - Future Village projects as warranted.
- Rain gardens (Figure 9)
 - Rain gardens are depressional areas landscaped with perennial flowers and native vegetation that soak up rainwater. They are strategically located to capture runoff from impervious surfaces, such as roofs and streets. Rain gardens fill with a few inches of water after a storm and then water filters into the ground, rather than running off to a storm drain. Located on private property.
- Rain barrels and downspout disconnection (Figure 10)
 - Program for rain barrel assistance
 - Limited to private property



Figure 8. Green Road with Bioswale



Figure 9. Rain Garden



Figure 10. Rain Barrel

5.3.2 Green Infrastructure Limitations

Green infrastructure systems have a growing record of reducing runoff from smaller and more frequent rain events; however, these systems do not target low-frequency, high-volume rainfall events. Care should be taken to realize that while green infrastructure can be used to compliment a stormwater management system for frequent storm events, flooding will continue throughout the Village from extreme rainfall events due to the undersized storm sewer system. Many green infrastructure practices rely on high infiltration rates. The Village's predominantly high clay soil content throughout make green infrastructure initiatives that rely on infiltration very difficult.

It is important to understand the magnitude of the flooding problem in the Village, the capacity of the existing storm sewer network, and the limitations of green infrastructure. In typical urban flood problem areas, the storage volumes required to reduce the flood depths to an acceptable level are significant. Flood volumes are typically quantified in acre-feet (1 acre-foot is the equivalent of an acre of land that is flooded 1-foot deep). When comparing runoff volumes for a 0.5-acre lot in the Village to volumes provided by green infrastructure, the capacity limitations of green infrastructure are apparent:

- A single 0.5-acre lot in the Village would generate up to 25,900 gallons (0.08 acre-feet) of runoff during the 10-year design storm (1.91 inches in 30 minutes):
 - 471 rain barrels per property are required to store this water.
- 1 acre-ft of flood storage equals:
 - 5,925 rain barrels (55 gallons each)
 - 8,250 feet of green alleys (0.08 acre-feet per 660 ft block)
 - 2,520 feet of roadway with pervious pavement

The construction of green infrastructure techniques like green streets and rain gardens also has a heavy reliance on the in-situ soils for infiltration. Soil amendments to achieve proper infiltration rates to meet performance stands can increase construction costs and are limited in effectiveness by the underlying soils. Roadway jurisdictions and requirements can also limit the use and increase construction cost of green streets. Vegetation used in rain gardens and bio retention areas also requires establishment and maintenance.

CHAPTER 6 FSA CAPITAL IMPROVEMENT PROJECTS (WEST FORK)

This Plan identifies long term capital improvement projects for each of the FSAs on the west side of the Village (Figure 11). The recommended projects are summarized in Table 3 and detailed in the following sections.

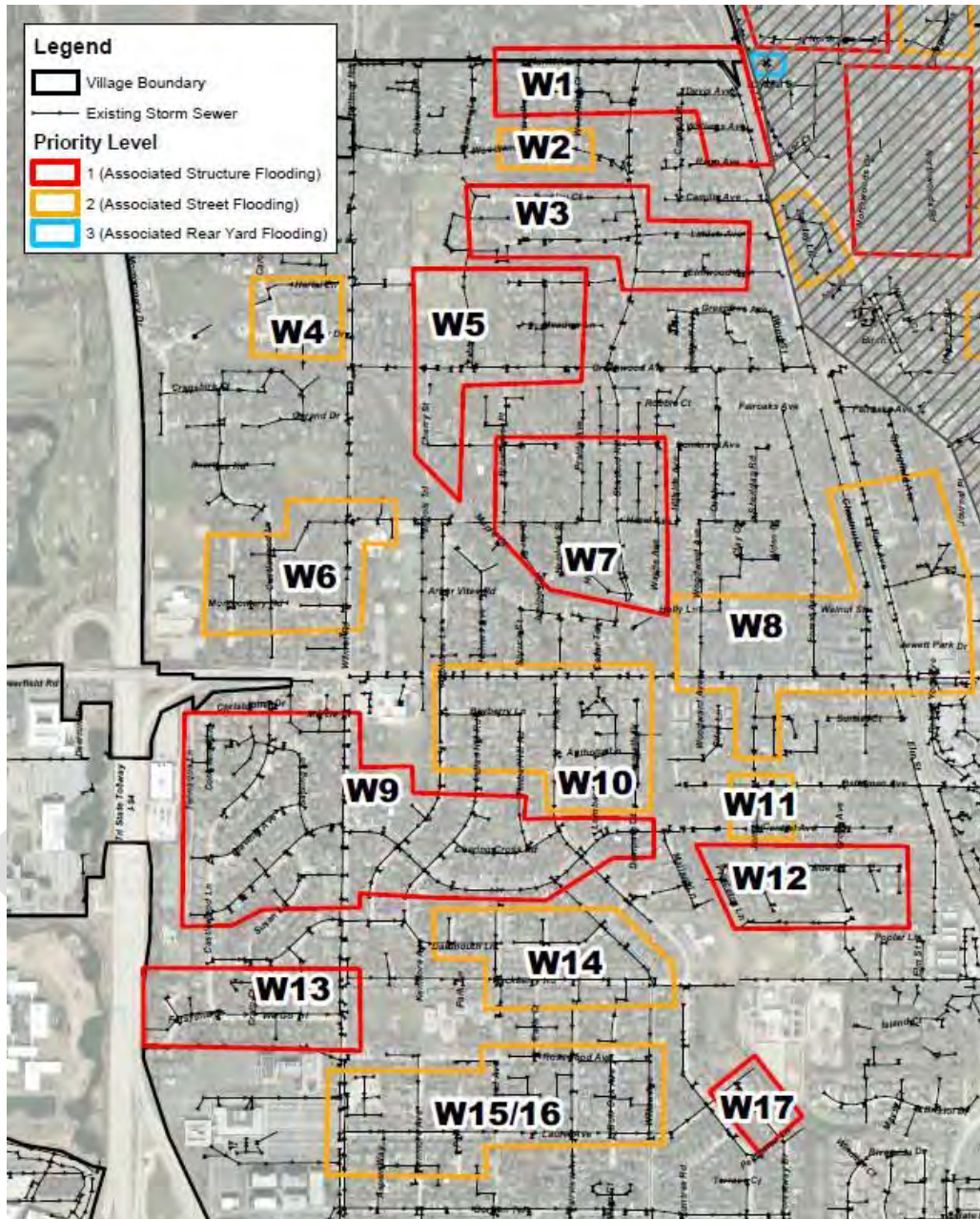


Figure 11. Deerfield Flood Study Areas, West Fork

Table 3. West Fork Flood Study Area Summary

FSA #	Description	Priority Level	Prerequisite Projects	Cost
W1	North Avenue/Chestnut Street	1	-	\$2.5M
W2	Woodland Drive	2	W3	\$1.2M
W3	Stratford Road/Berkley Court	1	-	\$2.8M
W4	Hertel Lane/Lake Eleanor Drive	2	-	\$750k
W5A	Greenwood Avenue	1	-	\$1.3M
W5B				\$940k
W6	Montgomery Road	2	-	\$2.2M
W7	Hazel Avenue/Prairie Avenue	1	-	\$2.5M
W8	Deerfield Road/Woodward Avenue	2	-	\$16.8M
W9	Central Avenue	1	-	\$6.9M
W10	Deerpath Drive/Bayberry Lane	2	W9	\$3.9M
W11	Jonquil Terrace	2	-	\$1.1M
W12*	Brookside Lane	-	-	-
W13	We Go Trail	1	-	\$1.5M
W14A	Pine Street	2	-	\$610k
W14B	Hackberry Road	2	-	\$4.5M
W15/W16	Laurel Avenue	2	-	\$10.3M
W17	Forestway Drive/Pine Street	1	W15/W16	\$82k
TOTAL				\$59.7M

* The reported flooding associated with W12 was determined to be based on sanitary sewer back-up and not related to stormwater management. See Section 6.12 for details.

6.1 NORTH AVENUE/CHESTNUT STREET IMPROVEMENTS (W1)

6.1.1 Limitations of Existing System – Cause of Flooding, W1

FSA W1 is located near the northern boundary of the Village, along North Avenue, west of Waukegan Road. FSA W1 includes approximately 56 acres of tributary area and consists of storm sewers on contributing streets that connect to the main trunk sewer on North Avenue. The storm sewer system flows east into the receiving system under the railroad and east of Waukegan Road (See FSA E1).

The model results indicate that street flooding occurs along many of the contributing side streets in this area. Although the trunk sewer on North Avenue has 50-year capacity, the capacity of the overall storm sewer system in this FSA is less than a 1-year design storm. During storm events in excess of the 1-year design storm, ponding begins in the rear yards of Hawthorn Place and Woodbine Court and roadway flooding begins along Hawthorne Place, Woodbine Court, and Chestnut Street. The reported structure and rear yard flooding on Hawthorne Place and Woodbine Court can be attributed to the overflow from the adjacent street ponding.

6.1.2 Proposed Improvements, W1

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA W1.

The proposed W1 improvements are shown on Exhibits 1/2 in Appendix 1 and include the following:

- Remove and replace the storm sewer along North Avenue from Woodbine Court to Chestnut Street.
- Remove and replace a portion of the sewers along Hawthorne Place, Woodbine Court, and Chestnut Street.
- Construct a stormwater storage basin (1.5 acre-feet) utilizing the open space at the northeast corner of the intersection of North Avenue and Chestnut Street.

Table 4 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W1.

Table 4. North Avenue/Chestnut Street (W1) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$2.5M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W1 improvements are classified as ‘Priority 1’ because of the associated structure, street, and yard flooding within the area. It should be noted that the stormwater storage basin is proposed on private property. The Village will need to acquire this area in order for the stormwater basin to be constructed. The engineers estimate of probable cost for this area is included in Appendix 2. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit

6.2 WOODLAND DRIVE (W2)

6.2.1 Limitations of Existing System – Cause of Flooding, W2

FSA W2 is located along Woodland Drive, east of Wilmot Road. FSA W2 includes approximately 35 acres of tributary area and consists of the main trunk sewer on Woodland Drive with contributing storm sewers on Oakwood Place and Crabtree Lane. The storm sewer system flows west into the receiving 36” sewer on Wilmot Road.

The model results indicate that street flooding occurs at the sag on Woodland Drive within this FSA. Although the trunk sewer downstream has approximately 25-year capacity, the capacity of the overall storm sewer system is less than a 1-year design storm. During storm events in excess of the 1-year design storm, roadway flooding begins at the sag on Woodland Drive. The ponded area overflows west along Woodland Drive toward Wilmot Road.

6.2.2 Proposed Improvements, W2

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. The proposed improvements associated with FSA W3 are a prerequisite for FSA W2.

The proposed W2 improvements are shown on Exhibits 3/4 in Appendix 1 and include the following:

- Remove and replace the storm sewer along Woodland Drive from Woodbine Court to Oakwood Place.

Table 5 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W2.

Table 5. Woodland Drive (W2) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$1.2M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W2 improvements are classified as ‘Priority 2’ because of the associated street flooding within the area. It should be noted that improvements were recently constructed in this area. A 36” RCP was installed from Oakwood Place to Wilmot Road to address the overflow from Woodland Drive through the adjacent residential yards to the south. The proposed improvements are intended to extend this additional capacity to also address the ponding upstream. The proposed overall level of service to the FSA is 10-year including both the proposed improvements and the constructed improvements. The engineers estimate of probable cost for this area is included in Appendix 2. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC

6.3 STRATFORD ROAD/BERKLEY COURT (W3)

6.3.1 Limitations of Existing System – Cause of Flooding, W3

FSA W3 is located north of Greenwood Avenue, along Stratford Road. FSA W3 includes approximately 37 acres of tributary area – and consists of a main trunk storm sewer along Stratford Road and contributing storm sewers on Berkley Court, Linden Avenue, and Elmwood Avenue. The storm sewer system flows south into the receiving system at Greenwood Avenue, where flow continues south along Stratford Road.

The model results indicated that street and rear yard flooding occurs along the contributing areas to the Stratford Road trunk sewer. Structure flooding has also been reported along the rear yards of Berkley Court. The ponding along the contributing streets and rear yards can be attributed to overflow from the ponded areas, as well as lack of available capacity on the main trunk sewer. The capacity of this storm sewer system is less than a 1-year design storm. During storm events in excess of the 1-year design storm, roadway flooding begins

along Berkley Court, Linden Avenue, and Elmwood Avenue. Ponding also begins in the rear yards of Berkley Court.

6.3.2 Proposed Improvements, W3

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA W3.

The proposed W3 improvements are shown on Exhibits 5/6 in Appendix 1 and include the following:

- Remove and replace the storm sewer along Stratford Road from Berkley Court to Greenwood Avenue.
- Remove and replace a portion of the sewers along Berkley Court, Linden Avenue, and Elmwood Avenue.
- Remove and replace the storm sewer that services the rear yards of Berkley Court. The existing backflow preventor should be reinstalled on the new sewer.

Table 6 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W3.

Table 6. Stratford Avenue/Berkley Court (W3) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$2.8M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W3 improvements are classified as ‘Priority 1’ because of the associated structure, street, and yard flooding within the area. The engineers estimate of probable cost for this area is included in Appendix 2. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit

6.4 HERTEL LANE/LAKE ELEANOR DRIVE (W4)

6.4.1 Limitations of Existing System – Cause of Flooding, W4

FSA W4 is located in the Lake Eleanor Estates subdivision, west of Wilmot Road. FSA W4 includes approximately 21 acres of tributary area and consists of storm sewers on Hertel Lane, Carol Lane, and Lake Eleanor Drive. The storm sewer system in this area consists of two separate outfalls. The first services Hertel Lane and Carol Lane and flows west into the West Fork and the second services Lake Eleanor Drive and flows south into the West Fork.

The capacity of this storm sewer system is less than a 1-year design storm. During storm events in excess of the 1-year design storm, roadway flooding begins at the existing sag on both Hertel Lane and Lake Eleanor Drive. Ponding also begins in the rear yards between the two roads due to overflow from the adjacent street ponding.

6.4.2 Proposed Improvements, W4

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA W4.

The proposed W4 improvements are shown on Exhibits 7/8 in Appendix 1 and include the following:

- Remove and replace the storm sewer along Hertel Lane/Carol Lane.
- Install a parallel outlet pipe at Carol Lane and at Lake Eleanor Drive.

Table 7 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W4.

Table 7. Hertel Lane/Lake Eleanor Drive (W4) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$750k

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W4 improvements are classified as ‘Priority 2’ because of the associated street and rear yard flooding within the area. The engineers estimate of probable cost for this area is included in Appendix 2. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IDNR-OWR
- ACOE

6.5 GREENWOOD AVENUE (W5)

6.5.1 Limitations of Existing System – Cause of Flooding

FSA W5 is located east and south of Woodland Park, west of Stratford Road. FSA W5 includes approximately 48 acres of tributary area and consists of a main trunk sewer on Greenwood Avenue with contributing storm sewers on Crabtree Lane, Elmwood Avenue, and Meadow Lane. The storm sewer system flows west along Greenwood Avenue to the existing outlet to the West Fork at Wilmot Road.

The capacity of this storm sewer system is less than a 1-year design storm. During storm events in excess of the 1-year design storm, roadway flooding begins in the sag along Greenwood Avenue. Additionally, overflow occurs through the yards along Elmwood Avenue and Meadow Lane in storms that exceed the 1-year design storm. There has been reported structure flooding

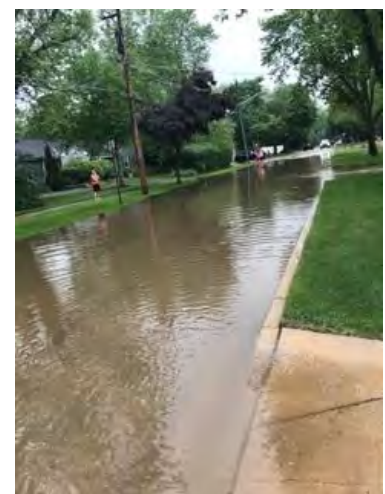


Figure 12. Inundation at Greenwood Avenue

due to the overland flow from the surcharge from the Crabtree Lane storm sewer. This surcharging occurs because of the lack of available capacity along Greenwood Avenue.

6.5.2 Proposed Improvements, W5

CBBEL designed a two-phase alternative to address the flooding within FSA W5. Overall, the W5 improvements are classified as ‘Priority 1’ because of the associated structure and street flooding within the area. The details of each phase are described below:

6.5.2.1 Proposed Improvements, W5A

The FSA W5A improvements are designed to provide a 10-year level of service for Elmwood Avenue, Meadow Lane and Crabtree Lane (with a maximum of 6-inches of street ponding). The proposed W5A improvements are hydraulically connected and not independent of one another. The proposed W5B improvements are a prerequisite for the W5A improvements.

The proposed W5A improvements are shown on Exhibits 9/10 in Appendix 1 and include the following:

- Remove and replace the storm sewer along Crabtree Lane, north of Greenwood Avenue.
- Remove and replace a portion of the storm sewer along Elmwood Avenue, including a new section of storm sewer extending west to the Woodland Park.
- Remove and replace a portion of the storm sewer in the side yards between Elmwood Avenue and Meadow Lane, and a new section storm sewer extending west to the Woodland Park.
- Construct a stormwater storage basin (0.7 acre-feet) utilizing the open area of southeast Woodland Park. Install a rain garden within footprint of proposed storage area.

Table 8 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W5A.

Table 8. Greenwood Avenue, Phase 1 (W5A) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$1.3M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The engineers estimate of probable cost for this area is included in **Appendix 2**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit

6.5.2.2 W5B Proposed Improvements, W5B

The FSA W5B improvements area designed to provide a 10-year level of service to the sag on Greenwood Avenue, as well as along Cherry Street (with a maximum of 6-inches of street ponding). The proposed

improvements within W5B are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA W5B.

The proposed W5B improvements are shown on Exhibits 9/10 in Appendix 1 and include the following:

- Install a new storm sewer on Cherry Street, including a new outlet to the West Fork.

Table 9 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W5B.

Table 9. Greenwood Avenue, Phase 2 (W5B) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$940k

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The engineers estimate of probable cost for this area is included in Appendix 2. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IDNR-OWR
- ACOE

6.6 MONTGOMERY ROAD (W6)

6.6.1 Limitations of Existing System – Cause of Flooding, W6

FSA W6 is located north of Deerfield Road and west of Wilmot Road, along Montgomery Road. FSA W6 includes approximately 80 acres of tributary area and includes the main trunk sewers on Wilmot Road and Hazel Avenue. The storm sewers along Castlewood Lane, King Richards Court, and Montgomery Road connect into this main trunk sewer within the FSA. The storm sewer system flows north and east to the outlet to the West Fork.

The capacity of the trunk sewer within this FSA is a 2-year design storm; however, along the contributing streets, the storm sewer system has less than a 1-year capacity. During storm events in excess of the 1-year design storm, roadway flooding begins along Montgomery Road, and storm events in excess of the 2-year event, the storm sewer along Wilmot Road and Hazel Avenue begins to surcharge.

6.6.2 Proposed Improvements, W6

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA W6.

The proposed W6 improvements are shown on Exhibits 11/12 in Appendix 1 and include the following:

- Install a relief storm sewer from the low area on Montgomery Road, through Floral Park, to Hazel Avenue. The proposed relief sewer involves removing and replacing sections of sewer along Montgomery Road and through Floral Park, as well as installing new sections of pipe.
- Remove and replace a portion of the storm sewer along Hazel Avenue, including a new outlet to the West Fork.

Table 10 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W6.

Table 10. Montgomery Road (W6) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$2.2M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W6 improvements are classified as ‘Priority 2’ because of the associated street and yard flooding within the area. The engineers estimate of probable cost for this area is included in Appendix 2. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit
- ACOE

6.7 HAZEL AVENUE/PRAIRIE AVENUE (W7)

6.7.1 Limitations of Existing System – Cause of Flooding, W7

FSA W7 is located south of Greenwood Avenue and west of Stratford Road. FSA W7 includes approximately 21 acres of tributary area and consists of two storm sewer systems. The first includes a main trunk sewer on Hazel Avenue that flows west into the West Fork. Contributing storm sewers from Broadmoor Place, Prairie Avenue, and Somerset Avenue connect to this trunk sewer. The second system involves the main trunk sewer along Stratford Road. This trunk sewer flows south to an outlet to the West Fork and includes contributing tributary area to the north (FSA W3) as well as from the west along Hazel Avenue.

The capacity varies between the storm sewer systems within the FSA. The capacity of the trunk sewer along Hazel Avenue is less than a 1-year design storm, while the capacity of the trunk sewer along Stratford Road, within this FSA, is a 2-year design storm. Therefore, the capacity for the overall FSA is less than a 1-year design storm. During storm events in excess of the 1-year design storm, structures begin to surcharge along Prairie Avenue and Hazel Avenue. Additionally, ponding begins along Holly Lane, Hazel Avenue, and Hemlock Street. During storms in excess of the 2-year design storm, surcharging begins along Stratford Road and overflow occurs through the rear yards of Hazel Avenue and Somerset Avenue due to the surcharging from Somerset Avenue flowing south. There is reported structure flooding along Hazel Avenue, which is due to this overflow.

6.7.2 Proposed Improvements, W7

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA W7.

The proposed W7 improvements are shown on Exhibits 13/14 in Appendix 1 and include the following:

- Remove and replace the storm sewer along Prairie Avenue from Somerset Avenue to Hazel Avenue.
- Install a parallel storm sewer along Hazel Avenue that continues south down Hemlock Street to a new outfall to the West Fork.
- Install two new sections of storm sewer along Somerset Avenue to hydraulically connect the adjacent storm sewers.
- Install a new section of storm sewer along Holly Lane to connect into the new sewer on Hemlock Street.

Table 11 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W7.

Table 11. Hazel Avenue/Prairie Avenue (W7) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$2.5M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W7 improvements are classified as ‘Priority 1’ because of the associated structure, street, and yard flooding within the area. The engineers estimate of probable cost for this area is included in Appendix 2. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit
- IDNR-OWR
- ACOE

6.8 DEERFIELD ROAD/WOODWARD AVENUE (W8)

6.8.1 Limitations of Existing System – Cause of Flooding, W8

FSA W8 is located along Deerfield Road, east of Waukegan Road. FSA W8 includes approximately 160 acres of tributary area and consists of the trunk sewer along Deerfield Road, and contributing storm sewers on Woodward Avenue, Jonquil Terrace, Forest Avenue, Chestnut Street, and Park Avenue. The storm sewer system flows west to the existing outfall to the West Fork along Deerfield Road.

The capacity of this storm sewer system is a less than a 1-year design storm. During storm events in excess of the 1-year design storm, surcharging along Deerfield Road beings to a occur west of Forest Avenue. The lack of

existing capacity along Deerfield Road causes ponding upstream at the Metra underpass, as well as at the low areas along the contributing streets.

6.8.2 Proposed Improvements, W8

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA W8.

The proposed W8 improvements are shown on Exhibits 15/16 in Appendix 1 and include the following:

- Remove and replace the storm sewer along Deerfield Road from Chestnut Street to the outfall to the West Fork.
- Remove and replace a portion of the storm sewer along Woodward Avenue, south of Holly Lane.
- Remove and replace a portion of the storm sewer along Jonquil Terrace.
- Construct a stormwater storage basin (3.0 acre-feet) utilizing the open space at Maplewood Park.
- Install a new relief storm sewer from the Metra underpass to the new stormwater storage basin. The new relief sewer includes removing and replacing a portion of the storm sewer along Park Avenue and Forest Avenue, as well as installing new storm sewer along Walnut Avenue. The installation of the relief sewer includes a directional bore under the railroad. Install porous pavement in parking lot west of the railroad.
- Install a new storm sewer connecting the storm sewer on Deerfield Road to the new stormwater storage basin at Maplewood Park.

Table 12 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W8.

Table 12. Deerfield Road/Woodward Avenue (W8) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$16.8M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W8 improvements are classified as ‘Priority 2’ because of the street and yard flooding within the area. The engineers estimate of probable cost for this area is included in Appendix 2. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit
- IDNR-OWR
- ACOE
- Lake Co DOT
- Metra

6.9 CENTRAL AVENUE (W9)

6.9.1 Limitations of Existing System – Cause of Flooding, W9

FSA W9 is located south of Deerfield Road, along Central Avenue. FSA W9 includes approximately 149 acres of tributary area and consists of storm sewers on Clavinia Avenue, Susan Lane, Castlewood Lane, and Sapling Lane connecting to the main trunk sewer on Central Avenue at Wilmot Road. FSA W9 also includes storm sewers along Appletree Lane, Indian Hill Road, Willow Avenue, and Pine Street that also connect to the trunk sewer along Central Avenue. The storm sewer system flows east toward the existing outlet to the West Fork along Central Avenue.

The capacity of Central Avenue trunk sewer, east of Indian Hill Road is less than a 2-year design storm, with some of the contributing storm sewers having less than a 1-year design storm capacity. During storm events in excess of the 1-year design storm, roadway flooding begins along Clavinia Avenue, Susan Lane, Sapling Lane, and Castlewood Lane, west of Wilmot Road. During storm events in excess of the 2-year design storm, roadway flooding begins along Appletree Lane and the Central Avenue trunk sewer begins to surcharge. A portion of the overflow along Central Avenue flows north along Deerpath Drive (See FSA W10). Structure flooding and street flooding was reported along Central Avenue.



Figure 13. Inundation at Central Avenue (Birchwood Avenue Intersection)

6.9.2 Proposed Improvements, W9

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA W9.

The proposed W9 improvements are shown on Exhibits 17/18 in Appendix 1 and include the following:

- Remove and replace the storm sewer along Sapling Lane from Castlewood Lane to Wilmot Road.
- Remove and replace a portion of the sewer along Clavinia Avenue.
- Remove and replace two sections of storm sewer along Central Ave (between Castlewood Lane and Wilmot Road and from Pine Street to the outfall to the West Fork). Create curb cuts and install bioswale in the parkway.
- Construct a stormwater storage basin (2.1 acre-feet) utilizing the open space at Wilmot Park, just south of Wilmot Elementary School.
- Remove and replace a section of storm sewer along Wilmot Road from Central Avenue to the new stormwater storage basin.
- Install a new section of storm sewer from the storm sewer replacement on Wilmot Road to the new stormwater storage basin.

Table 13 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W9.

Table 13. Central Avenue (W9) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$6.9M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W9 improvements are classified as ‘Priority 1’ because of the associated structure and street flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 2**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit
- IDNR-OWR
- ACOE

6.10 DEERPATH DRIVE/BAYBERRY LANE (W10)

6.10.1 Limitations of Existing System – Cause of Flooding, W10

FSA W10 is located between Deerfield Road and Central Avenue, east of Wilmot Elementary School. FSA W10 includes approximately 53 acres of tributary area and consists of storm sewers on Bayberry Lane, Pine Street, Anthony Lane, and Deerpath Drive that flow to an existing pump station and outlets east to the West Fork. Some of the area within this FSA is tributary to the Central Avenue trunk sewer to the south (See FSA W9); however, the overflow within this FSA flows east toward the low areas on Anthony Lane and Deerpath Drive.

The capacity of this storm sewer system is a less than a 1-year design storm. During storm events in excess of the 1-year design storm, roadway flooding begins along Anthony Lane and Deerpath Drive. Additionally, during design storms in excess of the 2-year event, surcharging beings along Bayberry Lane and Pine Street.

6.10.2 Proposed Improvements, W10

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. The proposed improvements associated with FSA W9 are prerequisite for FSA W10.

The proposed W10 improvements are shown on Exhibits 19/20 in Appendix 1 and include the following:

- Install a parallel storm sewer along Bayberry Lane and Pine Street from Appletree Lane to Anthony Lane.
- Remove and replace the storm sewer along Anthony Lane between Pine Street and Deerpath Drive.
- Remove and replace the storm sewer along Deerpath Drive to the outfall to the West Fork, including a new section of pipe that hydraulically connects the system to Central Avenue.

Table 14 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W10.

Table 14. Deerpath Drive/Bayberry Lane (W10) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$3.9M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W1 improvements are classified as ‘Priority 2’ because of the associated street flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 2**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit
- IDNR-OWR
- ACOE

6.11 JONQUIL TERRACE (W11)

6.11.1 Limitations of Existing System – Cause of Flooding, W11

FSA W11 is located between Osterman Avenue and Central Avenue along Jonquil Terrace. FSA W11 includes approximately 76 acres of tributary area and consists of the storm sewer flows from Central Avenue to Jonquil Terrace and connects to main trunk sewer on Osterman Avenue. The storm sewer system flows west toward the outfall on Osterman Avenue. There is also a 12” storm sewer on Central Avenue, west of Jonquil Terrace that has its own outlet to the West Fork.

The main trunk sewer along Osterman Avenue, west of Jonquil Terrace, has 10-year capacity; however, the capacity of the storm sewer on Jonquil Terrace is less than 1-year design storm. During storm events in excess of the 1-year design storm, roadway flooding begins along Jonquil Terrace, which overflows west through the rear yards of residents along Central Avenue and Osterman Avenue.

6.11.2 Proposed Improvements, W11

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA W11.

The proposed W11 improvements are shown on Exhibits 21/22 in Appendix 1 and include the following:

- Install a new storm sewer from the low area on Jonquil Terrace to the outfall along Central Avenue. This involves removing and replacing the storm sewer along Central Avenue as well as a section of storm sewer along Jonquil Terrace.

- Remove and replace a section of storm sewer at the intersection of Osterman Avenue and Jonquil Terrace.

Table 15 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W11.

Table 15. Jonquil Terrace (W11) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$1.1M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W11 improvements are classified as ‘Priority 2’ because of the associated street flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 2**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IDNR-OWR
- ACOE

6.12 BROOKSIDE LANE (W12)

6.12.1 Limitations of Existing System – Cause of Flooding, W12

FSA W12 is located south of Central Avenue, along Brookside Lane. FSA W12 includes approximately 31 acres of tributary area and consists of the main trunk sewer on Brookside Lane that flows west toward Princeton Lane where it has an outfall to the West Fork.

The model indicates that there is street flooding along Princeton Road for the 10-year design storm event; however, this area is located within the regulatory floodplain. Flooding associated with the West Fork is not being addressed within this Stormwater Master Plan. Within this FSA, there was reported structure flooding along Brookside Lane. It was determined through reviewing the flood questionnaires, as well as from discussions with the Village staff that the reported structures within this study area were due to a sanitary sewer backup.

6.12.2 Proposed Improvements, W12

CBBEL did not design a proposed alternative for this area since the reported structure flooding along Brookside Lane was determined to be caused by a sanitary sewer backup and was not stormwater related. Also, as previously mentioned, the ponding along Princeton Lane is located within the regulatory floodplain of the West Fork. This stormwater management report does not address flooding associated with the rivers located within the Village. The existing conditions inundation map is included as **Exhibit 23** in **Appendix 1**.

6.13 WE GO TRAIL (W13)

6.13.1 Limitations of Existing System – Cause of Flooding, W13

FSA W13 is located adjacent to I-94 and west of Wilmot Road, along We Go Trail. FSA W13 includes approximately 25 acres of tributary area and consists of the storm sewers on We Go Trail and Forsythia Drive, with contributing storm sewers on Craig Court and Paula Court. The We Go Trail storm sewer flows east and connects to the main trunk sewer on Wilmot Road.

The capacity of the storm sewer system within this FSA is a 1-year design storm. During storm events in excess of the 1-year design storm, roadway flooding begins along We Go Trail and We Go Court. Additionally, ponding begins in the rear yards of We Go Court and Forsythia Drive. The existing capacity of the receiving 27” storm sewer at Wilmot Road is a 2-year design storm.

6.13.2 Proposed Improvements, W13

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA W13.

The proposed W13 improvements are shown on Exhibits 24/25 in Appendix 1 and include the following:

- Remove and replace the storm sewer along We Go Trail from Castlewood Lane to Wilmot Road.
- Remove and replace the storm sewer along Forsynthia Drive from We Go Court to We Go Trail.
- Construct a stormwater storage basin (0.9 acre-feet) east of the intersection of We Go Trail and Wilmot Road, utilizing the open space along the west side of South Park Elementary School.

Table 16 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W13.

Table 16. We Go Trail (W13) Summary

Existing Capacity	Proposed Level of Service	Total Cost
1-year	10-year	\$1.5M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W13 improvements are classified as ‘Priority 1’ because of the associated structure, street, and yard flooding within the area. The engineers estimate of probable cost for this area is included in Appendix 2. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit

6.14 PINE STREET (W14A)

6.14.1 Limitations of Existing System – Cause of Flooding, W14A

FSA W14A is located south of Central Avenue, along Pine Street. FSA W14A includes approximately 12 acres of tributary area and consists of a portion of the storm sewer along Pine Street, which currently flows north to the trunk sewer on Central Avenue (See FSA W9).

The capacity of the overall storm sewer system in this area is a 1-year design storm. During storm events in excess of the 1-year design storm, ponding begins in the roadway sag on Pine Street.

6.14.2 Proposed Improvements, W14A

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding).

The proposed W14A improvements are shown on Exhibits 26/27 in Appendix 1 and include the following:

- Install a new storm sewer from the sag on Pine Street, to a new outlet to the West Fork.

Table 17 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W14A.

Table 17. Pine Street (W14A) Summary

Existing Capacity	Proposed Level of Service	Total Cost
1-year	10-year	\$610k

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W14A improvements are classified as ‘Priority 2’ because of the associated street flooding within the area. The engineers estimate of probable cost for this area is included in Appendix 2. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit
- IDNR-OWR
- ACOE

6.15 HACKBERRY ROAD (W14B)

6.15.1 Limitations of Existing System – Cause of Flooding, W14B

FSA W14B is located south of Central Avenue and east of Wilmot Road, along Hackberry Road. FSA W14B includes approximately 58 acres of tributary area and consists of storm sewers on Dartmouth Lane, Birchwood Avenue, and Willow Avenue connecting to the main trunk sewer on Hackberry Road. The storm sewer system flows east to the existing outfall to the West Fork along Hackberry Road.

The capacity of the overall storm sewer system in this area is a 1-year design storm. During storm events in excess of the 1-year design storm, the trunk sewer along Hackberry Road begins to surcharge and roadway flooding begins along Dartmouth Lane and Birchwood Avenue.

6.15.2 Proposed Improvements, W14B

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). There are no prerequisite projects for FSA W14B.

The proposed W14B improvements are shown on Exhibits 28/29 in Appendix 1 and include the following:

- Remove and replace the storm sewer along Hackberry Road from Birchwood Avenue to the outlet to the West Fork.

Table 18 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W14B.

Table 18. Hackberry Road (W14B) Summary

Existing Capacity	Proposed Level of Service	Total Cost
1-year	10-year	\$4.5M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W14B improvements are classified as ‘Priority 2’ because of the associated street flooding within the area. The engineers estimate of probable cost for this area is included in Appendix 2. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit
- IDNR-OWR
- ACOE

6.16 LAUREL AVENUE (W15/W16)

6.16.1 Limitations of Existing System – Cause of Flooding, W15/16

FSAs W15/W16 are located east of Wilmot Road, along Laurel Avenue. FSAs W15/W16 include approximately 118 acres of tributary area and consist of storm sewers on Aspen Way, Kenmore Avenue, Park Lane, Birchwood Avenue, Fairview Avenue, Burr Oak Avenue, Willow Avenue, and Pine Street connecting to the main trunk sewer on Laurel Avenue. The storm sewer system flows east to the existing outlet to the West Fork along Laurel Avenue.

The capacity of the overall storm sewer system is a less than a 1-year design storm. During storm events in excess of the 1-year design storm, roadway flooding begins along Wilmot Road, Birchwood Avenue, Fairview Avenue, and Willow Avenue. Ponding also begins in the rear yards of Fairview Avenue and Burr Oak Avenue.

The trunk sewer along Laurel Avenue has 2-year capacity upstream of Birchwood Avenue, and 25-year capacity downstream of Birchwood Avenue.

6.16.2 Proposed Improvements, W15/16

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA W15/16.

The proposed W15/16 improvements are shown on Exhibits 30/31 in Appendix 1 and include the following:

- Remove and replace the storm sewer along Laurel Avenue from Wilmot Road to the outlet to the West Fork.
- Remove and replace a portion of the sewers along Birchwood Avenue, Fairview Avenue, Burr Oak Avenue, and Willow Avenue.

Table 19 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W15/16.

Table 19. Laurel Avenue (W15/16) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$10.3M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The W15/16 improvements are classified as ‘Priority 2’ because of the associated street and rear yard flooding within the area. The engineers estimate of probable cost for this area is included in

Appendix 2. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit
- IDNR-OWR
- ACOE

6.17 FORESTWAY DRIVE/PINE STREET (W17)

6.17.1 Limitations of Existing System – Cause of Flooding, W17

FSA W17 is located south of Laurel Avenue, along Forestway Drive and Pine Street. FSA W17 includes approximately 16 acres of tributary area and consists of the storm sewers that connect to the main trunk sewer on Laurel Avenue (See FSA W15/W16). The storm sewer system flows north into the receiving system.

The capacity of this storm sewer system is a 5-year design storm. During storm events in excess of the 10-year design storm, roadway flooding begins along Forestway Drive and in the rear yards between Forestway Drive and Pine Street.



Figure 14. Inundation at Forestway Drive

6.17.2 Proposed Improvements, W17

Since this FSA has existing 10-year level of service, a proposed capital improvement was not designed; however, the proposed improvements from W15/W16 are anticipated to provide benefit to FSA W17. CBBEL recommends establishing a safe overflow route between Forestway Drive and the adjacent West Fork to address the reported flooding in the area. This improvement will improve the drainage through the area in excess of a 10-year storm event. The existing conditions inundation map is included as **Exhibit 32** in **Appendix 1**.

Table 20 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area W17.

Table 20. Forestway Drive/Pine Street (W17) Summary

Existing Capacity	Proposed Level of Service	Total Cost
5-year	10-year	\$82k

The W17 improvements are classified as ‘Priority 2’ because of the reported street and rear yard flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 2**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC

CHAPTER 7 FSA CAPITAL IMPROVEMENT PROJECTS (MIDDLE FORK)

This Plan identifies long term capital improvement projects for each of the FSAs (Figure 15). The recommended projects are summarized in Table 21 and detailed the following sections.

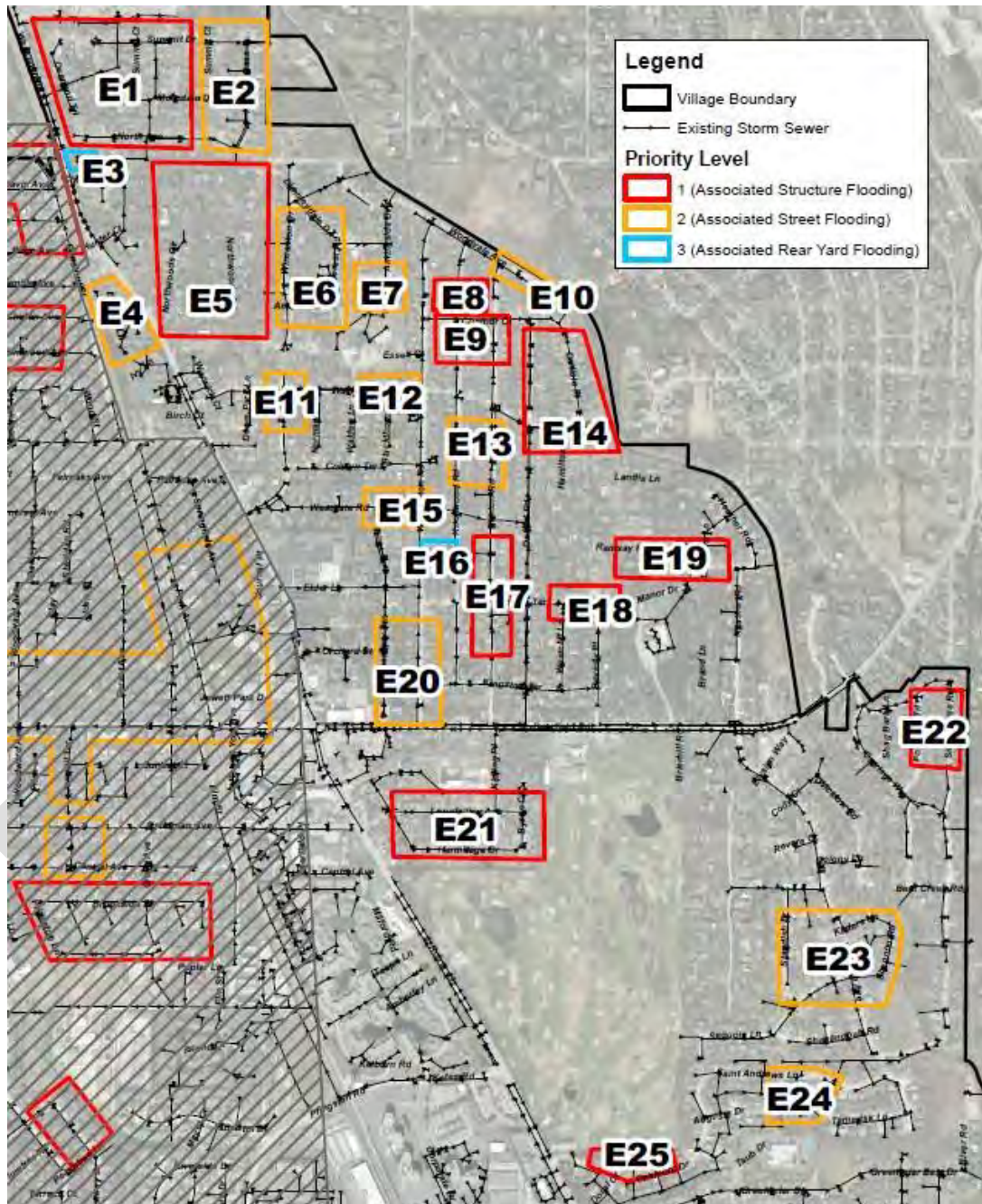


Figure 15. Deerfield Flood Study Areas, Middle Fork

Table 21. Middle Fork Flood Study Area Summary

FSA #	Description	Priority Level	Prerequisite Projects	Cost
E1	Summit Drive/Mountain Drive	1	-	\$1.1M
E2	Summit Drive/Portage Pass	2	-	\$780k
E3	Chapel Court	3	E1	\$140k
E4	Barclay Lane	2	-	-
E5	Northwoods Subdivision	1	-	\$4.8M
E6/7	Ambleside Drive	2	-	\$1.8M
E8/9	Woodridge Court/Knollwood Road	1	-	\$54k
E10*	Woodvale Avenue	-	-	-
E11/12	Warwick Road	2	-	\$1.3M
E13	Knollwood Road/Warwick Road	2	-	\$2.4M
E14	Carlisle Place	1	E13	\$340k
E15/E20A	Rosemary Terrace/Westgate Road	2	E16/17/18/19/20B	\$2.1M
E16/E17/E20B	Knollwood Road/Kenton Road	1	E18/19/20B	\$3.7M
E18/E19/E20B	Margate Terrace/Warrington Road	1	-	\$6.5M
E21	Longfellow Avenue/Hermitage Drive	1	-	\$2.5M
E22	Smoke Tree Road	1	-	\$720k
E23	Carlisle Avenue/Shannon Road	2	-	\$1.2M
E24	Saint Andrews Lane/Augusta Drive	2	-	\$680k
E25	Oakmont Drive	1	-	\$780k
TOTAL				\$30.8M

* The reported flooding associated with E10 was determined to be associated with the regulatory floodplain of the Middle Fork. See Section 7.8 for details.

7.1 SUMMIT DRIVE/MOUNTAIN DRIVE (E1)

7.1.1 Limitations of Existing System – Cause of Flooding, E1

FSA E1 is located east of Waukegan Road, just south of Deerfield High School within the North Trail subdivision. FSA E1 includes approximately 35 acres of tributary area. Additional tributary area is conveyed to this FSA through a 24” storm sewer under the railroad, from west of Waukegan Road (see FSA W1). FSA E1 consists of two mainline storm sewers. The first is a 48” RCP that flows east and north. It picks up the flow from the 24” under the railroad as well as the runoff from Waukegan Road. The second main conveyance pipe flows from south to north, traversing west along Summit Drive where it combines with the aforementioned 48” RCP. This water continues to flow north/northeast via an elliptical pipe prior to discharging to the Middle Fork.

Street flooding and rear yard drainage problems are known throughout this area. There are also reports of structure flooding due to overland flow. The capacity of this storm sewer system is less than a 1-year design storm for the north-south system and greater than a 50-year for the north/northeast route. During storm events in excess of the 1-year design storm, roadway flooding begins along Summit Drive, Mountain Drive, and North Avenue. Ponding begins in the rear yards for storms less than the 1-year storm.

7.1.2 Proposed Improvements, E1

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA E1.

The proposed E1 improvements are shown on Exhibits 33/34 in Appendix 3 and include the following:

- Remove and replace the storm sewer along Summit Drive with an elliptical pipe from the north/south sewer to confluence with the east/northeast sewer.
- Remove and replace the storm sewer with an elliptical pipe in the rear yards east of Summit Court.
- Install a diversion sewer along Mountain Drive.
- Install a diversion sewer on North Avenue connecting the east/west storm sewer along North Avenue to the north/south storm sewer.

Table 22 summarizes the existing capacity and proposed level of service and the cost associated with the proposed improvements in area E1.

Table 22. Summit Drive/Mountain Drive (E1) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$1.1M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The E1 improvements are classified as ‘Priority 1’ because of the associated structure, street, and yard flooding within the area. The engineers estimate of probable cost for this area is included in Appendix 4. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit

7.2 SUMMIT DRIVE/PORTAGE PASS (E2)

7.2.1 Limitations of Existing System – Cause of Flooding, E2

FSA E2 is located directly east of FSA E1, within the North Trail subdivision. FSA E2 includes approximately 20 acres of tributary area and consists of two mainline storm sewers that run parallel along Portage Pass north to Summit Drive and then east, prior to discharging to the Middle Fork. One sewer conveys the flow from the west, along North Avenue (30” RCP) and the other conveys flow from south to north (24-27” RCP).

Street flooding has been reported in this area. The capacity of the 10” storm sewer west of Portage Pass along Summit Drive is less than a 1-year design storm. During storm events in less than the 2-year design storm, roadway flooding begins along Portage Pass. Ponding begins in the rear yards for storms less than the 1-year event.

7.2.2 Proposed Improvements, E2

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA E2.

The proposed E2 improvements are shown on Exhibits 35/36 in Appendix 3 and include the following:

- Remove and replace a portion of the storm sewer along Portage Pass from the depression on Portage Pass to Summit Drive.
- Remove and replace the storm sewer along Summit Drive, east of Portage Pass to the outfall to the Middle Fork.

Table 23 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E2.

Table 23. Summit Drive/Portage Pass (E2) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$780k

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The E2 improvements are classified as ‘Priority 2’ because of the associated street and rear yard flooding within the area. The engineers estimate of probable cost for this area is included in Appendix 4.

4. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IDNR-OWR
- ACOE

7.3 CHAPEL COURT (E3)

7.3.1 Limitations of Existing System – Cause of Flooding, E3

FSA E3 is located south of North Avenue and east of Waukegan Road, along the rear yards of Chapel Court. FSA E3 includes approximately 1 acre of direct tributary area. This area is currently drained by a 6” storm sewer that is tributary to the 27” storm sewer along North Avenue (see FSA E1). The downstream receiving system at North Avenue has over 21 acres of tributary area and the conveyance system does not have adequate capacity, therefore the rear yard also begins to pond in less than a 1-year storm event.

The capacity of the rear yard storm sewer is less than a 1-year design storm. The capacity of the receiving storm sewer along North Avenue is also less than a 1-year storm event. Rear yard flooding has been reported in this area, which is consistent with the model results.

7.3.2 Proposed Improvements, E3

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. The proposed E3 improvements are dependent on the new storm sewer on North Avenue included as part of the FSA E1 improvements.

The proposed E3 improvements are shown on Exhibits 37/38 in Appendix 3 and include the following:

- Install a new storm sewer from the low-area in the rear yards of Chapel Court to the storm sewer south of North Avenue.

Table 24 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E3.

Table 24. Chapel Court (E3) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$140k

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The E3 improvements are classified as ‘Priority 3’ because of the associated rear yard flooding within the area. The engineers estimate of probable cost for this area is included in Appendix 4. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC

7.4 BARCLAY LANE (E4)

7.4.1 Limitations of Existing System – Cause of Flooding, E4

FSA E4 is located west of Waukegan Road, east of the railroad, and north of the Greenwood Avenue. FSA E4 includes approximately 6 acres of tributary area. The storm sewer system flows north through this FSA and includes a detention pond in the rear yards of Ivy Lane and another along Waukegan Road. The system then flows west under Barclay Lane and outlets to a ditch along the rear yards of Barclay Lane. The roadway and storm sewer system in this area is not owned by the Village.

The downstream receiving system of the stormwater storage facility between Barclay Lane and Waukegan Road is back-pitched towards the facility causing ponding along Barclay Lane in storms greater than the 1-year event. There were no reports of street, structure, or rear yard flooding in this FSA.

7.4.2 Proposed Improvements, E4

CBBEL recommends that the overflow route from the Barclay Lane to the ditch be returned to the original designed condition, west of the road. As a private road, the proposed improvements would be responsibility of the owner of the road to implement. There are no prerequisite projects for FSA E4. **The proposed E4 improvements are shown on Exhibits 39 in Appendix 3.**

Table 25 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E4.

Table 25. Barclay Lane (E4) Summary

Existing Capacity	Proposed Level of Service	Total Cost
1-year	10-year	-*

*The cost of the proposed improvements would be on the responsibility of the owner of the road.

The E4 improvements are classified as ‘Priority 2’ because of the associated street flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC

7.5 NORTHWOODS SUBDIVISION (E5)

7.5.1 Limitations of Existing System – Cause of Flooding, E5

FSA E5 is located south of North Avenue and east of Waukegan Road, within the Northwoods Subdivision. The roadway and infrastructure within this subdivision is not owned by the Village. Instead, the Homeowner’s Association for the subdivision currently owns and maintains the storm sewer system. The current sewer system includes a pipe that flows north from Northwoods Circle toward Northwoods Road, through the rear yards along Northwoods Road to the trunk sewer on North Avenue.

7.5.2 Proposed Improvements, E5

CBBEL designed an alternative for this area that would be considered a ‘conventional’ storm sewer system to service the subdivision. The proposed improvements would provide a 25-year level of service to the area. The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA E5.



Figure 16. Inundation at Northwoods Road

The proposed E5 improvements are shown on Exhibits 40/41 in Appendix 3 and include the following:

- Install a convention storm sewer system within the subdivision, including proposed inlets, curbs, and gutters.
- Remove and replace storm sewer along Northwoods Court, extending north to North Avenue.
- Install new storm sewer and outfall to the Middle Fork along North Avenue.

Table 26 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E5.

Table 26. Northwoods Subdivision (E5) Summary

Existing Capacity	Proposed Level of Service	Total Cost
N/A	25-year	\$4.8M

These improvements increase the level of service for the stormwater management system to 25-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The E5 improvements are classified as ‘Priority 1’ because of the associated structure, street, and yard flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit
- IDNR-OWR
- ACOE

7.6 AMBLESIDE DRIVE (E6/E7)

7.6.1 Limitations of Existing System – Cause of Flooding, E6/E7

FSA E6/E7 is located south of North Avenue and east of Wincanton Drive, along Ambleside Drive. FSA E6/E7 includes approximately 31 acres of tributary area and includes two trunk sewers. The first flows north along Wincanton Drive and has its own outlet to the Middle Fork. The second also flows north, along Ambleside Drive and outlets to the Middle Fork as well.

Street flooding was reported in this FSA. The capacity for the storm sewer along Wincanton Drive is a 2-year design storm event and is less than a 1-year design storm for the storm sewer along Ambleside Drive. In storms in excess of the 1-year, ponding begins along Ambleside Drive and the northeast corner of Walden Park. With storms greater than the 2-year design event, the storm sewers on Wincanton Drive begins to surcharge.

7.6.2 Proposed Improvements, E6/E7

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA E6/E7.

The proposed E6/E7 improvements are shown on Exhibits 42/43 in Appendix 3 and include the following:

- Remove and replace the storm sewer on Ambleside Drive to the outlet to the Middle Fork.
- Install a storm sewer connecting the trunk sewer on Wincanton Drive to the improvements along Ambleside Drive.

Table 27 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E6/E7.

Table 27. Ambleside Drive (E6/E7) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$1.8M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The E6/E7 improvements are classified as ‘Priority 2’ because of the associated street and rear yard flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit
- IDNR-OWR
- ACOE

7.7 WOODRIDGE COURT/KNOLLWOOD ROAD (E8/E9)

7.7.1 Limitations of Existing System – Cause of Flooding, E8/E9

FSA E8/E9 is located north of Warwick Road and east of Warrington Road, where there has been reported structure flooding along Knollwood Road and Woodridge Court. From review of the flood questionnaires, discussion with Village staff, and analysis of the model results, it was determined that the reported flooding was due to insufficient overflow routes from the residential rear yards to the storm sewer system along the respective street. It should be noted that a recent project was constructed by the Village that has already shown improvements within this FSA.

7.7.2 Proposed Improvements, E8/E9

CBBEL designed an alternative for this area to reestablish the overland flow routes from the rear yards of the residents with reported structure flooding to the respective street storm sewer system. There are no prerequisite projects for FSA E8/E9. **The proposed E8/E9 improvements are shown on Exhibit 44 in Appendix 3.**

Table 28 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E8/E9.

Table 28. Woodridge Court/Knollwood Road (E8/E9) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$54k

The E8/E9 improvements are classified as ‘Priority 1’ because of the associated structure flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC

7.8 WOODVALE AVENUE (E10)

7.8.1 Limitations of Existing System – Cause of Flooding, E10

FSA E10 is located north of Cumnor Court and east of Warrington Road, along Woodvale Avenue. FSA E10 includes approximately 7 acres of tributary area and consists of the main trunk sewer on Warrington Road and Woodvale Avenue that flows north and east to an outlet to the Middle Fork.

The model results indicate that there is street flooding along Woodvale Avenue for the 10-year design storm event; however, this area is located within the regulatory floodplain. Flooding associated with the Middle Fork is not being addressed within this Plan.

7.8.2 Proposed Improvements, E10

CBBEL did not design a proposed alternative for this area since the ponding along Woodvale Avenue is located within the regulatory floodplain of the Middle Fork. This stormwater management report does not address flooding associated with the rivers located within the Village. An existing conditions inundation map is included as **Exhibit 45** in **Appendix 3**.

7.9 WARWICK ROAD (E11/E12)

7.9.1 Limitations of Existing System – Cause of Flooding, E11/E12

FSA E11/E12 is located west of Warrington Road, along Wincanton Drive and Warwick Road. FSA E11/E12 includes approximately 45 acres of tributary area. The main trunk sewer (along Wincanton Drive and Warwick Road) flows north and east into the parallel trunk sewers along Warrington Road.

The capacity of the trunk sewer within this FSA is less than a 1-year storm event. During storms in excess of the 1-year, street flooding begins along both Wincanton Drive and Warwick Road. The capacity of the receiving storm sewer on Warrington Road is greater than the 10-year design storm event.



Figure 17. Inundation at Warwick Road

7.9.2 Proposed Improvements, E11/E12

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA E11/E12.

The proposed E11/E12 improvements are shown on Exhibits 46/47 in Appendix 3 and include the following:

- Remove and replace the storm sewer along Wincanton Drive from the low-area to Warwick Road.
- Remove and replace the storm sewer along Warwick Road between Wincanton Drive to Walden Lane.

- Install a stormwater storage basin (0.8 acre-feet) south of the parking lot of Walden School, including an inlet to the basin (connecting to the storm sewer on Warwick Road) and an outlet that connects to the storm sewer on Essex Court.

Table 29 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E11/E12.

Table 29. Warwick Road (E11/E12) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$1.3M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The E11/E12 improvements are classified as ‘Priority 2’ because of the associated street flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit

7.10 KNOLLWOOD ROAD/WARWICK ROAD (E13)

7.10.1 Limitations of Existing System – Cause of Flooding, E13

FSA E13 is located east of Warrington Road, along Knollwood Road and Kenton Road. FSA E13 includes approximately 46 acres of tributary area and includes the trunk sewers along Warrington Road, Knollwood Road, Kenton Road, and Oxford Road that flow north to the receiving storm sewer on Cumnor Court, which flows east to an outlet to the Middle Fork.

The capacity within the FSA is less than a 1-year storm event. In storms in excess of the 1-year event, street ponding occurs along Knollwood Road and Kenton Road. The capacity of the receiving storm sewer along Cumnor Court, downstream of Kenton Road, is a 10-year design storm event.

7.10.2 Proposed Improvements, E13

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA E13.

The proposed E13 improvements are shown on Exhibits 48/49 in Appendix 3 and include the following:

- Remove and replace the storm sewer along Knollwood Road, from the low-area south of Warwick Road to Cumnor Court.
- Remove and replace the storm sewer along Cumnor Court between Knollwood Road and Kenton Road.
- Remove and replace a section of storm sewer on Kenton Road, from the low-area south of Warwick Road to Warwick Road.

- Install a new section of storm sewer on Warwick Road, between Kenton Road and Knollwood Road.
- Remove and replace a section of storm sewer on Warwick Road between Kenton Road and Oxford Road.

Table 30 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E13.

Table 30. Knollwood Road/Warwick Road (E13) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$2.4M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The E13 improvements are classified as ‘Priority 2’ because of the associated street flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit

7.11 CARLISLE PLACE (E14)

7.11.1 Limitations of Existing System – Cause of Flooding, E14

FSA E14 is located directly east of FSA 13, along Carlisle Place and includes approximately 10 acres of direct tributary area. The storm sewer on Carlisle Place connects to both the main trunk sewer on Cumnor Court (See FSA 13) and the trunk sewer on Warwick Road. Both trunk sewers flow east to an outlet to the Middle Fork. There has been reported street flooding, structure flooding, and rear yard flooding within this FSA.

The capacity of the Carlisle Place storm sewer is a 2-year storm event. During storm events in excess of a 2-year design storm, ponding begins along Carlisle Place. Due to the proximity of this FSA to the Middle Fork, tailwater effects limit the storm sewer discharge when the elevation of the Middle Fork is higher than the outlet pipe.

7.11.2 Proposed Improvements, E14

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA E14.

The proposed E14 improvements are shown on Exhibits 50/51 in Appendix 3 and include the following:

- Remove and replace a section of the storm sewer along Carlisle Place from the low-area north of Warwick Road to the outlet to the Middle Fork.

Table 31 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E14.

Table 31. Carlisle Place (E14) Summary

Existing Capacity	Proposed Level of Service	Total Cost
2-year	10-year	\$340k

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The upsized outlet will provide flood reduction benefit to address the multiple flooding complaints along Carlisle Place. Although it should be noted that flooding associated with the Middle Fork is not addressed by this Stormwater Management Plan. The E14 improvements are classified as ‘Priority 1’ because of the associated structure, street, and rear yard flooding reported within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IDNR-OWR
- ACOE

7.12 ROSEMARY TERRACE/WESTGATE ROAD (E15/E20A)

7.12.1 Limitations of Existing System – Cause of Flooding, E15/E20A

FSA E15/E20A is located north of Deerfield Road, between Waukegan Road and Warrington Road. FSA E15/E20A includes approximately 49 acres of tributary area and consists of the main trunk sewer on Rosemary Terrace and Westgate Road which flows west into the receiving system at Warrington Road. At Warrington Road, the stormwater is either conveyed north along Warrington Road or east along Westgate Road. There is also contributing flow from Elder Lane and Orchard Street.

The capacity of the storm sewer system within the FSA is a 1-year design storm event. In storms in excess of the 1-year, ponding beings along Rosemary Terrace. In storms in excess of the 2-year, the storm sewer begins to surcharge near the intersection of Rosemary Terrace and Westgate Road, and ponding beings along the street.

7.12.2 Proposed Improvements, E15/E20A

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. Improvements associated with FSA E16/E17/E20B and E18/E19/E20B, which are located downstream of this FSA, are prerequisites for FSA E15/E20A.

The proposed E15/E20A improvements are shown on Exhibits 52/53 in Appendix 3 and include the following:

- Remove and replace two sections of storm sewer along Rosemary Terrace between Deerfield Road and Westgate Road.
- Remove and replace the storm sewer along Westgate Road between Rosemary Terrace and Warrington Road.

Table 32 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E15/E20A.

Table 32. Rosemary Terrace/Westgate Road (E15/E20A) Summary

Existing Capacity	Proposed Level of Service	Total Cost
1-year	10-year	\$2.1M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The E15/E20A improvements are classified as ‘Priority 2’ because of the associated street and yard flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit

7.13 KNOLLWOOD ROAD/KENTON ROAD (E16/E17/E20B)

7.13.1 Limitations of Existing System – Cause of Flooding, E16/E17/E20B

FSA E16/E17/E20B is located north of Deerfield Road and east of Warrington Road. It includes approximately 44 acres of tributary area. The storm sewer system generally flows north and east toward the Middle Fork. The tributary area is directed to the two trunk sewers on Oxford Avenue that then flow east on Warwick Road and outlet to the Middle Fork (See FSA E14).

The overall capacity for this FSA is less than a 1-year design storm event. During storms in excess of the 1-year event, ponding begins along Margate Terrace and Warrington Road. The low point on Margate Terrace, east of Westcliff Lane is over 4 feet lower than the Oxford Road centerline. Thus, once the hydraulic grade line in the Oxford Road storm sewer exceeds the road elevation of Margate Terrace at the low point (<1-year storm), street ponding begins. The rear yard ponding along Knollwood Road occurs during storms in excess of the 2-year event. Overall, the storm sewers within this area have a lack of available capacity and surcharges in events in excess of the 1-year.

7.13.2 Proposed Improvements, E16/E17/E20B

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. Improvements associated with E18/E19/E20B are prerequisite for this FSA.

The proposed E16/E17/E20B improvements are shown on Exhibits 54/55 in Appendix 3 and include the following:

- Install a storm sewer from the low-area on Warrington Road to the intersection of Knollwood Road and Westgate Road, including:

- A new section of storm sewer from the low-area on Warrington Road, along Margate Terrace, to Knollwood Road.
- Replacement of the storm sewer on Knollwood Road from Margate Terrace to Westgate Road.
- A lateral to the identified rear yard flooding on the west side of Knollwood Road.
- Remove and replace the storm sewer on Kenton Road, from the low-area south of Margate Terrace to Westgate Road.
- Remove and replace a section of storm sewer on Westgate Road from Kenton Road to Oxford Road.
- Remove and replace the storm sewer on Margate Terrace between Kenton Road and Oxford Road, also including a section of the Oxford Road storm sewer.

Table 33 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E16/E17/E20B.

Table 33. Knollwood Road/Kenton Road (E16/E17/E20B) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$3.7M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The proposed improvements are classified as ‘Priority 1’ because of the associated structure, street, and rear yard flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit

7.14 MARGATE TERRACE/KINGSTON TERRACE (E18/E19/E20B)

7.14.1 Limitations of Existing System – Cause of Flooding, E18/E19/E20B

FSA E18/E19/E20B is located north of Deerfield Road and east of Warrington Road. It includes approximately 75 acres of tributary area. The storm sewer system generally flows north and east toward the Middle Fork. The majority of the tributary area is directed to the two trunk sewers on Oxford Avenue that then flow east on Warwick Road and outlet to the Middle Fork (See FSA E14).

The overall capacity for this FSA is less than a 1-year design storm event. During storms in excess of the 1-year event, ponding begins along Margate Terrace, Warrington Road, Kingston Terrace, and Manor Drive. Overland flow from the low area on Margate Terrace (as discussed in FSA E16/E17/E20B) is northeast through the rear yards of the homes located at 320/330/342 Margate Terrace toward the Middle Fork. The rear yard ponding along Knollwood Road occurs during storms in excess of the 2-year event. Overall, the storm sewers within this area have a lack of available capacity and surcharges in events in excess of the 1-year.

7.14.2 Proposed Improvements, E18/E19/E20B

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. Although there are no prerequisite projects for this FSA, the benefits will not be fully realized until the FSA E16/E17/E20B and E15/20A are constructed.

The proposed E18/E19/E20B improvements are shown on Exhibits 56/57 in Appendix 3 and include the following:

- Install a storm sewer from the low-area of Warrington Road to the outlet to the Middle Fork, including:
 - Replacement of the storm sewer along Kingston Terrace from Warrington Road to Beverly Place, including a section of storm sewer that extends to the low-area on Warrington Road.
 - Replacement of the storm sewer on Beverly Place from Kingston Terrace to Margate Terrace.
 - Replacement of the storm sewer along Margate Terrace/Manor Drive from Westcliff Lane to the outlet to the Middle Fork.

Table 3 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E18/E19/E20B.

Table 34. Margate Terrace/Kingston Terrace (E18/E19/E20B) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$6.5M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. These improvements also provide a 100-year level of protection for the homes located at 320/330/342 Margate Terrace. The proposed improvements are classified as ‘Priority 1’ because of the associated structure, street, and rear yard flooding within the area. The engineers estimate of probable cost for this area is included in Appendix 4. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit
- IDNR-OWR
- ACOE

7.15 LONGFELLOW AVENUE/HERMITAGE DRIVE (E21)

7.15.1 Limitations of Existing System – Cause of Flooding, E21

FSA E21 is located south of Deerfield Road, adjacent to Kipling Elementary School and the Briarwood Country Club. FSA E21 includes approximately 28 acres of tributary area and consists of storm sewers along Longfellow Avenue, Hermitage Drive, and Byron Court, that connect to the trunk sewer on Kipling Place that flows north to the receiving sewer system on Deerfield Road.



Figure 18. Inundation at Byron Court

Although the storm sewer on Kipling Street has 10-year capacity, the overall capacity within this area is less than a 1-year storm event. During storm events in excess of the 1-year, street ponding beings along Longfellow Avenue, Hermitage Drive and Byron Court.

7.15.2 Proposed Improvements, E21

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA E21.

The proposed E21 improvements are shown on Exhibits 58/59 in Appendix 3 and include the following:

- Remove and replace the storm sewer along the north-south portion of Hermitage Drive.
- Remove and replace the storm sewer along Longfellow Avenue from the low-area to Hermitage Drive.
- Remove and replace the storm sewer along Byron Court, between Hermitage Drive and Longfellow Avenue.
- Install a new stormwater storage basin (0.5 acre-feet) that utilizes the open space at Kipling Elementary School, including an outlet that connects to the storm sewer that flows east toward Kipling Place and replacement of the storm sewer along Whittier Avenue, which will be the inlet to the proposed basin.

Table 35 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E21.

Table 35. Longfellow Avenue/Hermitage Drive (E21) Summary

Existing Capacity	Proposed Level of Service	Total Cost
< 1-year	10-year	\$2.5M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The E21 improvements are classified as ‘Priority 1’ because of the associated structure,

street, and rear yard flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IEPA, NPDES permit

7.16 SMOKE TREE ROAD (E22)

7.16.1 Limitations of Existing System – Cause of Flooding, E22

FSA E22 is located south of Deerfield Road, along and to the east of Carriage Way. FSA E22 includes approximately 34 acres of tributary area and consists of storm sewers on Millstone Road and Smoke Tree Road that are conveyed toward the storm sewer on Carriage Way where flow continues west to the outlet to the Middle Fork.

The overall capacity for the system is a 10-year design storm event. During storms in excess of the 10-year event, the storm sewers along Millstone Road and Smoke Tree Road begin to surcharge and ponding begins along Carriage Way. Although the storm sewer system has 10-year capacity, structure flooding, street flooding, and rear yard flooding was reported in this area. The current storm sewer system does not extend upstream to the areas in which the flooding was reported. Therefore, the reported flooding is caused by insufficient overflow toward the storm sewer system and a lack of inlets such that the stormwater in these areas is not conveyed to the storm sewer system and causes ponding.

7.16.2 Proposed Improvements, E22

CBBEL designed an alternative for this area to provide 10-year level of service (with a maximum of 6-inches of street ponding) for the overall FSA. This included extending the storm sewers to the known problems areas in order to ensure that stormwater is able to be conveyed effectively. The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA E22.

The proposed E22 improvements are shown on Exhibits 60/61 in Appendix 3 and include the following:

- Install two new sections of storm sewer along Smoke Tree Road that extend to the known problem areas.
- Install a new section of storm sewer along Fox Hunt Trail that extends to the known problem area.

Table 36 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E22.

Table 36. Smoke Tree Road (E22) Summary

Existing Capacity	Proposed Level of Service	Total Cost
10-year	10-year	\$720k

These improvements increase the level of service for the overall stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent

with Village staff recommendations. The E22 improvements are classified as ‘Priority 1’ because of the associated structure, street, and rear yard flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC

7.17 CARLISLE AVENUE/SHANNON ROAD (E23)

7.17.1 Limitations of Existing System – Cause of Flooding, E23

FSA E23 is located south of Deerfield Road and east of the Briarwood Country Club, along Carlisle Avenue. FSA E23 includes approximately 44 acres of tributary area and consists of the main trunk sewer on Sequoia Lane that flows east to Shannon Road where there is an outlet to the Middle Fork. Carlisle Avenue, Kildare Lane, and Shenandoah Road have contributing storm sewers to the main sewer on Sequoia Lane within the FSA.

The capacity of the Sequoia Lane storm sewer is a 10-year design storm; however, the storm sewers along Carlisle Avenue have a 1-year capacity and the storm sewer along Shannon Road has a 2-year capacity. During storm events in excess of the 1-year, ponding begins along Carlisle Avenue and ponding begins along Shannon Road with storms in excess of the 2-year design event.



Figure 19. Inundation at Shannon Road

7.17.2 Proposed Improvements, E23

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding). The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA E23.

The proposed E23 improvements are shown on Exhibits 62/63 in Appendix 3 and include the following:

- Remove and replace two sections of storm sewer on Carlisle Avenue (north of Kildare Lane and south of Sequoia Lane).
- Remove and replace the storm sewer on Kildare Lane from Carlisle Avenue to Shannon Road.
- Remove and replace the storm sewer on Sequoia Lane from Carlisle Avenue to Shannon Road.
- Remove and replace the storm sewer on Shannon Road, including the outlet to the Middle Fork.

Table 37 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E23.

Table 37. Carlisle Avenue/Shannon Road (E23) Summary

Existing Capacity	Proposed Level of Service	Total Cost
1-year	10-year	\$1.2M

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The E23 improvements are classified as ‘Priority 2’ because of the associated street flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC
- IDNR-OWR
- ACOE

7.18 SAINT ANDREWS LANE/AUGUSTA DRIVE (E24)

7.18.1 Limitations of Existing System – Cause of Flooding, E24

FSA E24 is located north of Lake Cook Road and east of the Briarwood Country Club, within the Deer Run subdivision. FSA E24 includes approximately 55 acres of tributary area, as it is part of the series of detention basins that service the subdivision. The main trunk sewer generally flows east through the rear yards connecting the detention basins together.

The capacity of the storm sewer system within the FSA is a 2-year design event. During storm events in excess of the 2-year, ponding begins along Augusta Drive and Saint Andrews Lane. During a 10-year design storm event, the detention basins are within the existing banks and do not overflow. The street ponding is due to the insufficient conveyance from the street to the detention areas.

7.18.2 Proposed Improvements, E24

CBBEL designed an alternative for this area to provide a 10-year level of service. The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA E24.

The proposed E24 improvements are shown on Exhibits 64/65 in Appendix 3 and include the following:

- Remove and replace the storm sewer on Augusta Drive, from the low-area on Augusta Drive, west of the intersection with Tamarisk Lane, to the existing detention basin north of Saint Andrews Lane. Create curb cuts and install a bioswale in parkway.

Table 38 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E24.

Table 38. St Andrews Lane/Augusta Drive (E24) Summary

Existing Capacity	Proposed Level of Service	Total Cost
2-year	10-year	\$680k

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The E24 improvements are classified as ‘Priority 2’ because of the associated street flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC

7.19 OAKMONT DRIVE (E25)

7.19.1 Limitations of Existing System – Cause of Flooding, E25

FSA E25 is located east of Waukegan Road and south of Briarwood Country Club in the Deer Run subdivision. FSA E25 includes approximately 41 acres of tributary area and consists of the storm sewer along the southern rear yards of Oakmont Drive that flows east toward a system of detention basins that begin between Augusta Drive and Exmoor Court.

The capacity of the Oakmont Drive rear yard storm sewer is greater than a 10-year storm event, however, the lateral that extends to the northern rear yards of Oakmont Drive (adjacent to the golf course) is a 1-year design storm event. During storms in excess of the 1-year event, ponding begins along the rear yards in this area and is associated with overflow from the adjacent golf course as well as a lack of conveyance to the trunk sewer.

7.19.2 Proposed Improvements, E25

CBBEL designed an alternative for this area to provide a 10-year level of service (with a maximum of 6-inches of street ponding) and a 100-year level of service for the structure flooding. The proposed improvements within this FSA are hydraulically connected and not independent of one another. There are no prerequisite projects for FSA E25.

The proposed E25 improvements are shown on Exhibits 66/67 in Appendix 3 and include the following:

- Remove and replace the storm sewer on Oakmont Drive, west of Doral Court to Exmoor Court.
- Remove and replace the storm sewer on Exmoor Court, south of Oakmont Drive.
- Remove and replace the storm sewer that services the northern rear yards of Oakmont Drive.

Table 39 summarizes the existing and proposed level of service and the cost associated with the proposed improvements in area E25.

Table 39. Oakmont Drive (E25) Summary

Existing Capacity	Proposed Level of Service	Total Cost
1-year	10-year	\$780k

These improvements increase the level of service for the stormwater management system to 10-year (with a maximum of 6-inches of street ponding), which is similar to current design standards and consistent with Village staff recommendations. The E25 improvements are classified as ‘Priority 1’ because of the associated structure and street flooding within the area. The engineers estimate of probable cost for this area is included in **Appendix 4**. Permitting and coordination for the proposed project includes the following agencies:

- Lake County SMC

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CHAPTER 8 PRIORITIZATION OF CAPITAL IMPROVEMENT PROJECTS

The summary table below ranks the proposed capital improvements by different categories including the initial priority level based on the type of associated flooding within the project area, the cost of the project, the number of flooding areas addressed by the project, the estimated number of permits required, and the compatibility of the proposed project with other Village planned capital improvements projects¹. CBBEL developed a ranking table where a score (1-3) has been associated with each category for each proposed project. The scores from each category were then added together to assign each project a total metric score, where the higher the total metric score is, the more favorable the project. Based on the total metric score, the proposed capital improvement projects were assigned an overall rank. Tie breakers were based on the type and number of areas addressed by the project, as well as by cost. See **Table 40** for a summary of the prioritization of all proposed capital improvement projects.

Table 40. Prioritized Capital Improvement Projects

Flood Study Area	Description	Priority Level	Cost	# of Areas Addressed	Estimated # of Permits Required	Project Compatibility with other Village Plans ¹	Pre-Requisite to Other Projects	Total Metric Score	Overall Rank
		6 = Level 1 (Structure) 3 = Level 2 (Street) 1 = Level 3 (Rear Yard)	6 = < \$1M 3 = \$1M - \$3M 1 = > \$3M	6 = > 5 3 = 3-5 1 = 1-2	3 = 1 2 = 2-3 1 = > 3	3 = 1-2 Years 2 = 3-4 Years 1 = > 5 Years	3 = >1 1 = None	Higher Score = More Favorable	
W3	Stratford Road/Berkley Court	6	3	6	2	1	3	21	1
E21	Longfellow Avenue/Hermitage Drive	6	3	6	2	2	1	20	2 (tie)
E22	Smoke Tree Road	6	6	3	3	1	1	20	2 (tie)
E8/E9	Woodridge Court/Knollwood Road	6	6	1	3	3	1	20	2 (tie)
E14	Carlisle Place	6	6	3	2	1	1	19	3 (tie)
E16/17/20B	Knollwood Road/Kenton Road	6	1	6	2	3	1	19	3 (tie)
E25	Oakmont Drive	6	6	1	3	2	1	19	3 (tie)
W17	Forestway Drive	6	6	1	3	2	1	19	3 (tie)
W9	Central Avenue	6	1	6	1	2	3	19	3 (tie)
E1	Summit Drive/Mountain Drive	6	3	3	2	1	3	18	10 (tie)
E18/19/20B	Margate Terrace/Kingston Terrace	6	1	6	1	1	3	18	10 (tie)
W4	Hertel Lane/Lake Eleanor Drive	3	6	3	2	3	1	18	10 (tie)
W13	We Go Trail	6	3	3	2	2	1	17	13 (tie)
W7	Hazel Avenue/Prairie Avenue	6	3	3	1	3	1	17	13 (tie)
E2	Summit Drive/Portage Pass	3	6	3	2	1	1	16	14 (tie)
E24	Saint Andrews Lane/Augusta Drive	3	6	1	3	2	1	16	14 (tie)
W1	North Avenue/Chestnut Street	6	3	3	2	1	1	16	14 (tie)
W15/16	Laurel Avenue	3	1	6	1	2	3	16	14 (tie)
E13	Knollwood Road/Warwick Road	3	3	3	2	1	3	15	20 (tie)
W5	Greenwood Avenue	6	3	3	1	1	1	15	20 (tie)
E6/7	Ambleside Drive	3	3	3	1	3	1	14	22 (tie)
W14A	Pine Street	3	6	1	1	2	1	14	22 (tie)
E11/12	Warwick Road	3	3	3	2	1	1	13	24 (tie)
E15/E20A	Rosemary Terrace/Westgate Road	3	3	3	2	1	1	13	24 (tie)

E23	Carlisle Avenue/Shannon Road	3	3	3	2	1	1	13	24 (tie)
E3	Chapel Court	1	6	1	3	1	1	13	24 (tie)
W6	Montgomery Road	3	3	3	2	1	1	13	24 (tie)
W8	Deerfield Road/Woodward Avenue	3	1	6	1	1	1	13	24 (tie)
W2	Woodland Drive	3	3	1	3	1	1	12	30
W11	Jonquil Terrace	3	3	1	2	1	1	11	31
W10	Deerpath Drive/Bayberry Lane	3	1	3	1	1	1	10	32 (tie)
W14B	Hackberry Road	3	1	3	1	1	1	10	32 (tie)
E4	Barclay Lane	-	-	-	-	-	-	-	-
E10	Woodvale Avenue	-	-	-	-	-	-	-	-
W12	Brookside Lane	-	-	-	-	-	-	-	-

¹ The ranking basis for the proposed project compatibility with other future Village capital improvements projects is based on the Village’s “Capital Improvement Projects – 5-Year Outlook” dated January 10, 2020.

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CHAPTER 9 FUNDING OF CAPITAL PROJECTS

The long-term capital improvement projects require significant capital expenditures. The following funding sources have been used in other communities to fund infrastructure projects.

9.1 PAY-AS-YOU-GO CAPITAL FUNDING

The Village could dedicate a portion of the Capital Planning Budget each year to construct a portion of each selected project. The phasing and portion of the project constructed each year would depend on the budget that can be allocated to the stormwater improvements.

9.2 MUNICIPAL BOND

A municipal bond is a bond issued by a local government or their agencies. The Village could issue bonds to cover all or part of the projects. This would allow a greater portion of the project to be completed in a short period of time while the debt service would extend over several decades.

9.3 SPECIAL SERVICE AREA (SSA)

A Special Service Area (SSA) is a taxing mechanism that can be used to fund a wide range of special or additional services and/or physical improvements in a defined geographic area within the Village. The Village could develop a SSA that places a levy on the properties within each Flood Study Area. The revenues from the SSA could be used to fund drainage projects and repay Municipal Bonds.

9.4 OUTSIDE FUNDING SOURCES

Federal, State and County funding of stormwater projects has been successfully used by communities. However, these outside funding sources are limited and the competition for the resources is fierce. The application process can be rigorous and take months or years to complete. Given the flooding problems and potential improvement projects, the following two outside funding sources have the highest likelihood of success.

9.4.1 FEMA Hazard Mitigation Grant Program (HMGP)

This program provides grants to states and local governments to implement long term hazard mitigation measures after a major disaster declaration. The program will pay for 75% of mitigation projects that meet a minimum benefit/cost ratio of 1.0, in which none of the proposed flood reduction projects would qualify. In the event that a major disaster for the State is declared in the future, it is our recommendation that the Village then apply for this grant. The funding available is only a portion of the total losses for a particular disaster, which makes this a very competitive grant with an application process that can take up to 24 months.

9.4.2 FEMA Pre-Disaster Mitigation Grant Program (PDM)

The goal of this program is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. Mitigation planning is a key process used to break the cycle of disaster damage, reconstruction, and

repeated damage. PDM grants are funded annually by Congressional appropriations and are awarded on a nationally competitive basis. The program will pay for a percentage of mitigation projects that meet a minimum benefit/cost ratio of 1.0. The competition for this grant is nation-wide and is very competitive.

9.4.3 Flood Mitigation Assistance (FMA)

This nationwide FEMA program provides funds for projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis. Unlike the HMGP program, this is a nationwide competition that focuses on Repetitive Loss properties as defined under the National Flood Insurance Program (NFIP). These funds are typically allocated to repetitive loss properties and buy-outs.

9.4.4 Lake County Watershed Management Board Grants

The primary role of the Watershed Management Board (WMB) is to oversee the allocation of SMC funding and SMC staff resource allocations for projects across the four watersheds of Lake County. The WMB cost-share grant program is available to help fund drainage improvement and flood reduction projects. Projects submitted are assessed and prioritized based on nine benefit criteria (inter-jurisdictional, flood hazard reduction, structural damage, water quality, natural resources, nuisance flood reduction, multiple use, outside funding utilization, and phosphorous public education component). The program places flood damage reduction as the highest priority and offered approximately \$177,000 in assistance in 2018 with a cost share match of 50%.

9.4.5 Lake County Stormwater Infrastructure Repair Fund

Lake County SMC has developed a Stormwater Infrastructure Repair Fund (SIRF) to assist with inter-jurisdictional drainage and flooding problems discovered through community, flood response or flood problem inventory. The program offers \$100,000 per year with a minimum 50% cost share requirement. The proposed project must have flood benefits for a 10-year design storm, enhance water quality utilizing best management practices, and alleviate flood damage types with structural flood damage given the highest priority for flood damage type.

9.5 STORMWATER UTILITY FEE

The concept of the stormwater utility fee is to collect from both residents and businesses within the entire Village based on the amount of impervious area on each property. The impervious area is directly related to the amount of stormwater runoff contributing to the storm sewer system. An equivalent residential unit (ERU) is the basis for the amount paid to the utility fee on a monthly basis and can be included on tax bills or water bills. Impervious areas for businesses and industries in the Village should be calculated to determine the number of ERUs within a specific non-residential parcel. The Stormwater Utility Fee could be used to fund drainage projects and repay Municipal Bonds. The utility fee per ERU would be set based on the cost of the project, length of time for repayment and additional reserves needed for maintenance, etc. Several municipalities have developed stormwater utility fees in the past 10 years.

A few of these municipalities include:

- Arlington Heights: \$6.25 monthly.
- Buffalo Grove: \$0.00695 monthly (per ft² of parcel area).
- Downers Grove: \$10.11 - \$20.22 monthly (based on residential impervious area).
- Highland Park: \$8.50 monthly (per equivalent residential unit (ERU), where 1 ERU = 1,000 ft² of impervious area on a residential lot).
- Hoffman Estates: \$1.50 - \$2.50 monthly (based on residential lot size).
- Libertyville: Bi-monthly based on a two-part formula –
 - (ERU x current rate \$) + (IDF x current rate \$); where ERU = 3,800 ft² of impervious area, and IDF = the Intensity of Development Factor, which measures the ratio of pervious (permeable) surface to impervious surface.
- Mundelein: \$3 - \$12 monthly (based on residential acreage).
- Park Ridge: \$11 monthly (per ERU, where 1 ERU = 2,800 ft² of impervious area).
- Wheeling: \$2 monthly (per ERU, where 1 ERU = 3,000 ft² of impervious area).
- Wilmette: \$7.38 - \$11.63 monthly (based on impervious area).

CHAPTER 10 STORM SEWER SYSTEM FACTS, SPECIFICS AND REALITIES

The final chapter of this Plan for the Village is intended to highlight facts, answer common questions and dispel myths about the Village's storm sewer network. The following statements have been provided to help the general public understand why flooding occurs throughout the Village and understand what the Village is doing to address the issues through the proposed improvements outlined in this Plan.

10.1.1 Will my street continue to flood if the project is constructed?

A large-scale capital project will reduce frequency, depth and duration of street flooding. However, given the flat topography of the Village, during the most extreme storm events there will likely still be brief street flooding. It should also be noted that this stormwater management report does not address flooding associated with the rivers located within the Village.

10.1.2 What are the benefits of spending millions of dollars on a capital improvement project?

The benefits of a large-scale capital improvement project include reduction in the frequency, depth and duration of flooding of streets, yards and homes.

10.1.3 Can the Village solve the flooding problems using only green infrastructure, i.e. rain barrels and rain gardens?

While we strongly recommend the implementation of green infrastructure, it will not significantly reduce flooding by itself.

10.1.4 If water comes up through my floor drain during a flood event, how will these capital improvements reduce that risk? Is it valuable to install either an overhead plumbing system or a flood control system?

Yes, we recommend that all residents flood proof their homes to the maximum extent practicable. Flood proofing measurements include the conversion to an overhead plumbing system, and if this is cost prohibitive, then a flood control system on the sanitary lateral.

10.1.5 What can I do on my property to help drainage?

Property owners should direct stormwater runoff away from the structure by extending downspouts and establishing positive drainage away from the structure. If the soil around the foundation of a structure is pitched towards the structure, it's recommended that material is added or removed until the slope moves away from the house (this is known as "grading"). This material should be dense-preferably clay soil. Sump pumps with a battery back-up will also ensure footing and perimeter drains are working properly to direct runoff away from the structure foundations.

APPENDIX 1

EXISTING/PROPOSED CONDITIONS EXHIBITS, WEST FORK



Legend

Existing Storm Sewer

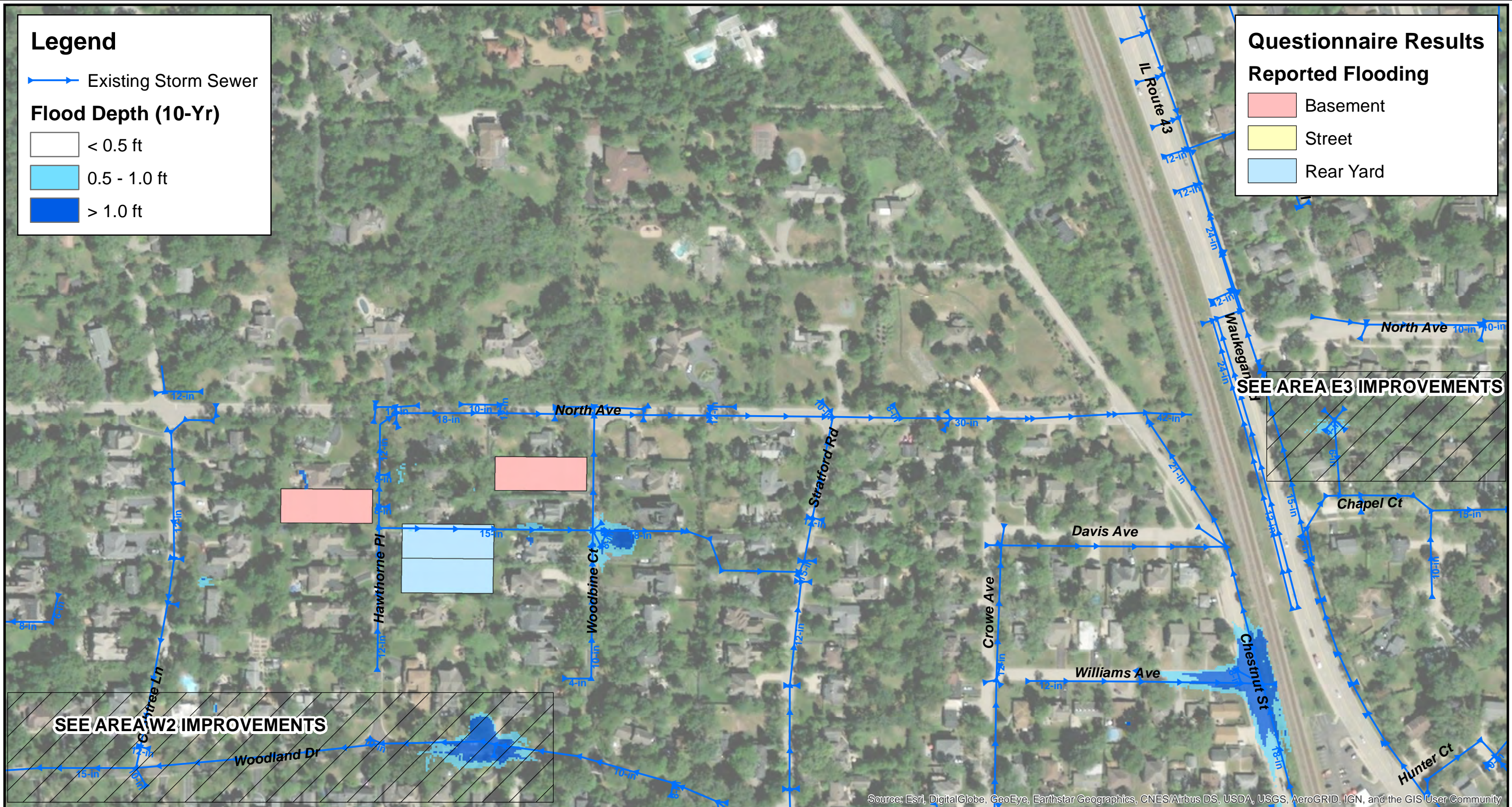
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results


Reported Flooding

- Basement
- Street
- Rear Yard






Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


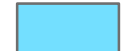

1 inch = 200 feet

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	<p>TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W1</p>			<p>DATE 05/21/2021</p>	
				<p>EXHIBIT 1</p>	

Legend


-  Proposed Storm Sewer
-  Existing Storm Sewer
-  Proposed Storage Area

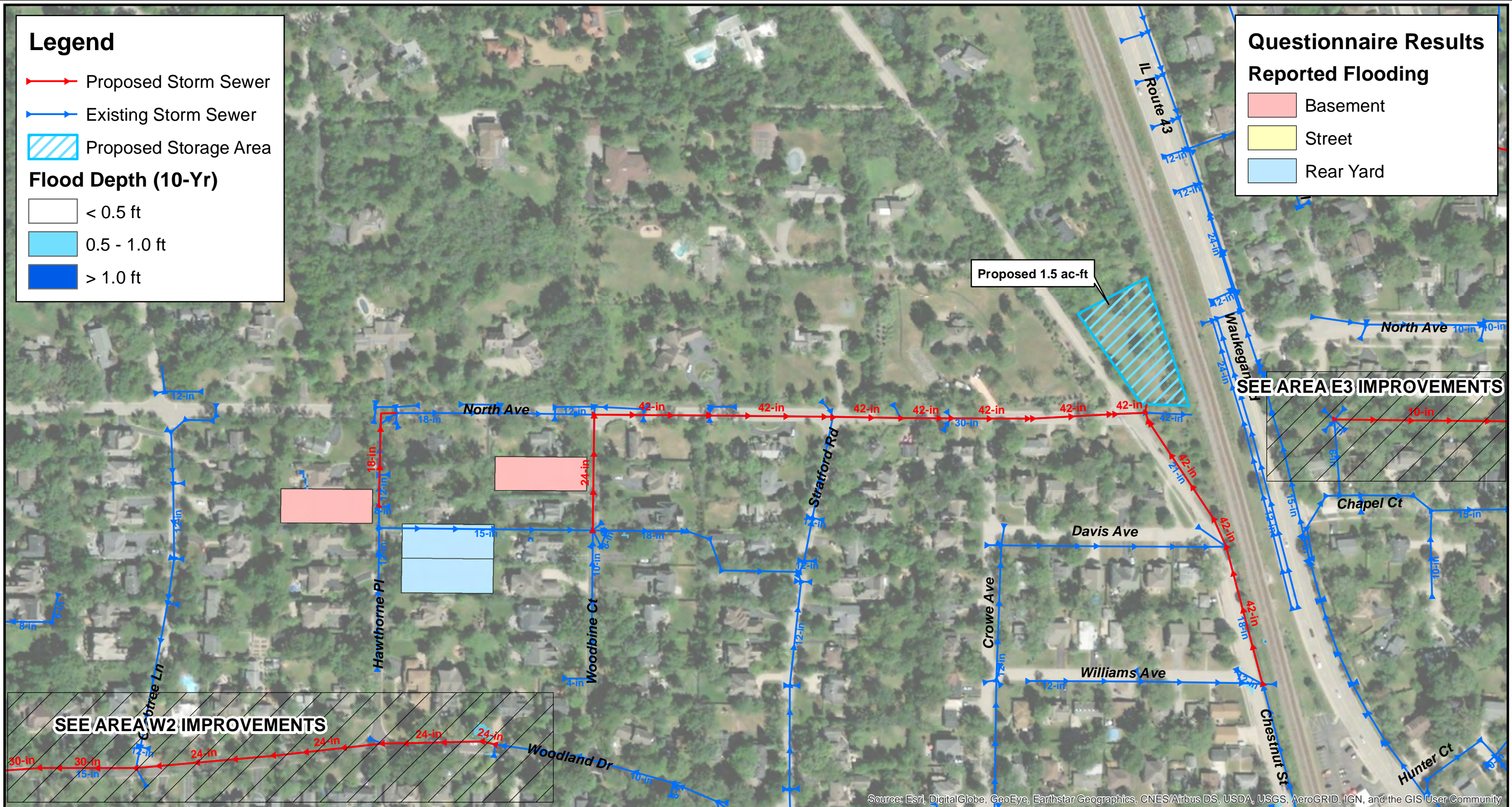
Flood Depth (10-Yr)

-  < 0.5 ft
-  0.5 - 1.0 ft
-  > 1.0 ft

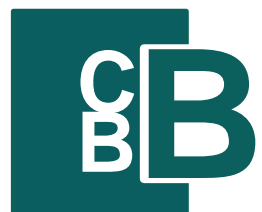
Questionnaire Results

Reported Flooding

-  Basement
-  Street
-  Rear Yard



1 inch = 200 feet

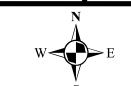


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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W1

DSGN.	CHKD.
	
DATE 05/21/2021	
EXHIBIT 2	

Legend

Existing Storm Sewer

Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486



TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W2

DSGN.	CHKD.
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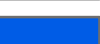
DATE	05/21/2021
	EXHIBIT 3



Legend




 Proposed Storm Sewer
 Existing Storm Sewer

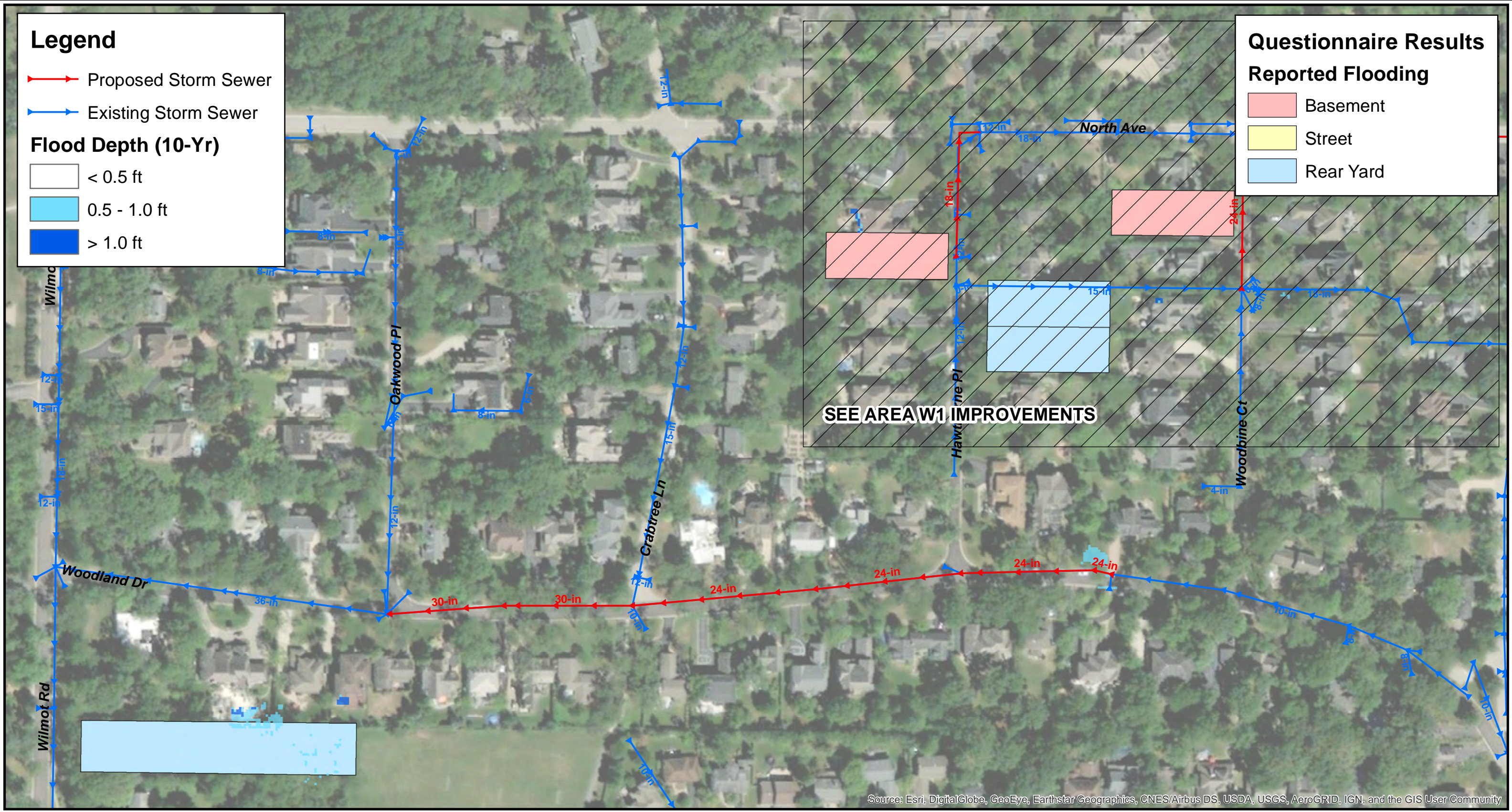
Flood Depth (10-Yr)

 < 0.5 ft
 0.5 - 1.0 ft
 > 1.0 ft

Questionnaire Results


Reported Flooding

 Basement
 Street
 Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet

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	<p>TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W2</p>			<p>DATE 05/21/2021</p>	
				<p>EXHIBIT 4</p>	

Legend

Existing Storm Sewer

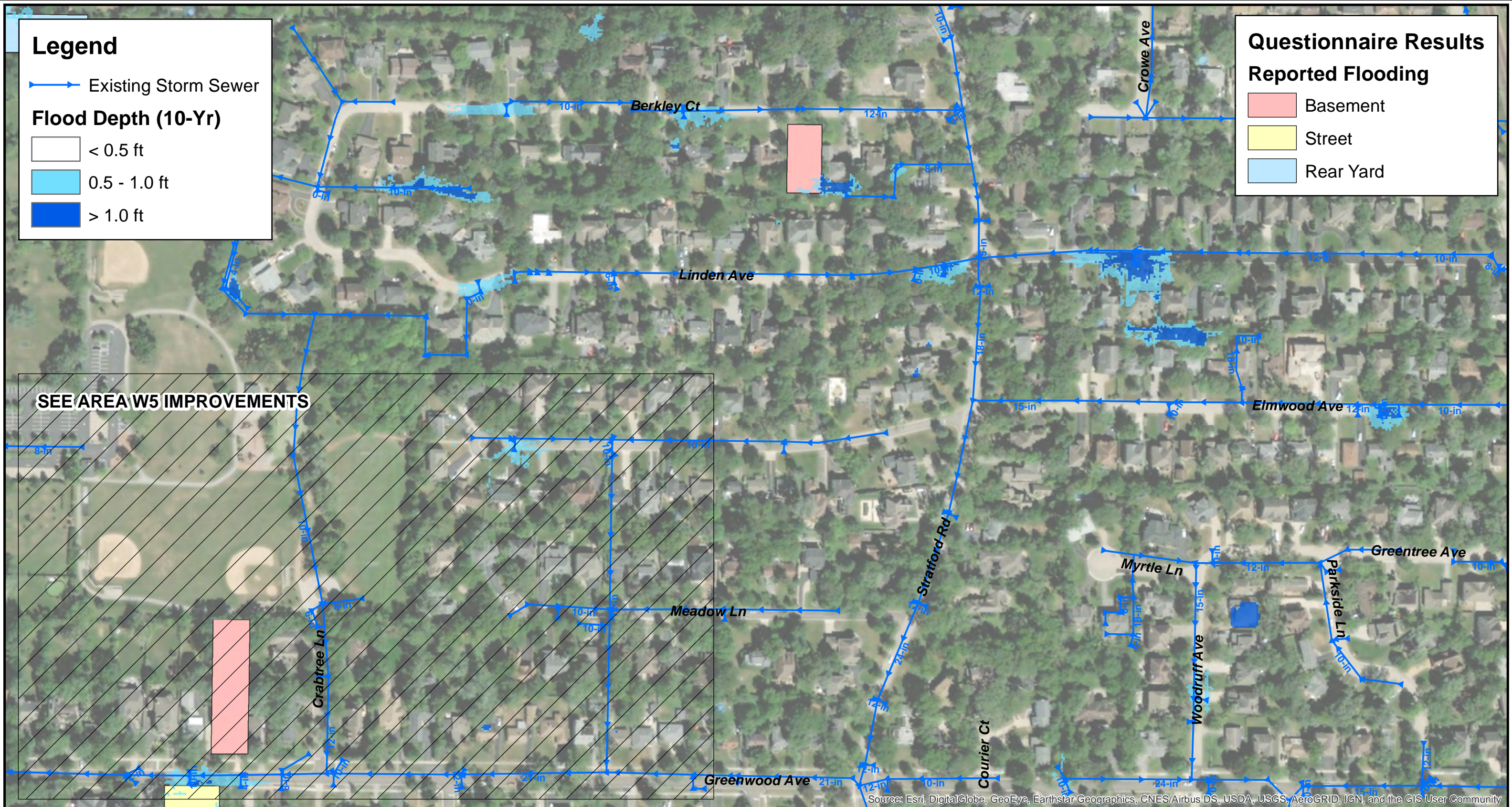
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

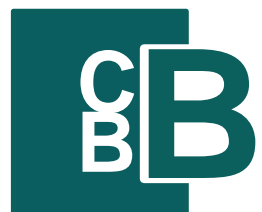
Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

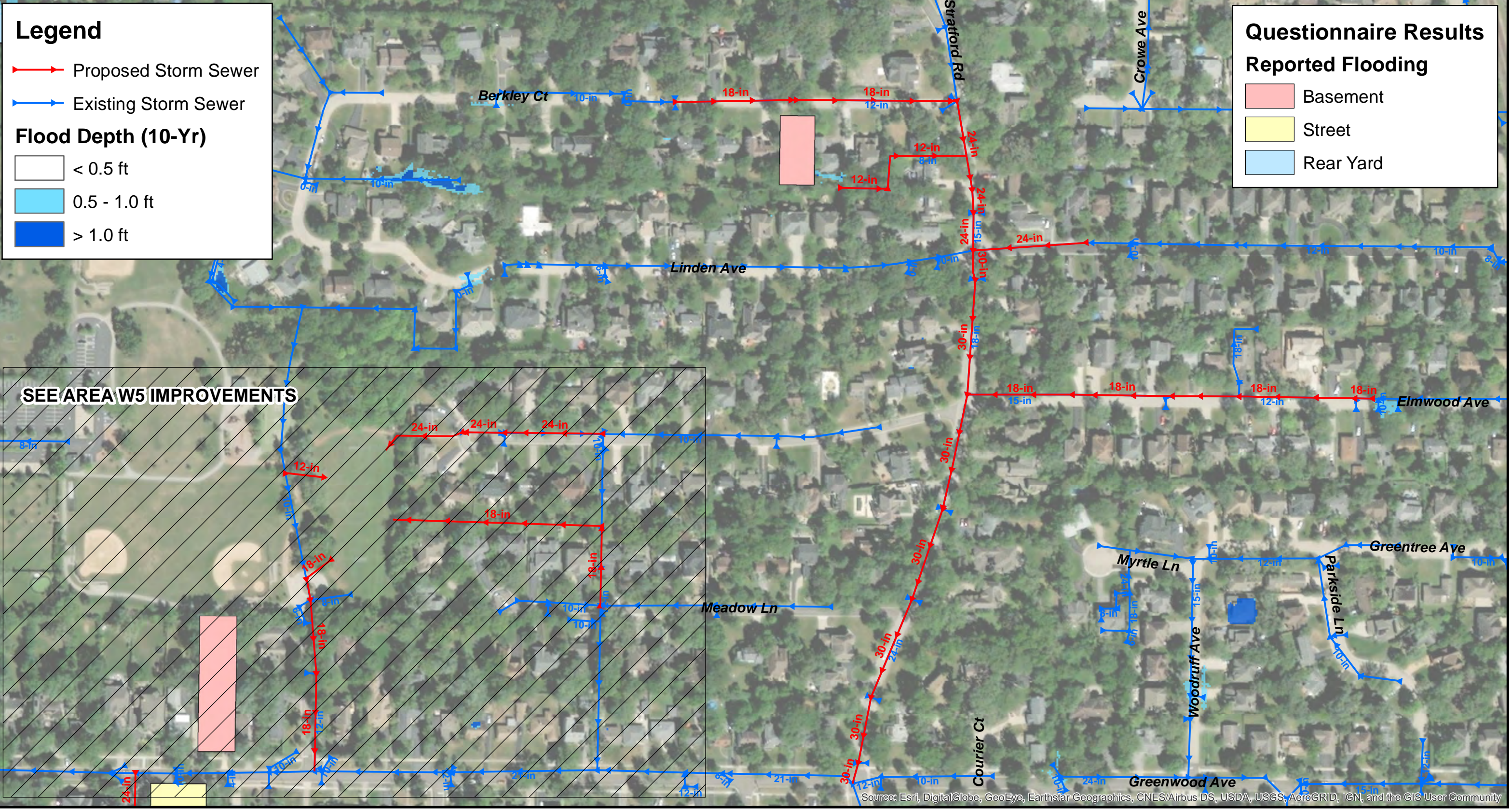
PROJECT NO. 190486


TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W3

DSGN.	CHKD.
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DATE 05/21/2021

EXHIBIT 5



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	<p>TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W3</p>		<p>DATE 05/21/2021</p>	
			<p>EXHIBIT 6</p>	

Legend

Existing Storm Sewer

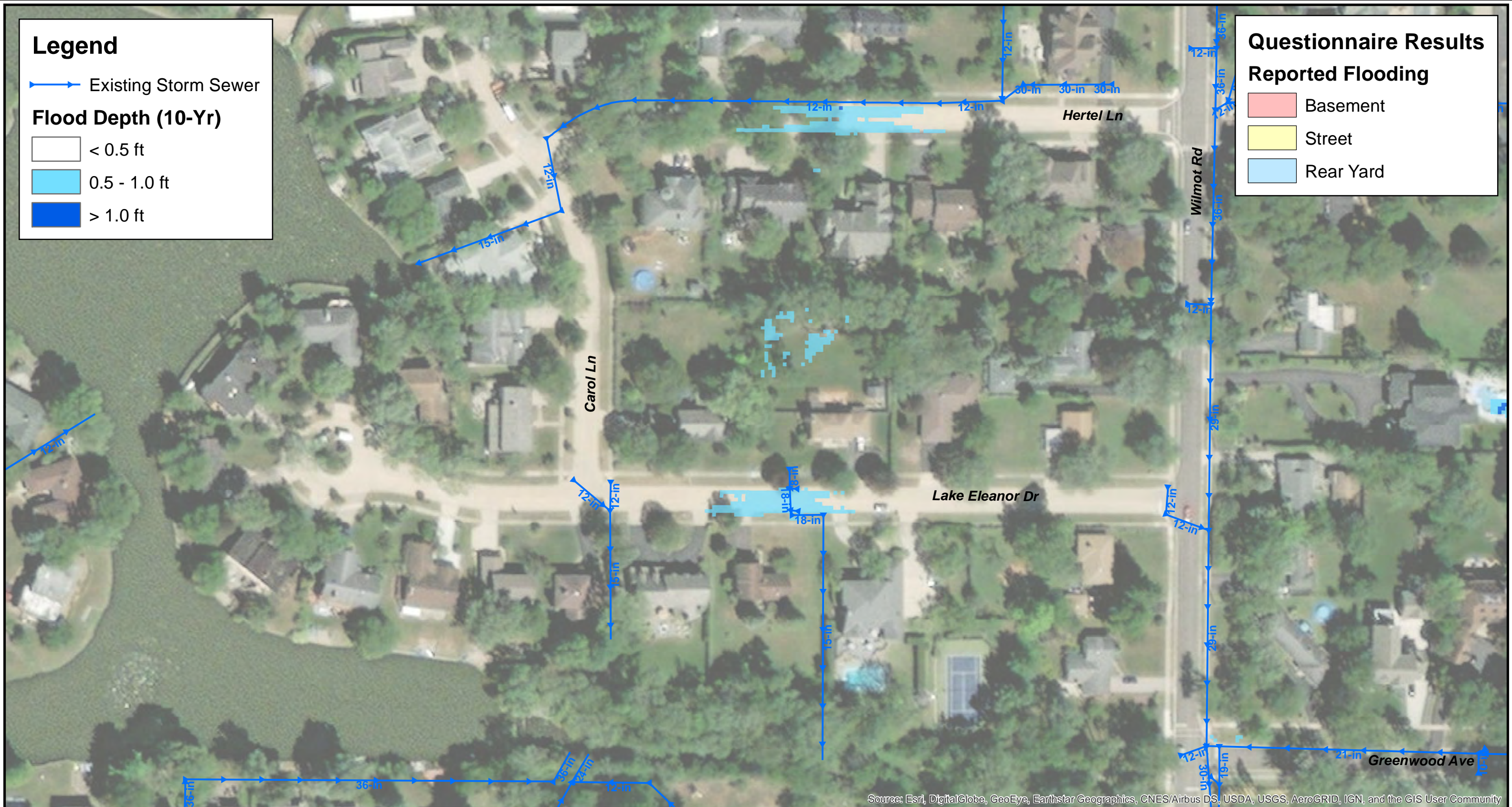
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

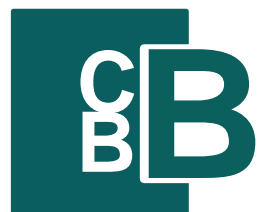
Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet



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PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W4

DSGN.

CHKD.



DATE 05/21/2021

EXHIBIT 7

Legend

→ Proposed Storm Sewer
 → Existing Storm Sewer

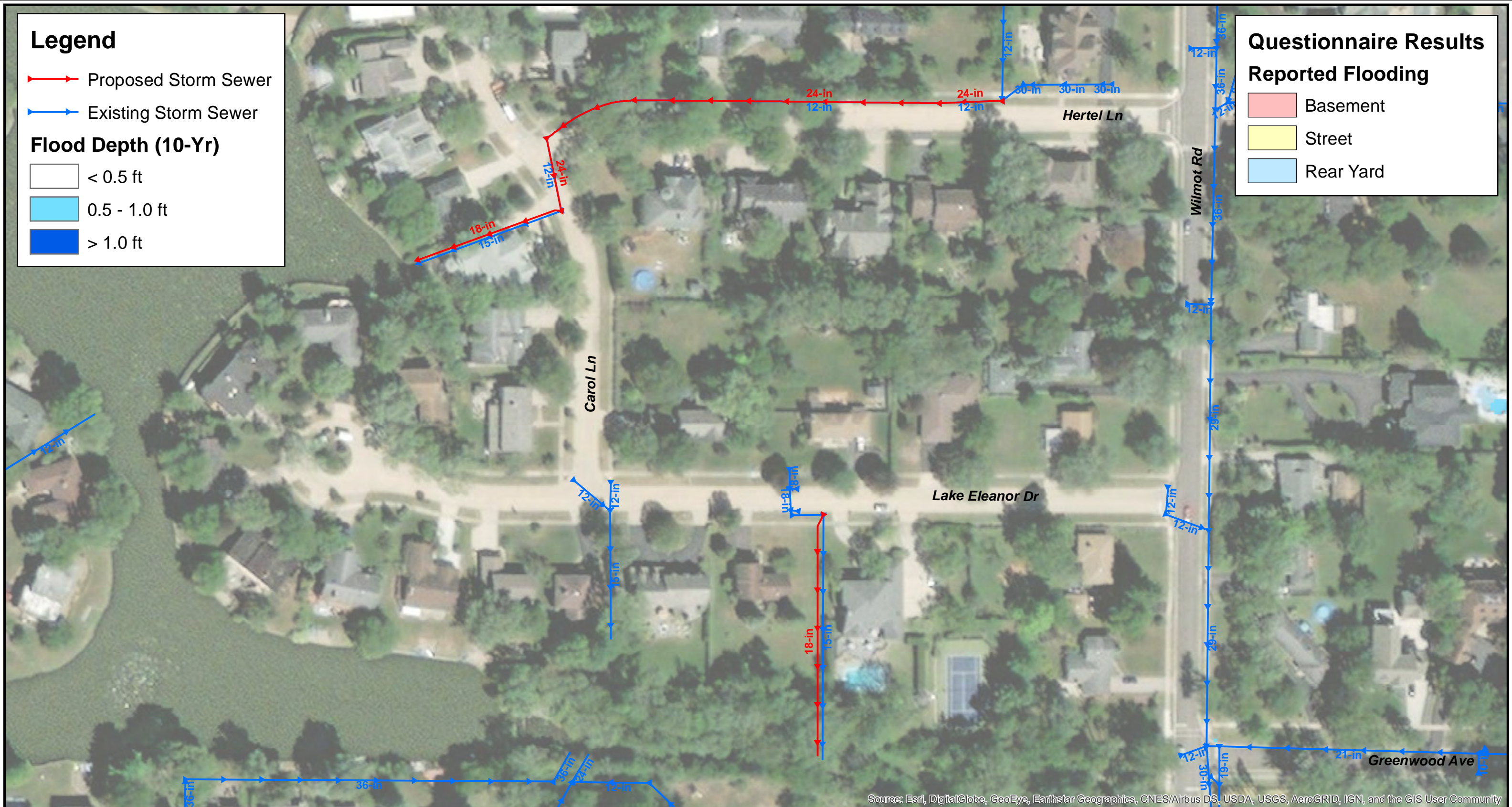
Flood Depth (10-Yr)

< 0.5 ft
 0.5 - 1.0 ft
 > 1.0 ft

Questionnaire Results

Reported Flooding

Basement
 Street
 Rear Yard




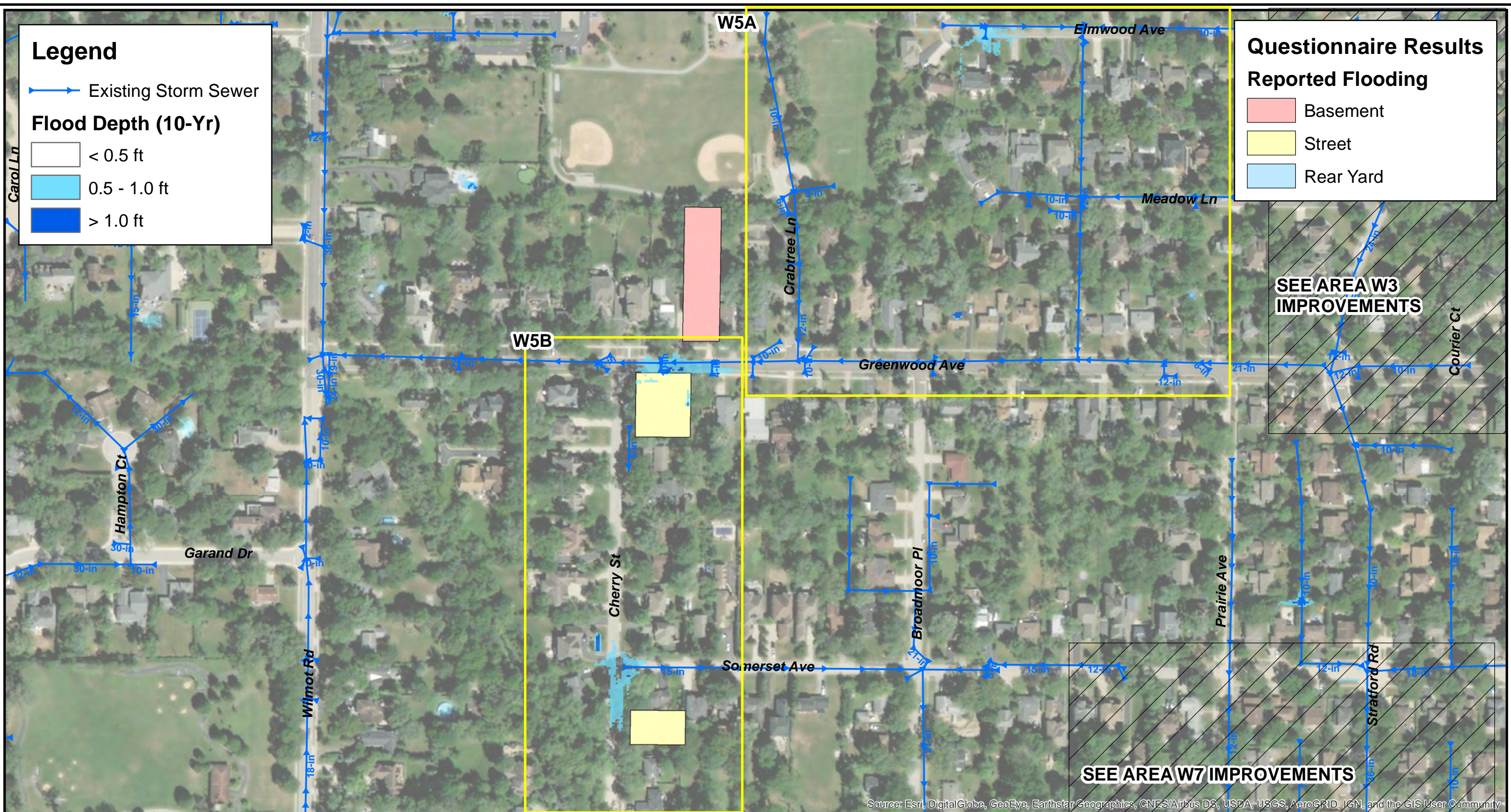
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet



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CLIENT VILLAGE OF DEERFIELD	PROJECT NO. 190486	DSGN.	CHKD.
			
TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W4		DATE 05/21/2021	
		EXHIBIT 8	



Legend

Existing Storm Sewer

Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

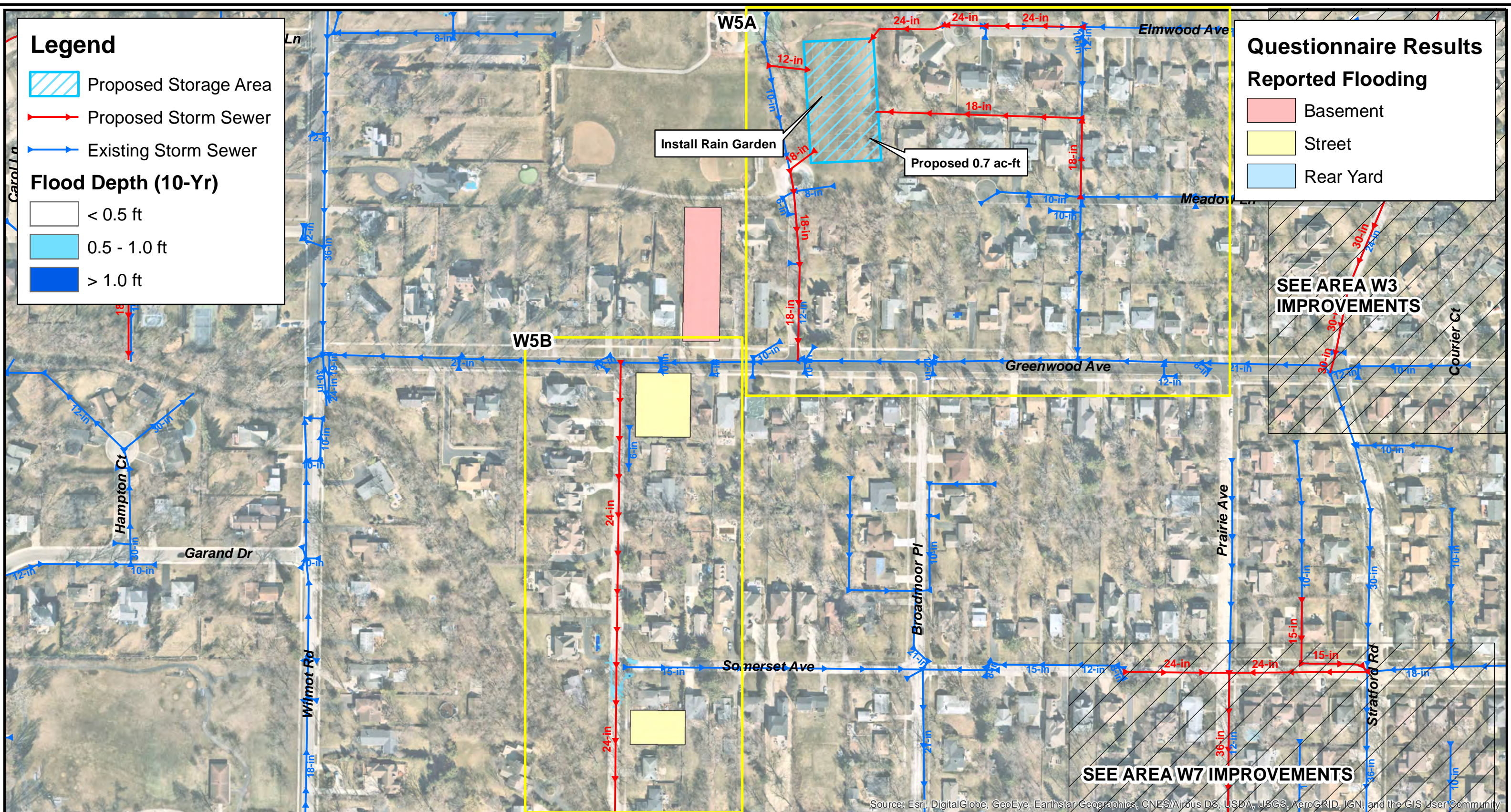
PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W5

DSGN.	CHKD.
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DATE 05/21/2021

EXHIBIT 9



Legend

- Proposed Storage Area
- Proposed Storm Sewer
- Existing Storm Sewer

Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding


- Basement
- Street
- Rear Yard

SEE AREA W3 IMPROVEMENTS

SEE AREA W7 IMPROVEMENTS

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet

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	<p>TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W5</p>	<p>DATE 05/21/2021</p>		
	<p>EXHIBIT 10</p>			

Legend

Existing Storm Sewer

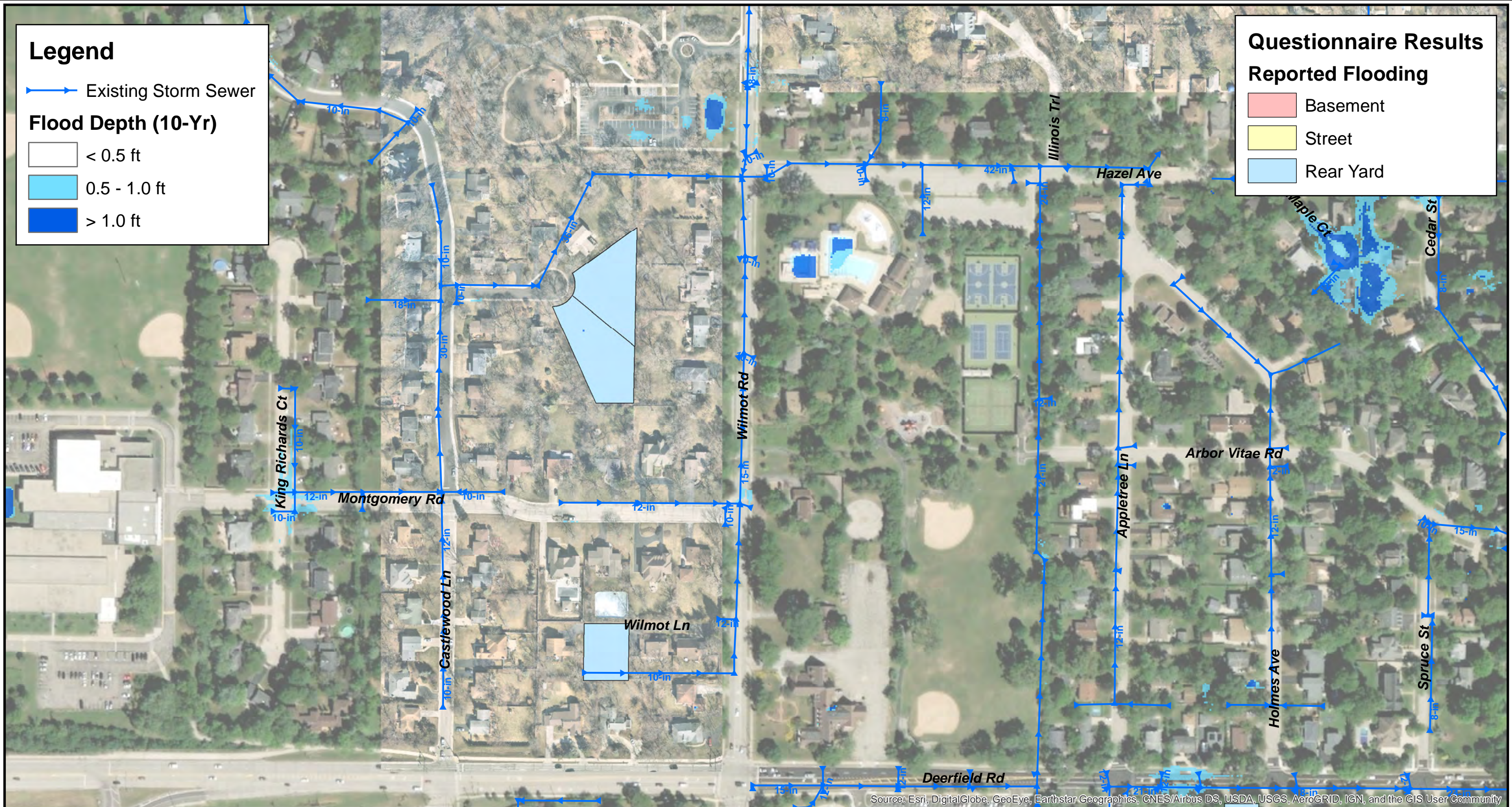
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W6

DSGN.		CHKD.	
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DATE 05/21/2021

EXHIBIT 11

Legend

→ Proposed Storm Sewer

→ Existing Storm Sewer

Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

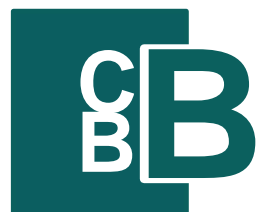
Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W6

DSGN.		CHKD.	
--------------	--	--------------	--

DATE 05/21/2021

EXHIBIT 12

Legend

Existing Storm Sewer

Flood Depth (10-Yr)

< 0.5 ft

0.5 - 1.0 ft

> 1.0 ft

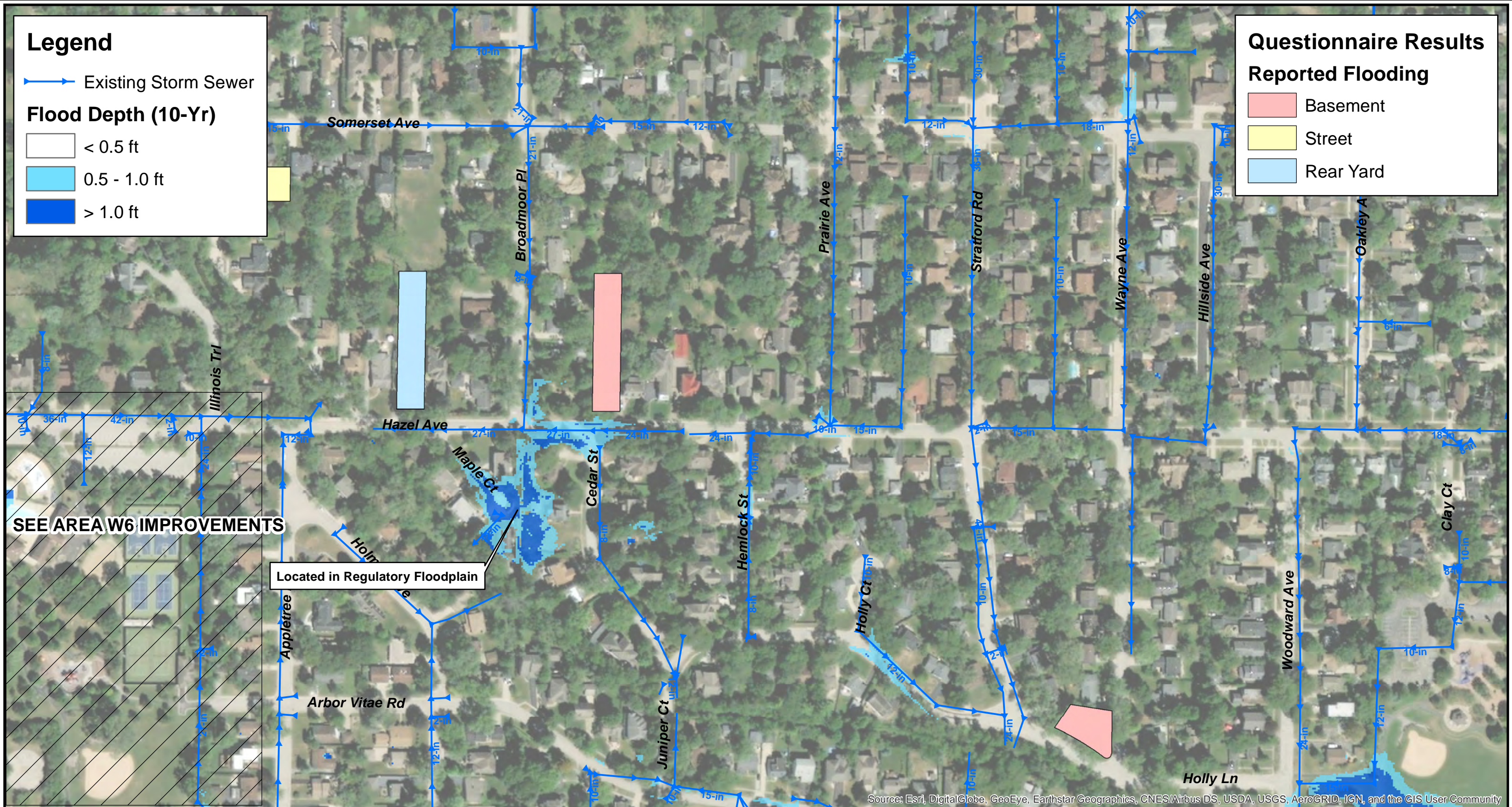
Questionnaire Results

Reported Flooding

Basement

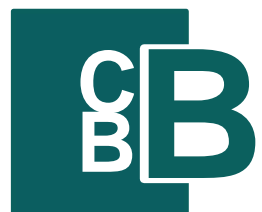
Street

Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486



TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W7

DSGN.	CHKD.
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DATE	05/21/2021
	EXHIBIT 13



Legend




-  Proposed Storm Sewer
-  Existing Storm Sewer

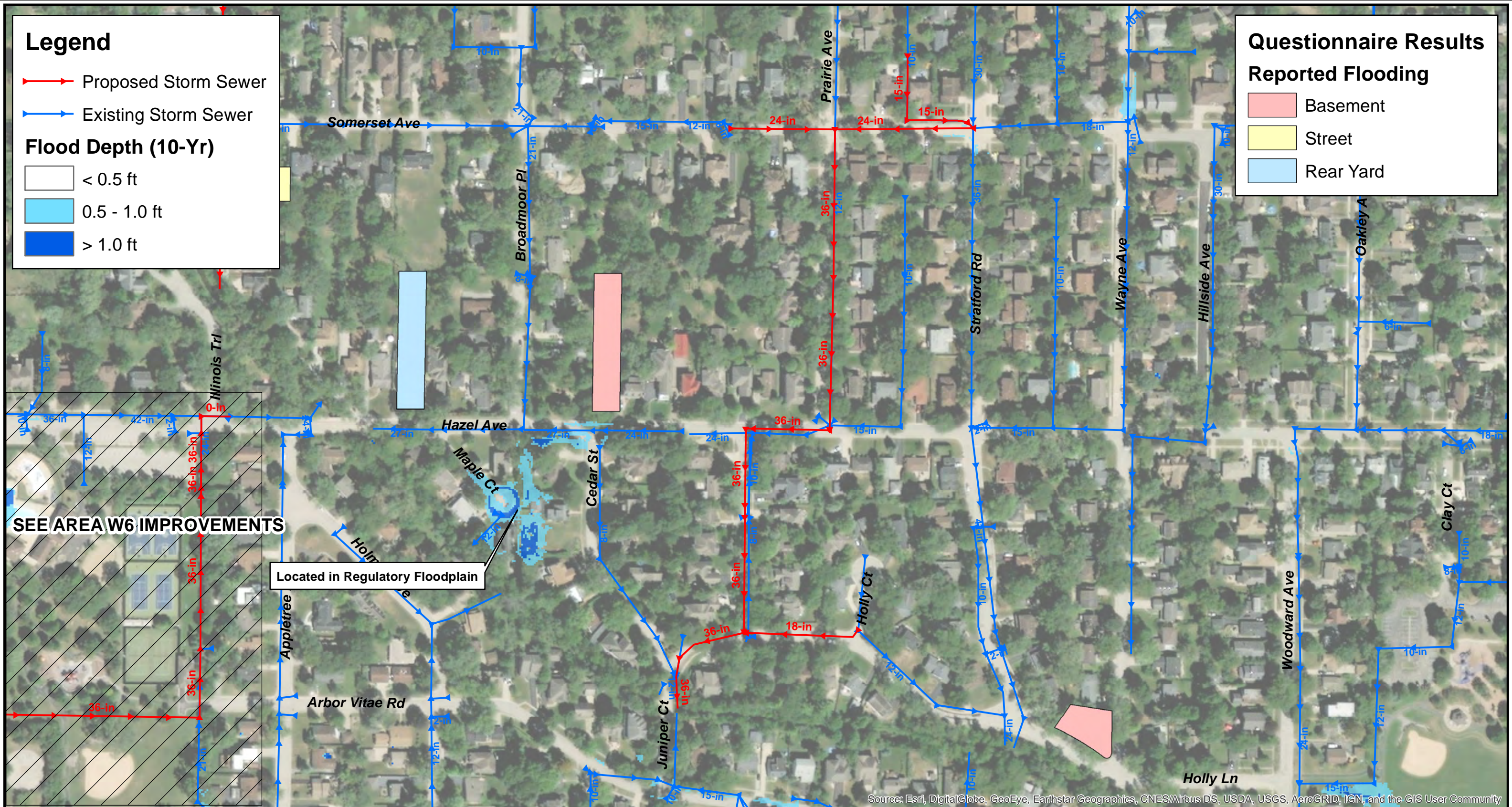
Flood Depth (10-Yr)

-  < 0.5 ft
-  0.5 - 1.0 ft
-  > 1.0 ft

Questionnaire Results

Reported Flooding

-  Basement
-  Street
-  Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet




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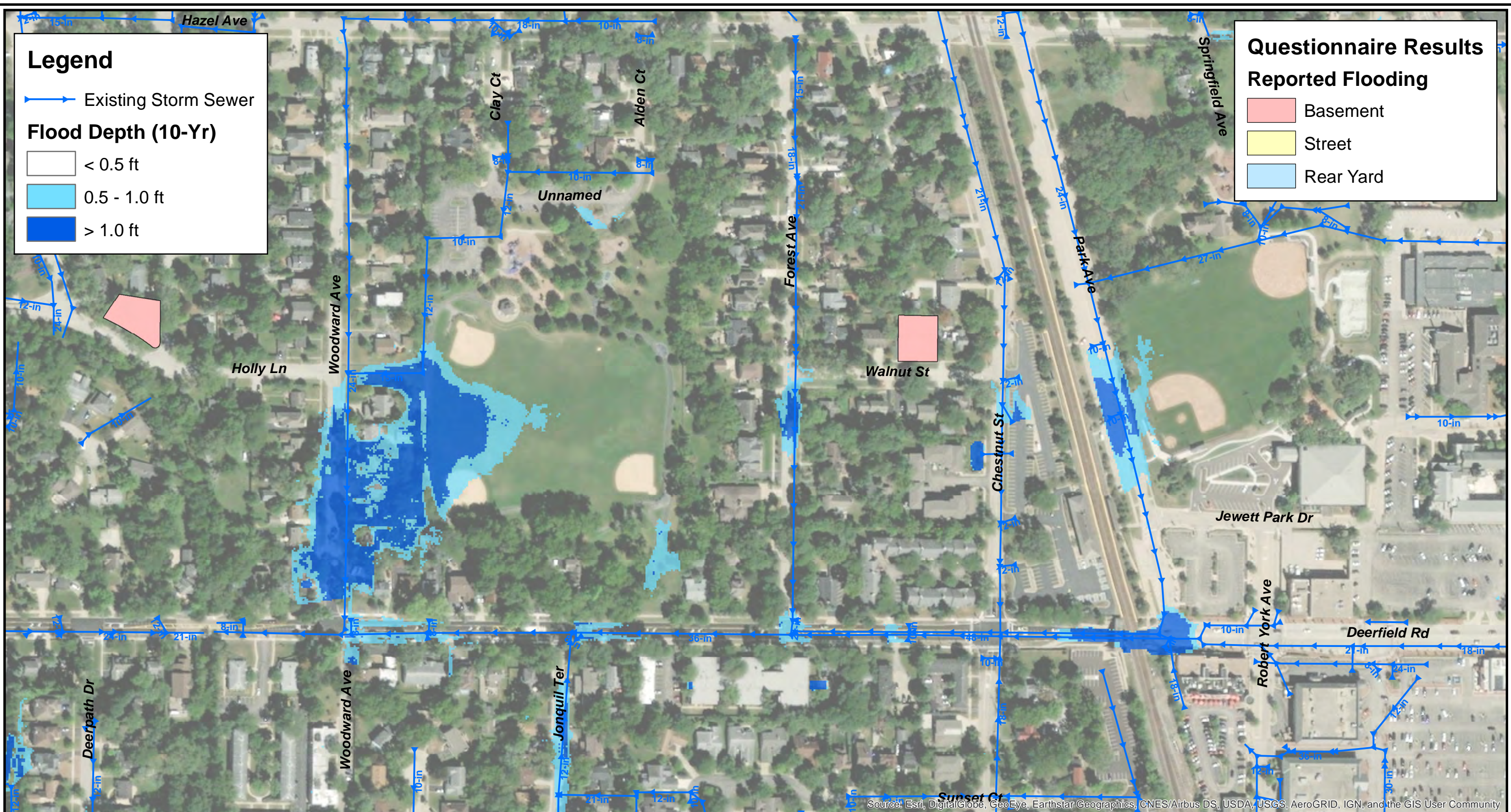
CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W7

DSGN.	CHKD.
--------------	--------------

	DATE 05/21/2021
	EXHIBIT 14



Legend

Existing Storm Sewer

Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486





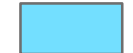

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W8

DSGN. **CHKD.**


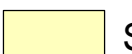

DATE 05/21/2021

EXHIBIT 15

Legend

-  Proposed Storage Area
 -  Proposed Storm Sewer
 -  Existing Storm Sewer
- Flood Depth (10-Yr)**
-  < 0.5 ft
 -  0.5 - 1.0 ft
 -  > 1.0 ft

Questionnaire Results

- Reported Flooding**
-  Basement
 -  Street
 -  Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W8

DSGN. **CHKD.**

DATE 05/21/2021

EXHIBIT 16

Legend

Existing Storm Sewer

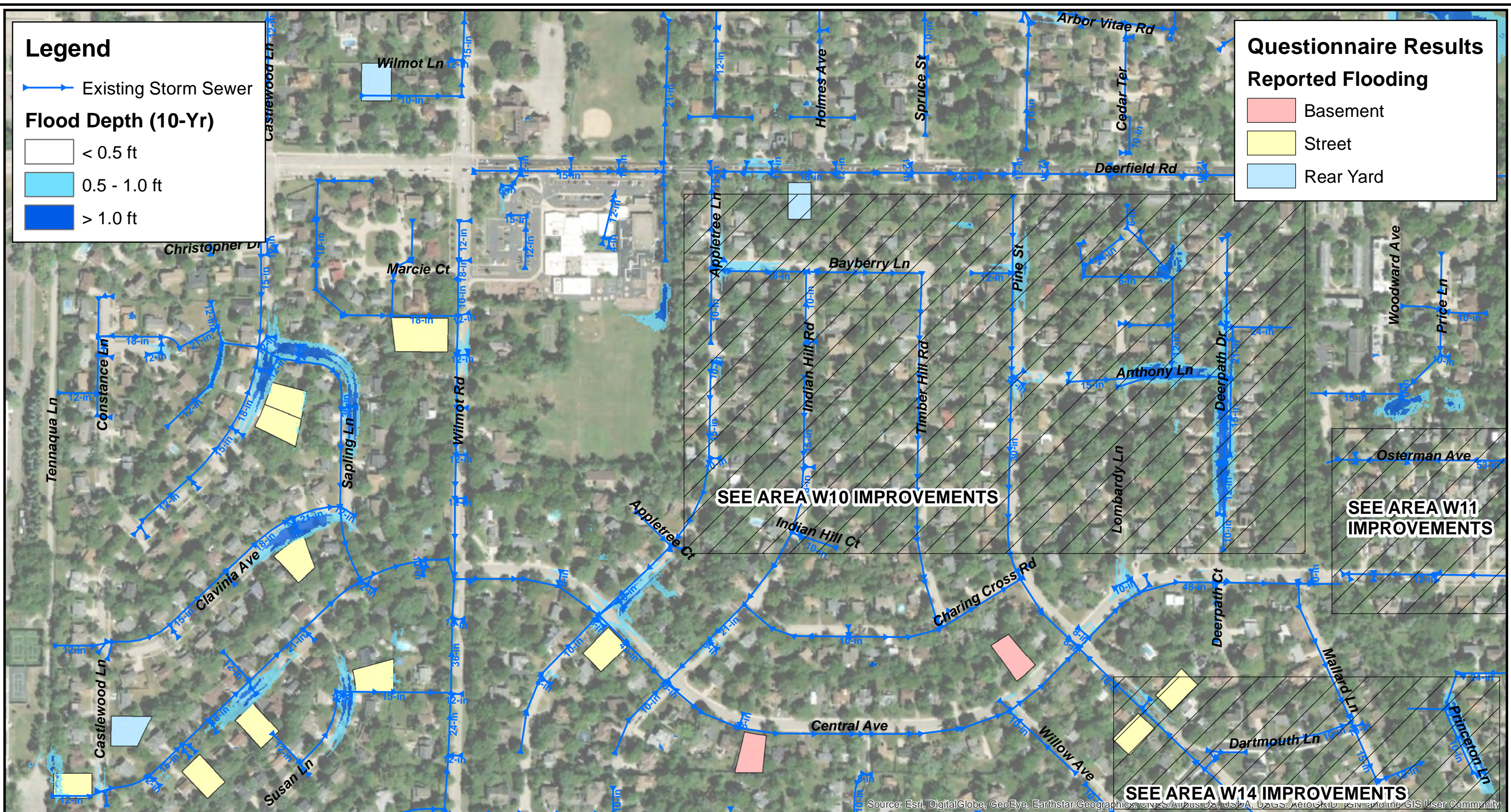
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding




- Basement
- Street
- Rear Yard






1 inch = 300 feet

	CLIENT VILLAGE OF DEERFIELD	PROJECT NO. 190486	DSGN.	CHKD.		
	TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W9			DATE 05/21/2021		
				EXHIBIT 17		

Legend


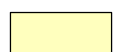

-  Proposed Storage Area
-  Proposed Storm Sewer
-  Existing Storm Sewer

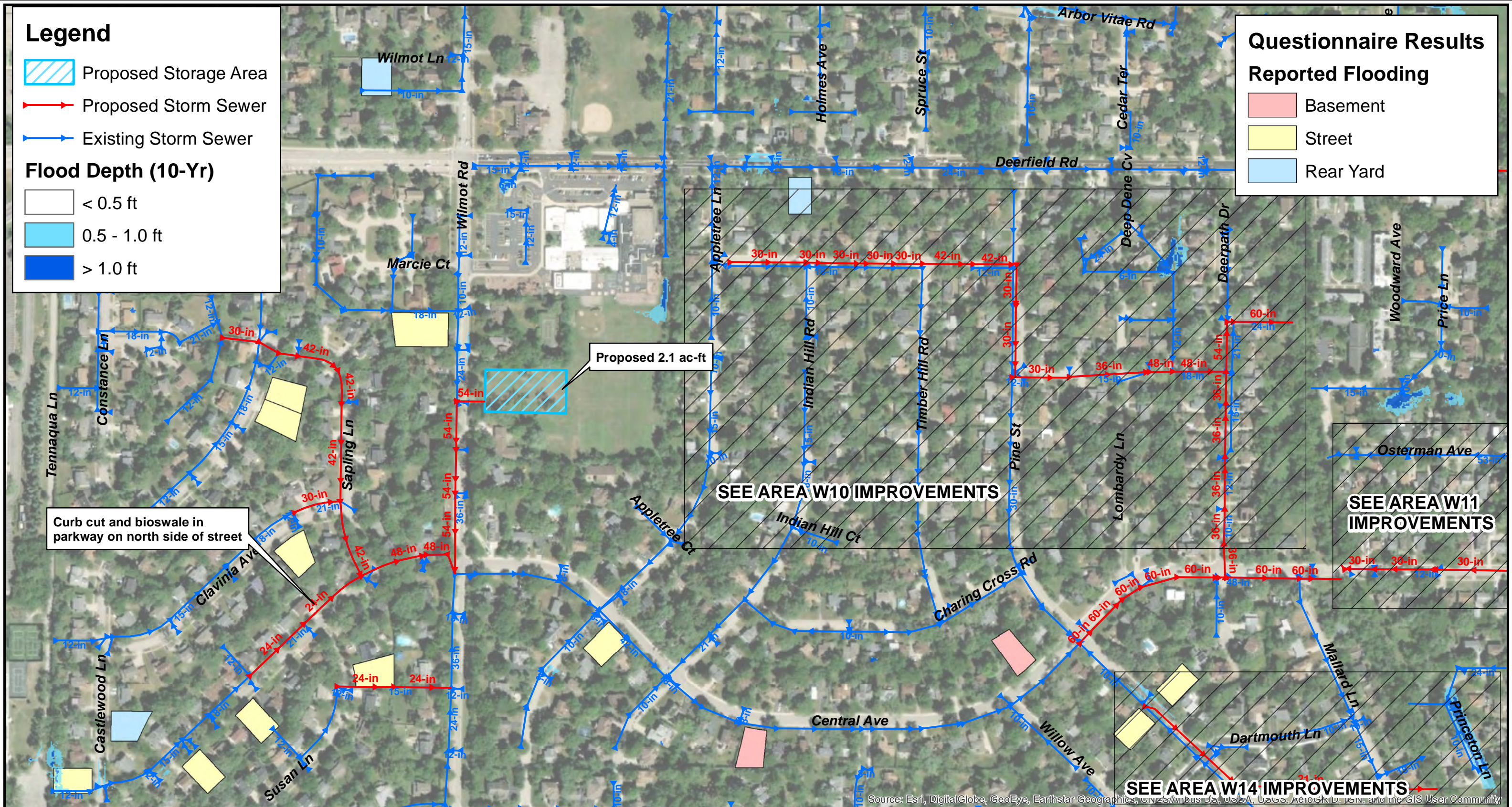
Flood Depth (10-Yr)

-  < 0.5 ft
-  0.5 - 1.0 ft
-  > 1.0 ft

Questionnaire Results

Reported Flooding

-  Basement
-  Street
-  Rear Yard




Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNR/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 300 feet



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CLIENT VILLAGE OF DEERFIELD
PROJECT NO. 190486
TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W9

DSGN.		CHKD.		
				DATE 05/21/2021
				EXHIBIT 18

Legend

Existing Storm Sewer

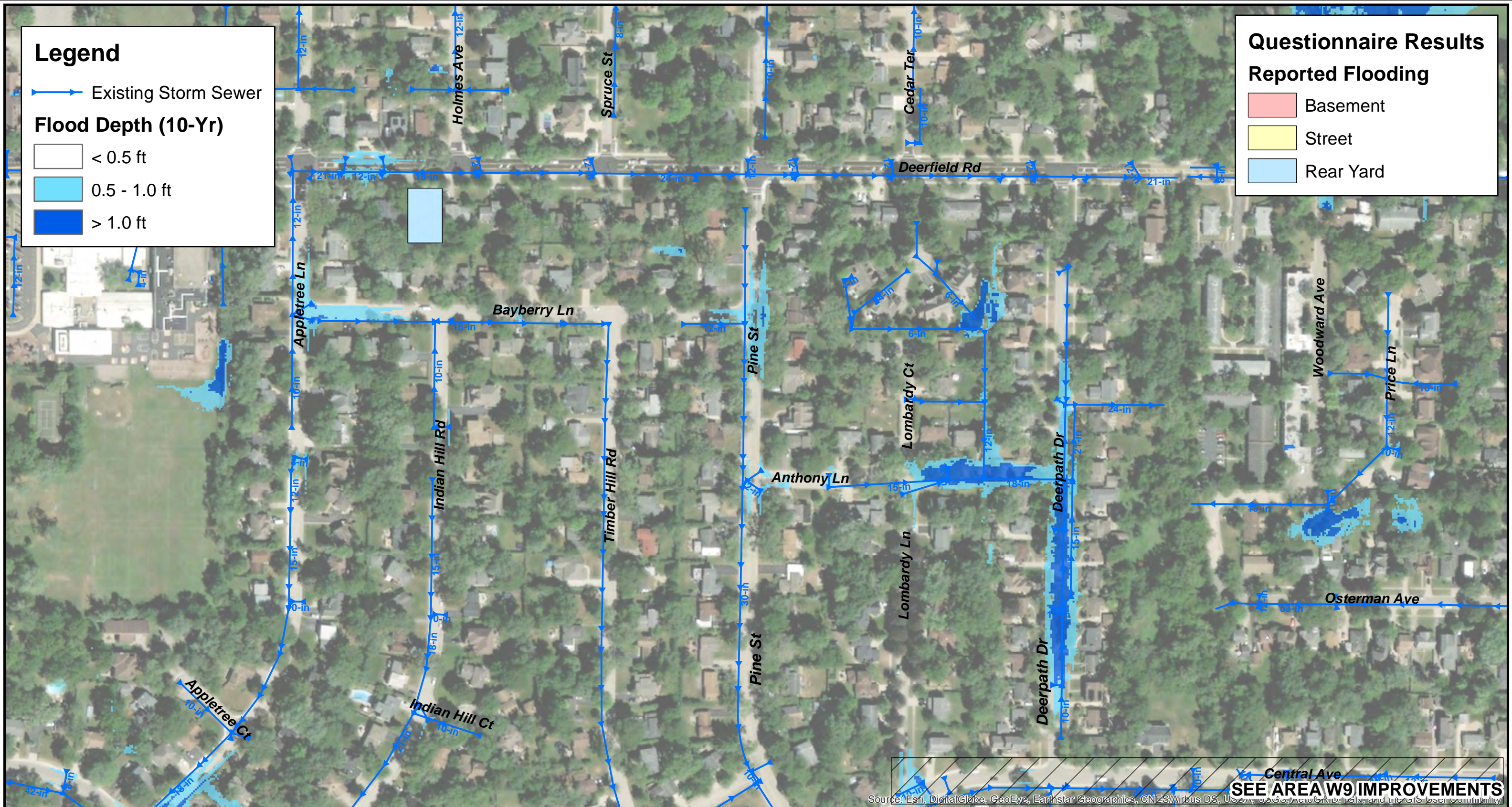
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS user community

SEE AREA W9 IMPROVEMENTS

1 inch = 200 feet



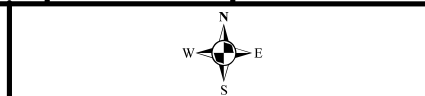
Christopher B. Burke Engineering, Ltd.
 9575 West Higgins Road, Suite 600
 Rosemont, IL 60018
 (847) 823-0500 / FAX (847) 823-0520

CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W10



DSGN.		CHKD.	
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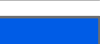
DATE 05/21/2021

EXHIBIT 19

Legend




 Proposed Storm Sewer
 Existing Storm Sewer

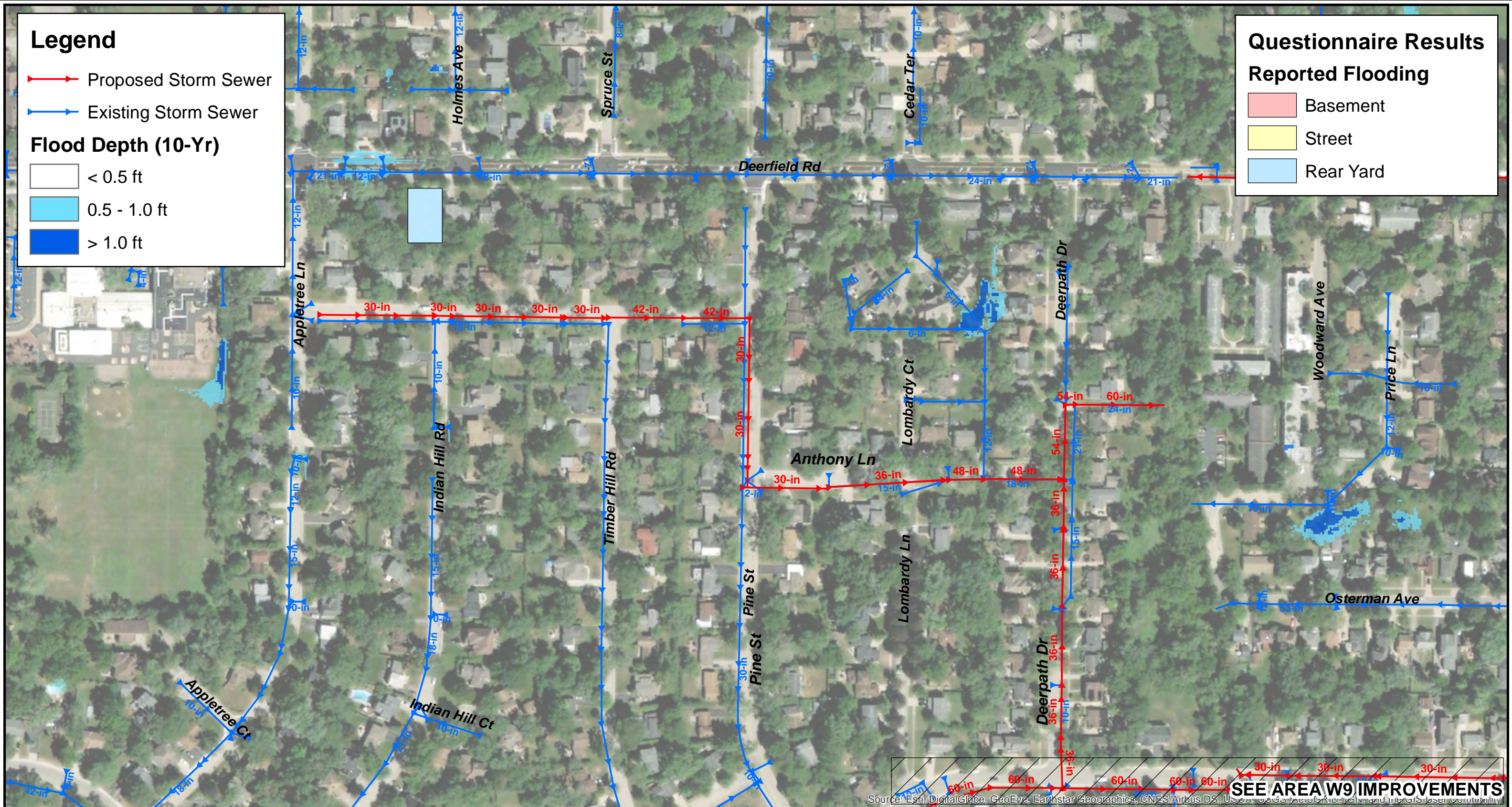
Flood Depth (10-Yr)

 < 0.5 ft
 0.5 - 1.0 ft
 > 1.0 ft

Questionnaire Results

Reported Flooding



 Basement
 Street
 Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS user community

SEE AREA W9 IMPROVEMENTS

1 inch = 200 feet

 <p>Christopher B. Burke Engineering, Ltd. 9575 West Higgins Road, Suite 600 Rosemont, IL 60018 (847) 823-0500 / FAX (847) 823-0520</p>	<p>CLIENT VILLAGE OF DEERFIELD</p>	<p>PROJECT NO. 190486</p>	<p>DSGN.</p>	<p>CHKD.</p>	
	<p>TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W10</p>			<p>DATE 05/21/2021</p>	
				<p>EXHIBIT 20</p>	

Legend

Existing Storm Sewer

Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W11



DSGN.		CHKD.	
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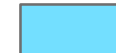

DATE 05/21/2021

EXHIBIT 21

Legend




-  Proposed Storm Sewer
-  Existing Storm Sewer

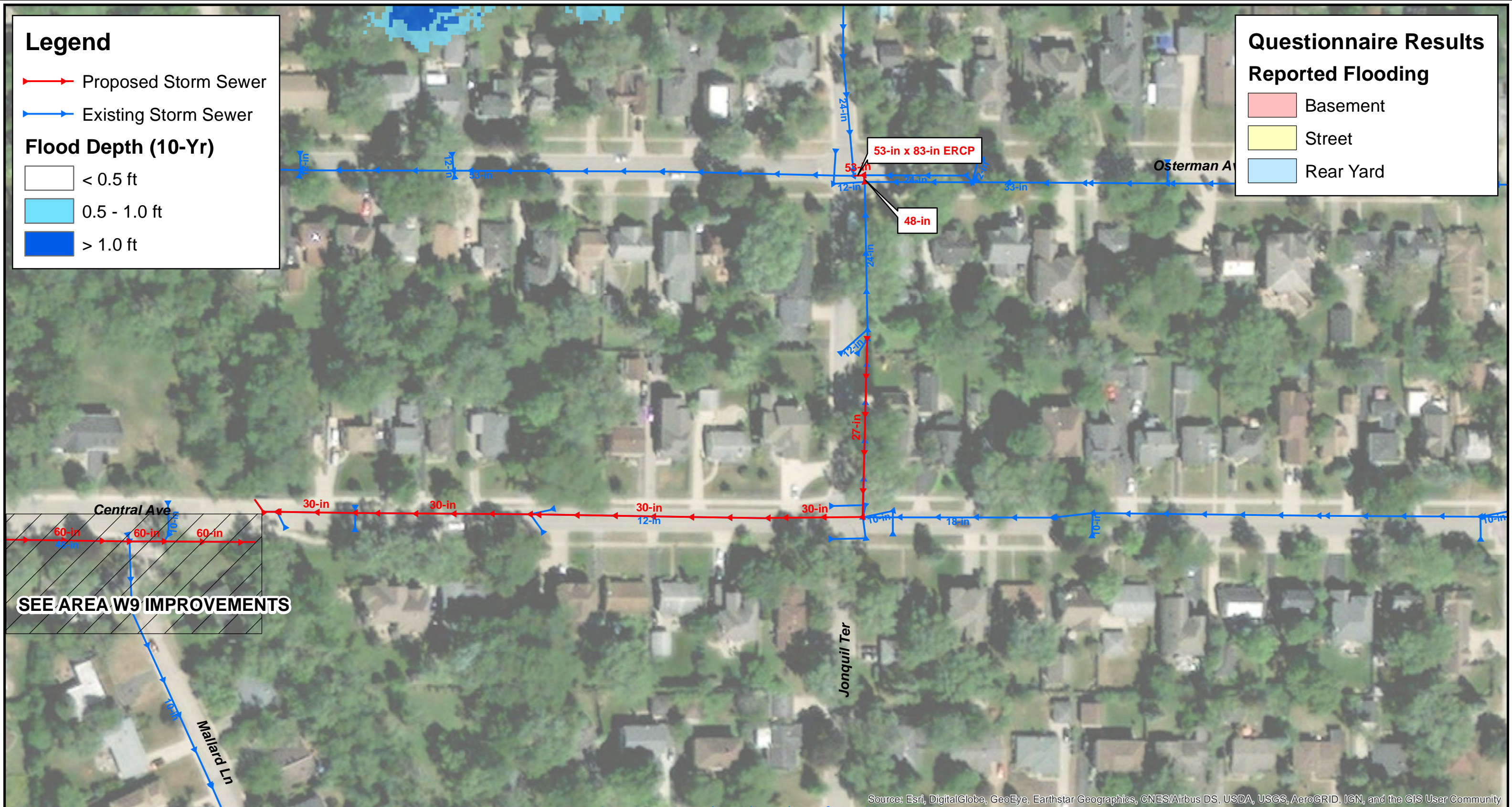
Flood Depth (10-Yr)

-  < 0.5 ft
-  0.5 - 1.0 ft
-  > 1.0 ft

Questionnaire Results

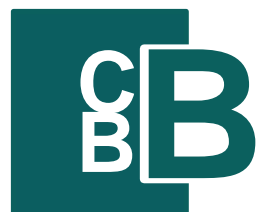
Reported Flooding

-  Basement
-  Street
-  Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet




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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W11

DSGN.		CHKD.	
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	DATE 05/21/2021
	EXHIBIT 22

Legend

Existing Storm Sewer

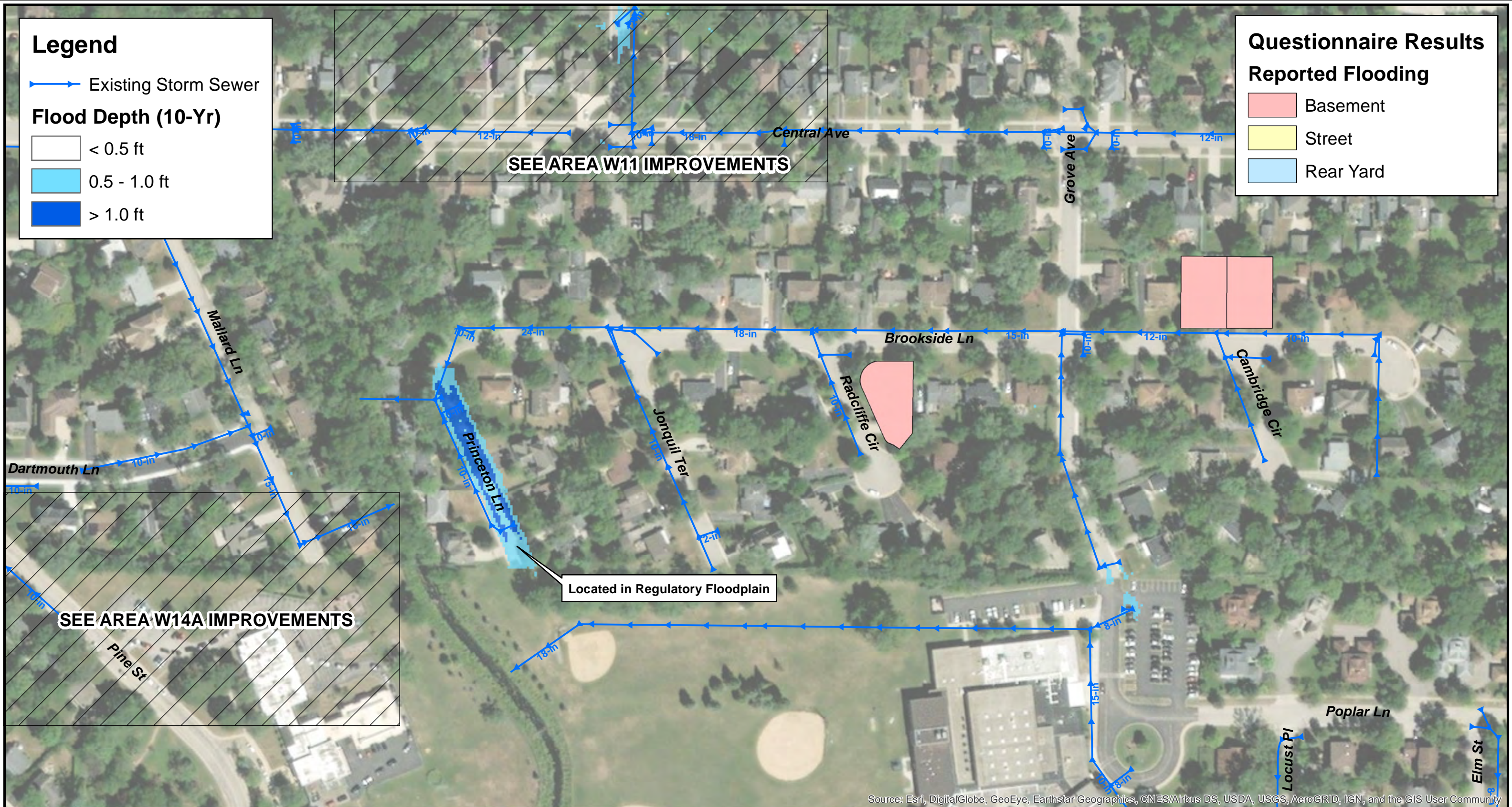
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W12

DSGN.		CHKD.	
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DATE 05/21/2021
EXHIBIT 23

Legend

Existing Storm Sewer

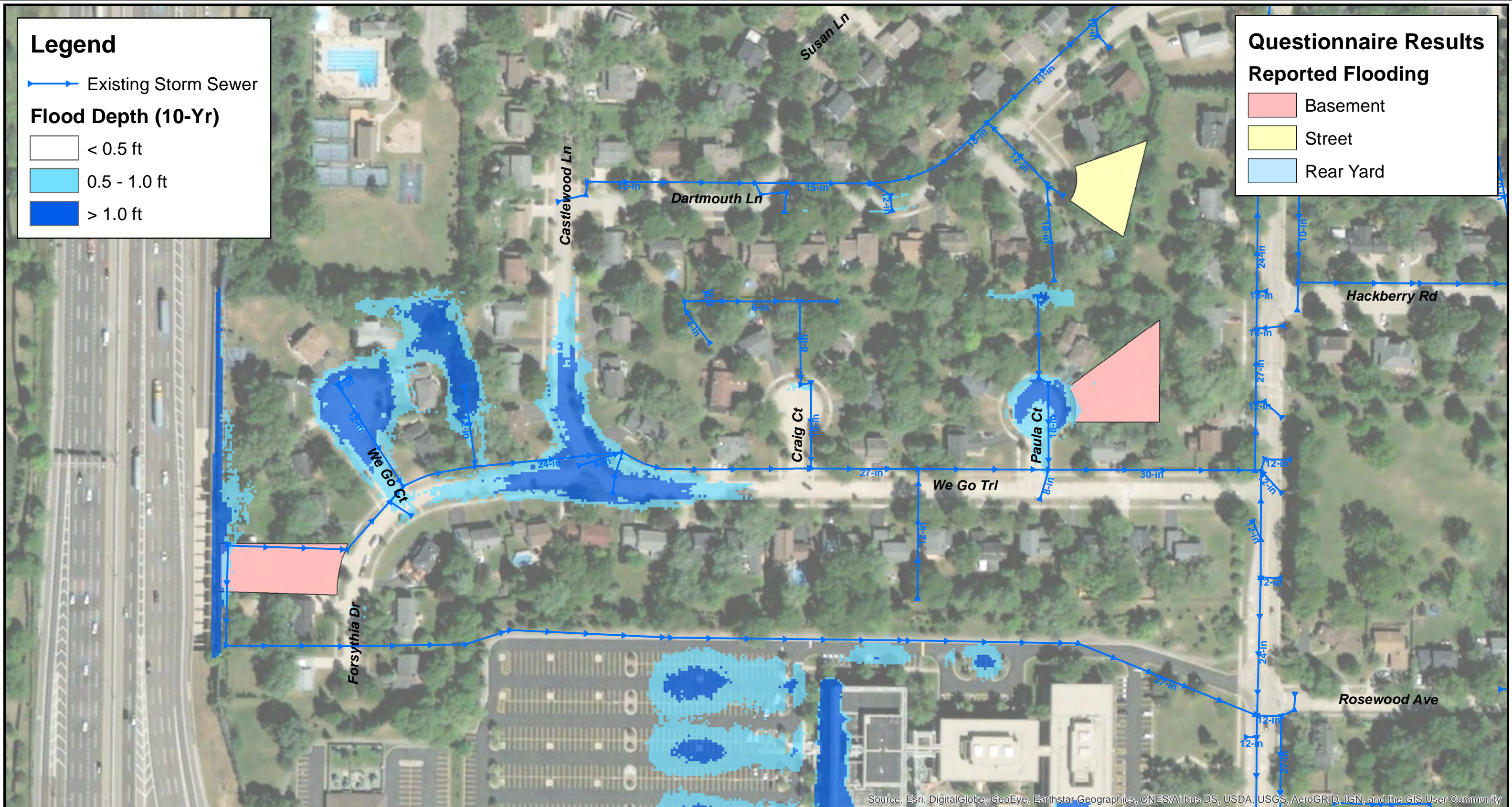
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results


Reported Flooding

- Basement
- Street
- Rear Yard






Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




1 inch = 150 feet

 <p>Christopher B. Burke Engineering, Ltd. 9575 West Higgins Road, Suite 600 Rosemont, IL 60018 (847) 823-0500 / FAX (847) 823-0520</p>	<p>CLIENT VILLAGE OF DEERFIELD</p>	<p>PROJECT NO. 190486</p>	<p>DSGN.</p>	<p>CHKD.</p>	
	<p>TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W13</p>			<p>DATE 05/21/2021</p>	
				<p>EXHIBIT 24</p>	

Legend




-  Proposed Storage Area
-  Proposed Storm Sewer
-  Existing Storm Sewer

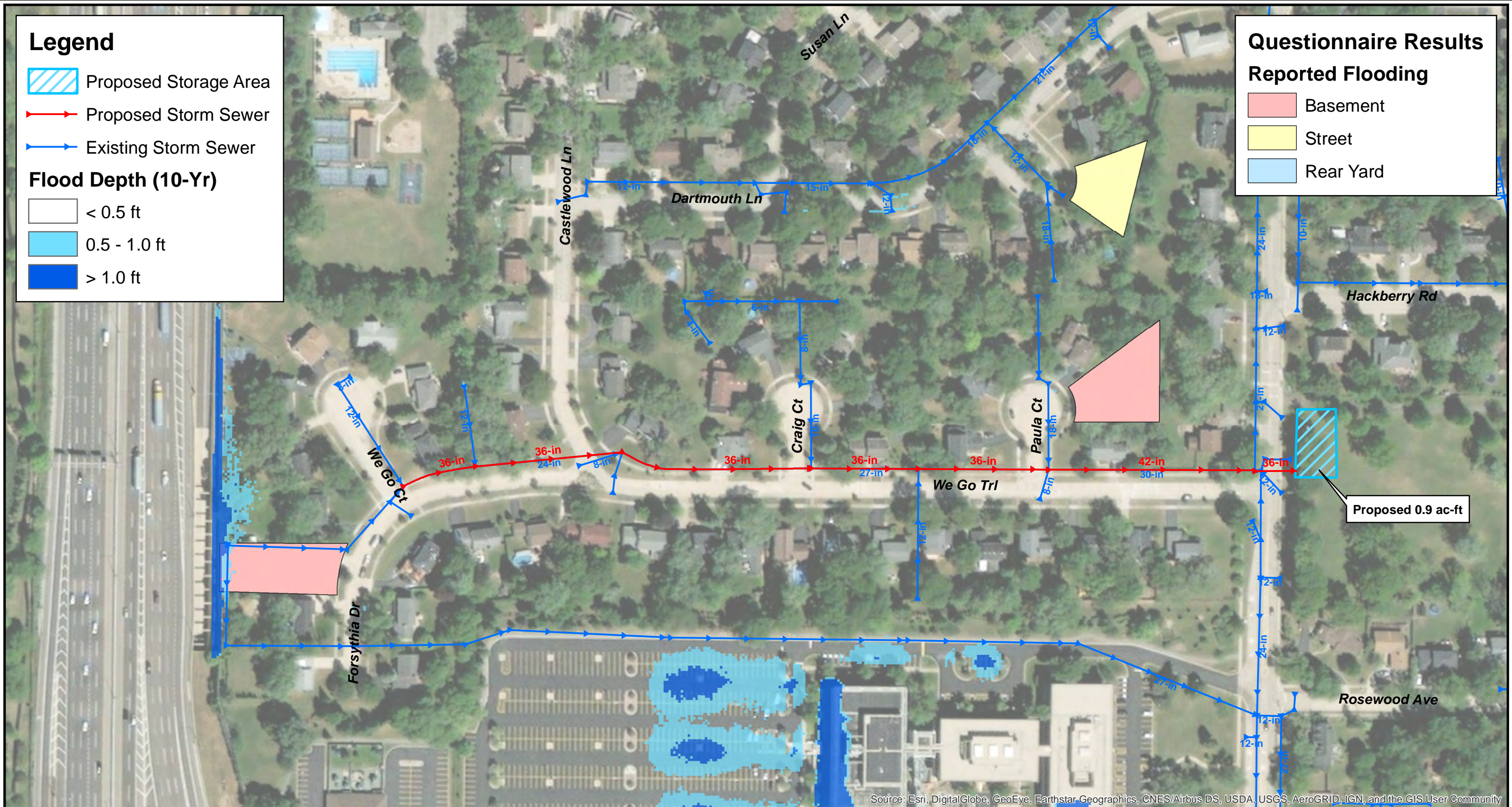
Flood Depth (10-Yr)

-  < 0.5 ft
-  0.5 - 1.0 ft
-  > 1.0 ft

Questionnaire Results

Reported Flooding

-  Basement
-  Street
-  Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet




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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W13

DSGN.		CHKD.	
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	DATE 05/21/2021
	EXHIBIT 25

Legend

Existing Storm Sewer

Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W14A

DSGN.		CHKD.	
		DATE	05/21/2021
		EXHIBIT 26	

Legend

→ Proposed Storm Sewer

→ Existing Storm Sewer

Flood Depth (10-Yr)

< 0.5 ft

0.5 - 1.0 ft

> 1.0 ft

Questionnaire Results

Reported Flooding

Basement

Street

Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W14A

DSGN. **CHKD.**

DATE 05/21/2021

EXHIBIT 27

Legend

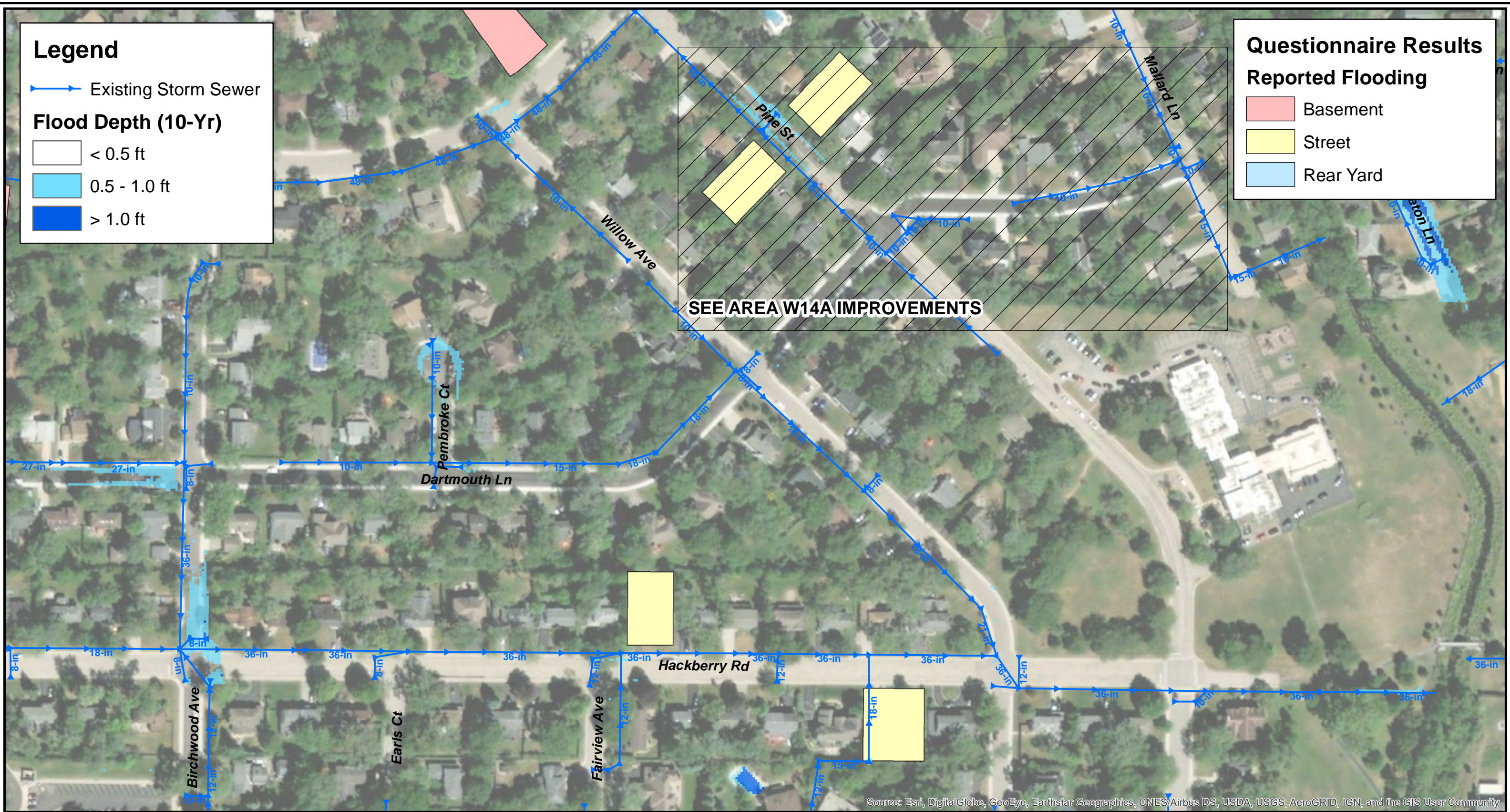
Existing Storm Sewer

Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

**Questionnaire Results
Reported Flooding**

- Basement
- Street
- Rear Yard



1 inch = 150 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W14B

DSGN.		CHKD.	
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DATE 05/21/2021
EXHIBIT 28

Legend

→ Proposed Storm Sewer
 → Existing Storm Sewer

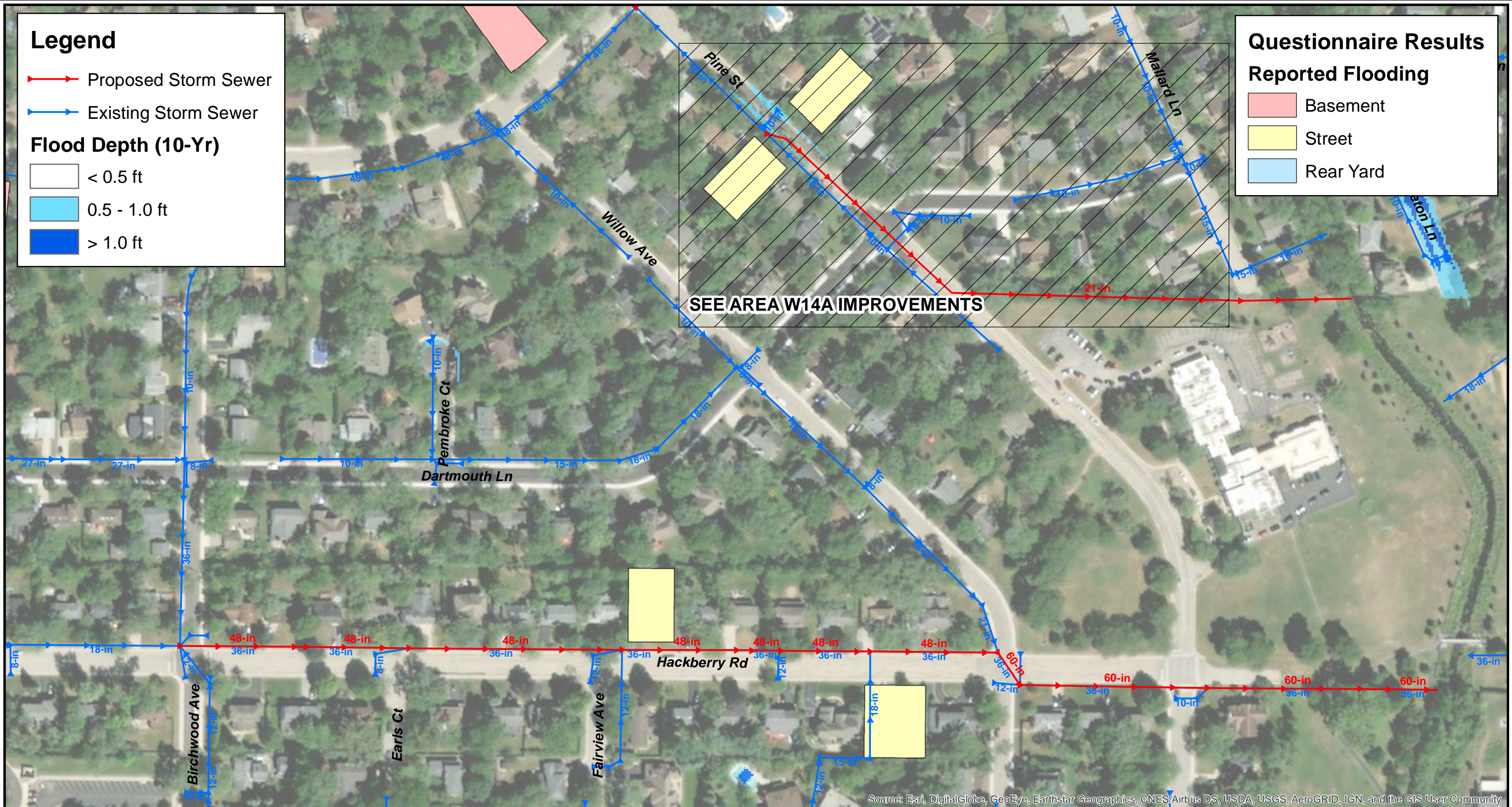
Flood Depth (10-Yr)

< 0.5 ft
 0.5 - 1.0 ft
 > 1.0 ft

Questionnaire Results

Reported Flooding

Basement
 Street
 Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W14B

DSGN.		CHKD.	
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DATE 05/21/2021

EXHIBIT 29

Legend

Existing Storm Sewer

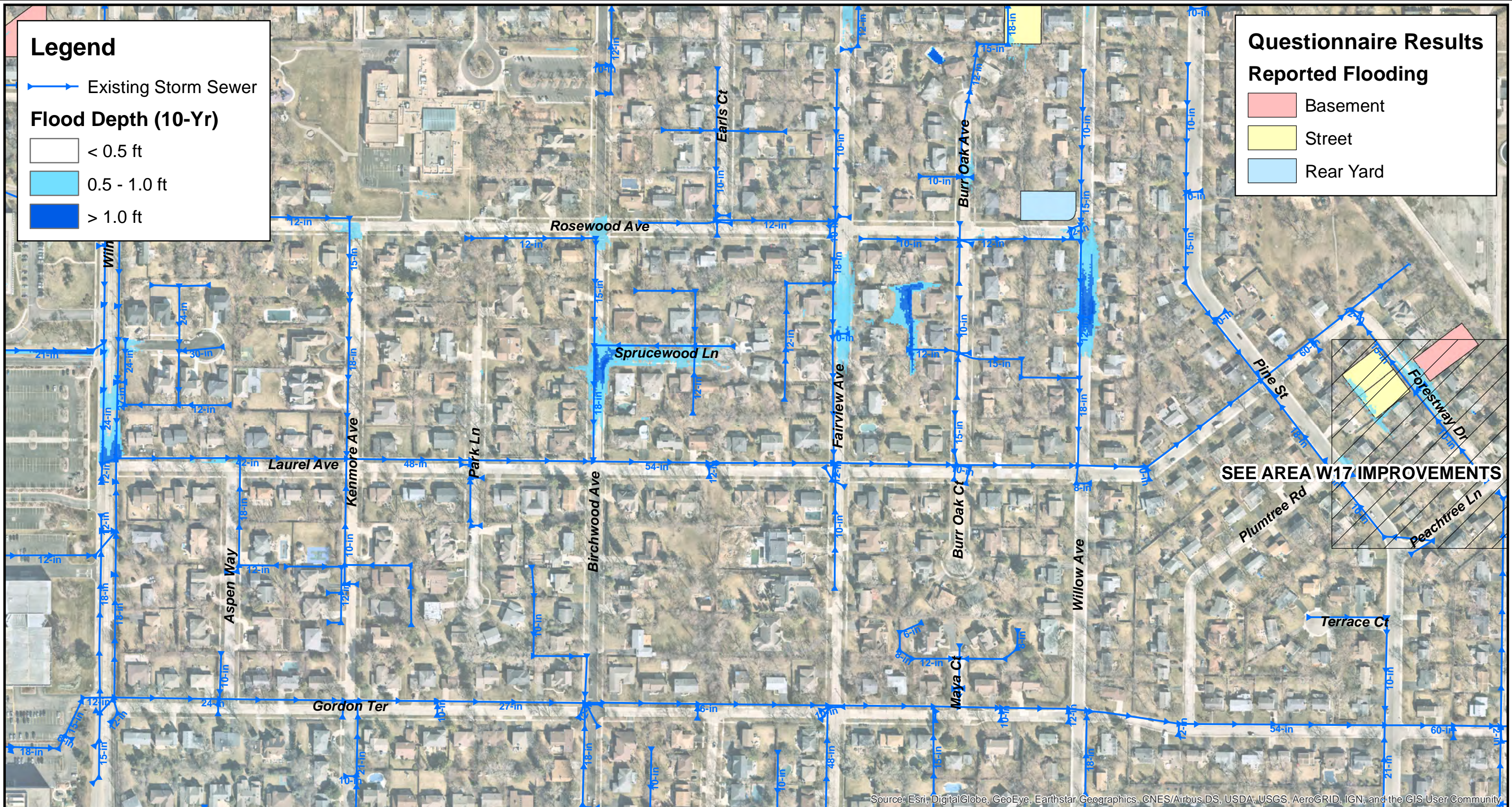
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



SEE AREA W17 IMPROVEMENTS

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 250 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W15/W16

DSGN.		CHKD.	
		DATE	05/21/2021
		EXHIBIT 30	

Legend

- Proposed Storm Sewer
- Existing Storm Sewer

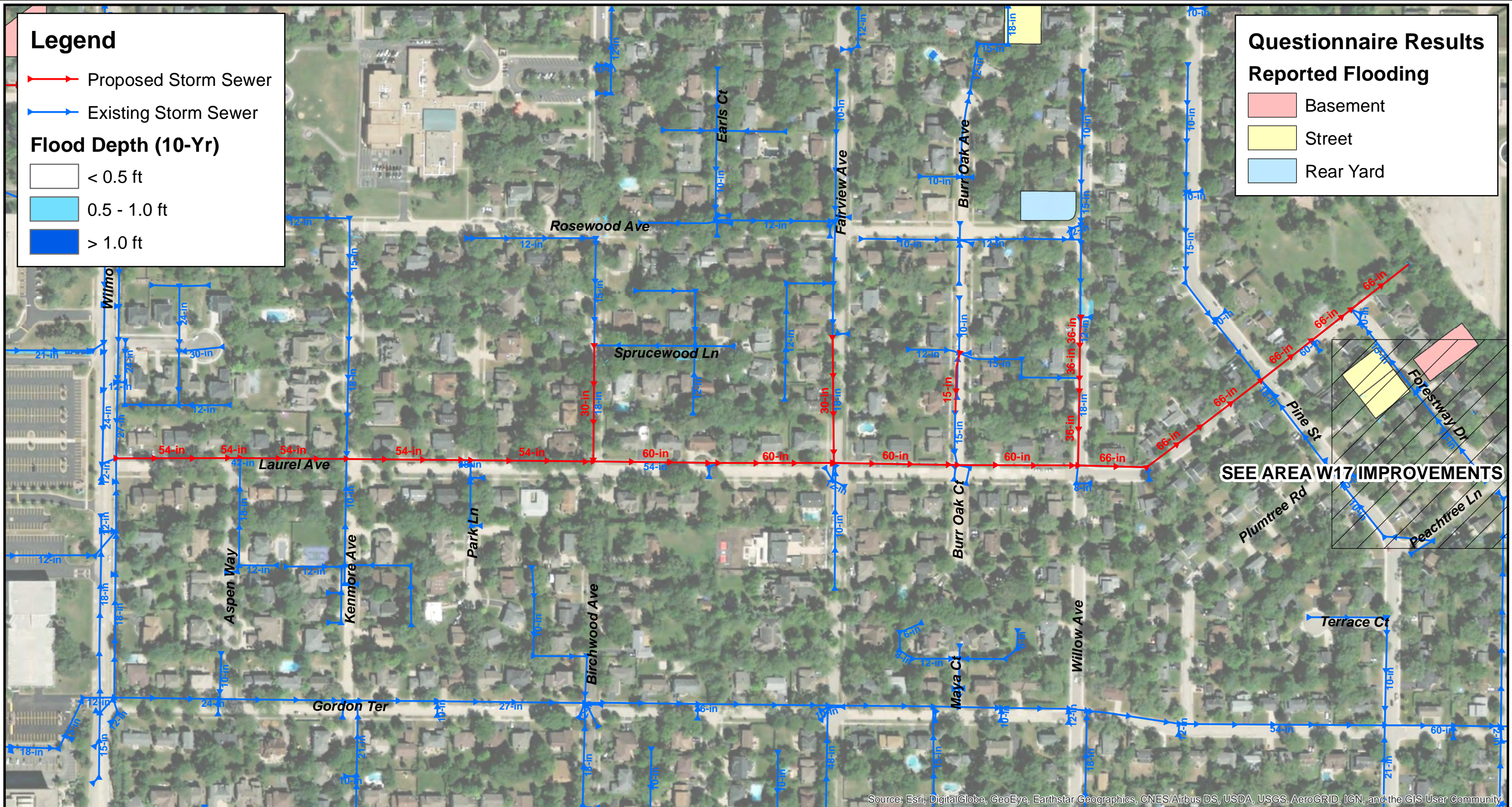
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



SEE AREA W17 IMPROVEMENTS

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 250 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA W15/W16

DSGN.	CHKD.
DATE 05/21/2021	
EXHIBIT 31	

Legend

Existing Storm Sewer

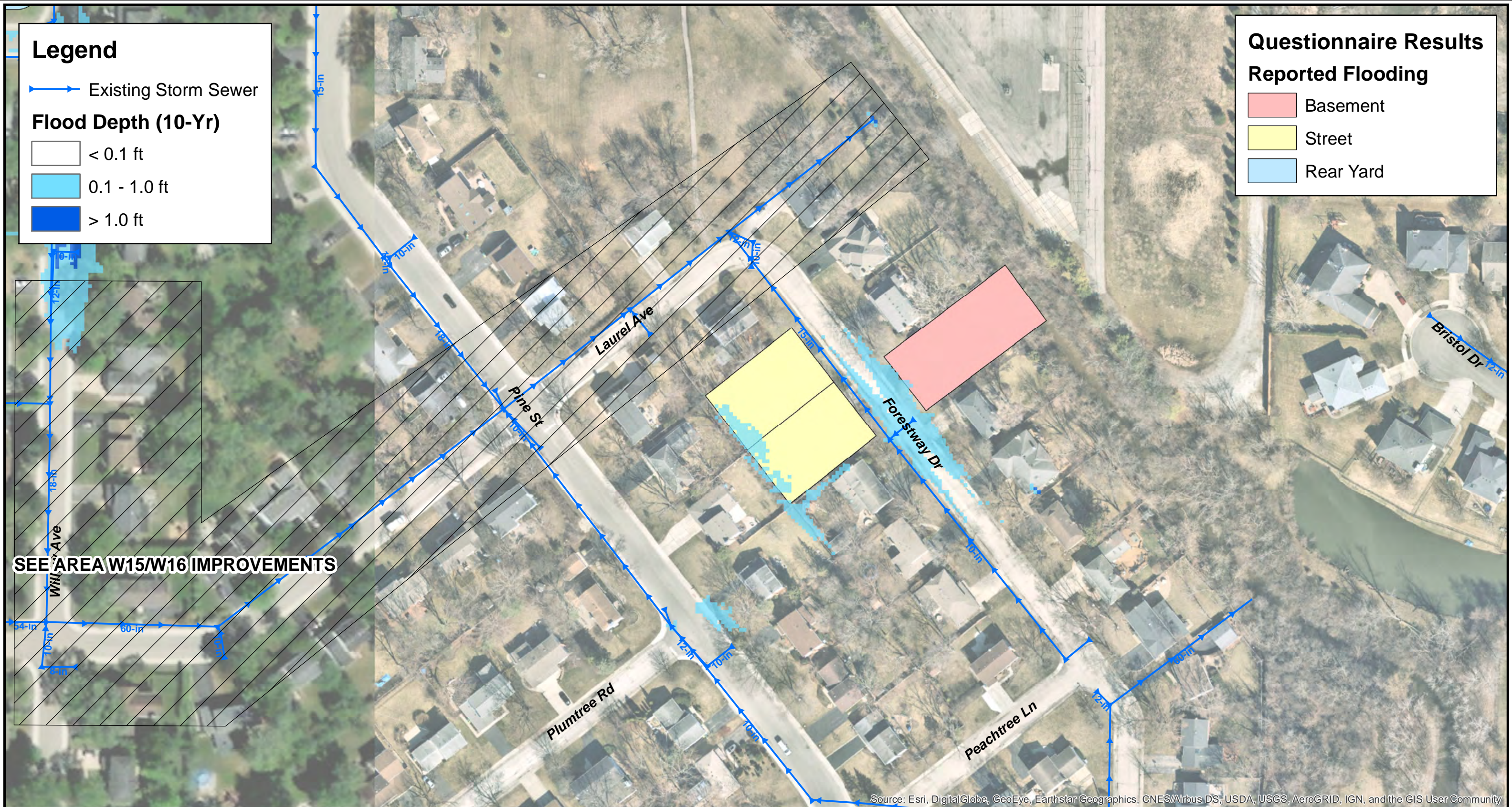
Flood Depth (10-Yr)

- < 0.1 ft
- 0.1 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA W17

DSGN. **CHKD.**

DATE 05/21/2021

EXHIBIT 32

APPENDIX 2
COST ESTIMATES, WEST FORK



CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W1

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W1		
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST	
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 15,000.00	
	EARTH EXCAVATION	CU YD	\$ 50.00	2,420	\$ 121,000.00	
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	5,800	\$ 34,800.00	
	SEEDING CLASS 4A	ACRES	\$ 5,000.00	0.90	\$ 4,500.00	
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	1,400	\$ 14,000.00	
	EROSION CONTROL BLANKET	SQ YD	\$ 3.00	4,400	\$ 13,200.00	
STORM SEWER	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	900	\$ 4,500.00	
	STONE RIPRAP AND FILTER FABRIC	SQ YD	\$ 150.00	15	\$ 2,250.00	
	TRENCH BACKFILL	CU YD	\$ 45.00	2,580	\$ 116,100.00	
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	400	\$ 34,000.00	
	STORM SEWER, RCP 18"	FOOT	\$ 95.00	240	\$ 22,800.00	
	STORM SEWER, RCP 24"	FOOT	\$ 125.00	255	\$ 31,875.00	
	STORM SEWER, RCP 42"	FOOT	\$ 210.00	1,860	\$ 390,600.00	
	STORM SEWER, RCP 48"	FOOT	\$ 225.00	20	\$ 4,500.00	
	STORM SEWER REMOVAL	FOOT	\$ 20.00	2,375	\$ 47,500.00	
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	35	\$ 17,500.00	
	REINFORCED CONCRETE FLARED END SECTIONS, 48" W/ GRATE	EACH	\$ 6,000.00	1	\$ 6,000.00	
	INLET, TYPE A	EACH	\$ 1,800.00	20	\$ 36,000.00	
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	4	\$ 18,000.00	
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	1	\$ 6,500.00	
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	8	\$ 64,000.00	
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	1	\$ 9,000.00	
	MANHOLES, 8'-DIAMETER, TYPE A, T1F CL	EACH	\$ 12,000.00	1	\$ 12,000.00	
	ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	31	\$ 1,550.00
		REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	31	\$ 1,550.00
		GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	93	\$ 279.00
COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT		FOOT	\$ 45.00	2,375	\$ 106,875.00	
PCC SIDEWALK REMOVAL AND REPLACEMENT		SQ FT	\$ 10.00	1,200	\$ 12,000.00	
DRIVEWAY REMOVAL AND REPLACEMENT		SQ YD	\$ 100.00	130	\$ 13,000.00	
DETECTABLE WARNINGS		SQ FT	\$ 40.00	560	\$ 22,400.00	
CLASS D PATCHES, 9" (SPECIAL)		SQ YD	\$ 65.00	2,750	\$ 178,750.00	
UTILITY		RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	75	\$ 20,625.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	150	\$ 37,500.00	
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	11	\$ 38,500.00	
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	11	\$ 27,500.00	
MISC	MISC. SESC		L. SUM	1	\$ 30,000.00	
	MOBILIZATION		L. SUM	1	\$ 60,000.00	
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 60,000.00	
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 30,000.00	

SUBTOTAL =	\$ 1,666,154.00
CONTINGENCY & MINOR ITEMS (25%) =	\$ 416,539.00
CONSTRUCTION TOTAL =	\$ 2,082,693.00
DESIGN ENGINEERING (7.5%) =	\$ 157,000.00
CONSTRUCTION ENGINEERING (7.5%) =	\$ 157,000.00
PERMITTING (2.5%) =	\$ 53,000.00
TOTAL COST OF IMPROVEMENTS =	\$ 2,449,693.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W2

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W2	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 5,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	700	\$ 4,200.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	700	\$ 7,000.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	835	\$ 37,575.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	200	\$ 17,000.00
	STORM SEWER, RCP 24"	FOOT	\$ 125.00	790	\$ 98,750.00
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	405	\$ 62,775.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	1,195	\$ 23,900.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	10	\$ 5,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	8	\$ 14,400.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	3	\$ 13,500.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	4	\$ 26,000.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	1	\$ 8,000.00
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	13	\$ 650.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	13	\$ 650.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	39	\$ 117.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	1,275	\$ 57,375.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	1,200	\$ 12,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	150	\$ 15,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	240	\$ 9,600.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	1,200	\$ 78,000.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	75	\$ 20,625.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	150	\$ 37,500.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	26	\$ 91,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	26	\$ 65,000.00
MISC	MISC. SESS		L. SUM	1	\$ 15,000.00
	MOBILIZATION		L. SUM	1	\$ 29,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 29,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 15,000.00
				SUBTOTAL = \$	798,617.00
				CONTINGENCY & MINOR ITEMS (25%) = \$	199,655.00
				CONSTRUCTION TOTAL = \$	998,272.00
				DESIGN ENGINEERING (7.5%) = \$	75,000.00
				CONSTRUCTION ENGINEERING (7.5%) = \$	75,000.00
				PERMITTING (2.5%) = \$	25,000.00
				TOTAL COST OF IMPROVEMENTS = \$	1,173,272.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W3

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W3	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 5,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	1,900	\$ 11,400.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	1,900	\$ 19,000.00
	TRENCH BACKFILL	CU YD	\$ 45.00	4,420	\$ 198,900.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	300	\$ 25,500.00
	STORM SEWER, RCP 12"	FOOT	\$ 85.00	340	\$ 28,900.00
	STORM SEWER, RCP 18"	FOOT	\$ 95.00	1,485	\$ 141,075.00
	STORM SEWER, RCP 24"	FOOT	\$ 125.00	575	\$ 71,875.00
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	1,195	\$ 185,225.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	3,595	\$ 71,900.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	26	\$ 13,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	16	\$ 28,800.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	12	\$ 54,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	8	\$ 52,000.00
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	1	\$ 9,000.00
	MANHOLES, 9'-DIAMETER, TYPE A, T1F CL	EACH	\$ 15,000.00	1	\$ 15,000.00
	ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	35
REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL		CU YD	\$ 50.00	35	\$ 1,750.00
GEOTECHNICAL FABRIC FOR GROUND STABILIZATION		SQ YD	\$ 3.00	105	\$ 315.00
COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT		FOOT	\$ 45.00	3,415	\$ 153,675.00
PCC SIDEWALK REMOVAL AND REPLACEMENT		SQ FT	\$ 10.00	4,500	\$ 45,000.00
DRIVEWAY REMOVAL AND REPLACEMENT		SQ YD	\$ 100.00	340	\$ 34,000.00
DETECTABLE WARNINGS		SQ FT	\$ 40.00	400	\$ 16,000.00
CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	3,280	\$ 213,200.00	
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	125	\$ 34,375.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	250	\$ 62,500.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	30	\$ 105,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	30	\$ 75,000.00
MISC	MISC. SESC		L. SUM	1	\$ 34,000.00
	MOBILIZATION		L. SUM	1	\$ 67,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 67,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 34,000.00

SUBTOTAL = \$	1,875,140.00
CONTINGENCY & MINOR ITEMS (25%) = \$	468,785.00
CONSTRUCTION TOTAL = \$	2,343,925.00
DESIGN ENGINEERING (7.5%) = \$	176,000.00
CONSTRUCTION ENGINEERING (7.5%) = \$	176,000.00
PERMITTING (2.5%) = \$	59,000.00
TOTAL COST OF IMPROVEMENTS = \$	2,754,925.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W4

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W4	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 15,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	600	\$ 3,600.00
STORM SEWER	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	600	\$ 6,000.00
	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	675	\$ 3,375.00
	TRENCH BACKFILL	CU YD	\$ 45.00	487	\$ 21,915.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	150	\$ 12,750.00
	STORM SEWER, RCP 18"	FOOT	\$ 95.00	435	\$ 41,325.00
	STORM SEWER, RCP 24"	FOOT	\$ 125.00	590	\$ 73,750.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	1,025	\$ 20,500.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	7	\$ 3,500.00
	18" STORM SEWER OUTFALL	EACH	\$ 25,000.00	2	\$ 50,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	8	\$ 14,400.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	2	\$ 9,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	3	\$ 19,500.00
	MANHOLES, 8'-DIAMETER, TYPE A, T1F CL	EACH	\$ 12,000.00	1	\$ 12,000.00
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	9	\$ 450.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	9	\$ 450.00
	GEO TECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	27	\$ 81.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	550	\$ 24,750.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	400	\$ 4,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	150	\$ 15,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	80	\$ 3,200.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	820	\$ 53,300.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	25	\$ 6,875.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	50	\$ 12,500.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	4	\$ 14,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	4	\$ 10,000.00
MISC	MISC. SESC		L. SUM	1	\$ 10,000.00
	MOBILIZATION		L. SUM	1	\$ 19,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 19,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 10,000.00

SUBTOTAL =	\$ 509,221.00
CONTINGENCY & MINOR ITEMS (25%) =	\$ 127,306.00
CONSTRUCTION TOTAL =	\$ 636,527.00
DESIGN ENGINEERING (7.5%) =	\$ 48,000.000
CONSTRUCTION ENGINEERING (7.5%) =	\$ 48,000.000
PERMITTING (2.5%) =	\$ 16,000.000
TOTAL COST OF IMPROVEMENTS =	\$ 748,527.00

NOTES:

- THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITES.
- THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
- THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W5A

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W5A	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 10,000.00
	EARTH EXCAVATION	CU YD	\$ 50.00	2,420	\$ 121,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	6,700	\$ 40,200.00
	SEEDING CLASS 4A	ACRES	\$ 5,000.00	1.00	\$ 5,000.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	1,800	\$ 18,000.00
	EROSION CONTROL BLANKET	SQ YD	\$ 3.00	4,900	\$ 14,700.00
STORM SEWER	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	1,150	\$ 5,750.00
	STONE RIPRAP AND FILTER FABRIC	SQ YD	\$ 150.00	60	\$ 9,000.00
	TRENCH BACKFILL	CU YD	\$ 45.00	893	\$ 40,185.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	100	\$ 8,500.00
	STORM SEWER, RCP 12"	FOOT	\$ 85.00	90	\$ 7,650.00
	STORM SEWER, RCP 18"	FOOT	\$ 95.00	1,110	\$ 105,450.00
	STORM SEWER, RCP 24"	FOOT	\$ 125.00	485	\$ 60,625.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	850	\$ 17,000.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	11	\$ 5,500.00
	REINFORCED CONCRETE FLARED END SECTIONS, 12" W/ GRATE	EACH	\$ 1,900.00	1	\$ 1,900.00
	REINFORCED CONCRETE FLARED END SECTIONS, 18" W/ GRATE	EACH	\$ 2,500.00	2	\$ 5,000.00
	REINFORCED CONCRETE FLARED END SECTIONS, 24" W/ GRATE	EACH	\$ 2,750.00	1	\$ 2,750.00
	INLET, TYPE A	EACH	\$ 1,800.00	4	\$ 7,200.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	14	\$ 63,000.00
	ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	13
REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL		CU YD	\$ 50.00	13	\$ 650.00
GEOTECHNICAL FABRIC FOR GROUND STABILIZATION		SQ YD	\$ 3.00	39	\$ 117.00
COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT		FOOT	\$ 45.00	1,050	\$ 47,250.00
PCC SIDEWALK REMOVAL AND REPLACEMENT		SQ FT	\$ 10.00	2,700	\$ 27,000.00
DRIVEWAY REMOVAL AND REPLACEMENT		SQ YD	\$ 100.00	80	\$ 8,000.00
DETECTABLE WARNINGS		SQ FT	\$ 40.00	240	\$ 9,600.00
CLASS D PATCHES, 9" (SPECIAL)		SQ YD	\$ 65.00	880	\$ 57,200.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	25	\$ 6,875.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	50	\$ 12,500.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	7	\$ 24,500.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	7	\$ 17,500.00
MISC	MISC. SESC		L. SUM	1	\$ 16,000.00
	MOBILIZATION		L. SUM	1	\$ 31,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 31,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 16,000.00

SUBTOTAL = \$	854,252.00
CONTINGENCY & MINOR ITEMS (25%) = \$	213,563.00
CONSTRUCTION TOTAL = \$	1,067,815.00
DESIGN ENGINEERING (7.5%) = \$	81,000.000
CONSTRUCTION ENGINEERING (7.5%) = \$	81,000.000
PERMITTING (2.5%) = \$	27,000.000
TOTAL COST OF IMPROVEMENTS = \$	1,256,815.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W5B

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W5B	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 15,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	600	\$ 3,600.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	600	\$ 6,000.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	855	\$ 38,475.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	100	\$ 8,500.00
	STORM SEWER, RCP 24"	FOOT	\$ 125.00	1,050	\$ 131,250.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	4	\$ 2,000.00
	24" STORM SEWER OUTFALL	EACH	\$ 35,000.00	1	\$ 35,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	4	\$ 7,200.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	2	\$ 9,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	1	\$ 6,500.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	1	\$ 8,000.00
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	11	\$ 550.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	11	\$ 550.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	33	\$ 99.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	1,110	\$ 49,950.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	800	\$ 8,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	200	\$ 20,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	160	\$ 6,400.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	1,000	\$ 65,000.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	50	\$ 13,750.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	100	\$ 25,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	18	\$ 63,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	18	\$ 45,000.00
MISC	MISC. SESS		L. SUM	1	\$ 12,000.00
	MOBILIZATION		L. SUM	1	\$ 23,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 23,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 12,000.00

SUBTOTAL = \$	637,824.00
CONTINGENCY & MINOR ITEMS (25%) = \$	159,456.00
CONSTRUCTION TOTAL = \$	797,280.00
DESIGN ENGINEERING (7.5%) = \$	60,000.000
CONSTRUCTION ENGINEERING (7.5%) = \$	60,000.000
PERMITTING (2.5%) = \$	20,000.000
TOTAL COST OF IMPROVEMENTS = \$	937,280.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W6

PROJECT #: 190486
 DATE: MARCH 17, 2021
 REVISED: MAY 21, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W6	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 15,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	3,600	\$ 21,600.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	3,600	\$ 36,000.00
STORM SEWER	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	2,600	\$ 13,000.00
	TRENCH BACKFILL	CU YD	\$ 45.00	1,994	\$ 89,730.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	100	\$ 8,500.00
	STORM SEWER, RCP 36"	FOOT	\$ 175.00	2,375	\$ 415,625.00
	STORM SEWER, RCP 54"	FOOT	\$ 350.00	270	\$ 94,500.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	2,045	\$ 40,900.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	14	\$ 7,000.00
	54" STORM SEWER OUTFALL	EACH	\$ 67,500.00	1	\$ 67,500.00
	INLET, TYPE A	EACH	\$ 1,800.00	4	\$ 7,200.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	7	\$ 45,500.00
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	4	\$ 36,000.00
	MANHOLES, 8'-DIAMETER, TYPE A, T1F CL	EACH	\$ 12,000.00	1	\$ 12,000.00
	MANHOLES, 10'-DIAMETER, TYPE A, T1F CL	EACH	\$ 20,000.00	1	\$ 20,000.00
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	34	\$ 1,700.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	34	\$ 1,700.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	102	\$ 306.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	1,770	\$ 79,650.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	1,600	\$ 16,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	100	\$ 10,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	320	\$ 12,800.00
UTILITY	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	1,860	\$ 120,900.00
	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	100	\$ 27,500.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	200	\$ 50,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	9	\$ 31,500.00
MISC	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	9	\$ 22,500.00
	MISC. SESC		L. SUM	1	\$ 27,000.00
	MOBILIZATION		L. SUM	1	\$ 53,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 53,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 27,000.00

	SUBTOTAL = \$	1,464,611.00
	CONTINGENCY & MINOR ITEMS (25%) = \$	366,153.00
	CONSTRUCTION TOTAL = \$	1,830,764.00
	DESIGN ENGINEERING (7.5%) = \$	138,000.00
	CONSTRUCTION ENGINEERING (7.5%) = \$	138,000.00
	PERMITTING (2.5%) = \$	46,000.00
	TOTAL COST OF IMPROVEMENTS = \$	2,152,764.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W7

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W7	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 5,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	1,700	\$ 10,200.00
STORM SEWER	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	1,700	\$ 17,000.00
	TRENCH BACKFILL	CU YD	\$ 45.00	3,061	\$ 137,745.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	400	\$ 34,000.00
	STORM SEWER, RCP 15"	FOOT	\$ 90.00	295	\$ 26,550.00
	STORM SEWER, RCP 18"	FOOT	\$ 95.00	255	\$ 24,225.00
	STORM SEWER, RCP 24"	FOOT	\$ 125.00	530	\$ 66,250.00
	STORM SEWER, RCP 36"	FOOT	\$ 175.00	1,555	\$ 272,125.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	2,635	\$ 52,700.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	23	\$ 11,500.00
	36" STORM SEWER OUTFALL	EACH	\$ 45,000.00	1	\$ 45,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	20	\$ 36,000.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	4	\$ 18,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	7	\$ 45,500.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	1	\$ 8,000.00
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	3	\$ 27,000.00
MANHOLES, 9'-DIAMETER, TYPE A, T1F CL	EACH	\$ 15,000.00	2	\$ 30,000.00	
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	30	\$ 1,500.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	30	\$ 1,500.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	90	\$ 270.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	2,935	\$ 132,075.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	3,140	\$ 31,400.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	230	\$ 23,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	480	\$ 19,200.00
CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	2,710	\$ 176,150.00	
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	150	\$ 41,250.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	300	\$ 75,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	20	\$ 70,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	20	\$ 50,000.00
MISC	MISC. SESC		L. SUM	1	\$ 30,000.00
	MOBILIZATION		L. SUM	1	\$ 60,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 60,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 30,000.00

SUBTOTAL =	\$ 1,668,140.00
CONTINGENCY & MINOR ITEMS (25%) =	\$ 417,035.00
CONSTRUCTION TOTAL =	\$ 2,085,175.00
DESIGN ENGINEERING (7.5%) =	\$ 157,000.00
CONSTRUCTION ENGINEERING (7.5%) =	\$ 157,000.00
PERMITTING (2.5%) =	\$ 53,000.00
TOTAL COST OF IMPROVEMENTS =	\$ 2,452,175.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W8

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W8	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 10,000.00
	EARTH EXCAVATION	CU YD	\$ 50.00	4,840	\$ 242,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	18,000	\$ 108,000.00
	SEEDING CLASS 4A	ACRES	\$ 5,000.00	2.20	\$ 11,000.00
STORM SEWER	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	7,300	\$ 73,000.00
	EROSION CONTROL BLANKET	SQ YD	\$ 3.00	10,700	\$ 32,100.00
	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	1,300	\$ 6,500.00
	TRENCH BACKFILL	CU YD	\$ 45.00	11,700	\$ 526,500.00
	PRECAST CONCRETE BOX CULVERTS 5'X3'	FOOT	\$ 800.00	290	\$ 232,000.00
	PRECAST CONCRETE BOX CULVERTS 8'X5'	FOOT	\$ 850.00	560	\$ 476,000.00
	PRECAST CONCRETE BOX CULVERTS 12'X4'	FOOT	\$ 1,800.00	910	\$ 1,638,000.00
	PRECAST CONCRETE BOX CULVERTS 12'X5'	FOOT	\$ 2,000.00	500	\$ 1,000,000.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	500	\$ 42,500.00
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	360	\$ 55,800.00
	STORM SEWER, RCP 48"	FOOT	\$ 225.00	930	\$ 209,250.00
	STORM SEWER, RCP 60"	FOOT	\$ 375.00	880	\$ 330,000.00
	JACK & BORE STORM SEWER, 60"	FOOT	\$ 2,000.00	225	\$ 450,000.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	3,900	\$ 78,000.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	27	\$ 13,500.00
	REINFORCED CONCRETE FLARED END SECTIONS, 60" W/ GRATE	EACH	\$ 10,000.00	1	\$ 10,000.00
	5'X3' BOX CULVERT END SECTION	EACH	\$ 20,000.00	1	\$ 20,000.00
	8'X5' SIDE BY SIDE BOX CULVERT OUTFALL	EACH	\$ 250,000.00	1	\$ 250,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	22	\$ 39,600.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	7	\$ 31,500.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	2	\$ 13,000.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	4	\$ 32,000.00
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	2	\$ 18,000.00
	MANHOLES, 9'-DIAMETER, TYPE A, T1F CL	EACH	\$ 15,000.00	1	\$ 15,000.00
	MANHOLES, 10'-DIAMETER, TYPE A, T1F CL	EACH	\$ 20,000.00	4	\$ 80,000.00
	JUNCTION CHAMBER W/ 12'X4' BC & 18"	EACH	\$ 50,000.00	1	\$ 50,000.00
JUNCTION CHAMBER W/ 2'12'X4' BC & 48" & 21"	EACH	\$ 60,000.00	2	\$ 120,000.00	
JUNCTION CHAMBER W/ 4'X12' BC & 3'X5' BC & 5'X12' BC	EACH	\$ 100,000.00	1	\$ 100,000.00	
JUNCTION CHAMBER W/ 5'X12 BC & 2 SIDE BY SIDE 8'X5' BC & 48"	EACH	\$ 110,000.00	1	\$ 110,000.00	
ROADWAY RESTORATION	PAVEMENT REMOVAL	SQ YD	\$ 15.00	9,940	\$ 149,100.00
	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	300	\$ 15,000.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	300	\$ 15,000.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	900	\$ 2,700.00
	HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N50, 1.5"	TON	\$ 95.00	1,170	\$ 111,150.00
	POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, IL-4.75, N50, 0.75"	TON	\$ 115.00	210	\$ 24,150.00
	HOT-MIX ASPHALT BINDER COURSE, IL-19.0 N50, 2"	TON	\$ 90.00	990	\$ 89,100.00
	HOT-MIX ASPHALT BASE COURSE, 6"	SQ YD	\$ 55.00	8,840	\$ 486,200.00
	AGGREGATE BASE COURSE, TYPE B, 4"	SQ YD	\$ 15.00	9,940	\$ 149,100.00
	BITUMINOUS MATERIALS (TACK COAT)	POUND	\$ 1.00	5,970	\$ 5,970.00
	PORTLAND CEMENT CONCRETE PAVEMENT 9"	SQ YD	\$ 100.00	1,100	\$ 110,000.00
	HOT-MIX ASPHALT SURFACE REMOVAL	SQ YD	\$ 4.00	5,100	\$ 20,400.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	7,800	\$ 351,000.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	13,500	\$ 135,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	520	\$ 52,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	720	\$ 28,800.00
CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	540	\$ 35,100.00	
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	450	\$ 123,750.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	450	\$ 112,500.00
	NEW PARALLEL 8" WATER MAIN (INCLUDES HYDRANTS & VAULTS)	FOOT	\$ 350.00	2,900	\$ 1,015,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	31	\$ 108,500.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	31	\$ 77,500.00
MISC	NEW PARALLEL SANITARY SEWER	FOOT	\$ 200.00	2,900	\$ 580,000.00
	MISC. SESS		L. SUM	1	\$ 205,000.00
	MOBILIZATION		L. SUM	1	\$ 409,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 409,000.00
CONSTRUCTION LAYOUT		L. SUM	1	\$ 205,000.00	

SUBTOTAL = \$ 11,448,270.00
 CONTINGENCY & MINOR ITEMS (25%) = \$ 2,862,068.00
CONSTRUCTION TOTAL = \$ 14,310,338.00

 DESIGN ENGINEERING (7.5%) = \$ 1,074,000.00
 CONSTRUCTION ENGINEERING (7.5%) = \$ 1,074,000.00
 PERMITTING (2.5%) = \$ 358,000.00

TOTAL COST OF IMPROVEMENTS = \$ 16,816,338.00

- NOTES:
1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
 2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
 3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.
 4. THIS ESTIMATE ASSUMES THAT WALNUT STREET, FOREST AVENUE AND THE TWO SOUTHERN DRIVING LANES OF DEERFIELD ROAD WILL BE RECONSTRUCTED DUE TO PROPOSED DRAINAGE IMPROVEMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W9

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W9		
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST	
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 15,000.00	
	EARTH EXCAVATION	CU YD	\$ 50.00	3,388	\$ 169,400.00	
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	7,100	\$ 42,600.00	
	SEEDING CLASS 4A	ACRES	\$ 5,000.00	0.80	\$ 4,000.00	
STORM SEWER	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	3,200	\$ 32,000.00	
	EROSION CONTROL BLANKET	SQ YD	\$ 3.00	3,900	\$ 11,700.00	
	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	1,700	\$ 8,500.00	
	STONE RIPRAP AND FILTER FABRIC	SQ YD	\$ 150.00	15	\$ 2,250.00	
	TRENCH BACKFILL	CU YD	\$ 45.00	4,959	\$ 223,155.00	
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	600	\$ 51,000.00	
	STORM SEWER, RCP 24"	FOOT	\$ 125.00	865	\$ 108,125.00	
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	280	\$ 43,400.00	
	STORM SEWER, RCP 42"	FOOT	\$ 210.00	970	\$ 203,700.00	
	STORM SEWER, RCP 48"	FOOT	\$ 225.00	365	\$ 82,125.00	
	STORM SEWER, RCP 54"	FOOT	\$ 350.00	660	\$ 231,000.00	
	STORM SEWER, RCP 60"	FOOT	\$ 375.00	935	\$ 350,625.00	
	STORM SEWER REMOVAL	FOOT	\$ 20.00	3,140	\$ 62,800.00	
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	50	\$ 25,000.00	
	REINFORCED CONCRETE FLARED END SECTIONS, 54" W/ GRATE	EACH	\$ 8,000.00	1	\$ 8,000.00	
	60" STORM SEWER OUTFALL	EACH	\$ 75,000.00	1	\$ 75,000.00	
	INLET, TYPE A	EACH	\$ 1,800.00	24	\$ 43,200.00	
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	11	\$ 49,500.00	
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	1	\$ 6,500.00	
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	6	\$ 48,000.00	
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	10	\$ 90,000.00	
	MANHOLES, 8'-DIAMETER, TYPE A, T1F CL	EACH	\$ 12,000.00	3	\$ 36,000.00	
	MANHOLES, 9'-DIAMETER, TYPE A, T1F CL	EACH	\$ 15,000.00	2	\$ 30,000.00	
	MANHOLES, 10'-DIAMETER, TYPE A, T1F CL	EACH	\$ 20,000.00	1	\$ 20,000.00	
	ROADWAY RESTORATION	PAVEMENT REMOVAL	SQ YD	\$ 15.00	390	\$ 5,850.00
		AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	114	\$ 5,700.00
		REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	114	\$ 5,700.00
GEOTECHNICAL FABRIC FOR GROUND STABILIZATION		SQ YD	\$ 3.00	342	\$ 1,026.00	
HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N50, 1.5"		TON	\$ 95.00	290	\$ 27,550.00	
HOT-MIX ASPHALT BINDER COURSE, IL-19.0 N50, 2"		TON	\$ 90.00	390	\$ 35,100.00	
HOT-MIX ASPHALT BASE COURSE, 6"		SQ YD	\$ 55.00	3,430	\$ 188,650.00	
AGGREGATE BASE COURSE, TYPE B, 4"		SQ YD	\$ 15.00	3,430	\$ 51,450.00	
BITUMINOUS MATERIALS (TACK COAT)		POUND	\$ 1.00	2,320	\$ 2,320.00	
COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT		FOOT	\$ 45.00	7,345	\$ 330,525.00	
PCC SIDEWALK REMOVAL AND REPLACEMENT		SQ FT	\$ 10.00	13,800	\$ 138,000.00	
DRIVEWAY REMOVAL AND REPLACEMENT		SQ YD	\$ 100.00	380	\$ 38,000.00	
DETECTABLE WARNINGS		SQ FT	\$ 40.00	800	\$ 32,000.00	
CLASS D PATCHES, 9" (SPECIAL)		SQ YD	\$ 65.00	3,690	\$ 239,850.00	
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	250	\$ 68,750.00	
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	500	\$ 125,000.00	
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	34	\$ 119,000.00	
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	34	\$ 85,000.00	
MISC	NEW PARALLEL SANITARY SEWER	FOOT	\$ 200.00	1,960	\$ 392,000.00	
	CONCRETE STRUCTURES REMOVAL & REPLACEMENT (BRIDGE WINGWALL)	L. SUM		1	\$ 250,000.00	
	MISC. SESC	L. SUM		1	\$ 80,000.00	
	MOBILIZATION	L. SUM		1	\$ 159,000.00	
	TRAFFIC CONTROL AND PROTECTION	L. SUM		1	\$ 159,000.00	
	CONSTRUCTION LAYOUT	L. SUM		1	\$ 80,000.00	

SUBTOTAL = \$ 4,692,051.00
 CONTINGENCY & MINOR ITEMS (25%) = \$ 1,173,013.00
CONSTRUCTION TOTAL = \$ 5,865,064.00

DESIGN ENGINEERING (7.5%) = \$ 440,000.000
 CONSTRUCTION ENGINEERING (7.5%) = \$ 440,000.000
 PERMITTING (2.5%) = \$ 147,000.000

TOTAL COST OF IMPROVEMENTS = \$ 6,892,064.00

- NOTES:
1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
 2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
 3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W10

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W10		
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST	
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 5,000.00	
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	1,800	\$ 10,800.00	
STORM SEWER	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	1,800	\$ 18,000.00	
	TRENCH BACKFILL	CU YD	\$ 45.00	4,367	\$ 196,515.00	
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	400	\$ 34,000.00	
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	1,175	\$ 182,125.00	
	STORM SEWER, RCP 36"	FOOT	\$ 175.00	930	\$ 162,750.00	
	STORM SEWER, RCP 42"	FOOT	\$ 210.00	300	\$ 63,000.00	
	STORM SEWER, RCP 48"	FOOT	\$ 225.00	255	\$ 57,375.00	
	STORM SEWER, RCP 54"	FOOT	\$ 350.00	185	\$ 64,750.00	
	STORM SEWER, RCP 60"	FOOT	\$ 375.00	195	\$ 73,125.00	
	STORM SEWER REMOVAL	FOOT	\$ 20.00	2,845	\$ 56,900.00	
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	21	\$ 10,500.00	
	60" STORM SEWER OUTFALL	EACH	\$ 75,000.00	1	\$ 75,000.00	
	INLET, TYPE A	EACH	\$ 1,800.00	16	\$ 28,800.00	
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	6	\$ 27,000.00	
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	8	\$ 52,000.00	
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	5	\$ 40,000.00	
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	2	\$ 18,000.00	
	MANHOLES, 9'-DIAMETER, TYPE A, T1F CL	EACH	\$ 15,000.00	2	\$ 30,000.00	
	ROADWAY RESTORATION	PAVEMENT REMOVAL	SQ YD	\$ 15.00	1,800	\$ 27,000.00
		AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	69	\$ 3,450.00
REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL		CU YD	\$ 50.00	69	\$ 3,450.00	
GEOTECHNICAL FABRIC FOR GROUND STABILIZATION		SQ YD	\$ 3.00	207	\$ 621.00	
HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N50, 1.5"		TON	\$ 95.00	150	\$ 14,250.00	
HOT-MIX ASPHALT BINDER COURSE, IL-19.0 N50, 2"		TON	\$ 90.00	200	\$ 18,000.00	
HOT-MIX ASPHALT BASE COURSE, 6"		SQ YD	\$ 55.00	1,800	\$ 99,000.00	
AGGREGATE BASE COURSE, TYPE B, 4"		SQ YD	\$ 15.00	1,800	\$ 27,000.00	
BITUMINOUS MATERIALS (TACK COAT)		POUND	\$ 1.00	1,300	\$ 1,300.00	
COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT		FOOT	\$ 45.00	3,755	\$ 168,975.00	
PCC SIDEWALK REMOVAL AND REPLACEMENT		SQ FT	\$ 10.00	4,000	\$ 40,000.00	
DRIVEWAY REMOVAL AND REPLACEMENT		SQ YD	\$ 100.00	380	\$ 38,000.00	
DETECTABLE WARNINGS		SQ FT	\$ 40.00	640	\$ 25,600.00	
CLASS D PATCHES, 9" (SPECIAL)		SQ YD	\$ 65.00	2,630	\$ 170,950.00	
UTILITY		RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	500	\$ 137,500.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	400	\$ 100,000.00	
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	34	\$ 119,000.00	
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	34	\$ 85,000.00	
	NEW PARALLEL SANITARY SEWER	FOOT	\$ 200.00	440	\$ 88,000.00	
MISC	MISC. SESS		L. SUM	1	\$ 48,000.00	
	MOBILIZATION		L. SUM	1	\$ 95,000.00	
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 95,000.00	
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 48,000.00	

SUBTOTAL = \$	2,681,736.00
CONTINGENCY & MINOR ITEMS (25%) = \$	670,434.00
CONSTRUCTION TOTAL = \$	3,352,170.00
DESIGN ENGINEERING (7.5%) = \$	252,000.000
CONSTRUCTION ENGINEERING (7.5%) = \$	252,000.000
PERMITTING (2.5%) = \$	84,000.000
TOTAL COST OF IMPROVEMENTS = \$	3,940,170.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.
4. THIS ESTIMATE ASSUMES THAT PORTIONS OF ANTHONY LANE AND DEERPATH DRIVE WILL BE RECONSTRUCTED DUE TO STORM SEWER IMPROVEMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W11

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W11	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	700	\$ 4,200.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	700	\$ 7,000.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	720	\$ 32,400.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	100	\$ 8,500.00
	STORM SEWER, RCP 27"	FOOT	\$ 135.00	200	\$ 27,000.00
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	670	\$ 103,850.00
	STORM SEWER, RCP 48"	FOOT	\$ 225.00	10	\$ 2,250.00
	STORM SEWER, RCP EQRS 66"	FOOT	\$ 600.00	15	\$ 9,000.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	680	\$ 13,600.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	18	\$ 9,000.00
	30" STORM SEWER OUTFALL (AT BRIDGE)	EACH	\$ 75,000.00	1	\$ 75,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	6	\$ 10,800.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	4	\$ 18,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	4	\$ 26,000.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	1	\$ 8,000.00
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	2	\$ 18,000.00
	MANHOLES, 8'-DIAMETER, TYPE A, T1F CL	EACH	\$ 12,000.00	2	\$ 24,000.00
	MANHOLES, 10'-DIAMETER, TYPE A, T1F CL	EACH	\$ 20,000.00	1	\$ 20,000.00
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	8	\$ 400.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	8	\$ 400.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	24	\$ 72.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	875	\$ 39,375.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	800	\$ 8,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	140	\$ 14,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	160	\$ 6,400.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	930	\$ 60,450.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	50	\$ 13,750.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	100	\$ 25,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	12	\$ 42,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	12	\$ 30,000.00
MISC	MISC. SESC	L. SUM		1	\$ 14,000.00
	MOBILIZATION	L. SUM		1	\$ 27,000.00
	TRAFFIC CONTROL AND PROTECTION	L. SUM		1	\$ 27,000.00
	CONSTRUCTION LAYOUT	L. SUM		1	\$ 14,000.00

SUBTOTAL =	\$ 738,447.00
CONTINGENCY & MINOR ITEMS (25%) =	\$ 184,612.00
CONSTRUCTION TOTAL =	\$ 923,059.00
DESIGN ENGINEERING (7.5%) =	\$ 70,000.000
CONSTRUCTION ENGINEERING (7.5%) =	\$ 70,000.000
PERMITTING (2.5%) =	\$ 24,000.000
TOTAL COST OF IMPROVEMENTS =	\$ 1,087,059.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W13

PROJECT #: 190486
 DATE: MARCH 17, 2021
 REVISED: *MAY 21, 2021*
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W13	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 10,000.00
	EARTH EXCAVATION	CU YD	\$ 50.00	1,460	\$ 73,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	3,500	\$ 21,000.00
STORM SEWER	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	2,000	\$ 20,000.00
	EROSION CONTROL BLANKET	SQ YD	\$ 3.00	1,500	\$ 4,500.00
	STONE RIPRAP AND FILTER FABRIC	SQ YD	\$ 150.00	15	\$ 2,250.00
	TRENCH BACKFILL	CU YD	\$ 45.00	1,181	\$ 53,145.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	200	\$ 17,000.00
	STORM SEWER, RCP 36"	FOOT	\$ 175.00	1,135	\$ 198,625.00
	STORM SEWER, RCP 42"	FOOT	\$ 210.00	350	\$ 73,500.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	1,485	\$ 29,700.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	11	\$ 5,500.00
	REINFORCED CONCRETE FLARED END SECTIONS, 36" W/ GRATE	EACH	\$ 4,500.00	1	\$ 4,500.00
	INLET, TYPE A	EACH	\$ 1,800.00	10	\$ 18,000.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	2	\$ 9,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	7	\$ 45,500.00
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	2	\$ 18,000.00
	ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	19
REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL		CU YD	\$ 50.00	19	\$ 950.00
GEOTECHNICAL FABRIC FOR GROUND STABILIZATION		SQ YD	\$ 3.00	57	\$ 171.00
COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT		FOOT	\$ 45.00	1,700	\$ 76,500.00
PCC SIDEWALK REMOVAL AND REPLACEMENT		SQ FT	\$ 10.00	8,625	\$ 86,250.00
DRIVEWAY REMOVAL AND REPLACEMENT		SQ YD	\$ 100.00	70	\$ 7,000.00
DETECTABLE WARNINGS		SQ FT	\$ 40.00	240	\$ 9,600.00
CLASS B PATCHES, 9" (SPECIAL)		SQ YD	\$ 100.00	150	\$ 15,000.00
CLASS D PATCHES, 9" (SPECIAL)		SQ YD	\$ 65.00	75	\$ 4,875.00
RELOCATE / ADJUST WATER MAIN		FOOT	\$ 275.00	75	\$ 20,625.00
UTILITY	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	150	\$ 37,500.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	6	\$ 21,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	6	\$ 15,000.00
MISC	MISC. SECC		L. SUM	1	\$ 19,000.00
	MOBILIZATION		L. SUM	1	\$ 37,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 37,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 19,000.00

SUBTOTAL =	\$ 1,012,141.00
CONTINGENCY & MINOR ITEMS (25%) =	\$ 253,036.00
CONSTRUCTION TOTAL =	\$ 1,265,177.00
DESIGN ENGINEERING (7.5%) =	\$ 95,000.000
CONSTRUCTION ENGINEERING (7.5%) =	\$ 95,000.000
PERMITTING (2.5%) =	\$ 32,000.000
TOTAL COST OF IMPROVEMENTS =	\$ 1,487,177.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W14A

PROJECT #: 190486
 DATE: MAY 21, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W14A	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 10,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	900	\$ 5,400.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	900	\$ 9,000.00
	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	1,840	\$ 9,200.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	738	\$ 33,210.00
	STORM SEWER, RCP 21"	FOOT	\$ 110.00	1,060	\$ 116,600.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	4	\$ 2,000.00
	21" STORM SEWER OUTFALL	EACH	\$ 30,000.00	1	\$ 30,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	4	\$ 26,000.00
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	11	\$ 550.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	11	\$ 550.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	33	\$ 99.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	300	\$ 13,500.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	400	\$ 4,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	40	\$ 1,600.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	470	\$ 30,550.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	50	\$ 13,750.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	100	\$ 25,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	5	\$ 17,500.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	5	\$ 12,500.00
MISC	PATH REMOVAL AND REPLACEMENT		L. SUM	1	\$ 5,000.00
	MISC. SEWC		L. SUM	1	\$ 8,000.00
	MOBILIZATION		L. SUM	1	\$ 15,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 15,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 8,000.00

SUBTOTAL = \$	412,009.00
CONTINGENCY & MINOR ITEMS (25%) = \$	103,003.00
CONSTRUCTION TOTAL = \$	515,012.00
DESIGN ENGINEERING (7.5%) = \$	39,000.000
CONSTRUCTION ENGINEERING (7.5%) = \$	39,000.000
PERMITTING (2.5%) = \$	13,000.000
TOTAL COST OF IMPROVEMENTS = \$	606,012.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W14B

PROJECT #: 190486
 DATE: MAY 21,2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W14B	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 10,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	2,700	\$ 16,200.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	2,700	\$ 27,000.00
	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	1,840	\$ 9,200.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	4,573	\$ 205,785.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	400	\$ 34,000.00
	STORM SEWER, RCP 48"	FOOT	\$ 225.00	1,340	\$ 301,500.00
	STORM SEWER, RCP 60"	FOOT	\$ 375.00	750	\$ 281,250.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	2,090	\$ 41,800.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	28	\$ 14,000.00
	60" STORM SEWER OUTFALL	EACH	\$ 75,000.00	1	\$ 75,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	16	\$ 28,800.00
	RCP PIPE FITTING (WITH RISER), 60"	EACH	\$ 6,000.00	1	\$ 6,000.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	4	\$ 32,000.00
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	2	\$ 18,000.00
	MANHOLES, 8'-DIAMETER, TYPE A, T1F CL	EACH	\$ 12,000.00	2	\$ 24,000.00
	MANHOLES, 9'-DIAMETER, TYPE A, T1F CL	EACH	\$ 15,000.00	1	\$ 15,000.00
ROADWAY RESTORATION	PAVEMENT REMOVAL	SQ YD	\$ 15.00	4,200	\$ 63,000.00
	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	102	\$ 5,100.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	102	\$ 5,100.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	306	\$ 918.00
	HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N50, 1.5"	TON	\$ 95.00	350	\$ 33,250.00
	HOT-MIX ASPHALT BINDER COURSE, IL-19.0 N50, 2"	TON	\$ 90.00	470	\$ 42,300.00
	HOT-MIX ASPHALT BASE COURSE, 6"	SQ YD	\$ 55.00	4,200	\$ 231,000.00
	AGGREGATE BASE COURSE, TYPE B, 4"	SQ YD	\$ 15.00	4,200	\$ 63,000.00
	BITUMINOUS MATERIALS (TACK COAT)	POUND	\$ 1.00	2,840	\$ 2,840.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	6,100	\$ 274,500.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	2,400	\$ 24,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	290	\$ 29,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	480	\$ 19,200.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	150	\$ 9,750.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	300	\$ 82,500.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	600	\$ 150,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	26	\$ 91,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	26	\$ 65,000.00
	NEW PARALLEL SANITARY SEWER	FOOT	\$ 200.00	2,090	\$ 418,000.00
MISC	PATH REMOVAL AND REPLACEMENT		L. SUM	1	\$ 5,000.00
	MISC. SESSC		L. SUM	1	\$ 55,000.00
	MOBILIZATION		L. SUM	1	\$ 110,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 110,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 55,000.00

SUBTOTAL =	\$ 3,083,993.00
CONTINGENCY & MINOR ITEMS (25%) =	\$ 770,999.00
CONSTRUCTION TOTAL =	\$ 3,854,992.00
DESIGN ENGINEERING (7.5%) =	\$ 290,000.000
CONSTRUCTION ENGINEERING (7.5%) =	\$ 290,000.000
PERMITTING (2.5%) =	\$ 97,000.000
TOTAL COST OF IMPROVEMENTS =	\$ 4,531,992.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.
4. THIS ESTIMATE ASSUMES A PORTION OF HACKBERRY ROAD WILL BE RECONSTRUCTED DUE TO THE STORM SEWER IMPROVEMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W15/W16

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W15/W16		
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST	
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 10,000.00	
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	5,600	\$ 33,600.00	
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	5,600	\$ 56,000.00	
	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	500	\$ 2,500.00	
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	11,167	\$ 502,515.00	
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	400	\$ 34,000.00	
	STORM SEWER, RCP 15"	FOOT	\$ 90.00	165	\$ 14,850.00	
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	660	\$ 102,300.00	
	STORM SEWER, RCP 36"	FOOT	\$ 175.00	405	\$ 70,875.00	
	STORM SEWER, RCP 54"	FOOT	\$ 350.00	1,305	\$ 456,750.00	
	STORM SEWER, RCP 60"	FOOT	\$ 375.00	1,325	\$ 496,875.00	
	STORM SEWER, RCP 66"	FOOT	\$ 450.00	1,095	\$ 492,750.00	
	STORM SEWER REMOVAL	FOOT	\$ 20.00	4,955	\$ 99,100.00	
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	38	\$ 19,000.00	
	66" STORM SEWER OUTFALL	EACH	\$ 80,000.00	1	\$ 80,000.00	
	INLET, TYPE A	EACH	\$ 1,800.00	16	\$ 28,800.00	
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	7	\$ 31,500.00	
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	5	\$ 32,500.00	
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	7	\$ 63,000.00	
	MANHOLES, 8'-DIAMETER, TYPE A, T1F CL	EACH	\$ 12,000.00	8	\$ 96,000.00	
	ROADWAY RESTORATION	PAVEMENT REMOVAL	SQ YD	\$ 15.00	10,080	\$ 151,200.00
		AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	230	\$ 11,500.00
REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL		CU YD	\$ 50.00	230	\$ 11,500.00	
GEOTECHNICAL FABRIC FOR GROUND STABILIZATION		SQ YD	\$ 3.00	690	\$ 2,070.00	
HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N50, 1.5"		TON	\$ 95.00	840	\$ 79,800.00	
POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, IL-4.75, N50, 0.75"		TON	\$ 115.00	310	\$ 35,650.00	
HOT-MIX ASPHALT BINDER COURSE, IL-19.0 N50, 2"		TON	\$ 90.00	320	\$ 28,800.00	
HOT-MIX ASPHALT BASE COURSE, 6"		SQ YD	\$ 55.00	2,780	\$ 152,900.00	
AGGREGATE BASE COURSE, TYPE B, 4"		SQ YD	\$ 15.00	10,080	\$ 151,200.00	
BITUMINOUS MATERIALS (TACK COAT)		POUND	\$ 1.00	1,880	\$ 1,880.00	
PORTLAND CEMENT CONCRETE PAVEMENT 9"		SQ YD	\$ 100.00	7,300	\$ 730,000.00	
COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT		FOOT	\$ 45.00	9,820	\$ 441,900.00	
PCC SIDEWALK REMOVAL AND REPLACEMENT		SQ FT	\$ 10.00	16,100	\$ 161,000.00	
DRIVEWAY REMOVAL AND REPLACEMENT		SQ YD	\$ 100.00	470	\$ 47,000.00	
DETECTABLE WARNINGS		SQ FT	\$ 40.00	800	\$ 32,000.00	
CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	1,360	\$ 88,400.00		
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	1,000	\$ 275,000.00	
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	500	\$ 125,000.00	
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	42	\$ 147,000.00	
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	42	\$ 105,000.00	
	NEW PARALLEL SANITARY SEWER	FOOT	\$ 200.00	3,725	\$ 745,000.00	
MISC	MISC. SESC		L. SUM	1	\$ 125,000.00	
	MOBILIZATION		L. SUM	1	\$ 250,000.00	
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 250,000.00	
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 125,000.00	

SUBTOTAL =	\$ 6,996,715.00
CONTINGENCY & MINOR ITEMS (25%) =	\$ 1,749,179.00
CONSTRUCTION TOTAL =	\$ 8,745,894.00
DESIGN ENGINEERING (7.5%) =	\$ 656,000.00
CONSTRUCTION ENGINEERING (7.5%) =	\$ 656,000.00
PERMITTING (2.5%) =	\$ 219,000.00
TOTAL COST OF IMPROVEMENTS =	\$ 10,276,894.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.
4. THIS ESTIMATE ASSUMES LAUREL AVENUE WILL BE RECONSTRUCTED DUE TO STORM SEWER IMPROVEMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018
 VILLAGE OF DEERFIELD

PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE AREA W17

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA W17 (NO PIPE)	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 15,000.00
	EARTH EXCAVATION	CU YD	\$ 50.00	200	\$ 10,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	1,170	\$ 7,020.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	1,170	\$ 11,700.00
ROADWAY RESTORATION	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	100	\$ 4,500.00
MISC	MISC. SESC		L. SUM	1	\$ 1,000.00
	MOBILIZATION		L. SUM	1	\$ 2,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 2,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 1,000.00

SUBTOTAL = \$ 54,220.00
 CONTINGENCY & MINOR ITEMS (25%) = \$ 13,555.00
CONSTRUCTION TOTAL = \$ 67,775.00

 DESIGN ENGINEERING (7.5%) = \$ 6,000.000
 CONSTRUCTION ENGINEERING (7.5%) = \$ 6,000.000
 PERMITTING (2.5%) = \$ 2,000.000

TOTAL COST OF IMPROVEMENTS = \$ 81,775.00

- NOTES:
1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
 2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
 3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

APPENDIX 3

EXISTING/PROPOSED CONDITIONS EXHIBITS, MIDDLE FORK



Legend

Existing Storm Sewer

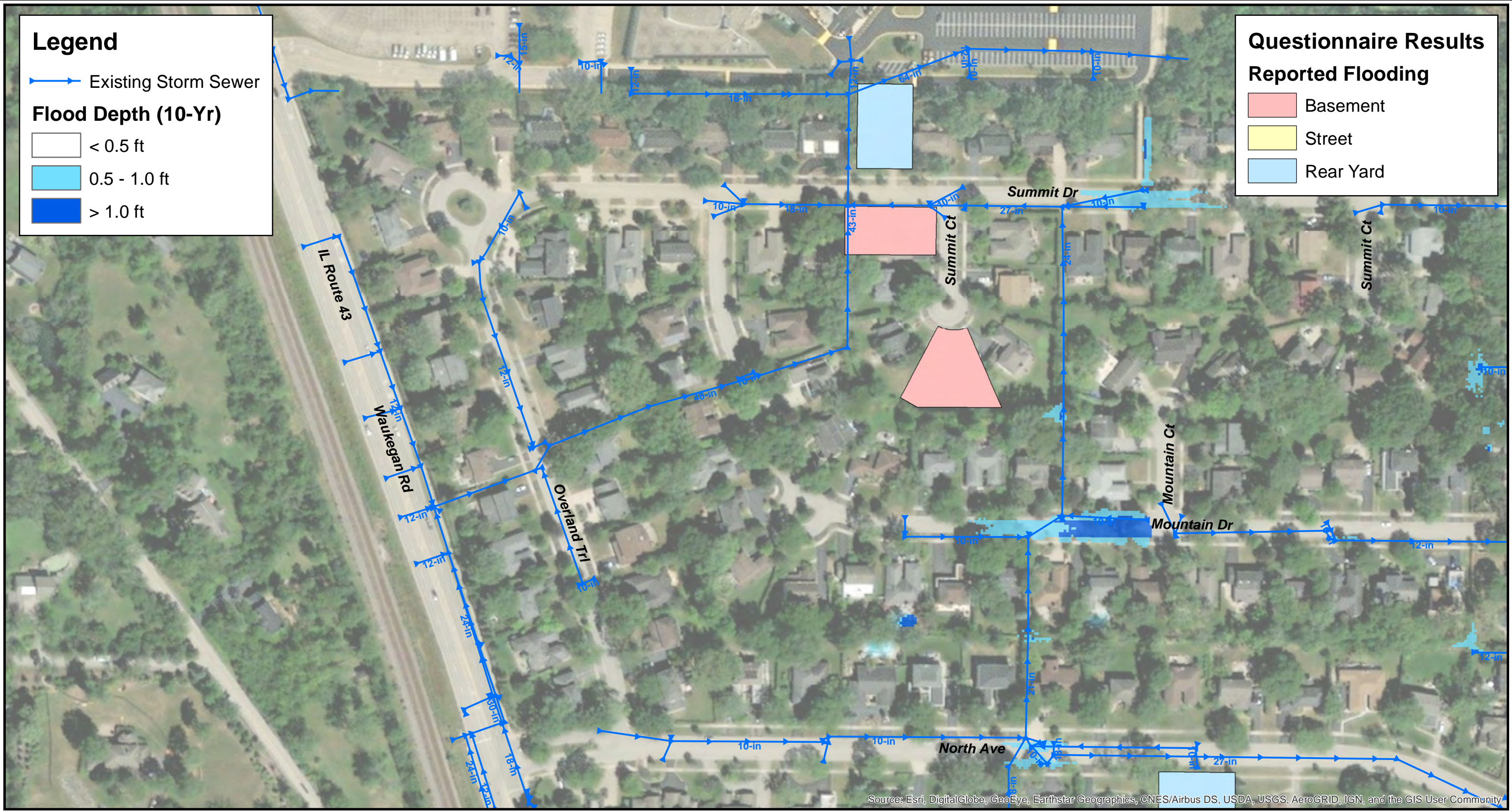
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet



Christopher B. Burke Engineering, Ltd.
 9575 West Higgins Road, Suite 600
 Rosemont, IL 60018
 (847) 823-0500 / FAX (847) 823-0520

CLIENT	VILLAGE OF DEERFIELD	PROJECT NO.	190486	DSGN.		CHKD.	
	TITLE		EXISTING CONDITIONS INUNDATION MAP, AREA E1				DATE
							EXHIBIT 33



Legend

→ Proposed Storm Sewer
 → Existing Storm Sewer

Flood Depth (10-Yr)

□ < 0.5 ft
 □ 0.5 - 1.0 ft
 □ > 1.0 ft

Questionnaire Results

Reported Flooding

□ Basement
 □ Street
 □ Rear Yard

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet



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 9575 West Higgins Road, Suite 600
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CLIENT VILLAGE OF DEERFIELD	PROJECT NO. 190486	DSGN.	CHKD.
TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA E1		DATE 05/21/2021	
		EXHIBIT 34	

Legend

Existing Storm Sewer

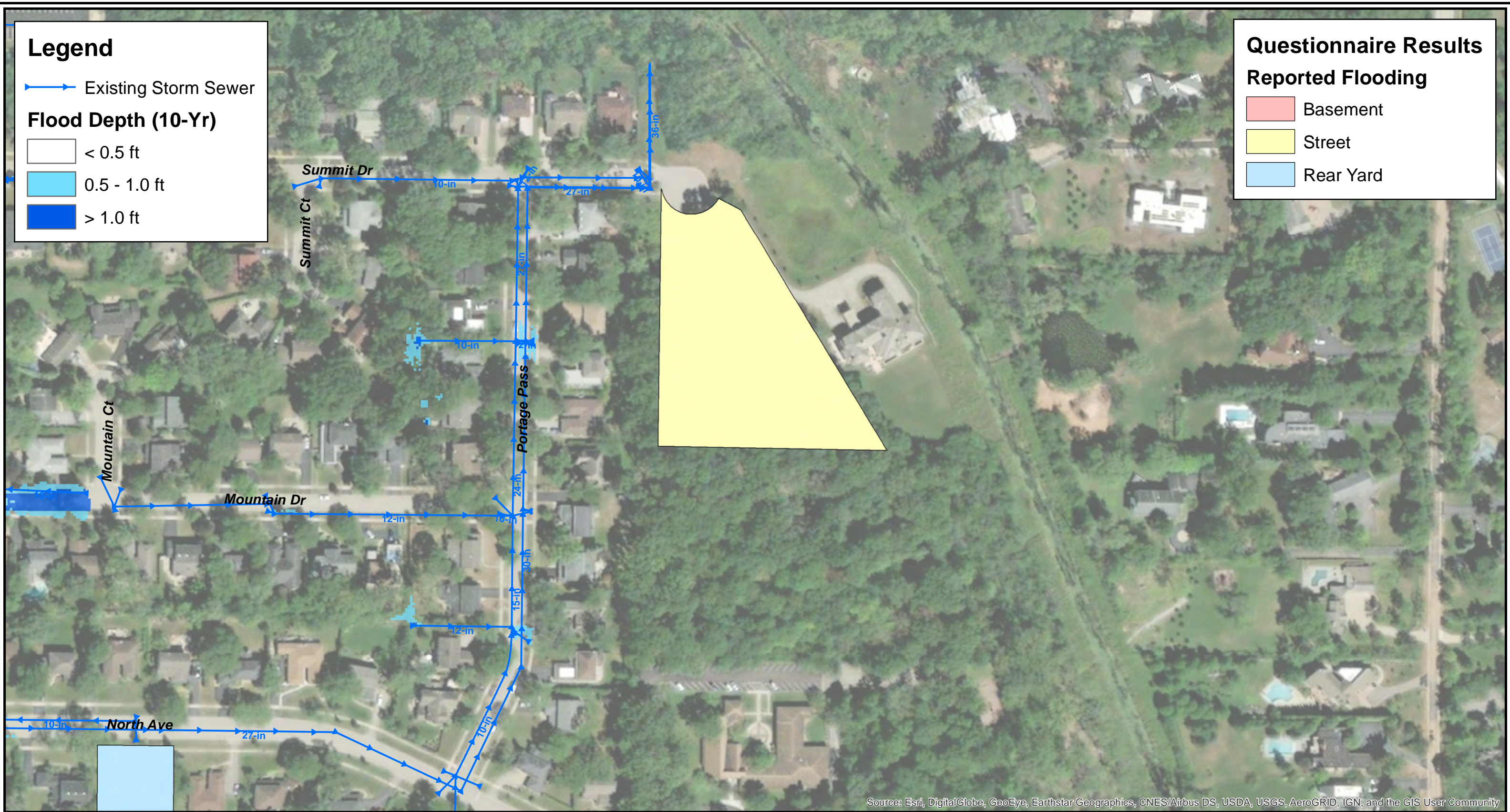
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E2

DSGN.

CHKD.



DATE 05/21/2021

EXHIBIT 35

Legend

→ Proposed Storm Sewer
 → Existing Storm Sewer

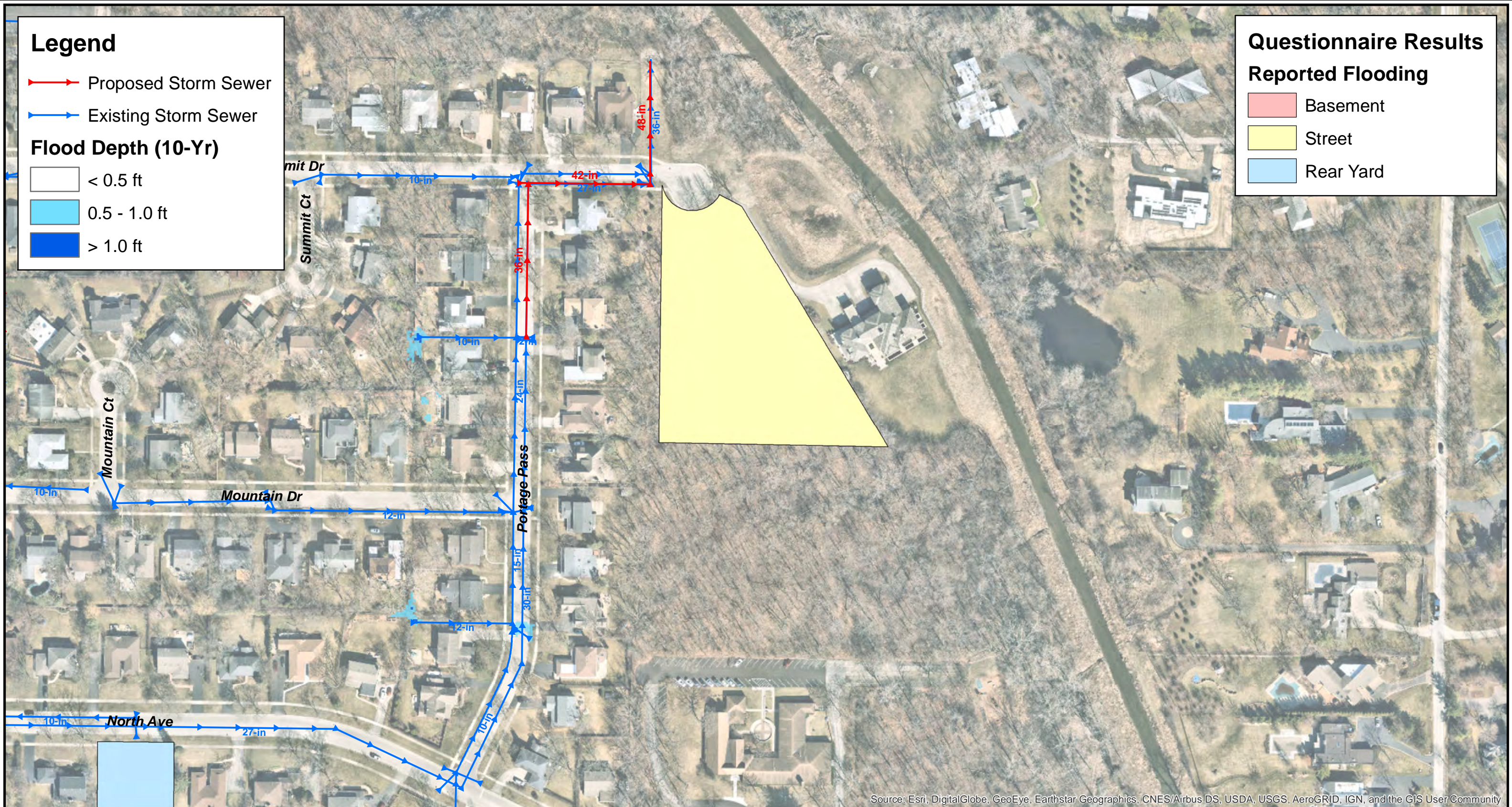
Flood Depth (10-Yr)

□ < 0.5 ft
 □ 0.5 - 1.0 ft
 □ > 1.0 ft

Questionnaire Results


Reported Flooding

□ Basement
 □ Street
 □ Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet

 <p>Christopher B. Burke Engineering, Ltd. 9575 West Higgins Road, Suite 600 Rosemont, IL 60018 (847) 823-0500 / FAX (847) 823-0520</p>	<p>CLIENT VILLAGE OF DEERFIELD</p>	<p>PROJECT NO. 190486</p>	<p>DSGN.</p>	<p>CHKD.</p>
	<p>TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA E2</p>		<p>DATE 05/21/2021</p>	
			<p>EXHIBIT 36</p>	

Legend

Existing Storm Sewer

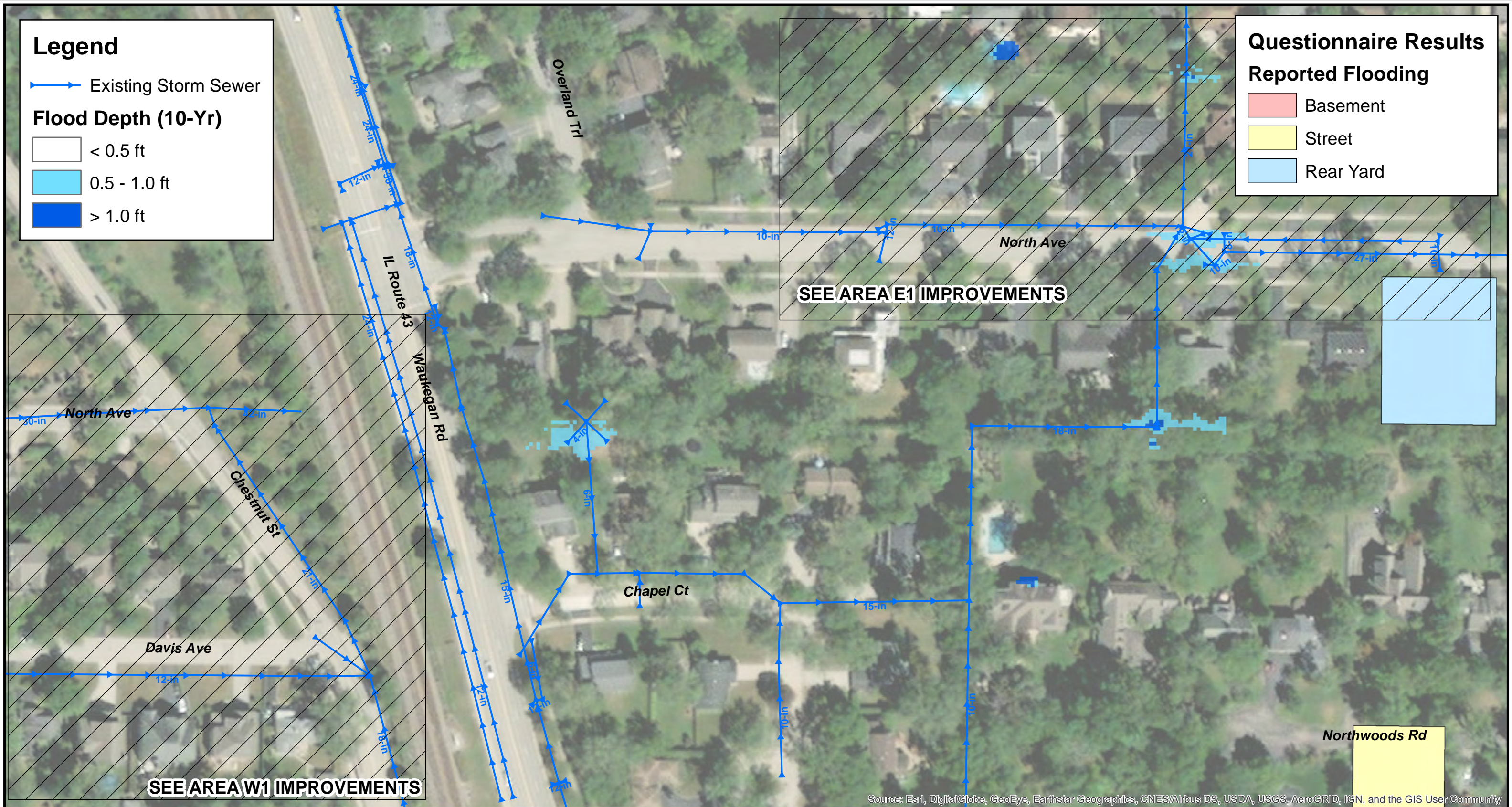
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

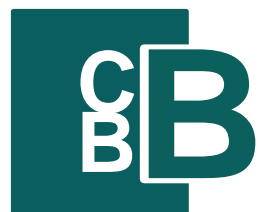
Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet




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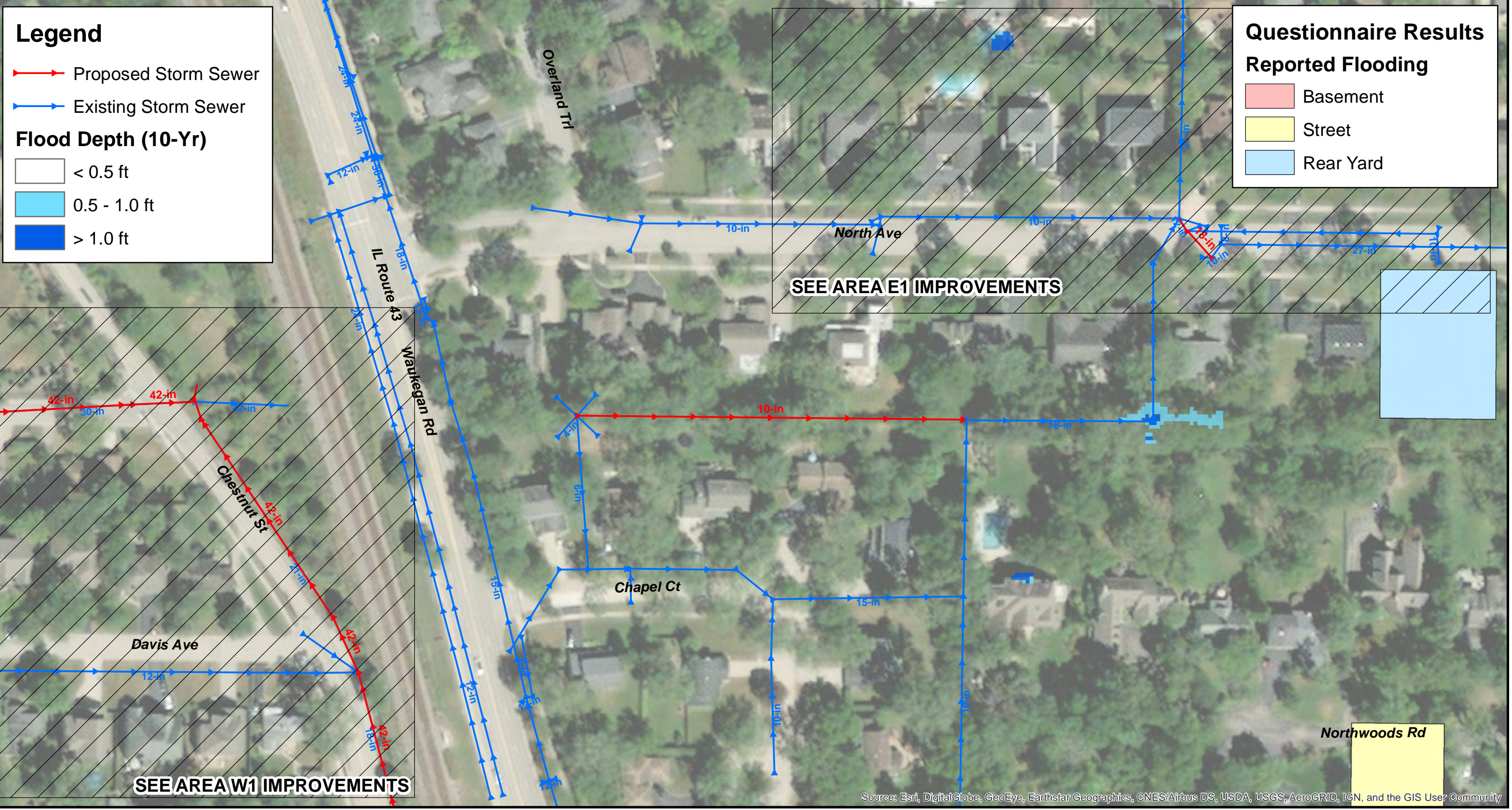
CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E3

DSGN.	CHKD.
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DATE 05/21/2021
EXHIBIT 37



Legend

→ Proposed Storm Sewer
 → Existing Storm Sewer

Flood Depth (10-Yr)

□ < 0.5 ft
 □ 0.5 - 1.0 ft
 □ > 1.0 ft

Questionnaire Results

Reported Flooding

□ Basement
 □ Street
 □ Rear Yard

1 inch = 100 feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

DSGN. **CHKD.**

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA E3



DATE 05/21/2021

EXHIBIT 38

Legend

Existing Storm Sewer

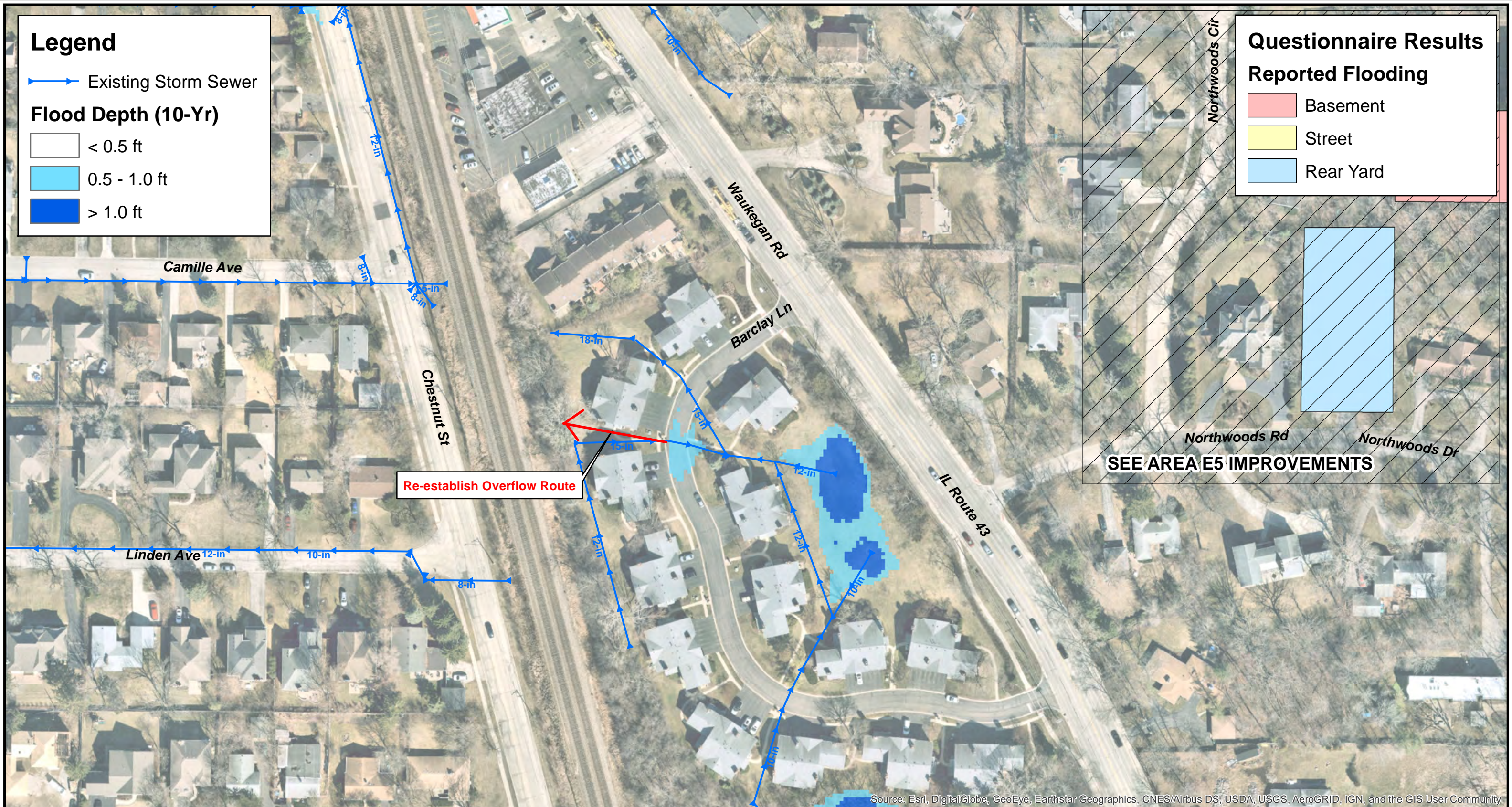
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

DSGN. **CHKD.**

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E4



DATE 05/21/2021

EXHIBIT 39

Legend

Existing Storm Sewer

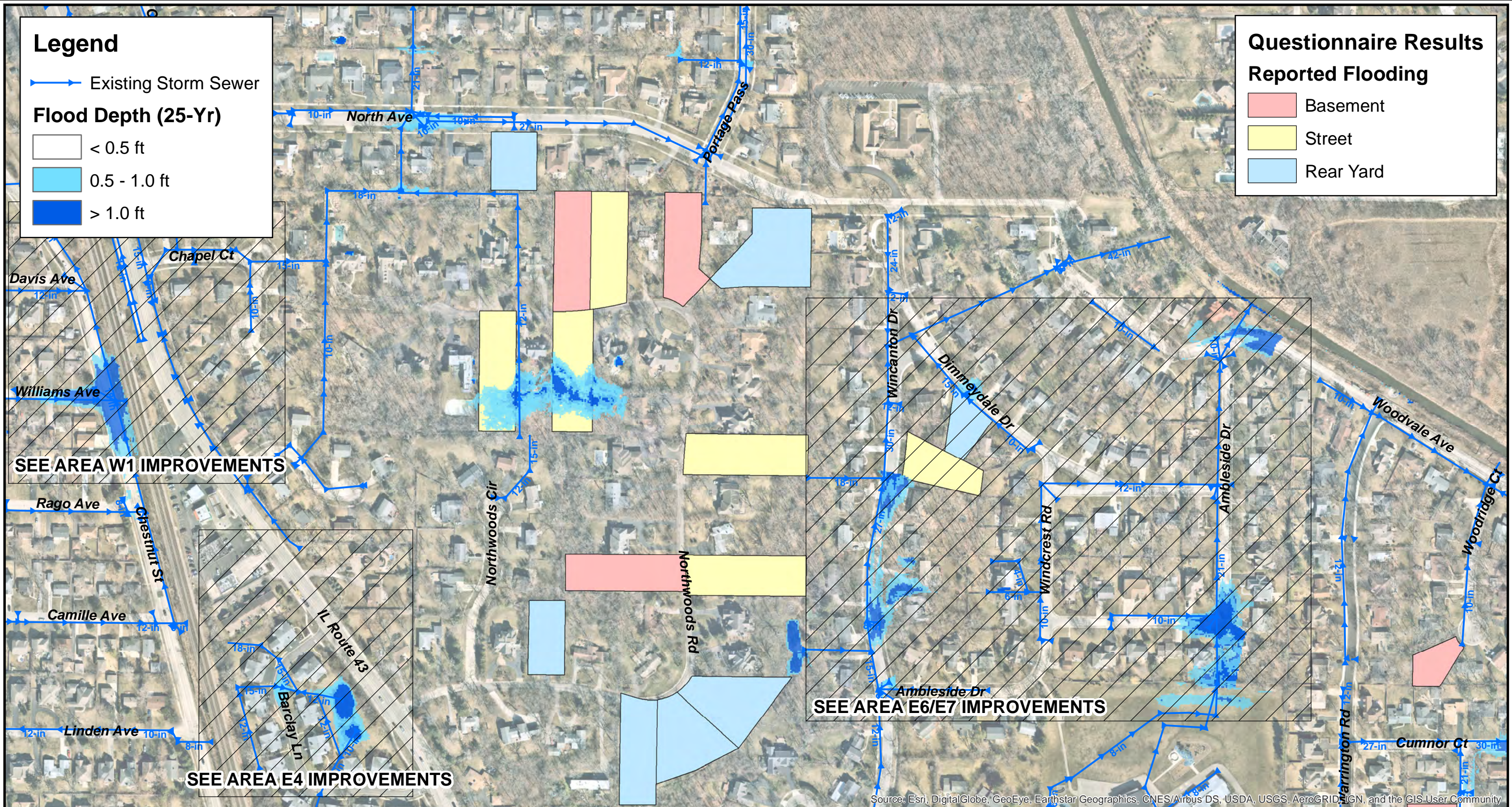
Flood Depth (25-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

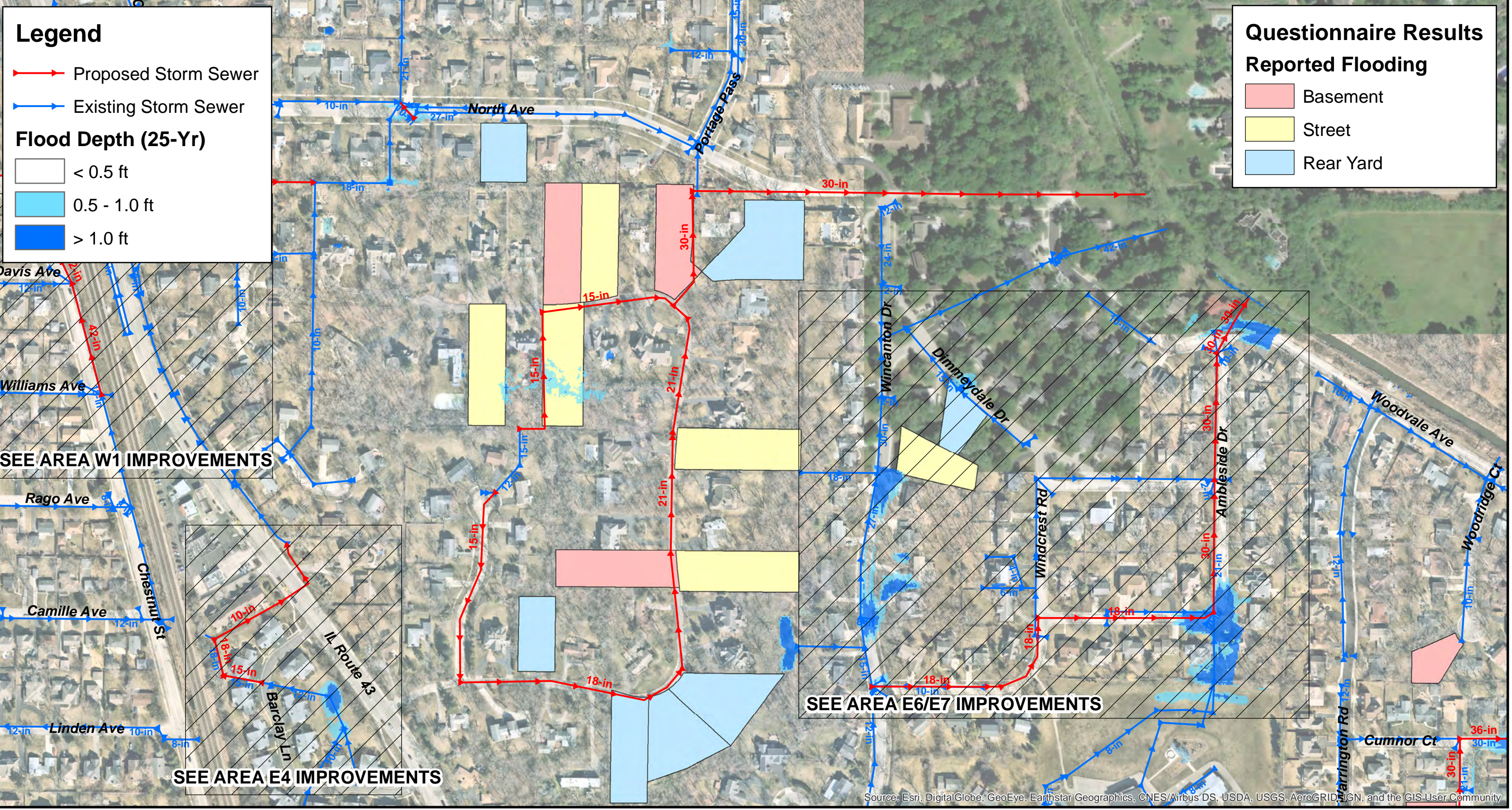
- Basement
- Street
- Rear Yard



1 inch = 250 feet

DSGN.	CHKD.
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	TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E5		DATE 05/21/2021
			EXHIBIT 40



Legend

- Proposed Storm Sewer
- Existing Storm Sewer

Flood Depth (25-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard

1 inch = 250 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA E5

DSGN.	CHKD.
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	DATE 05/21/2021
	EXHIBIT 41

Legend

Existing Storm Sewer

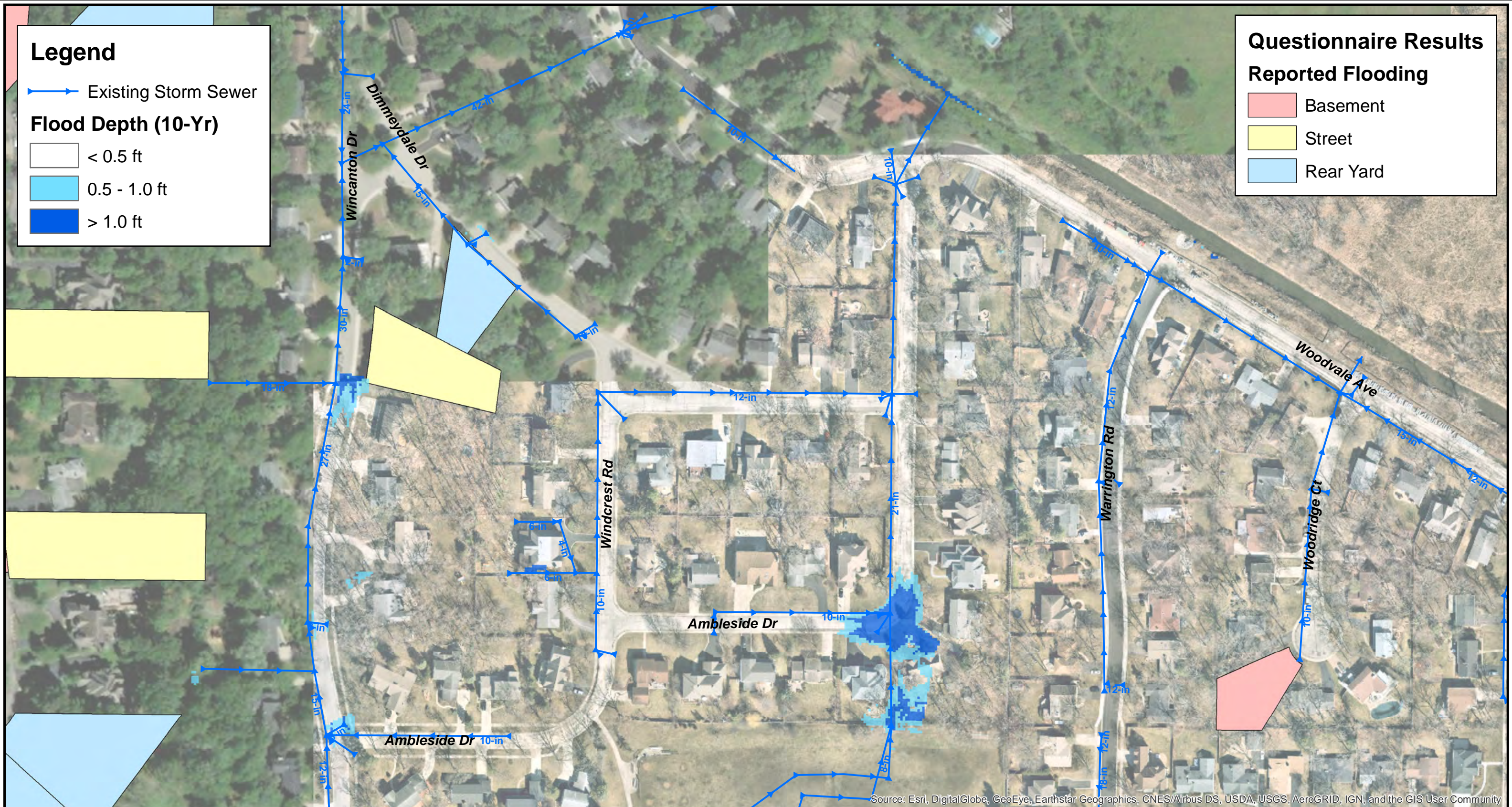
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E6/E7

DSGN.		CHKD.	
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	DATE 05/21/2021
	EXHIBIT 42

Legend

→ Proposed Storm Sewer

→ Existing Storm Sewer

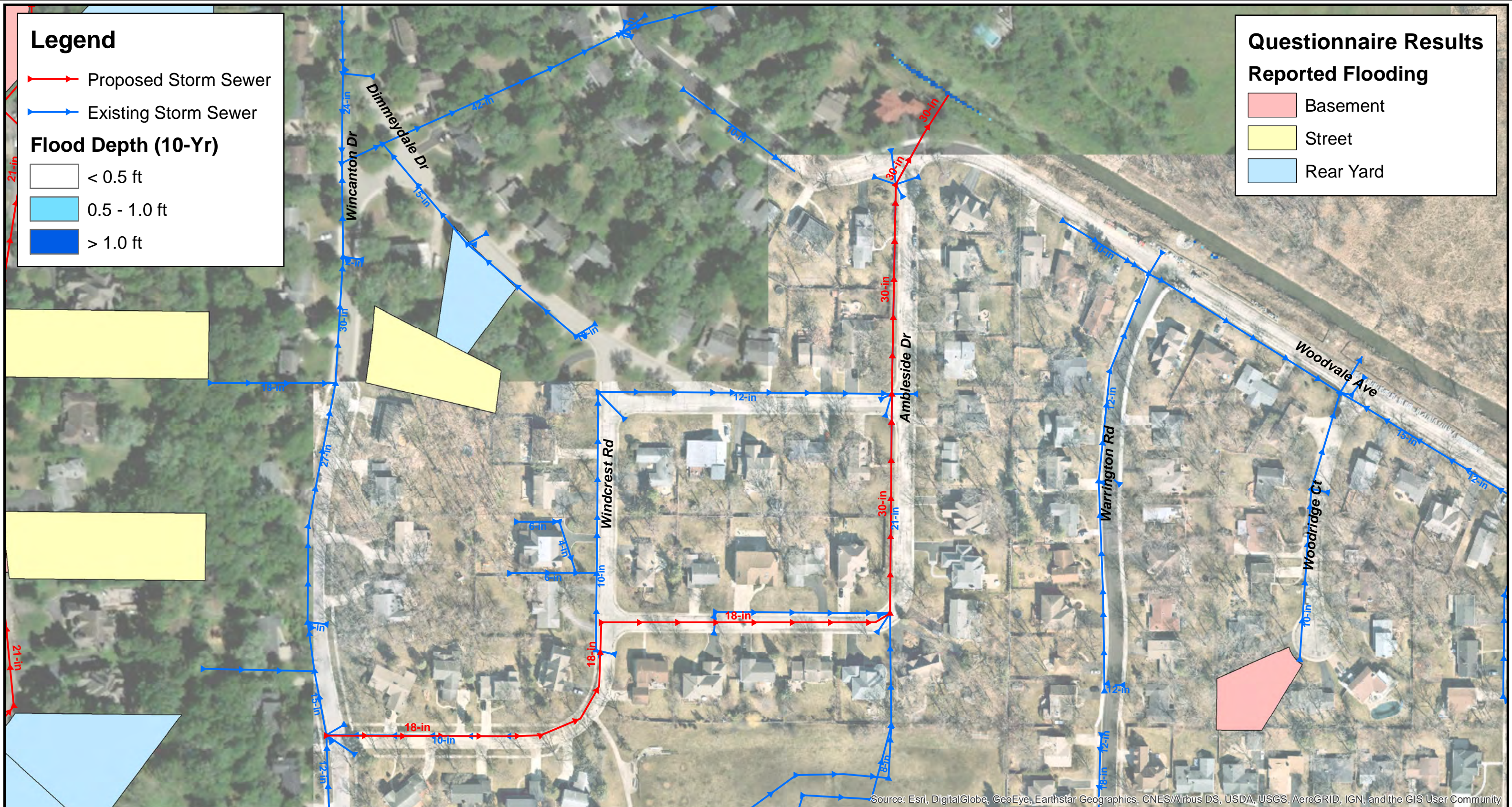
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

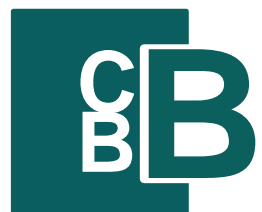
Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA E6/E7

DSGN.		CHKD.	
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	DATE 05/21/2021
	EXHIBIT 43

Legend

Existing Storm Sewer

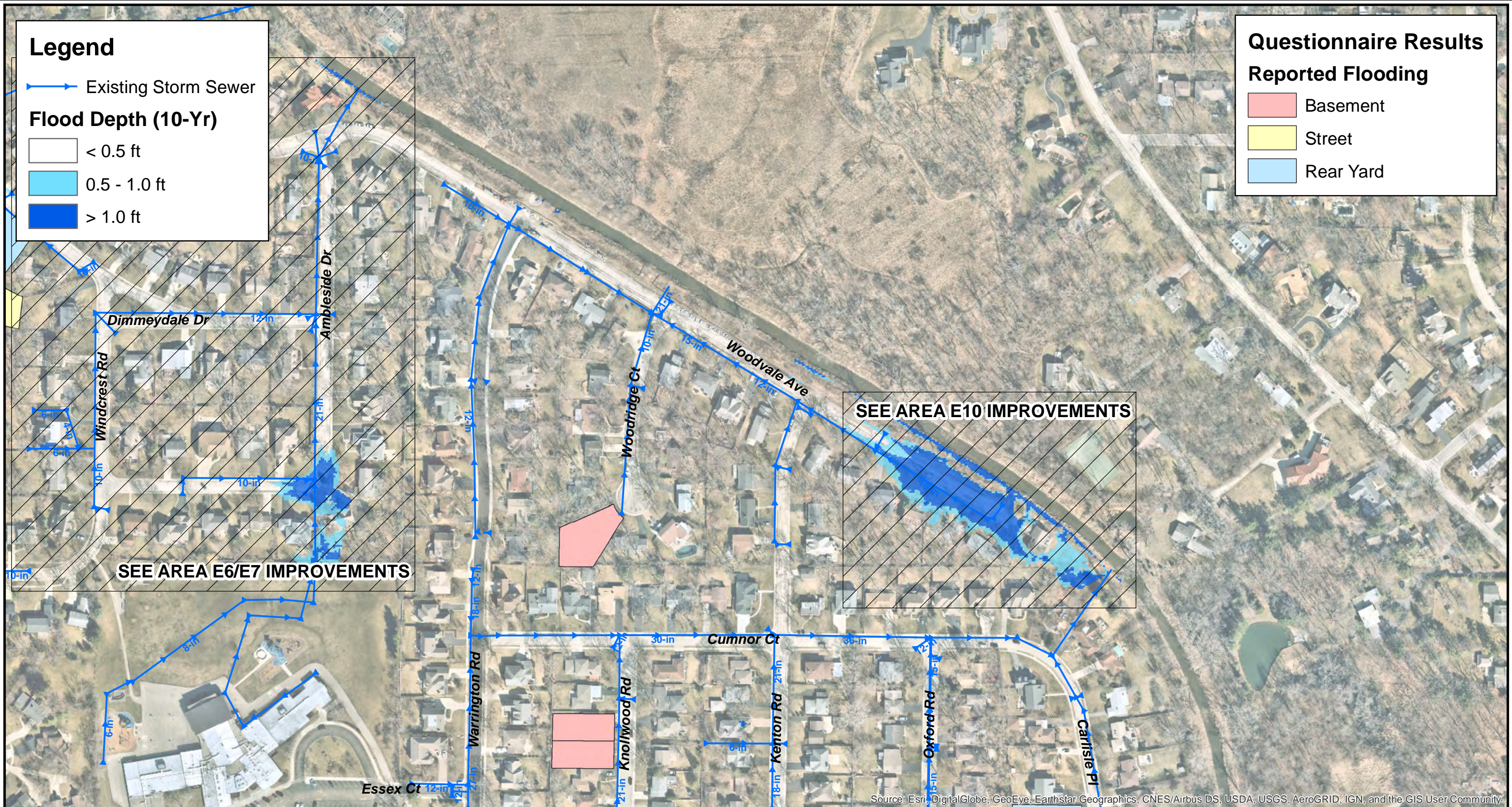
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E8/E9

DSGN. **CHKD.**

DATE 05/21/2021

EXHIBIT 44

Legend

Existing Storm Sewer

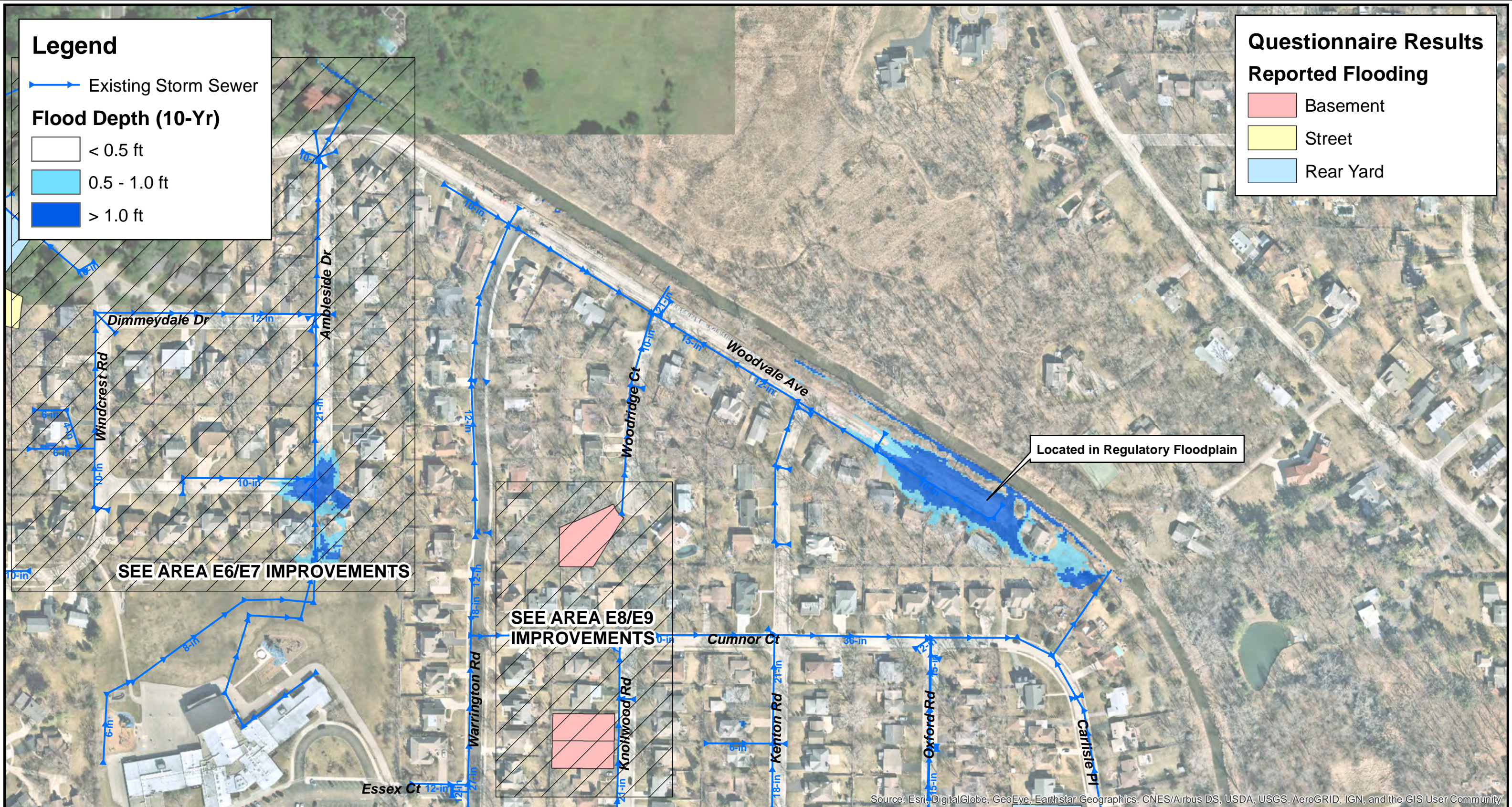
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E10

DSGN. **CHKD.**

DATE 05/21/2021
 EXHIBIT 45



Legend

Existing Storm Sewer

Flood Depth (10-Yr)

< 0.5 ft

0.5 - 1.0 ft

> 1.0 ft

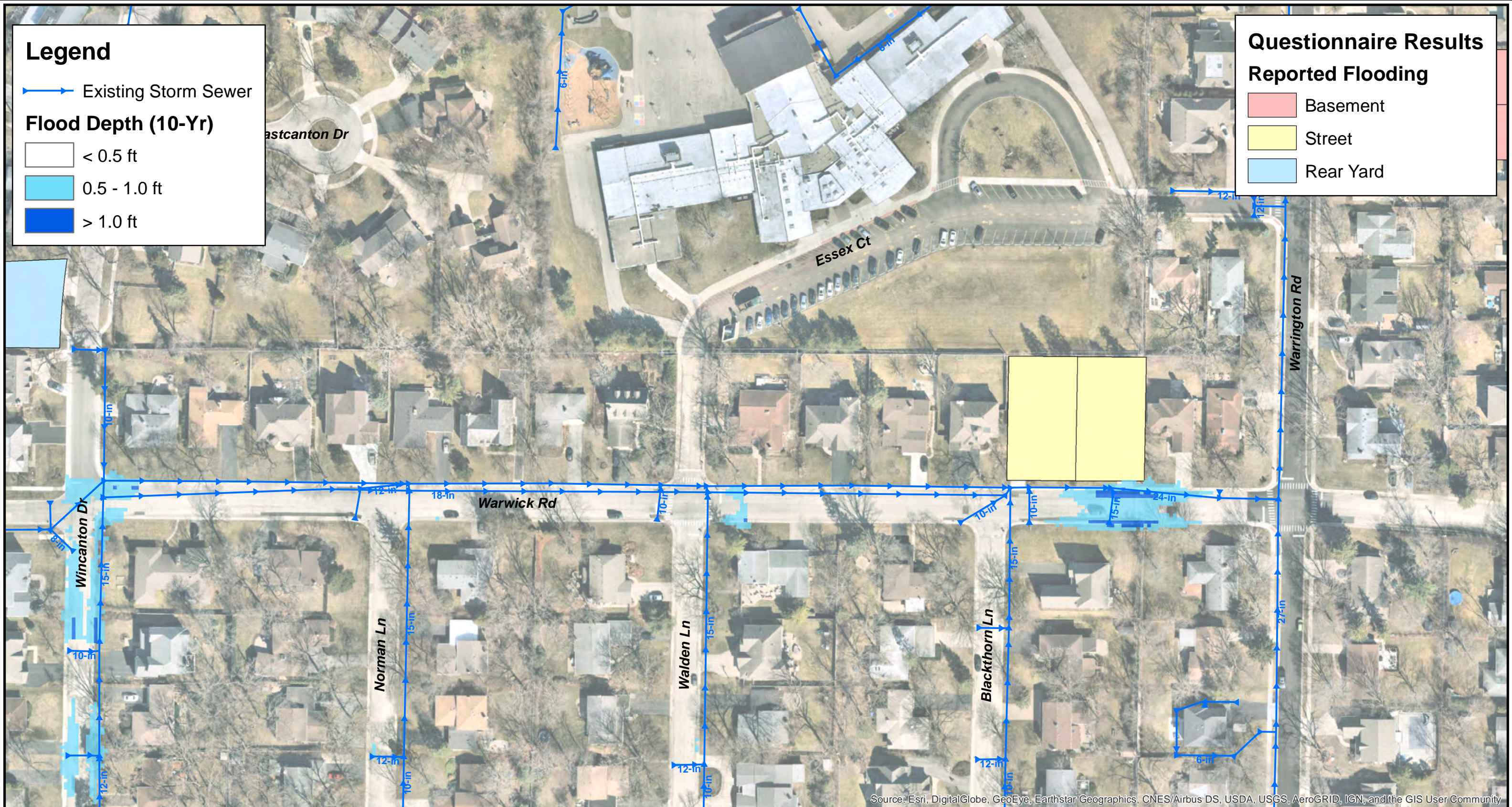
Questionnaire Results

Reported Flooding

Basement

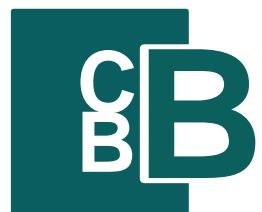
Street

Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E11/E12

DSGN.

CHKD.



DATE 05/21/2021

EXHIBIT 46


Legend

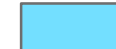
 Proposed Storage Area

 Proposed Storm Sewer

 Existing Storm Sewer

Flood Depth (10-Yr)

 < 0.5 ft

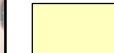
 0.5 - 1.0 ft

 > 1.0 ft

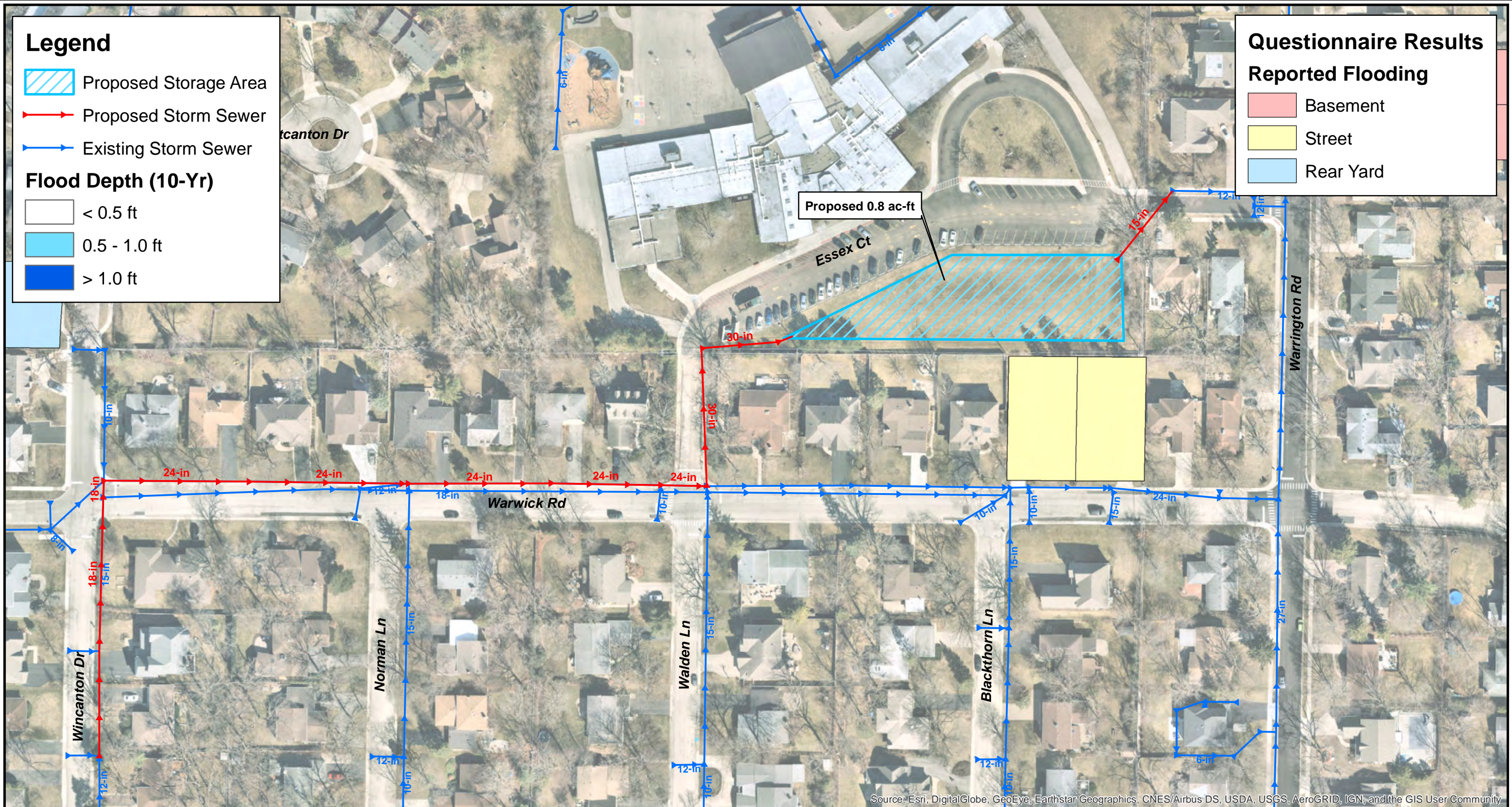
Questionnaire Results

Reported Flooding

 Basement

 Street

 Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet

DSGN.	CHKD.
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CLIENT	VILLAGE OF DEERFIELD	PROJECT NO.	190486
TITLE	PROPOSED CONDITIONS INUNDATION MAP, AREA E11/E12		

DATE	05/21/2021
	EXHIBIT 47

Legend

Existing Storm Sewer

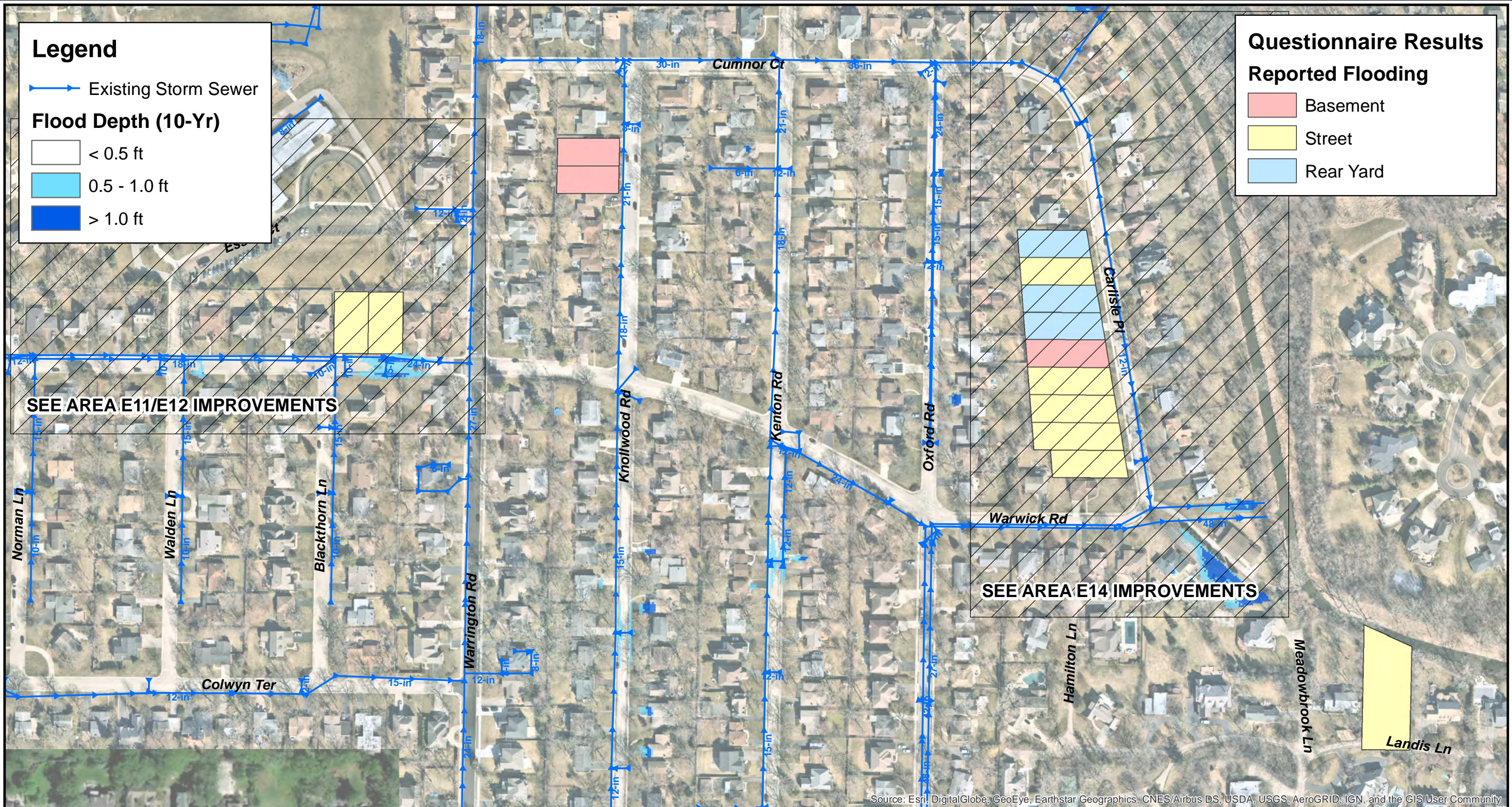
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E13

DSGN.	CHKD.
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	DATE 05/21/2021
	EXHIBIT 48

Legend

→ Proposed Storm Sewer
 → Existing Storm Sewer

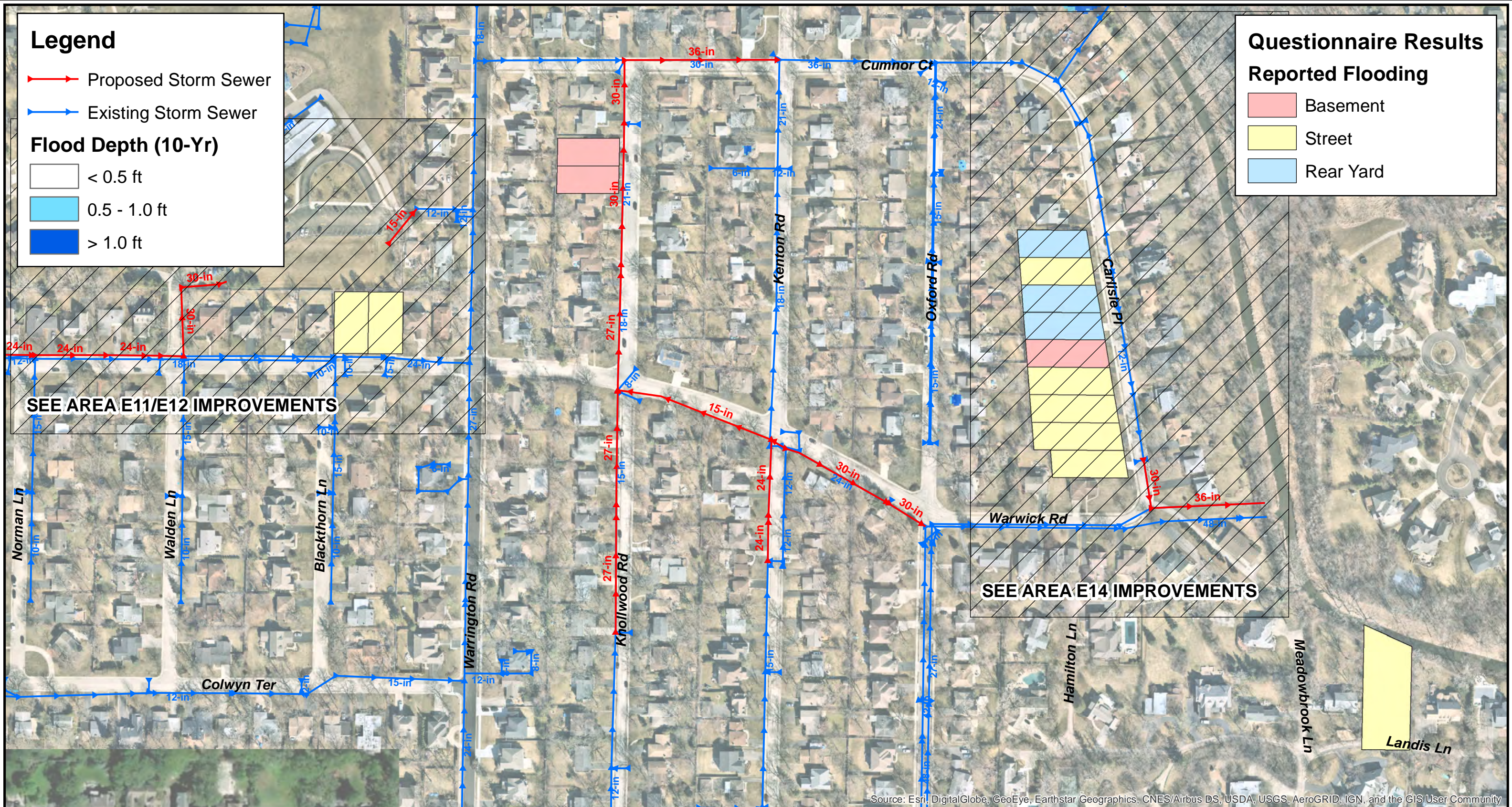
Flood Depth (10-Yr)

< 0.5 ft
 0.5 - 1.0 ft
 > 1.0 ft

Questionnaire Results

Reported Flooding

Basement
 Street
 Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA E13

DSGN.	CHKD.
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DATE	05/21/2021
	EXHIBIT 49



Legend

Existing Storm Sewer

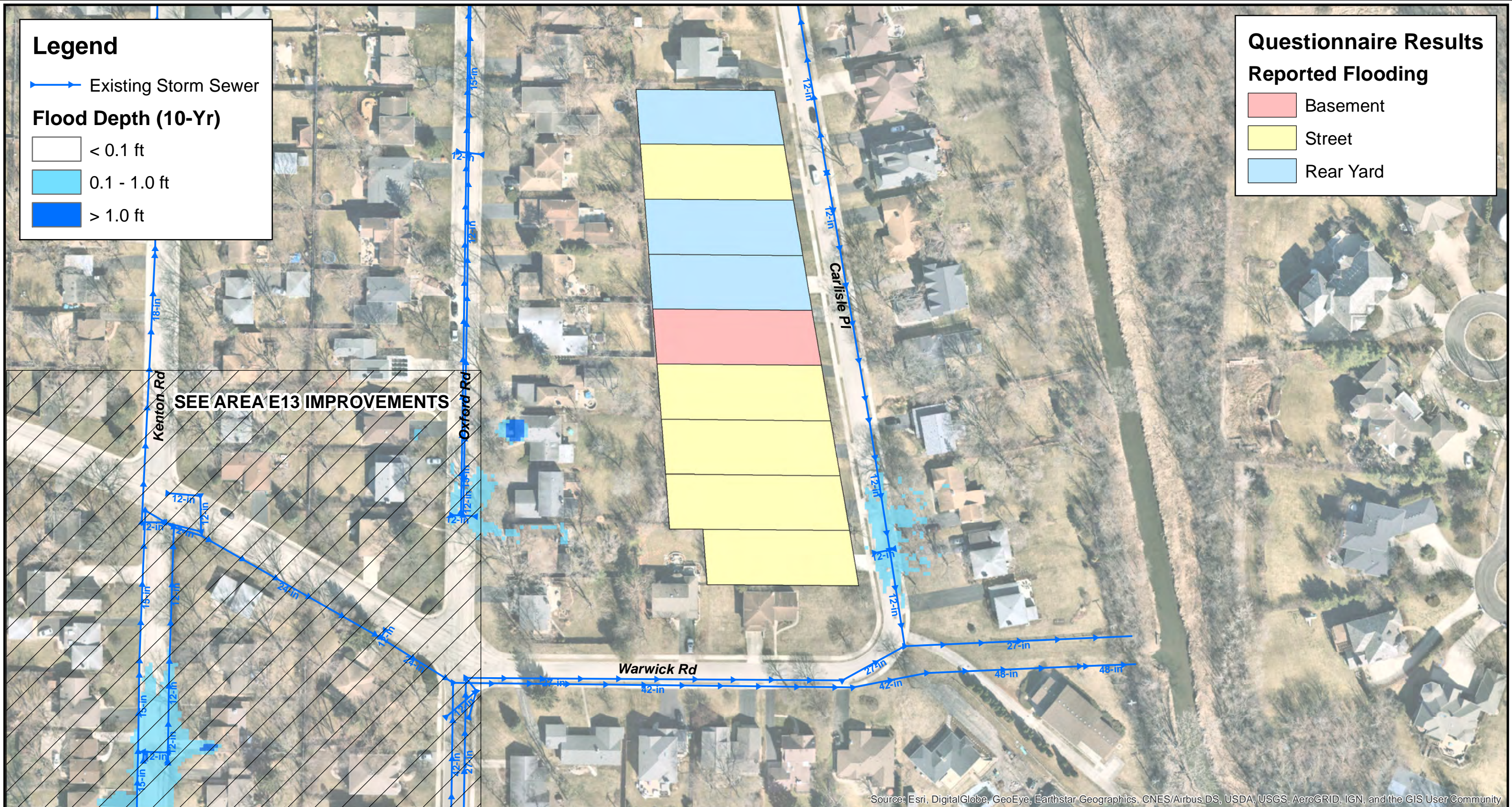
Flood Depth (10-Yr)

- < 0.1 ft
- 0.1 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



1 inch = 100 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E14

DSGN.		CHKD.	
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DATE 05/21/2021
EXHIBIT 50

Legend

→ Proposed Storm Sewer

→ Existing Storm Sewer

Flood Depth (10-Yr)

< 0.5 ft

0.5 - 1.0 ft

> 1.0 ft

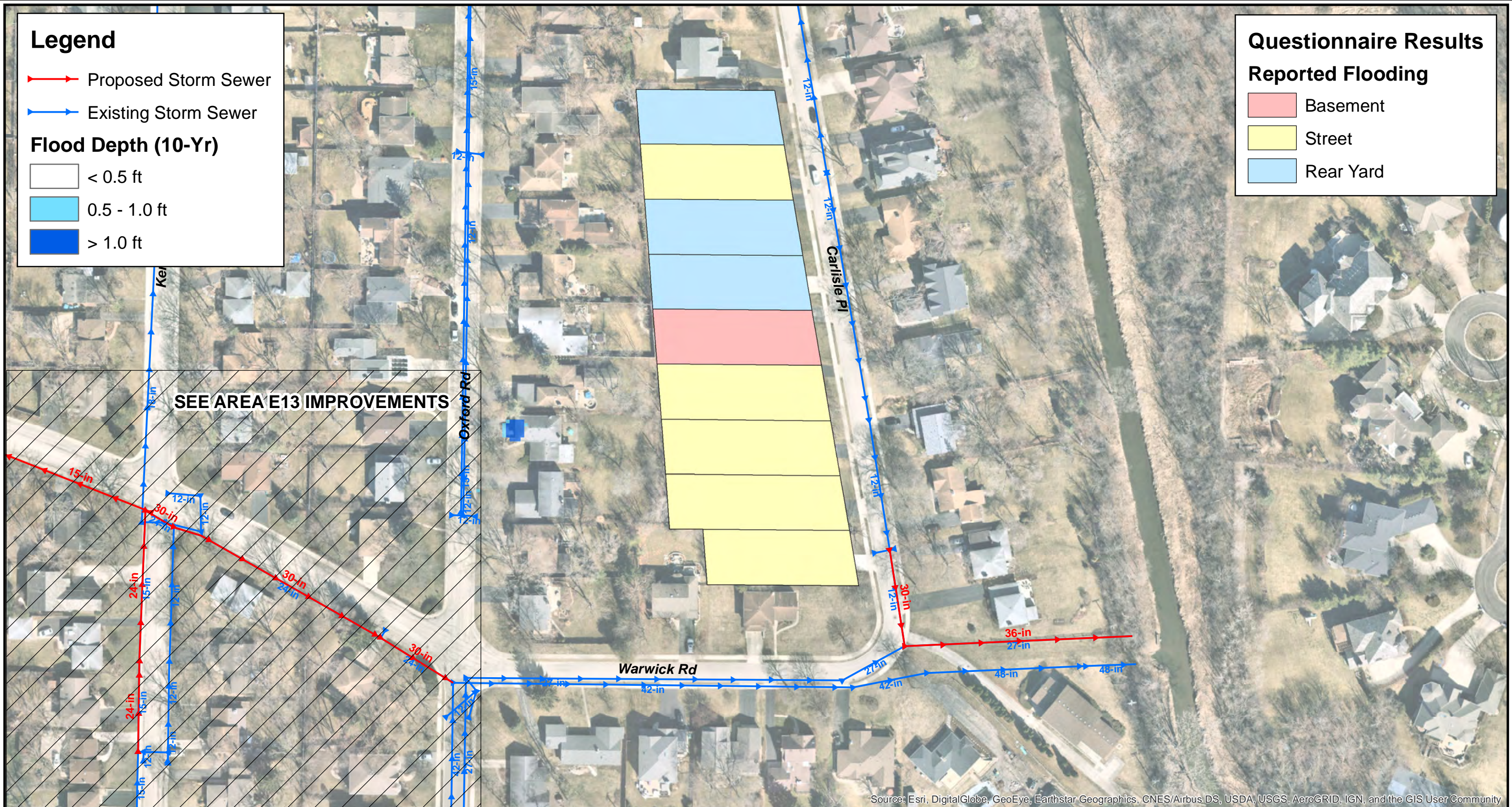
Questionnaire Results

Reported Flooding

Basement

Street

Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA E14

DSGN. **CHKD.**

DATE 05/21/2021

EXHIBIT 51

Legend

Existing Storm Sewer

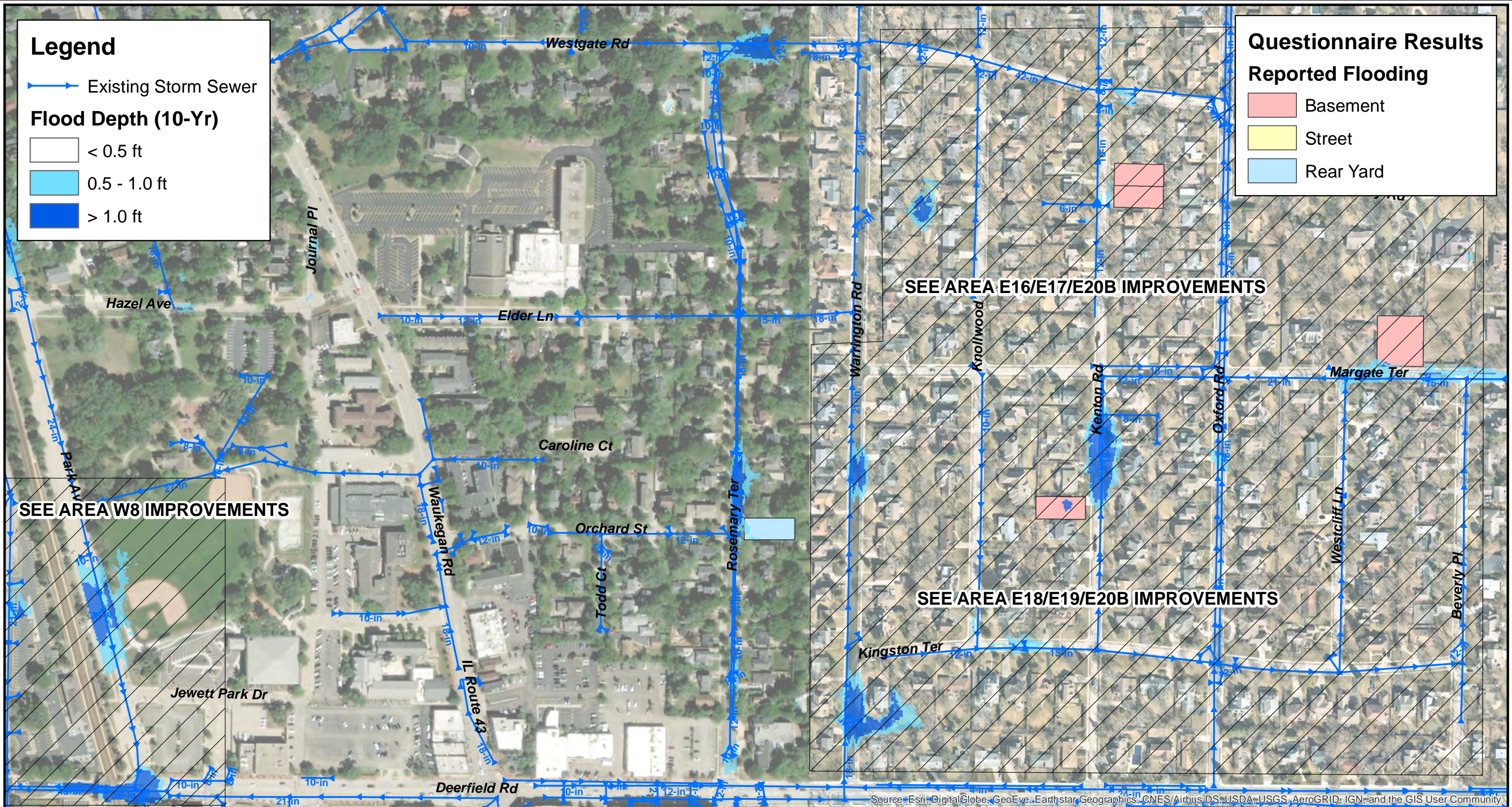
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar, Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 250 feet



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CLIENT	VILLAGE OF DEERFIELD	PROJECT NO.	190486	DSGN.		CHKD.	
	TITLE		EXISTING CONDITIONS INUNDATION MAP, AREA E15/E20A		DATE		05/21/2021
							EXHIBIT 52



Legend

- Proposed Storm Sewer
- Existing Storm Sewer

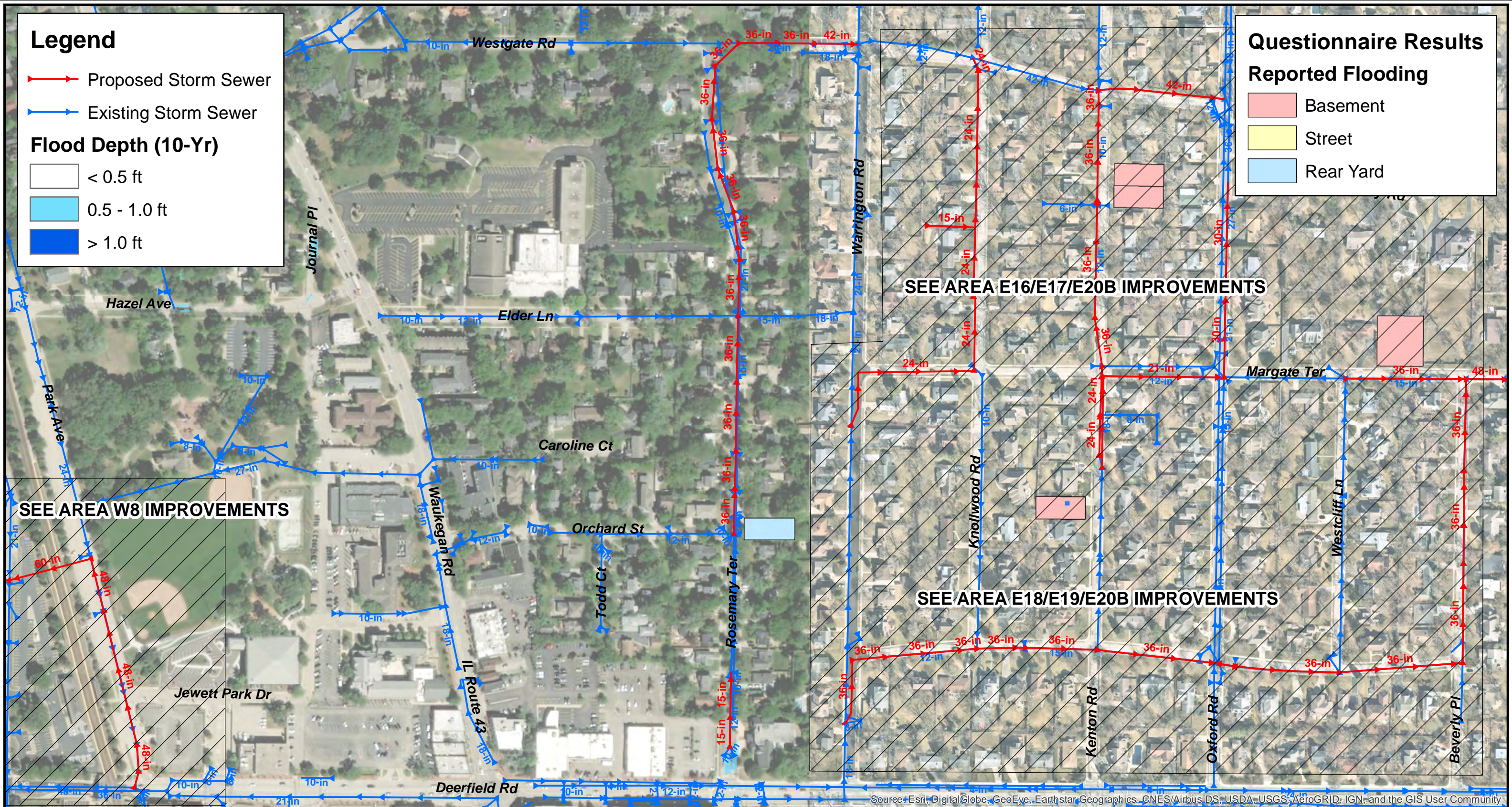
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



1 inch = 250 feet



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CLIENT	VILLAGE OF DEERFIELD	PROJECT NO.	190486	DSGN.		CHKD.	
TITLE	PROPOSED CONDITIONS INUNDATION MAP, AREA E15/E20A						
						DATE 05/21/2021 EXHIBIT 53	

Legend

Existing Storm Sewer

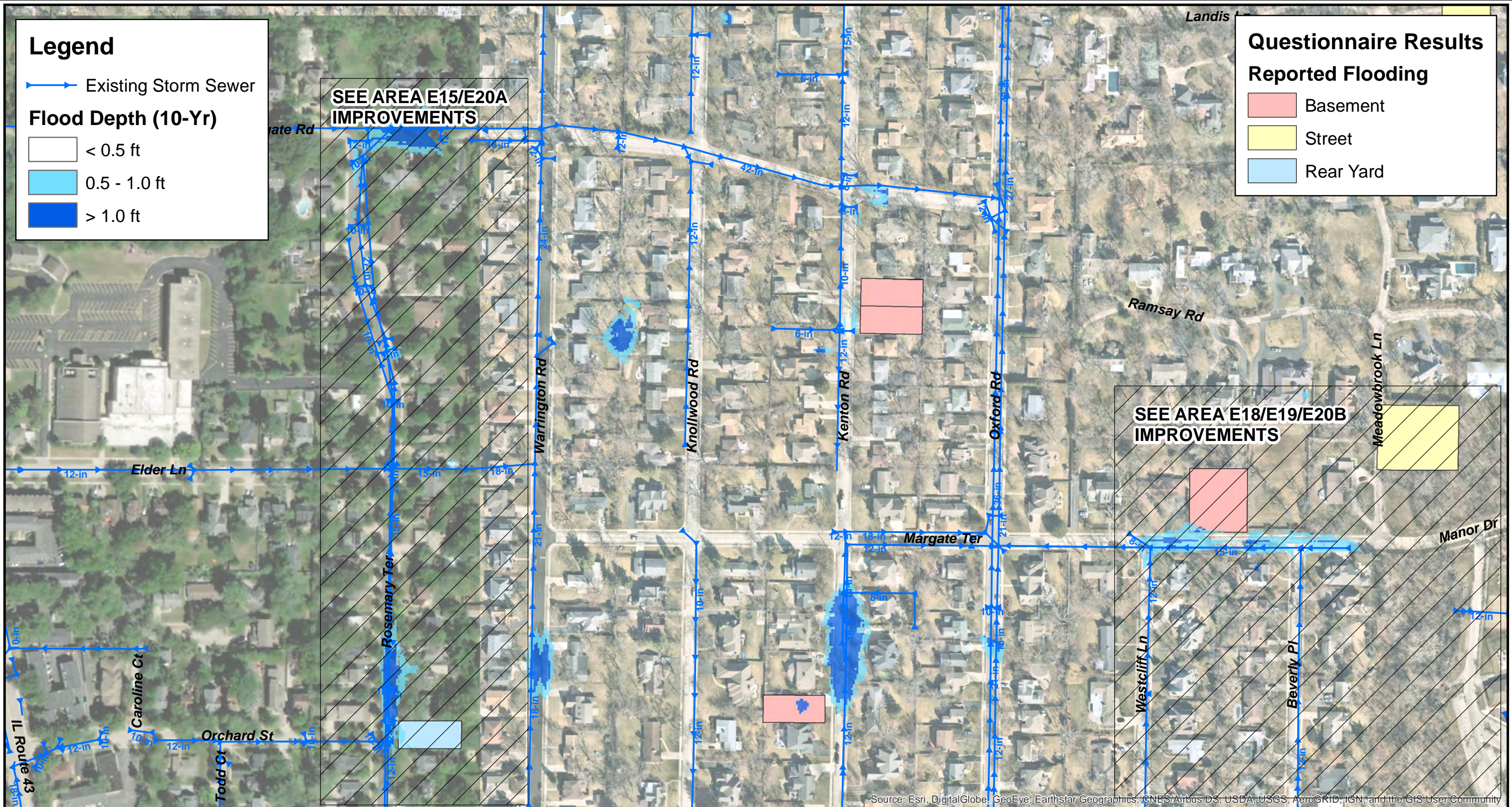
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREAS E16/E17/E20B

DSGN.		CHKD.	
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DATE 05/21/2021

EXHIBIT 54

Legend

→ Proposed Storm Sewer

→ Existing Storm Sewer

Flood Depth (10-Yr)

< 0.5 ft

0.5 - 1.0 ft

> 1.0 ft

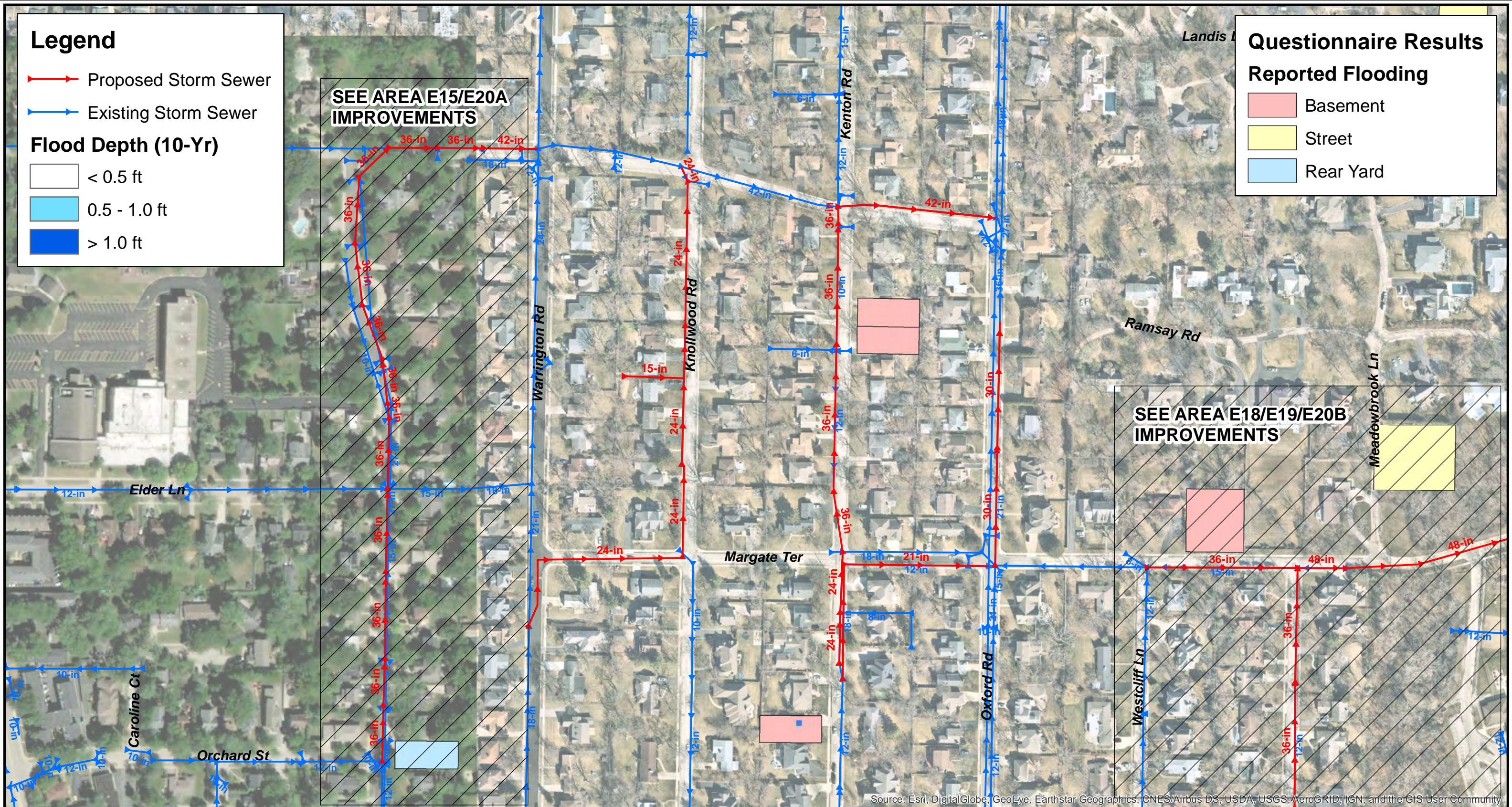
Questionnaire Results

Reported Flooding

Basement

Street

Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREAS E18/E19/E20B

DSGN.	CHKD.
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DATE	05/21/2021
	EXHIBIT 55



Legend

Existing Storm Sewer

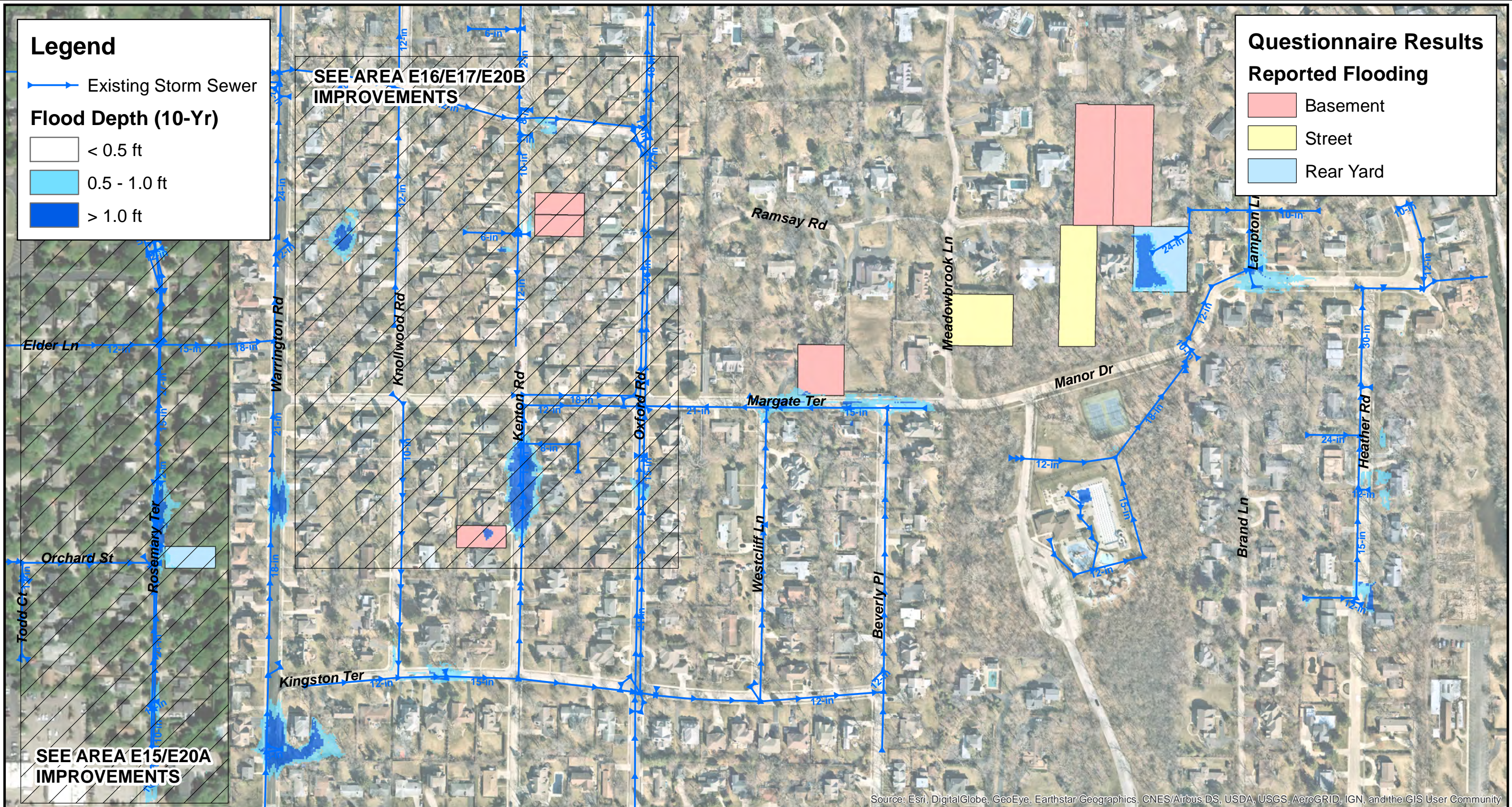
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

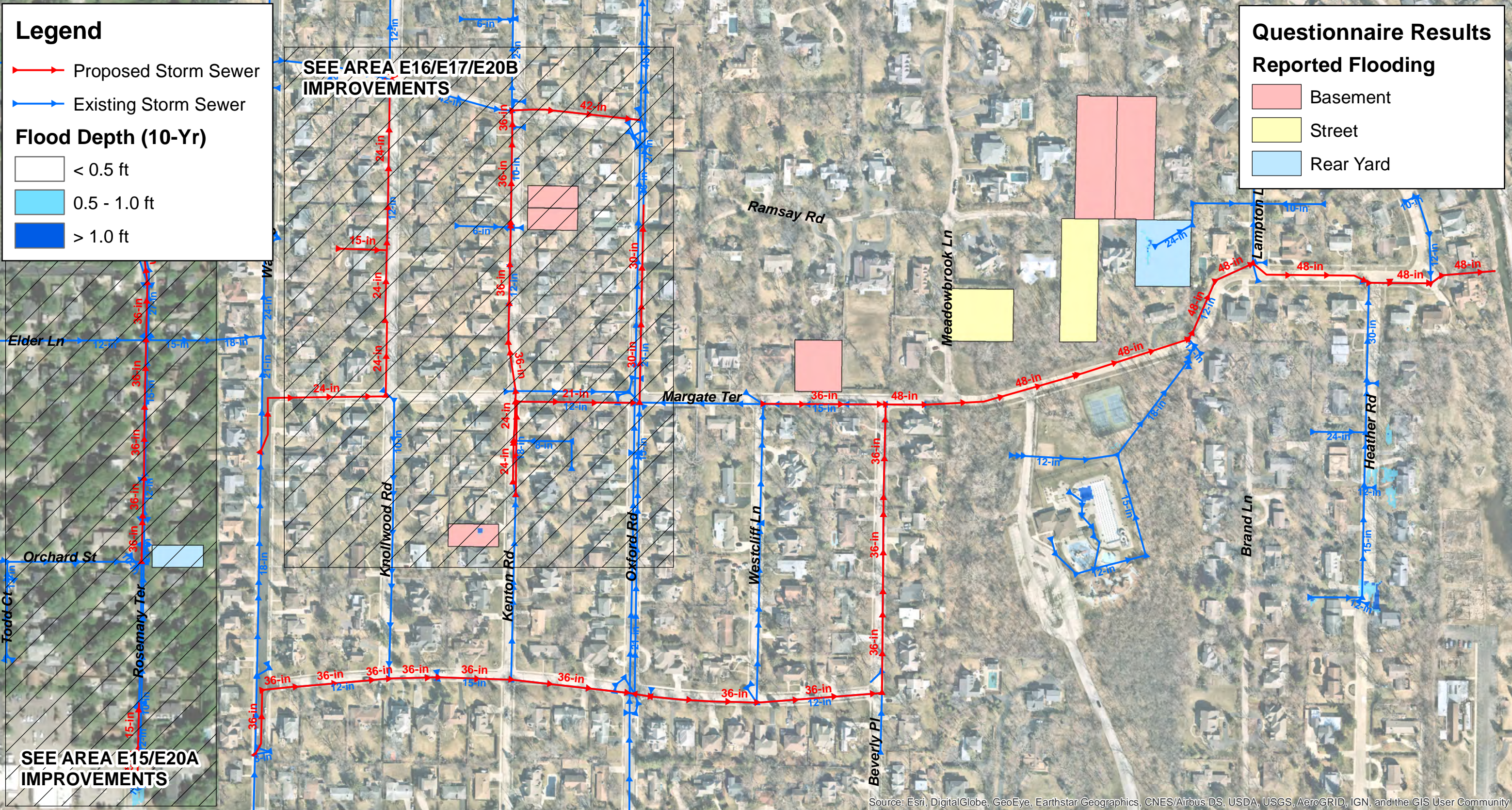
1 inch = 250 feet



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CLIENT	VILLAGE OF DEERFIELD	PROJECT NO.	190486
TITLE	EXISTING CONDITIONS INUNDATION MAP, AREAS E18/E19/E20B		

DSGN.		CHKD.	
		DATE	05/21/2021
		EXHIBIT 56	



Legend

→ Proposed Storm Sewer
 → Existing Storm Sewer

Flood Depth (10-Yr)

□ < 0.5 ft
 □ 0.5 - 1.0 ft
 □ > 1.0 ft

Questionnaire Results

Reported Flooding

□ Basement
 □ Street
 □ Rear Yard

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 250 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREAS E18/E19/E20B

DSGN.		CHKD.	
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DATE 05/21/2021

EXHIBIT 57

Legend

Existing Storm Sewer

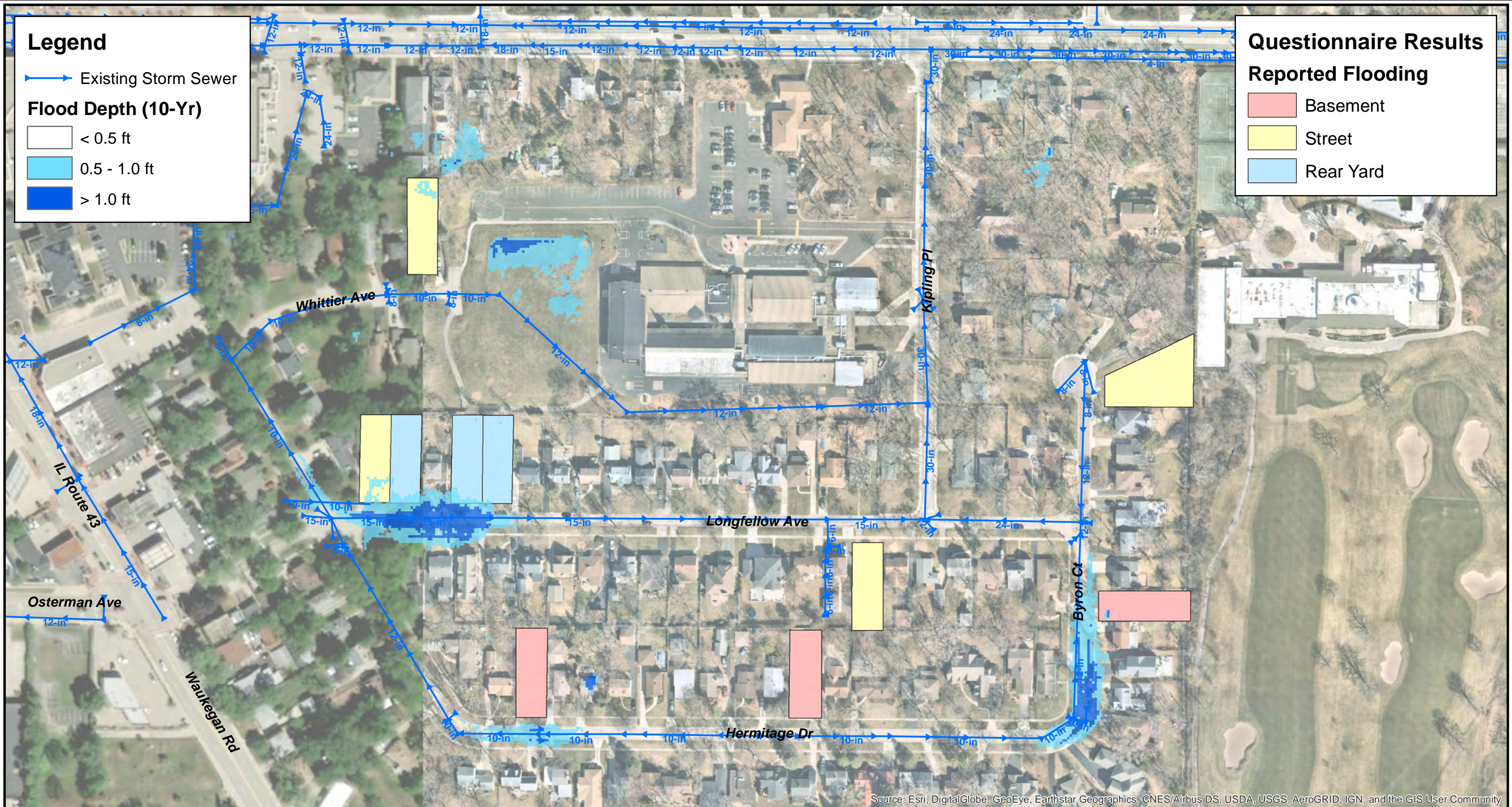
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

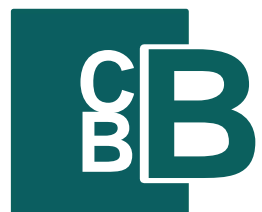
Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet



Christopher B. Burke Engineering, Ltd.
 9575 West Higgins Road, Suite 600
 Rosemont, IL 60018
 (847) 823-0500 / FAX (847) 823-0520

CLIENT VILLAGE OF DEERFIELD


PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E21

DSGN.		CHKD.	
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DATE 05/21/2021
EXHIBIT 58

Legend


 Proposed Storage Area

 Proposed Storm Sewer

 Existing Storm Sewer

Flood Depth (10-Yr)

 < 0.5 ft


 0.5 - 1.0 ft

 > 1.0 ft

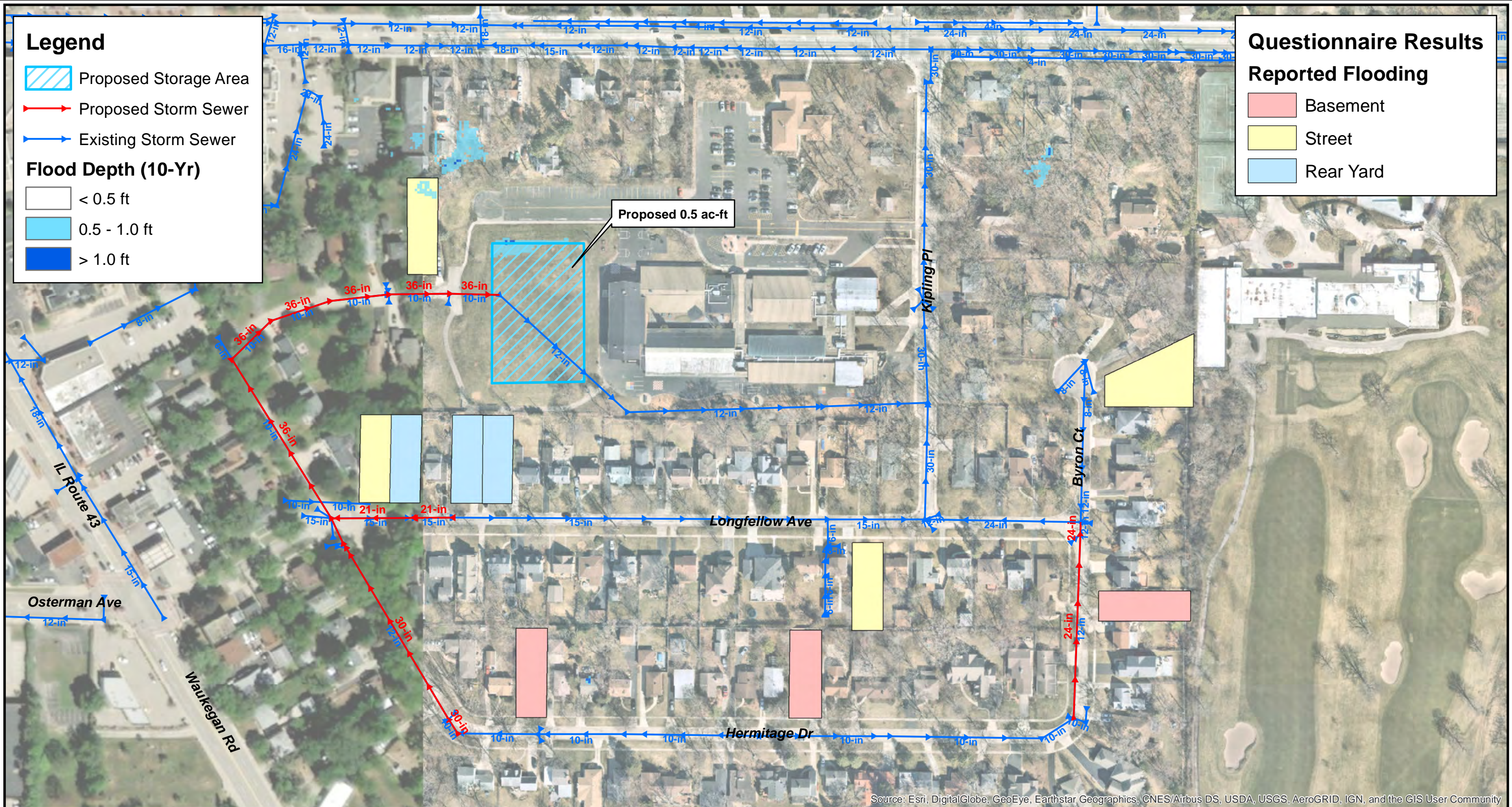
Questionnaire Results

Reported Flooding

 Basement

 Street

 Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA E21

DSGN.		CHKD.	
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DATE 05/21/2021

EXHIBIT 59

Legend

Existing Storm Sewer

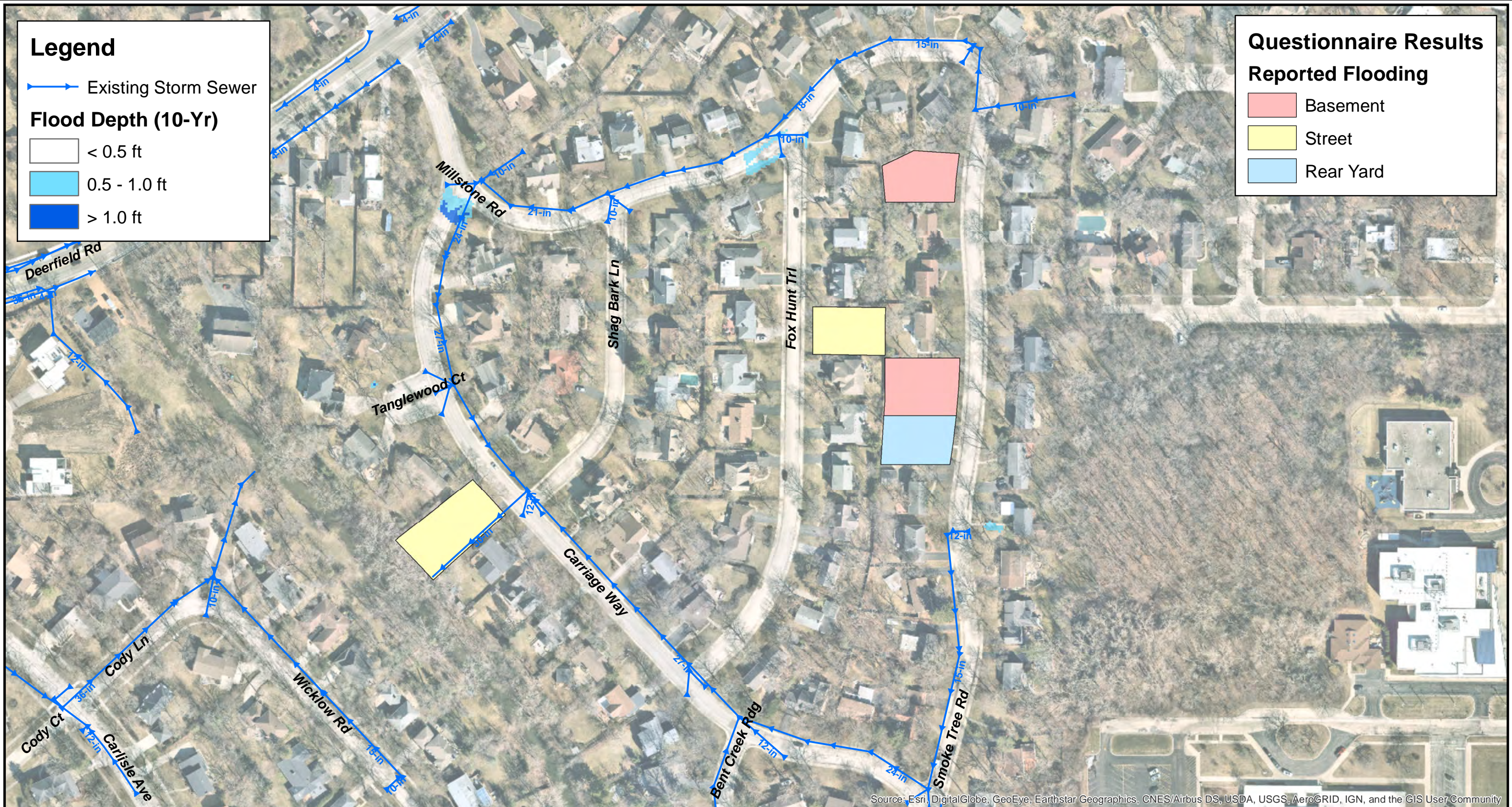
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E22

DSGN. **CHKD.**

DATE 05/21/2021

EXHIBIT 60

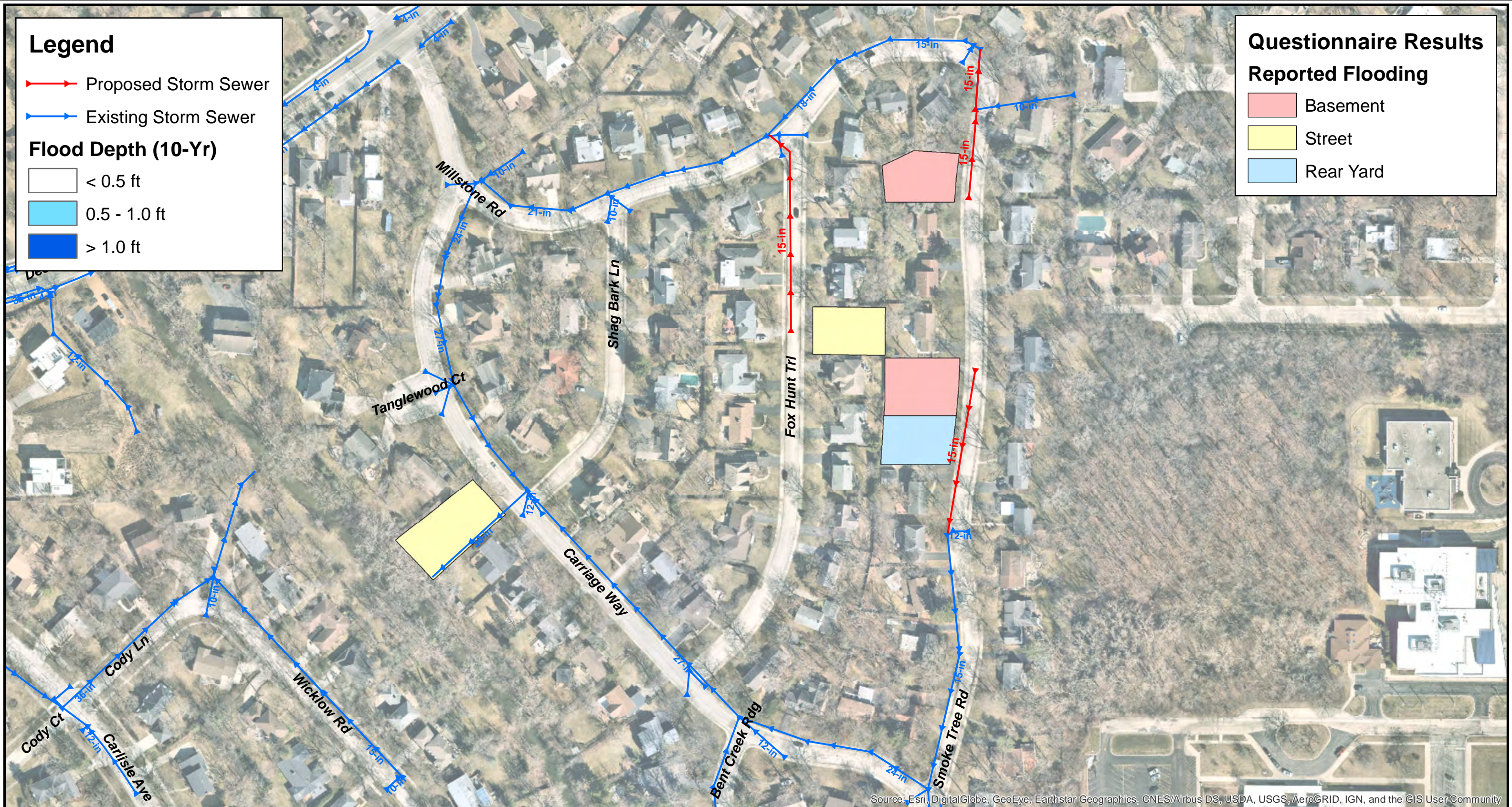


Legend

- Proposed Storm Sewer
 - Existing Storm Sewer
- Flood Depth (10-Yr)**
- < 0.5 ft
 - 0.5 - 1.0 ft
 - > 1.0 ft

Questionnaire Results

- Reported Flooding**
- Basement
 - Street
 - Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 150 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA E22

DSGN. **CHKD.**

DATE 05/21/2021

EXHIBIT 61



Legend

Existing Storm Sewer

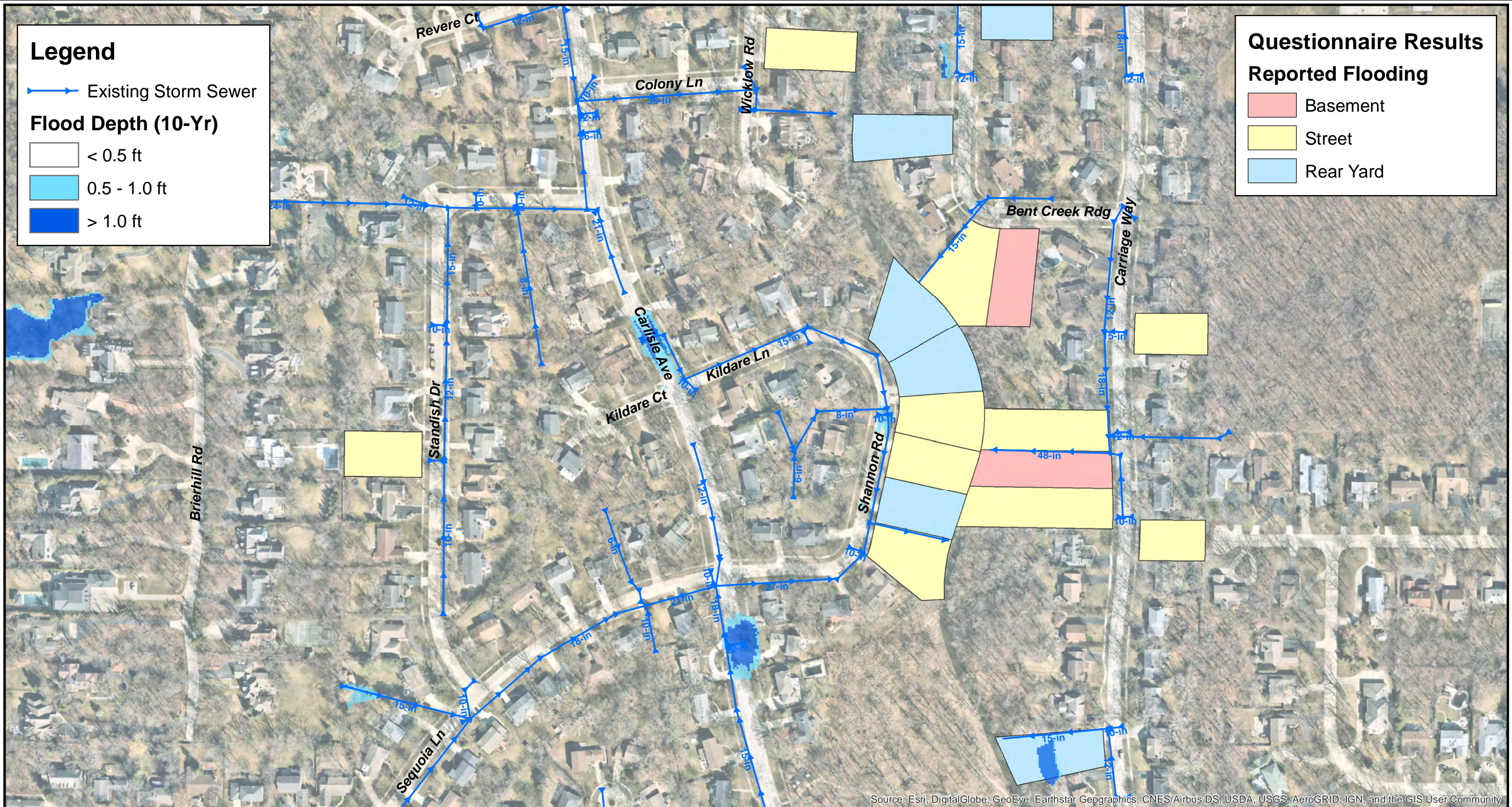
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486



TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E23

DSGN.		CHKD.	
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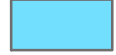

DATE 05/21/2021

EXHIBIT 62

Legend



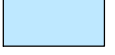
 Proposed Storm Sewer
 Existing Storm Sewer

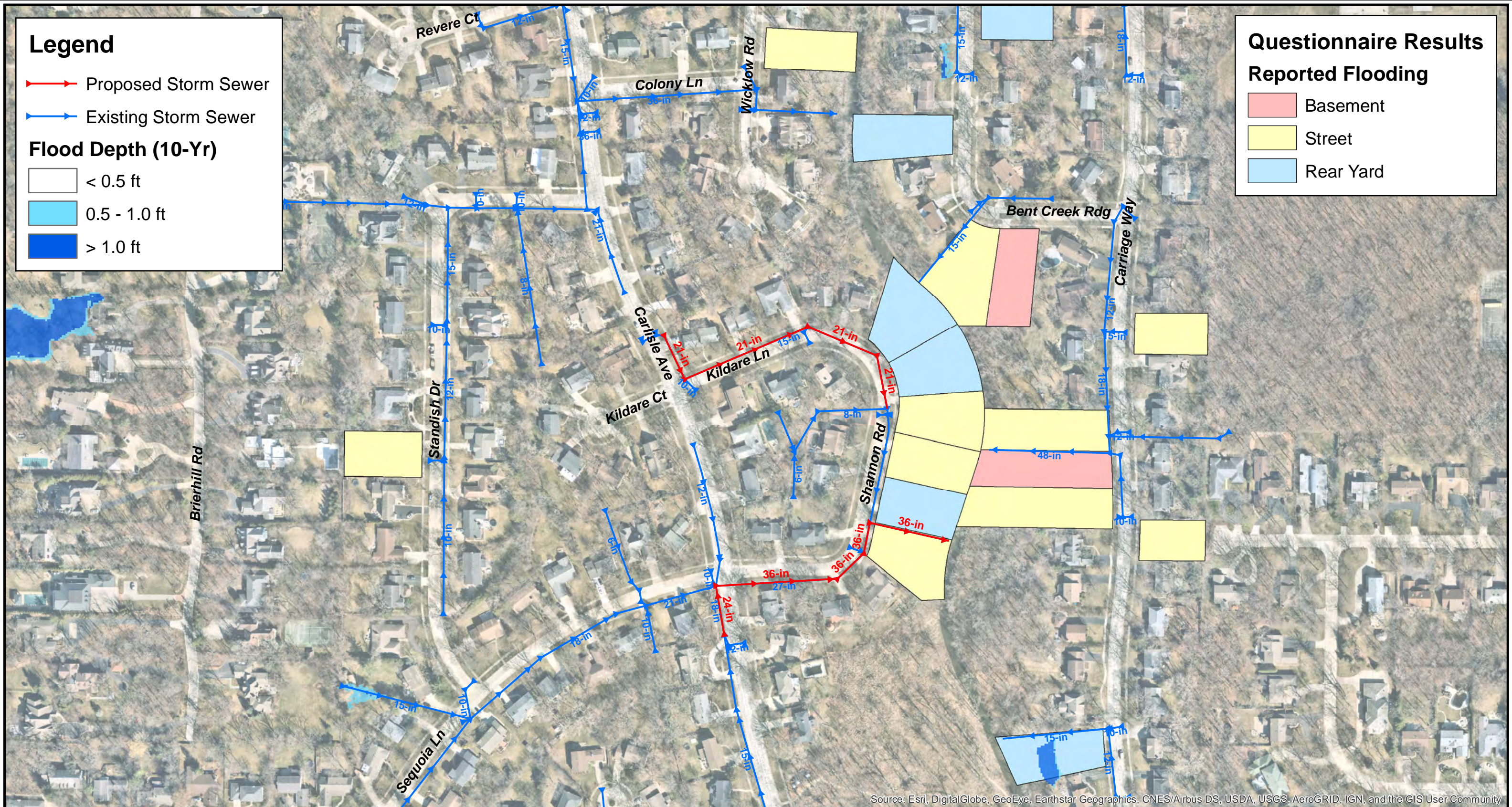
Flood Depth (10-Yr)

 < 0.5 ft
 0.5 - 1.0 ft
 > 1.0 ft

Questionnaire Results



Reported Flooding

 Basement
 Street
 Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 200 feet

 <p>Christopher B. Burke Engineering, Ltd. 9575 West Higgins Road, Suite 600 Rosemont, IL 60018 (847) 823-0500 / FAX (847) 823-0520</p>	<p>CLIENT</p> <p>VILLAGE OF DEERFIELD</p>	<p>PROJECT NO.</p> <p>190486</p>	<p>DSGN.</p>	<p>CHKD.</p>	
	<p>TITLE</p> <p>PROPOSED CONDITIONS INUNDATION MAP, AREA E23</p>			<p>DATE</p> <p>05/21/2021</p>	
				<p>EXHIBIT 63</p>	

Legend

Existing Storm Sewer

Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

DSGN.

CHKD.

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E24

DATE 05/21/2021

EXHIBIT 64



Legend

→ Proposed Storm Sewer
 → Existing Storm Sewer

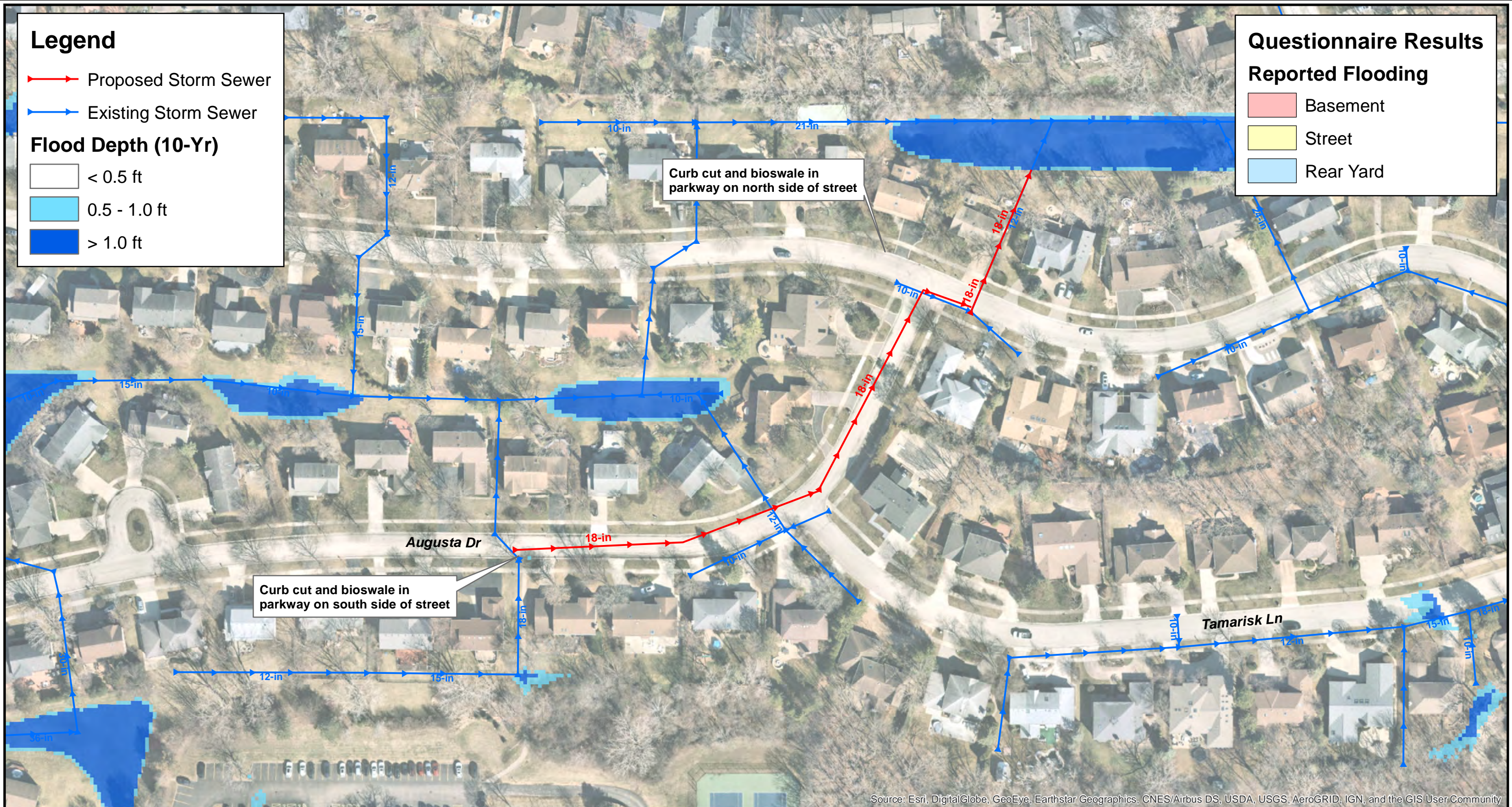
Flood Depth (10-Yr)

< 0.5 ft
 0.5 - 1.0 ft
 > 1.0 ft



Questionnaire Results

Reported Flooding

Basement
 Street
 Rear Yard



1 inch = 100 feet

 <p>Christopher B. Burke Engineering, Ltd. 9575 West Higgins Road, Suite 600 Rosemont, IL 60018 (847) 823-0500 / FAX (847) 823-0520</p>	<p>CLIENT VILLAGE OF DEERFIELD</p>	<p>PROJECT NO. 190486</p>	<p>DSGN.</p>	<p>CHKD.</p>
	<p>TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA E24</p>		<p></p> <p>DATE 05/21/2021</p>	

Legend

Existing Storm Sewer

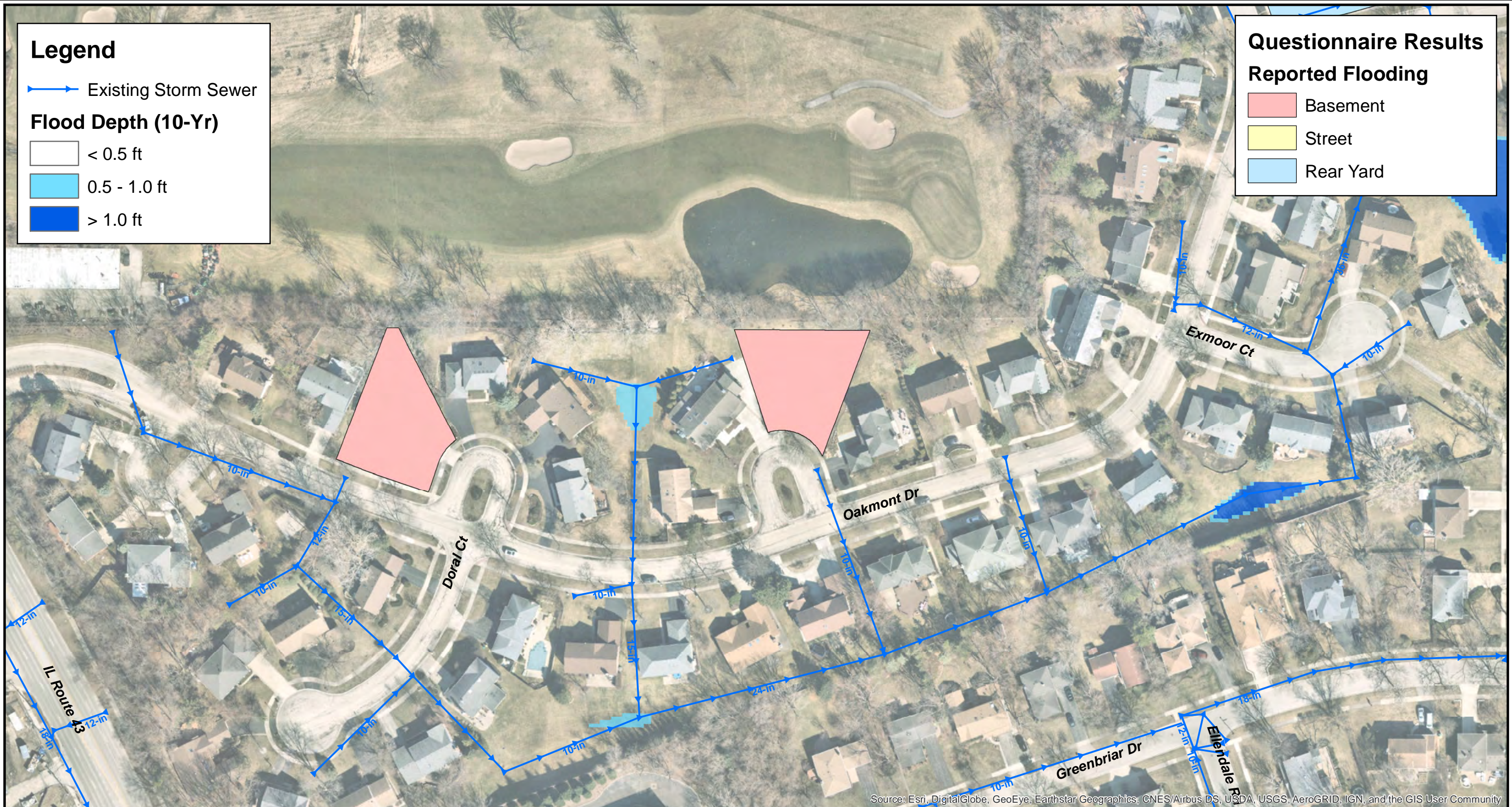
Flood Depth (10-Yr)

- < 0.5 ft
- 0.5 - 1.0 ft
- > 1.0 ft

Questionnaire Results

Reported Flooding

- Basement
- Street
- Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

DSGN.

CHKD.

TITLE EXISTING CONDITIONS INUNDATION MAP, AREA E25

DATE 05/21/2021

EXHIBIT 66



Legend

→ Proposed Storm Sewer

→ Existing Storm Sewer

Flood Depth (10-Yr)

< 0.5 ft

0.5 - 1.0 ft

> 1.0 ft

Questionnaire Results

Reported Flooding

Basement

Street

Rear Yard



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1 inch = 100 feet



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CLIENT VILLAGE OF DEERFIELD

PROJECT NO. 190486

DSGN.		CHKD.	
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TITLE PROPOSED CONDITIONS INUNDATION MAP, AREA E25



DATE 05/21/2021

EXHIBIT 67

APPENDIX 4
COST ESTIMATES, MIDDLE FORK



CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E1

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

			AREA E1		
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 5,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	900	\$ 5,400.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	900	\$ 9,000.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	707	\$ 31,815.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	100	\$ 8,500.00
	STORM SEWER, RCP 18"	FOOT	\$ 95.00	680	\$ 64,600.00
	STORM SEWER, RCP EQRS 27"	FOOT	\$ 150.00	95	\$ 14,250.00
	STORM SEWER, RCP EQRS 30"	FOOT	\$ 175.00	155	\$ 27,125.00
	STORM SEWER, RCP EQRS 36"	FOOT	\$ 200.00	355	\$ 71,000.00
	STORM SEWER, RCP EQRS 54"	FOOT	\$ 450.00	185	\$ 83,250.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	605	\$ 12,100.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	13	\$ 6,500.00
	INLET, TYPE A	EACH	\$ 1,800.00	4	\$ 7,200.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	3	\$ 13,500.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	2	\$ 13,000.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	4	\$ 32,000.00
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	2	\$ 18,000.00
MANHOLES, 9'-DIAMETER, TYPE A, T1F CL	EACH	\$ 15,000.00	1	\$ 15,000.00	
MANHOLES, 10'-DIAMETER, TYPE A, T1F CL	EACH	\$ 20,000.00	1	\$ 20,000.00	
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	32	\$ 1,600.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	32	\$ 1,600.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	96	\$ 288.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	1,215	\$ 54,675.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	400	\$ 4,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	70	\$ 7,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	80	\$ 3,200.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	1,290	\$ 83,850.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	25	\$ 6,875.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	50	\$ 12,500.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	6	\$ 21,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	6	\$ 15,000.00
MISC	MISC. SESS	L. SUM		1	\$ 14,000.00
	MOBILIZATION	L. SUM		1	\$ 27,000.00
	TRAFFIC CONTROL AND PROTECTION	L. SUM		1	\$ 27,000.00
	CONSTRUCTION LAYOUT	L. SUM		1	\$ 14,000.00

SUBTOTAL = \$	750,828.00
CONTINGENCY & MINOR ITEMS (25%) = \$	187,707.00
CONSTRUCTION TOTAL = \$	938,535.00
DESIGN ENGINEERING (7.5%) = \$	71,000.000
CONSTRUCTION ENGINEERING (7.5%) = \$	71,000.000
PERMITTING (2.5%) = \$	24,000.000
TOTAL COST OF IMPROVEMENTS = \$	1,104,535.00

- NOTES:
1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
 2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
 3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E2

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E2		
		ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK		TREE REMOVAL		L. SUM	1	\$ 5,000.00
		TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	600	\$ 3,600.00
		PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	600	\$ 6,000.00
		PERIMETER EROSION BARRIER	FOOT	\$ 5.00	360	\$ 1,800.00
STORM SEWER		STONE RIPRAP AND FILTER FABRIC	SQ YD	\$ 150.00	15	\$ 2,250.00
		TRENCH BACKFILL	CU YD	\$ 45.00	438	\$ 19,710.00
		STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	100	\$ 8,500.00
		STORM SEWER, RCP 36"	FOOT	\$ 175.00	255	\$ 44,625.00
		STORM SEWER, RCP 42"	FOOT	\$ 210.00	215	\$ 45,150.00
		STORM SEWER, RCP 48"	FOOT	\$ 225.00	205	\$ 46,125.00
		STORM SEWER REMOVAL	FOOT	\$ 20.00	420	\$ 8,400.00
		DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	6	\$ 3,000.00
		REINFORCED CONCRETE FLARED END SECTIONS, 48" W/ GRATE	EACH	\$ 6,000.00	1	\$ 6,000.00
		INLET, TYPE A	EACH	\$ 1,800.00	4	\$ 7,200.00
		MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	1	\$ 6,500.00
		MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	1	\$ 8,000.00
		MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	1	\$ 9,000.00
		MANHOLES, 8'-DIAMETER, TYPE A, T1F CL	EACH	\$ 12,000.00	2	\$ 24,000.00
	MANHOLES, 10'-DIAMETER, TYPE A, T1F CL	EACH	\$ 20,000.00	1	\$ 20,000.00	
ROADWAY RESTORATION		AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	19	\$ 950.00
		REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	19	\$ 950.00
		GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	57	\$ 171.00
		HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N50, 1.5"	TON	\$ 95.00	120	\$ 11,400.00
		POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, IL-4.75, N50, 0.75"	TON	\$ 115.00	60	\$ 6,900.00
		BITUMINOUS MATERIALS (TACK COAT)	POUND	\$ 1.00	1,190	\$ 1,190.00
		HOT-MIX ASPHALT SURFACE REMOVAL	SQ YD	\$ 4.00	1,340	\$ 5,360.00
		COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	880	\$ 39,600.00
		PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	1,450	\$ 14,500.00
		DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	70	\$ 7,000.00
		DETECTABLE WARNINGS	SQ FT	\$ 40.00	40	\$ 1,600.00
UTILITY		CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	770	\$ 50,050.00
		RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	25	\$ 6,875.00
		REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	50	\$ 12,500.00
		NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	6	\$ 21,000.00
MISC		NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	6	\$ 15,000.00
		MISC. SECC		L. SUM	1	\$ 10,000.00
		MOBILIZATION		L. SUM	1	\$ 19,000.00
		TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 19,000.00
		CONSTRUCTION LAYOUT		L. SUM	1	\$ 10,000.00
					SUBTOTAL = \$	527,906.00
					CONTINGENCY & MINOR ITEMS (25%) = \$	131,977.00
					CONSTRUCTION TOTAL = \$	659,883.00
					DESIGN ENGINEERING (7.5%) = \$	50,000.00
					CONSTRUCTION ENGINEERING (7.5%) = \$	50,000.00
					PERMITTING (2.5%) = \$	17,000.00
					TOTAL COST OF IMPROVEMENTS = \$	776,883.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.
4. THIS ESTIMATE ASSUMES THE RESURFACING OF SUMMIT DRIVE EAST OF PORTAGE PASS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E3

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E3	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 15,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	1,200	\$ 7,200.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	1,200	\$ 12,000.00
	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	1,100	\$ 5,500.00
STORM SEWER	STORM SEWER, RCP 10"	FOOT	\$ 75.00	420	\$ 31,500.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	2	\$ 9,000.00
MISC	MISC. SESC		L. SUM	1	\$ 2,000.00
	MOBILIZATION		L. SUM	1	\$ 4,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 4,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 2,000.00

SUBTOTAL = \$ 92,200.00
 CONTINGENCY & MINOR ITEMS (25%) = \$ 23,050.00
CONSTRUCTION TOTAL = \$ 115,250.00

 DESIGN ENGINEERING (7.5%) = \$ 9,000.000
 CONSTRUCTION ENGINEERING (7.5%) = \$ 9,000.000
 PERMITTING (2.5%) = \$ 3,000.000

TOTAL COST OF IMPROVEMENTS = \$ 136,250.00

- NOTES:
1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
 2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
 3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E5

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E5	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	EARTH EXCAVATION	CU YD	\$ 50.00	1,100	\$ 55,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	7,600	\$ 45,600.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	7,600	\$ 76,000.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	7,453	\$ 335,385.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	400	\$ 34,000.00
	STORM SEWER, RCP 15"	FOOT	\$ 90.00	1,285	\$ 115,650.00
	STORM SEWER, RCP 18"	FOOT	\$ 95.00	640	\$ 60,800.00
	STORM SEWER, RCP 21"	FOOT	\$ 110.00	1,005	\$ 110,550.00
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	1,555	\$ 241,025.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	3,845	\$ 76,900.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	6	\$ 3,000.00
	30" STORM SEWER OUTFALL	EACH	\$ 40,000.00	1	\$ 40,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	20	\$ 36,000.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	20	\$ 90,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	4	\$ 26,000.00
MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	2	\$ 16,000.00	
ROADWAY RESTORATION	PAVEMENT REMOVAL	SQ YD	\$ 15.00	6,300	\$ 94,500.00
	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	192	\$ 9,600.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	192	\$ 9,600.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	576	\$ 1,728.00
	HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N50, 1.5"	TON	\$ 95.00	530	\$ 50,350.00
	HOT-MIX ASPHALT BINDER COURSE, IL-19.0 N50, 2"	TON	\$ 95.00	700	\$ 66,500.00
	HOT-MIX ASPHALT BASE COURSE, 6"	SQ YD	\$ 55.00	6,300	\$ 346,500.00
	AGGREGATE BASE COURSE, TYPE B, 4"	SQ YD	\$ 15.00	6,300	\$ 94,500.00
	BITUMINOUS MATERIALS (TACK COAT)	POUND	\$ 1.00	4,260	\$ 4,260.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	8,400	\$ 378,000.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	1,600	\$ 16,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	590	\$ 59,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	320	\$ 12,800.00
	CLASS B PATCHES, 9" (SPECIAL)	SQ YD	\$ 100.00	1,530	\$ 153,000.00
CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	120	\$ 7,800.00	
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	100	\$ 27,500.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	200	\$ 50,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	25	\$ 87,500.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	25	\$ 62,500.00
MISC	MISC. SESC	L. SUM		1	\$ 58,000.00
	MOBILIZATION	L. SUM		1	\$ 116,000.00
	TRAFFIC CONTROL AND PROTECTION	L. SUM		1	\$ 116,000.00
	CONSTRUCTION LAYOUT	L. SUM		1	\$ 58,000.00

SUBTOTAL = \$	3,241,548.00
CONTINGENCY & MINOR ITEMS (25%) = \$	810,387.00
CONSTRUCTION TOTAL = \$	4,051,935.00
DESIGN ENGINEERING (7.5%) = \$	304,000.00
CONSTRUCTION ENGINEERING (7.5%) = \$	304,000.00
PERMITTING (2.5%) = \$	102,000.00
TOTAL COST OF IMPROVEMENTS = \$	4,761,935.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CDD REQUIREMENTS.
4. THIS ESTIMATE ASSUMES NORTHWOODS DRIVE WILL BE RECONSTRUCTED WITH URBAN CROSS SECTION.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E6 E7

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E6 E7	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 5,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	1,100	\$ 6,600.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	1,100	\$ 11,000.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	1,702	\$ 76,590.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	500	\$ 42,500.00
	STORM SEWER, RCP 18"	FOOT	\$ 95.00	1,065	\$ 101,175.00
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	875	\$ 135,625.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	600	\$ 12,000.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	8	\$ 4,000.00
	30" STORM SEWER OUTFALL	EACH	\$ 40,000.00	1	\$ 40,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	20	\$ 36,000.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	6	\$ 27,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	3	\$ 19,500.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	1	\$ 8,000.00
MANHOLES, 8'-DIAMETER, TYPE A, T1F CL	EACH	\$ 12,000.00	1	\$ 12,000.00	
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	40	\$ 2,000.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	40	\$ 2,000.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	120	\$ 360.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	1,940	\$ 87,300.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	7,760	\$ 77,600.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	200	\$ 20,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	400	\$ 16,000.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	2,080	\$ 135,200.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	125	\$ 34,375.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	250	\$ 62,500.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	18	\$ 63,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	18	\$ 45,000.00
MISC	MISC. SESS		L. SUM	1	\$ 22,000.00
	MOBILIZATION		L. SUM	1	\$ 44,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 44,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 22,000.00

SUBTOTAL = \$ 1,214,325.00
 CONTINGENCY & MINOR ITEMS (25%) = \$ 303,582.00
CONSTRUCTION TOTAL = \$ 1,517,907.00

 DESIGN ENGINEERING (7.5%) = \$ 114,000.000
 CONSTRUCTION ENGINEERING (7.5%) = \$ 114,000.000
 PERMITTING (2.5%) = \$ 38,000.000

TOTAL COST OF IMPROVEMENTS = \$ 1,783,907.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E8 E9 E10

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E8 E9 E10		
		ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK		EARTH EXCAVATION	CU YD	\$ 50.00	200	\$ 10,000.00
		TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	1,200	\$ 7,200.00
		PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	1,200	\$ 12,000.00
MISC		MISC. SESC	L. SUM		1	\$ 1,000.00
		MOBILIZATION	L. SUM		1	\$ 2,000.00
		TRAFFIC CONTROL AND PROTECTION	L. SUM		1	\$ 2,000.00
		CONSTRUCTION LAYOUT	L. SUM		1	\$ 1,000.00
SUBTOTAL = \$						35,200.00
CONTINGENCY & MINOR ITEMS (25%) = \$						8,800.00
CONSTRUCTION TOTAL = \$						44,000.00
DESIGN ENGINEERING (7.5%) = \$						4,000.000
CONSTRUCTION ENGINEERING (7.5%) = \$						4,000.000
PERMITTING (2.5%) = \$						2,000.000
\$						-
TOTAL COST OF IMPROVEMENTS = \$						54,000.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E11 E12

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E11 E12	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 5,000.00
	EARTH EXCAVATION	CU YD	\$ 50.00	1,300	\$ 65,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	4,900	\$ 29,400.00
	SEEDING CLASS 4A	ACRES	\$ 5,000.00	0.80	\$ 4,000.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	1,000	\$ 10,000.00
	EROSION CONTROL BLANKET	SQ YD	\$ 3.00	3,900	\$ 11,700.00
STORM SEWER	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	600	\$ 3,000.00
	STONE RIPRAP AND FILTER FABRIC	SQ YD	\$ 150.00	30	\$ 4,500.00
	TRENCH BACKFILL	CU YD	\$ 45.00	890	\$ 40,050.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	300	\$ 25,500.00
	STORM SEWER, RCP 15"	FOOT	\$ 90.00	100	\$ 9,000.00
	STORM SEWER, RCP 18"	FOOT	\$ 95.00	300	\$ 28,500.00
	STORM SEWER, RCP 24"	FOOT	\$ 125.00	660	\$ 82,500.00
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	250	\$ 38,750.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	300	\$ 6,000.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	14	\$ 7,000.00
	REINFORCED CONCRETE FLARED END SECTIONS, 15" W/ GRATE	EACH	\$ 2,000.00	1	\$ 2,000.00
	REINFORCED CONCRETE FLARED END SECTIONS, 30" W/ GRATE	EACH	\$ 3,500.00	1	\$ 3,500.00
	INLET, TYPE A	EACH	\$ 1,800.00	12	\$ 21,600.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	3	\$ 13,500.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	3	\$ 19,500.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	1	\$ 8,000.00
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	26	\$ 1,300.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	26	\$ 1,300.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	78	\$ 234.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	1,490	\$ 67,050.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	5,960	\$ 59,600.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	120	\$ 12,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	240	\$ 9,600.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	1,350	\$ 87,750.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	75	\$ 20,625.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	150	\$ 37,500.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	11	\$ 38,500.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	11	\$ 27,500.00
MISC	MISC. SESC		L. SUM	1	\$ 17,000.00
	MOBILIZATION		L. SUM	1	\$ 33,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 33,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 17,000.00

SUBTOTAL = \$	900,959.00
CONTINGENCY & MINOR ITEMS (25%) = \$	225,240.00
CONSTRUCTION TOTAL = \$	1,126,199.00
DESIGN ENGINEERING (7.5%) = \$	85,000.000
CONSTRUCTION ENGINEERING (7.5%) = \$	85,000.000
PERMITTING (2.5%) = \$	29,000.000
TOTAL COST OF IMPROVEMENTS = \$	1,325,199.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E13

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E13	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 5,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	1,500	\$ 9,000.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	1,500	\$ 15,000.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	1,744	\$ 78,480.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	500	\$ 42,500.00
	STORM SEWER, RCP 15"	FOOT	\$ 90.00	360	\$ 32,400.00
	STORM SEWER, RCP 24"	FOOT	\$ 125.00	265	\$ 33,125.00
	STORM SEWER, RCP 27"	FOOT	\$ 135.00	805	\$ 108,675.00
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	835	\$ 129,425.00
	STORM SEWER, RCP 36"	FOOT	\$ 175.00	340	\$ 59,500.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	2,605	\$ 52,100.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	13	\$ 6,500.00
	INLET, TYPE A	EACH	\$ 1,800.00	20	\$ 36,000.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	3	\$ 13,500.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	7	\$ 45,500.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	1	\$ 8,000.00
MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	1	\$ 9,000.00	
MANHOLES, 8'-DIAMETER, TYPE A, T1F CL	EACH	\$ 12,000.00	1	\$ 12,000.00	
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	54	\$ 2,700.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	54	\$ 2,700.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	162	\$ 486.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	2,905	\$ 130,725.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	11,620	\$ 116,200.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	330	\$ 33,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	400	\$ 16,000.00
CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	2,690	\$ 174,850.00	
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	125	\$ 34,375.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	250	\$ 62,500.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	30	\$ 105,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	30	\$ 75,000.00
MISC	MISC. SESC		L. SUM	1	\$ 29,000.00
	MOBILIZATION		L. SUM	1	\$ 58,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 58,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 29,000.00
				SUBTOTAL = \$	1,623,241.00
				CONTINGENCY & MINOR ITEMS (25%) = \$	405,811.00
				CONSTRUCTION TOTAL = \$	2,029,052.00
				DESIGN ENGINEERING (7.5%) = \$	153,000.000
				CONSTRUCTION ENGINEERING (7.5%) = \$	153,000.000
				PERMITTING (2.5%) = \$	51,000.000
				TOTAL COST OF IMPROVEMENTS = \$	2,386,052.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E14

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E14	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 10,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	700	\$ 4,200.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	700	\$ 7,000.00
STORM SEWER	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	500	\$ 2,500.00
	TRENCH BACKFILL	CU YD	\$ 45.00	156	\$ 7,020.00
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	110	\$ 17,050.00
	STORM SEWER, RCP 36"	FOOT	\$ 175.00	250	\$ 43,750.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	360	\$ 7,200.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	2	\$ 1,000.00
	36" STORM SEWER OUTFALL	EACH	\$ 45,000.00	1	\$ 45,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	2	\$ 3,600.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	1	\$ 6,500.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	1	\$ 8,000.00
	ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	9
REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL		CU YD	\$ 50.00	9	\$ 450.00
GEOTECHNICAL FABRIC FOR GROUND STABILIZATION		SQ YD	\$ 3.00	27	\$ 81.00
COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT		FOOT	\$ 45.00	140	\$ 6,300.00
PCC SIDEWALK REMOVAL AND REPLACEMENT		SQ FT	\$ 10.00	300	\$ 3,000.00
DRIVEWAY REMOVAL AND REPLACEMENT		SQ YD	\$ 100.00	90	\$ 9,000.00
CLASS D PATCHES, 9" (SPECIAL)		SQ YD	\$ 65.00	90	\$ 5,850.00
UTILITY	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	3	\$ 10,500.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	3	\$ 7,500.00
MISC	MISC. SESC		L. SUM	1	\$ 5,000.00
	MOBILIZATION		L. SUM	1	\$ 9,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 9,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 5,000.00

SUBTOTAL =	\$ 233,951.00
CONTINGENCY & MINOR ITEMS (25%) =	\$ 58,488.00
CONSTRUCTION TOTAL =	\$ 292,439.00
DESIGN ENGINEERING (7.5%) =	\$ 22,000.000
CONSTRUCTION ENGINEERING (7.5%) =	\$ 22,000.000
PERMITTING (2.5%) =	\$ 8,000.000
TOTAL COST OF IMPROVEMENTS =	\$ 344,439.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E15 E20A

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E15 E20A	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL	L. SUM		1	\$ 10,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	1,100	\$ 6,600.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	1,100	\$ 11,000.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	2,234	\$ 100,530.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	400	\$ 34,000.00
	STORM SEWER, RCP 15"	FOOT	\$ 90.00	205	\$ 18,450.00
	STORM SEWER, RCP 36"	FOOT	\$ 175.00	1,590	\$ 278,250.00
	STORM SEWER, RCP 42"	FOOT	\$ 210.00	120	\$ 25,200.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	1,915	\$ 38,300.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	20	\$ 10,000.00
	60" STORM SEWER OUTFALL	EACH	\$ 75,000.00	1	\$ 75,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	24	\$ 43,200.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	2	\$ 9,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	9	\$ 58,500.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	3	\$ 24,000.00
MANHOLES, 9'-DIAMETER, TYPE A, T1F CL	EACH	\$ 15,000.00	1	\$ 15,000.00	
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	45	\$ 2,250.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	45	\$ 2,250.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	135	\$ 405.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	2,275	\$ 102,375.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	1,600	\$ 16,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	280	\$ 28,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	320	\$ 12,800.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	2,160	\$ 140,400.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	100	\$ 27,500.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	200	\$ 50,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	25	\$ 87,500.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	25	\$ 62,500.00
MISC	MISC. SESC	L. SUM		1	\$ 26,000.00
	MOBILIZATION	L. SUM		1	\$ 52,000.00
	TRAFFIC CONTROL AND PROTECTION	L. SUM		1	\$ 52,000.00
	CONSTRUCTION LAYOUT	L. SUM		1	\$ 26,000.00

SUBTOTAL = \$	1,445,010.00
CONTINGENCY & MINOR ITEMS (25%) = \$	361,253.00
CONSTRUCTION TOTAL = \$	1,806,263.00
DESIGN ENGINEERING (7.5%) = \$	136,000.00
CONSTRUCTION ENGINEERING (7.5%) = \$	136,000.00
PERMITTING (2.5%) = \$	46,000.00
TOTAL COST OF IMPROVEMENTS = \$	2,124,263.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E16 E17 E20B

PROJECT #: 190486
 DATE: MAY 21, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E16 E17 E20B	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 20,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	2,200	\$ 13,200.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	2,200	\$ 22,000.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	5,411	\$ 243,495.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	800	\$ 68,000.00
	STORM SEWER, RCP 15"	FOOT	\$ 90.00	135	\$ 12,150.00
	STORM SEWER, RCP 21"	FOOT	\$ 110.00	570	\$ 62,700.00
	STORM SEWER, RCP 24"	FOOT	\$ 125.00	1,565	\$ 195,625.00
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	535	\$ 82,925.00
	STORM SEWER, RCP 36"	FOOT	\$ 175.00	735	\$ 128,625.00
	STORM SEWER, RCP 42"	FOOT	\$ 210.00	350	\$ 73,500.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	1,608	\$ 32,150.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	63	\$ 31,500.00
	INLET, TYPE A	EACH	\$ 1,800.00	32	\$ 57,600.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	7	\$ 31,500.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	3	\$ 19,500.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	4	\$ 32,000.00
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	1	\$ 9,000.00
	MANHOLES, 8'-DIAMETER, TYPE A, T1F CL	EACH	\$ 12,000.00	1	\$ 12,000.00
MANHOLES, 10'-DIAMETER, TYPE A, T1F CL	EACH	\$ 20,000.00	1	\$ 20,000.00	
ROADWAY RESTORATION	PAVEMENT REMOVAL	SQ YD	\$ 15.00	1,400	\$ 21,000.00
	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	85	\$ 4,250.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	85	\$ 4,250.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	255	\$ 765.00
	HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N50, 1.5"	TON	\$ 95.00	120	\$ 11,400.00
	POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, IL-4.75, N50, 0.75"	TON	\$ 115.00	60	\$ 6,900.00
	HOT-MIX ASPHALT BASE COURSE, 6"	SQ YD	\$ 55.00	1,400	\$ 77,000.00
	AGGREGATE BASE COURSE, TYPE B, 4"	SQ YD	\$ 15.00	1,400	\$ 21,000.00
	BITUMINOUS MATERIALS (TACK COAT)	POUND	\$ 1.00	950	\$ 950.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	4,240	\$ 190,800.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	3,200	\$ 32,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	450	\$ 45,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	640	\$ 25,600.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	3,790	\$ 246,350.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	200	\$ 55,000.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	400	\$ 100,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	40	\$ 140,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	40	\$ 100,000.00
MISC	MISC. SESC		L. SUM	1	\$ 45,000.00
	MOBILIZATION		L. SUM	1	\$ 90,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 90,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 45,000.00

SUBTOTAL =	\$ 2,519,735.00
CONTINGENCY & MINOR ITEMS (25%) =	\$ 629,934.00
CONSTRUCTION TOTAL =	\$ 3,149,669.00
DESIGN ENGINEERING (7.5%) =	\$ 237,000.00
CONSTRUCTION ENGINEERING (7.5%) =	\$ 237,000.00
PERMITTING (2.5%) =	\$ 79,000.00
TOTAL COST OF IMPROVEMENTS =	\$ 3,702,669.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.
4. THIS ESTIMATE ASSUMES THE RECONSTRUCTION OF WESTGATE ROAD.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E18 E19 E20B

PROJECT #: 190486
 DATE: MAY 21, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E18 E19 E20B	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 20,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	2,700	\$ 16,200.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	2,700	\$ 27,000.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	11,365	\$ 511,425.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	1,000	\$ 85,000.00
	STORM SEWER, RCP 36"	FOOT	\$ 175.00	2,975	\$ 520,625.00
	STORM SEWER, RCP 48"	FOOT	\$ 225.00	1,815	\$ 408,375.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	1,488	\$ 29,750.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	63	\$ 31,500.00
	48" STORM SEWER OUTFALL	EACH	\$ 60,000.00	1	\$ 60,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	40	\$ 72,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	6	\$ 39,000.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	11	\$ 88,000.00
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	5	\$ 45,000.00
	MANHOLES, 8'-DIAMETER, TYPE A, T1F CL	EACH	\$ 12,000.00	1	\$ 12,000.00
MANHOLES, 9'-DIAMETER, TYPE A, T1F CL	EACH	\$ 15,000.00	2	\$ 30,000.00	
MANHOLES, 10'-DIAMETER, TYPE A, T1F CL	EACH	\$ 20,000.00	2	\$ 40,000.00	
ROADWAY RESTORATION	PAVEMENT REMOVAL	SQ YD	\$ 15.00	5,900	\$ 88,500.00
	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	222	\$ 11,100.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	222	\$ 11,100.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	666	\$ 1,998.00
	HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N50, 1.5"	TON	\$ 95.00	490	\$ 46,550.00
	POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, IL-4.75, N50, 0.75"	TON	\$ 115.00	20	\$ 2,300.00
	HOT-MIX ASPHALT BINDER COURSE, IL-19.0 N50, 2"	TON	\$ 95.00	600	\$ 57,000.00
	HOT-MIX ASPHALT BASE COURSE, 6"	SQ YD	\$ 55.00	500	\$ 27,500.00
	AGGREGATE BASE COURSE, TYPE B, 4"	SQ YD	\$ 15.00	5,900	\$ 88,500.00
	BITUMINOUS MATERIALS (TACK COAT)	POUND	\$ 1.00	340	\$ 340.00
	PORTLAND CEMENT CONCRETE PAVEMENT 9"	SQ YD	\$ 100.00	5,400	\$ 540,000.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	6,605	\$ 297,225.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	4,000	\$ 40,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	360	\$ 36,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	800	\$ 32,000.00
CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	3,720	\$ 241,800.00	
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	250	\$ 68,750.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	500	\$ 125,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	32	\$ 112,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	32	\$ 80,000.00
MISC	MISC. SESC		L. SUM	1	\$ 79,000.00
	MOBILIZATION		L. SUM	1	\$ 158,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 158,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 79,000.00

SUBTOTAL = \$	4,417,538.00
CONTINGENCY & MINOR ITEMS (25%) = \$	1,104,385.00
CONSTRUCTION TOTAL = \$	5,521,923.00
DESIGN ENGINEERING (7.5%) = \$	415,000.00
CONSTRUCTION ENGINEERING (7.5%) = \$	415,000.00
PERMITTING (2.5%) = \$	139,000.00
TOTAL COST OF IMPROVEMENTS = \$	6,490,923.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.
4. THIS ESTIMATE ASSUMES THE RECONSTRUCTION OF MARGATE TERRACE.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E21

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E21	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	EARTH EXCAVATION	CU YD	\$ 50.00	8,100	\$ 405,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	6,000	\$ 36,000.00
	SEEDING CLASS 4A	ACRES	\$ 5,000.00	1.02	\$ 5,100.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	1,000	\$ 10,000.00
	EROSION CONTROL BLANKET	SQ YD	\$ 3.00	5,000	\$ 15,000.00
	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	950	\$ 4,750.00
STORM SEWER	STONE RIPRAP AND FILTER FABRIC	SQ YD	\$ 150.00	15	\$ 2,250.00
	TRENCH BACKFILL	CU YD	\$ 45.00	1,367	\$ 61,515.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	400	\$ 34,000.00
	STORM SEWER, RCP 21"	FOOT	\$ 110.00	200	\$ 22,000.00
	STORM SEWER, RCP 24"	FOOT	\$ 125.00	325	\$ 40,625.00
	STORM SEWER, RCP 30"	FOOT	\$ 155.00	410	\$ 63,550.00
	STORM SEWER, RCP 36"	FOOT	\$ 175.00	775	\$ 135,625.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	1,710	\$ 34,200.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	26	\$ 13,000.00
	REINFORCED CONCRETE FLARED END SECTIONS, 36" W/ GRATE	EACH	\$ 4,500.00	1	\$ 4,500.00
	INLET, TYPE A	EACH	\$ 1,800.00	16	\$ 28,800.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	8	\$ 36,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	8	\$ 52,000.00
	MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	1	\$ 9,000.00
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	38	\$ 1,900.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	38	\$ 1,900.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	114	\$ 342.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	2,600	\$ 117,000.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	3,300	\$ 33,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	200	\$ 20,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	320	\$ 12,800.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	1,850	\$ 120,250.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	100	\$ 27,500.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	200	\$ 50,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	18	\$ 63,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	18	\$ 45,000.00
MISC	MISC. SESS	L. SUM		1	\$ 31,000.00
	MOBILIZATION	L. SUM		1	\$ 61,000.00
	TRAFFIC CONTROL AND PROTECTION	L. SUM		1	\$ 61,000.00
	CONSTRUCTION LAYOUT	L. SUM		1	\$ 31,000.00

SUBTOTAL =	\$ 1,689,607.00
CONTINGENCY & MINOR ITEMS (25%) =	\$ 422,402.00
CONSTRUCTION TOTAL =	\$ 2,112,009.00
DESIGN ENGINEERING (7.5%) =	\$ 159,000.00
CONSTRUCTION ENGINEERING (7.5%) =	\$ 159,000.00
PERMITTING (2.5%) =	\$ 53,000.00
TOTAL COST OF IMPROVEMENTS =	\$ 2,483,009.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E22

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E22	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	500	\$ 3,000.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	500	\$ 5,000.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	1,089	\$ 49,005.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	175	\$ 14,875.00
	STORM SEWER, RCP 15"	FOOT	\$ 90.00	855	\$ 76,950.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	175	\$ 3,500.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	7	\$ 3,500.00
	INLET, TYPE A	EACH	\$ 1,800.00	10	\$ 18,000.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	7	\$ 31,500.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	1	\$ 6,500.00
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	15	\$ 750.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	15	\$ 750.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	45	\$ 135.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	955	\$ 42,975.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	4,775	\$ 47,750.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	90	\$ 9,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	80	\$ 3,200.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	800	\$ 52,000.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	25	\$ 6,875.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	50	\$ 12,500.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	8	\$ 28,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	8	\$ 20,000.00
MISC	MISC. SESC	L. SUM		1	\$ 9,000.00
	MOBILIZATION	L. SUM		1	\$ 18,000.00
	TRAFFIC CONTROL AND PROTECTION	L. SUM		1	\$ 18,000.00
	CONSTRUCTION LAYOUT	L. SUM		1	\$ 9,000.00
				SUBTOTAL = \$	489,765.00
				CONTINGENCY & MINOR ITEMS (25%) = \$	122,442.00
				CONSTRUCTION TOTAL = \$	612,207.00
				DESIGN ENGINEERING (7.5%) = \$	46,000.00
				CONSTRUCTION ENGINEERING (7.5%) = \$	46,000.00
				PERMITTING (2.5%) = \$	16,000.00
				TOTAL COST OF IMPROVEMENTS = \$	720,207.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E23

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E23	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 5,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	800	\$ 4,800.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	800	\$ 8,000.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	1,214	\$ 54,630.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	200	\$ 17,000.00
	STORM SEWER, RCP 21"	FOOT	\$ 110.00	680	\$ 74,800.00
	STORM SEWER, RCP 24"	FOOT	\$ 125.00	110	\$ 13,750.00
	STORM SEWER, RCP 36"	FOOT	\$ 175.00	595	\$ 104,125.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	1,485	\$ 29,700.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	16	\$ 8,000.00
	36" STORM SEWER OUTFALL	EACH	\$ 45,000.00	1	\$ 45,000.00
	INLET, TYPE A	EACH	\$ 1,800.00	8	\$ 14,400.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	2	\$ 9,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	6	\$ 39,000.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	1	\$ 8,000.00
MANHOLES, 7'-DIAMETER, TYPE A, T1F CL	EACH	\$ 9,000.00	2	\$ 18,000.00	
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	31	\$ 1,550.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	31	\$ 1,550.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	93	\$ 279.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	1,385	\$ 62,325.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	1,600	\$ 16,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	90	\$ 9,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	160	\$ 6,400.00
CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	1,450	\$ 94,250.00	
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	50	\$ 13,750.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	50	\$ 12,500.00
	ADJUST WATER SERVICES	EACH	\$ 2,500.00	8	\$ 20,000.00
	ADJUST SANITARY SERVICES	EACH	\$ 1,500.00	8	\$ 12,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	1	\$ 3,500.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	1	\$ 2,500.00
MISC	MISC. SESC		L. SUM	1	\$ 8,000.00
	MOBILIZATION		L. SUM	1	\$ 29,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 22,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 15,000.00
				SUBTOTAL = \$	782,809.00
				CONTINGENCY & MINOR ITEMS (25%) = \$	195,703.00
				CONSTRUCTION TOTAL = \$	978,512.00
				DESIGN ENGINEERING (7.5%) = \$	74,000.00
				CONSTRUCTION ENGINEERING (7.5%) = \$	74,000.00
				PERMITTING (2.5%) = \$	25,000.00
				TOTAL COST OF IMPROVEMENTS = \$	1,151,512.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E24

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E24	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 5,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	500	\$ 3,000.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	500	\$ 5,000.00
	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	400	\$ 2,000.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	872	\$ 39,240.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	200	\$ 17,000.00
	STORM SEWER, RCP 18"	FOOT	\$ 95.00	815	\$ 77,425.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	815	\$ 16,300.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	5	\$ 2,500.00
	INLET, TYPE A	EACH	\$ 1,800.00	10	\$ 18,000.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	6	\$ 27,000.00
	MANHOLES, 5'-DIAMETER, TYPE A, T1F CL	EACH	\$ 6,500.00	1	\$ 6,500.00
ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	15	\$ 750.00
	REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL	CU YD	\$ 50.00	15	\$ 750.00
	GEOTECHNICAL FABRIC FOR GROUND STABILIZATION	SQ YD	\$ 3.00	45	\$ 135.00
	COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	\$ 45.00	825	\$ 37,125.00
	PCC SIDEWALK REMOVAL AND REPLACEMENT	SQ FT	\$ 10.00	800	\$ 8,000.00
	DRIVEWAY REMOVAL AND REPLACEMENT	SQ YD	\$ 100.00	100	\$ 10,000.00
	DETECTABLE WARNINGS	SQ FT	\$ 40.00	160	\$ 6,400.00
	CLASS D PATCHES, 9" (SPECIAL)	SQ YD	\$ 65.00	820	\$ 53,300.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	50	\$ 13,750.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	100	\$ 25,000.00
	ADJUST WATER SERVICES	EACH	\$ 2,500.00	9	\$ 22,500.00
	ADJUST SANITARY SERVICES	EACH	\$ 1,500.00	9	\$ 13,500.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	1	\$ 3,500.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	1	\$ 2,500.00
MISC	MISC. SESS		L. SUM	1	\$ 5,000.00
	MOBILIZATION		L. SUM	1	\$ 17,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 13,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 9,000.00
				SUBTOTAL = \$	460,175.00
				CONTINGENCY & MINOR ITEMS (25%) = \$	115,044.00
				CONSTRUCTION TOTAL = \$	575,219.00
				DESIGN ENGINEERING (7.5%) = \$	44,000.00
				CONSTRUCTION ENGINEERING (7.5%) = \$	44,000.00
				PERMITTING (2.5%) = \$	15,000.00
				TOTAL COST OF IMPROVEMENTS = \$	678,219.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

CHRISTOPHER B. BURKE ENGINEERING LTD
 9575 WEST HIGGINS ROAD, SUITE 600
 ROSEMONT, IL 60018

VILLAGE OF DEERFIELD
PROPOSED DRAINAGE IMPROVEMENTS - CONCEPT COST ESTIMATE - AREA E25

PROJECT #: 190486
 DATE: MARCH 17, 2021
 CALCULATED BY: JRS/JTA
 CHECKED BY: AJS

				AREA E25	
	ITEM	UNIT	UNIT COST	QUANTITY	TOTAL COST
SITE WORK	TREE REMOVAL		L. SUM	1	\$ 5,000.00
	TOPSOIL FURNISH AND PLACE, 6"	SQ YD	\$ 6.00	700	\$ 4,200.00
	PARKWAY RESTORATION - SODDING	SQ YD	\$ 10.00	700	\$ 7,000.00
	PERIMETER EROSION BARRIER	FOOT	\$ 5.00	450	\$ 2,250.00
STORM SEWER	TRENCH BACKFILL	CU YD	\$ 45.00	1,198	\$ 53,910.00
	STORM SEWER, RCP 12" (LATERALS)	FOOT	\$ 85.00	200	\$ 17,000.00
	STORM SEWER, RCP 18"	FOOT	\$ 95.00	1,025	\$ 97,375.00
	STORM SEWER REMOVAL	FOOT	\$ 20.00	512	\$ 10,240.00
	DRAINAGE STRUCTURE REMOVAL	EACH	\$ 500.00	5	\$ 2,500.00
	INLET, TYPE A	EACH	\$ 1,800.00	8	\$ 14,400.00
	MANHOLES, 4'-DIAMETER, TYPE A, T1F CL	EACH	\$ 4,500.00	8	\$ 36,000.00
	MANHOLES, 6'-DIAMETER, TYPE A, T1F CL	EACH	\$ 8,000.00	1	\$ 8,000.00
	ROADWAY RESTORATION	AGGREGATE SUBGRADE IMPROVEMENT	CU YD	\$ 50.00	19
REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL		CU YD	\$ 50.00	19	\$ 950.00
GEOTECHNICAL FABRIC FOR GROUND STABILIZATION		SQ YD	\$ 3.00	57	\$ 171.00
COMBINATION CONCRETE CURB AND GUTTER REMOVAL AND REPLACEMENT		FOOT	\$ 45.00	1,025	\$ 46,125.00
PCC SIDEWALK REMOVAL AND REPLACEMENT		SQ FT	\$ 10.00	1,400	\$ 14,000.00
DRIVEWAY REMOVAL AND REPLACEMENT		SQ YD	\$ 100.00	140	\$ 14,000.00
DETECTABLE WARNINGS		SQ FT	\$ 40.00	160	\$ 6,400.00
CLASS D PATCHES, 9" (SPECIAL)		SQ YD	\$ 65.00	855	\$ 55,575.00
UTILITY	RELOCATE / ADJUST WATER MAIN	FOOT	\$ 275.00	50	\$ 13,750.00
	REMOVE AND REPLACE SANITARY SEWER	FOOT	\$ 250.00	50	\$ 12,500.00
	ADJUST WATER SERVICES	EACH	\$ 2,500.00	12	\$ 30,000.00
	ADJUST SANITARY SERVICES	EACH	\$ 1,500.00	12	\$ 18,000.00
	NEW WATER SERVICE WITH B-BOX	EACH	\$ 3,500.00	2	\$ 7,000.00
	NEW SANITARY SERVICE WITH CLEANOUT	EACH	\$ 2,500.00	2	\$ 5,000.00
MISC	MISC. SESS		L. SUM	1	\$ 5,000.00
	MOBILIZATION		L. SUM	1	\$ 20,000.00
	TRAFFIC CONTROL AND PROTECTION		L. SUM	1	\$ 15,000.00
	CONSTRUCTION LAYOUT		L. SUM	1	\$ 10,000.00
				SUBTOTAL = \$	532,296.00
				CONTINGENCY & MINOR ITEMS (25%) = \$	133,074.00
				CONSTRUCTION TOTAL = \$	665,370.00
				DESIGN ENGINEERING (7.5%) = \$	50,000.00
				CONSTRUCTION ENGINEERING (7.5%) = \$	50,000.00
				PERMITTING (2.5%) = \$	17,000.00
				TOTAL COST OF IMPROVEMENTS = \$	782,370.00

NOTES:

1. THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISITION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY EXISTING PRIVATE UTILITIES.
2. THIS ESTIMATE ASSUMES 2021 CONSTRUCTION COSTS.
3. THIS ESTIMATE ASSUMES ALL EXCAVATED MATERIAL TO BE HAULED-OFF MEETS CCDD REQUIREMENTS.

APPENDIX 5

YARD FLOODING ASSISTANT PROGRAM EXAMPLES





YARD FLOODING ASSISTANCE PROGRAM

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PROGRAM INTRODUCTION

The Village of Roselle developed this cost share program to assist property owners that have experienced yard flooding problems.

Positive yard drainage involves properly sloped grades to convey stormwater runoff to lower ground or to a yard storm sewer system. Some of our subdivisions were developed with storm sewers in yards within drainage easements, others were not and relied on properly pitched slopes.

Over the years, ground settling, filling, landscaping, fences and sheds may have adversely impacted the ability for water to properly drain in these areas. In addition, yard areas that once were able to absorb the water, may not continue to do so due to increases in impervious areas and the resultant runoff from private property improvements such as building additions, patios, pool decks, sidewalks and accessory buildings.

Participation in this program is based on a first come first serve basis and is subject to available funding.

PROGRAM DESCRIPTION

Eligible Projects

The following criteria shall be met for projects to be eligible for participation in this Yard Flooding Assistance Program:

- The project shall benefit at least two single family residential and single family attached residential homes, located within the corporate limits of the Village of Roselle; and
- The project shall address standing water issues with a documented duration of 72 hours or more; and

Eligible Subsidy

The Village may cost share up to 50% of eligible improvements but no more than a maximum reimbursement (per project) amount of \$3,000. The percentage of cost sharing shall be determined by the number of proposed projects, the number of properties that will benefit from a proposed project, the factors set forth in the “Eligible Improvements” section of this memo, and available funding. The program is discretionary and the Village will have no duty or obligation to provide reimbursements until it has executed a reimbursement agreement with the Owner(s).

Eligible Improvements

Option 1: Re-grading yard(s) to reestablish proper pitch.

The preferred improvement is one that minimizes future maintenance requirements. Re-grading the yard(s) by utilizing a combination of filling low areas with soil or removing high points along the drainage profile where appropriate requires less future maintenance than other improvements such as the installation of storm sewers.

Option 2: Private gravity storm sewer installation.

In cases where re-grading is not a practical alternative, installation of a storm sewer (drain) to drain a low area may be the appropriate option. This option also requires that a receiving storm sewer be available in the vicinity of the problem area. This might be an existing yard storm sewer system in close proximity to the problem area or a storm sewer system in the street in front of the subject property that can be accessed by extending a storm sewer/drain to the front along a side property line. A gravity system is one that maintains a positive pitch and drains via gravity to the receiving storm sewer system without the aid of a sump pump.

Option 3: Pumped storm sewer installation.

In cases where the receiving storm sewer is too shallow to receive gravity flow, a pumped system utilizing a sump pump may be an appropriate option. This option involves providing an electrical feed to serve the pump.

Option 4: Installation of a rain garden.

A rain garden is a specially planted depressional area that allows stormwater runoff to be absorbed by the soils by amending the soil to be more permeable and to utilize planting materials

(typically native plants) that have the ability to absorb moisture through their roots and return the moisture to the atmosphere through the plants natural transpiration process. The effectiveness of rain gardens is highly dependent upon proper design and typically takes several seasons for plant materials to mature to an effective moisture transpiration system.

Eligible Costs

Eligible costs are as follows:

- Cost of digging, hauling and disposal of excavated materials to remove high points in the yard that interferes with proper drainage.
- Cost for the purchase and spreading of fill material to fill low points in the yard that hold water.
- Costs for the purchase and installation of gravity storm sewers and yard drainage inlets.
- Cost to install a sump pit and pump (including electrical work) to collect and pump storm water that collects in low areas that cannot be re-graded or served by a gravity sewer.
- Costs to purchase and install discharge piping from sump pump.
- Costs to install a rain garden including excavation, soil amendment and plant materials.
- Cost of topsoil and grass seeding to restore disturbed grass/lawns.
- Project professional design and oversight costs.
- Applicable permit fees.
-

Non-Eligible Costs include the following:

- Costs to remove manmade objects that interfere with proper drainage such as fences, sheds, landscape walls, etc.
- Use of materials not meeting the requirements of Village Codes.
- Planting or replacement of new landscaping (bushes, trees, sod, fences, walls, etc.).
- New electrical panels and/or upgrading the house electrical supply. (the cost to run electric to a yard sump pump is eligible as stated under eligible costs, provided there is existing capacity in the electrical service/panel to accommodate the pump)
- Legal and title expenses that may be required by a project.

General Requirements

1. All work performed under this program shall meet all applicable requirements of the Building Codes of the Village of Roselle including, but not limited to, the Illinois Plumbing Code, National Electric Code and the International Building Code.
2. Any/all pumps associated with Option 3 shall be connected to a dedicated electrical circuit.
3. All work shall performed by licensed and bonded contractors.
4. Reimbursement through this Program is limited to one time per address.
5. All work and reimbursement shall be approved in conformance with the Village's written Program Application/Participation Agreement.

HOMEOWNER(S) TO DESIGN, INSTALL, OWN AND MAINTAIN SYSTEM-NO WARRANTY OF GUARANTEE

The Village's agreement to cost share as set forth in this policy is not and shall not constitute a warranty, promise or guarantee by the Village that the drainage systems described herein will fully or partially mitigate the problem. It is merely a policy by which the Village may cost share in the worthy improvements in the hopes that those improvements may provide overland drainage relief to eligible homeowners. Each eligible homeowner, in conjunction with any advisor the homeowner trusts, must reach an independent judgment as whether or not to install overland drainage improvements and not rely on the Village's cost sharing agreement as a basis for concluding that the chosen system will be effective.

Village of Roselle
Yard Flooding Assistance Program
Instructions on How to Apply

1. Contact the Public Works Department at 630-671-2360 to schedule a preliminary inspection to ensure the property is eligible. Village Staff will consult with the property owner(s) to identify the history of flooding/drainage problems and evaluate options for mitigating the potential for flooding.
2. After being deemed eligible, solicit proposal(s) from contractor(s). Request that the selected contractor prepare detailed drawings of proposed improvements and provide a written proposal that provides a detailed description of the scope of work. Also, complete the following forms:
a) General Information Form and b) Participation Agreement

Submit drawings, proposals and required forms to the Public Works Department at:
474 Congress Circle North
Roselle, Illinois 60172

3. Drawings will be reviewed by the Village and will either be approved as noted or returned for revisions. When drawings receive approval, apply for applicable sewer installation, grading and electrical permits with the Village of Roselle Community Development Department.
4. Contractors will need to contact the Community Development Department to schedule normal inspections during the course of work and at completion for a final inspection.
5. After the work has been inspected and approved, the homeowner will need to pay the full amount to the contractor(s) and then submit the following to the Public Works Department for reimbursement:
 - a. Completed "Request for Reimbursement Form"
 - b. Copy of a paid & itemized invoice from the contractors that performed the work.
 - c. Copy of the cancelled check (both sides), and/or credit card receipt, that the homeowner paid all contractor(s).
6. Homeowner will receive the Village's reimbursement check approximately three weeks after all of the required paperwork is submitted, and approved, by the Public Works Department.
7. **NO WARRANTY OR GUARANTEE: THE VILLAGE'S AGREEMENT TO COST SHARE AS SET FORTH IN THIS POLICY IS NOT AND SHALL NOT CONSTITUTE A WARRANTY, PROMISE OR GUARANTEE BY THE VILLAGE THAT THE SYSTEM DESIGNED BY THE HOMEOWNER OR THE HOMEOWNER'S DESIGN PROFESSIONAL WILL COMPLETELY SOLVE THE BACKYARD FLOODING ISSUE. THE VILLAGE WILL STRIVE TO PROVIDE SOUND DRAINAGE ADVICE DURING THE PROCESS BUT ULTIMATELY THE HOMEOWNER(S) AND THEIR CONTRACTORS ARE RESPONSIBLE FOR THE PROPER PERFORMANCE OF THE CHOSEN SYSTEM. IT IS MERELY AN AGREEMENT BY THE VILLAGE TO SHARE THE COST OF INSTALLING THE CHOSEN SYSTEM IN THE HOPES THAT THE SYSTEM WILL PROVIDE THE DESIRED RELIEF TO THE BACKYARD FLOODING**

ISSUE. EACH ELIGIBLE HOMEOWNER, IN CONJUNCTION WITH ANY ADVISOR THE HOMEOWNER TRUSTS, MUST REACH AN INDEPENDENT JUDGMENT AS WHETHER OR NOT TO INSTALL THE CHOSEN SYSTEM AND NOT RELY ON THE VILLAGE'S COST SHARING AGREEMENT AS A BASIS FOR CONCLUDING THAT THE CHOSEN SYSTEM WILL BE EFFECTIVE.



Village of Roselle Yard Flooding Assistance Program General Information Form

Applicant Name: _____
(Name of property owner who will act as lead contact on the project)

Address: _____

Phone: (Home) _____ (Cell) _____

E-mail Address: _____

1st Co-Applicant Name: _____

Address: _____

Phone: (Home) _____ (Cell) _____

2nd Co-Applicant Name: _____
(If more than 2 co-applicants, submit information on a second sheet)

Address: _____

Phone: (Home) _____ (Cell) _____

How long does water stand in the backyards? _____Hours (Submit documentation evidencing water stands at least 72 hours such as time/date stamped digital photos)

How many property owners will benefit from the improvement? _____ All property owners must be included as applicant and co-applicants above.

Application Materials Required: Each of the following documents must be attached to this application in order for the application to proceed and for a permit to be issued:

1. Copy of detailed proposal and drawings from contractor performing the work.
2. Copy of the fully executed Participation Agreement.
3. Completed permit application form (with all applicable fees paid).

Property Owner Certification

I, _____ am the homeowner of the subject property and I certify that all of the information contained on this General Information Form is true and accurate. Providing inaccurate information may result in a property being deemed ineligible for participation in this Program and subjects the owner to repayment of any subsidies received.

Signature

Date



Village of Roselle
Yard Flooding Assistance Program
Request for Reimbursement Form

Name: _____

Address: _____

Phone: (home) _____ (work) _____

Type of Improvement (circle one):

- 1. Re-grading 2. Gravity Storm Sewer 3. Pumped Storm Sewer 4. Rain Garden

Date work was completed: _____

Permit number issued: _____

Contractor who performed work: _____

Total cost of eligible expenses: \$ _____ Total reimbursement requested: \$ _____

Property Owner Certification

I, _____ am the homeowner of the subject property and I certify that all of the information contained on this Request for Reimbursement Form is true and accurate. Providing inaccurate information may result in a property being deemed ineligible for participation in this Program and subjects the owner to repayment of any subsidies received.

Signature

Date

Contractor Certification

I, _____ of _____ certify that all work completed under this program has been performed in accordance with the Yard Flooding Assistance Program and all applicable Village Codes.

Signature

Date

Village Certification

As an authorized agent of the Village of Roselle who administers the Yard Flooding Assistance Program, I certify that I have reviewed all the necessary paperwork associated with above mentioned application and permit and found them in compliance with the provisions of the Yard Flooding Assistance Program. Therefore, I recommend the reimbursement amount be paid.

Signature

Date

YARD FLOODING ASSISTANCE PROGRAM APPLICATION AND PARTICIPATION AGREEMENT

THIS APPLICATION AND AGREEMENT made on this _____ day of _____, _____, between the **VILLAGE OF ROSELLE**, DuPage and Cook Counties, Illinois, 31 S. Prospect Street, Roselle, Illinois (hereinafter referred to as "Village") and:

Applicant Name: _____
(Name of property owner who will act as lead contact on the project)

Address: _____

1st Co-Applicant Name: _____

Address: _____

2nd Co-Applicant Name: _____
(If more than 2 co-applicants, submit information on a second sheet)

Address: _____

in Roselle, Illinois (hereinafter referred to collectively as "Property Owner").

WITNESSETH:

WHEREAS, Property Owner is the owner of property located at the address indicated above and such building has been the subject of occasional overland flooding in the past; and

WHEREAS, the Village has adopted a program to provide overland flooding assistance in the Village and such program provides for discretionary reimbursement to Property Owner for certain basic costs to improve overland drainage, a copy of which program is available at the Village (hereinafter referred to as the "Program"); and

WHEREAS, the Property Owner desires to participate in such Program and the Village and the Property Owner desire, if approved for reimbursement by the Village, to enter into this Agreement governing the installation of overland drainage improvements and the Village's reimbursement of certain expenses relating thereto in accordance with the Program.

NOW, THEREFORE, in consideration of the above and the terms and conditions set forth below and for other good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the parties hereto agree as follows:

Section 1: The preamble paragraphs set forth above are hereby expressly made a part of and operative provisions of this Agreement as fully as if set forth at length in this Section 1.

Section 2: Definitions. The following terms shall have the following meaning when used in this Agreement unless the context clearly indicates a contrary meaning.

"Contractor" shall mean a contractor who has obtained the necessary licenses and permits from the Village to do work under the Program.

"Program" is the program for installation of improvements to improve yard drainage within the Village as established by the administrative program adopted by the Village.

"Proposal" shall mean a detailed bid for equipment, material and labor. Quantities shall be itemized.

"Permit" is the Village permit which Property Owner must obtain before any improvements can be installed by a Contractor.

Section 3: Village Approval. Prior to the installation of any improvements for which Property Owner expects reimbursement hereunder, the specific plans, including the Proposal, shall be submitted to the Village for approval. No work shall be commenced until such Village approval is obtained. If any such work is commenced after initial inspection, without issuance of all applicable permits, Property Owner shall not be entitled to reimbursement unless the Village engineer determines that all permits are issued, that the work conforms to the Programs requirements, including the terms of this Agreement, and appropriate final inspections completed and approved.

Section 4: Installation. Property Owner agrees to install the approved improvements in accordance with the Program. Installation shall be performed according to the approved permit. The time may be extended upon written request by Property Owner and written permission by the Village if the work is delayed because of weather, unavailability of a Contractor or other factor beyond Property Owner's control where Property Owner has exercised reasonable diligence to timely complete the installation of the facilities.

Section 5: Contract for Work. The contract for installation shall be signed based on the Proposal attached hereto and hereby made a part hereof. The contract for the installation shall be a contract between the Contractor and the Property Owner. The Village shall not be a party to such contract.

Section 6: Permit Required. The installation of the drainage improvements and electric facilities where applicable will require a permit issued by the Village.

Section 7: Inspections. The Village shall be notified so that it can inspect the drainage and electric work as required in the Program Procedures. The proposed area for the Work shall in all circumstances be inspected by the Village prior to the commencement of the Work. If the area is not inspected prior to the commencement of the work reimbursement shall be denied

Section 8: Reimbursement Items. The Village will reimburse the items approved by the Village Engineer for project as listed in the reimbursement guidelines included in the

summary for the Program. In no event shall the amount of reimbursement exceed the Program's designated reimbursement amounts.

Section 9: Payment of Reimbursement. Reimbursement for approved eligible items at approved amounts will be made when all work is completed, inspected and approved by the Village. To receive reimbursement, Property Owner shall follow all requirements of the Program, this Participation Agreement and upon submission of a claim on the Request for Reimbursement Form.

Section 10: Property Owner's Responsibility. Once the improvements are completed the following items will be the responsibility of the Property Owner:

- (a) Restoration or replacement of shrubbery.
- (b) Correction of subsidence in the excavated area. Settling of excavated soils is common. The Property Owner will be responsible for any future filling and reseeded.
- (c) Future maintenance of inlet structures, sewers, pumps, rain garden plantings, associated electrical equipment and all other related equipment and improvements shall be the responsibility of the property owner.

Section 11: Liability. The Village shall have no liability for any design, lack of intended function, system or design failure, negligent plan review, defective work or other damage, injury or loss on account of any act or omission occurring as a direct or indirect result of the Program. All statutory and common law privileges remain fully reserved by the Village and nothing in this Agreement shall in any manner be interpreted to waive, release, compromise or in any manner qualify those privileges and immunities. Property Owner hereby agrees to indemnify and hold Village harmless against any and all claims and further covenants not to sue the Village for any and all claims by the Property owner or any third person related to the Program.

Section 12: Disclaimer. The Program is designed to improve overland drainage. However, there is always some risk of drainage problems as a result of unexpected sewer collapse, obstruction, power failure, extreme environmental conditions or other unforeseen factors. The Village is not a guarantor of and provides no warranties for the Program.

In addition, reliable continuous functioning of Property Owner's sump pump is necessary for the pumped storm sewer option to function properly. The Property Owner shall check the operation of the pump regularly. The Property Owner has the responsibility for all testing, inspections and any corrective work that may become necessary.

Section 13: Notices. Unless otherwise notified in writing, all notices, requests and demands shall be in writing and shall be personally delivered to or mailed by United States Certified mail, postage prepaid and return receipt requested, as follows:

For the Village: Director of Public Works

Village of Roselle
474 Congress Circle North
Roselle, Illinois 60172

For the Property Owner:

Applicant Name: _____
Applicant Address: _____
Applicant Phone: _____

or at such other addresses that any party hereto may designate in writing to the other parties pursuant to the provisions of this Section.

Section 14: Breach. If the Property Owner fails to comply with all requirements of this Agreement or to complete installation as provided in this Agreement, the Village shall have no obligation to reimburse the Property Owner.

Section 15: Entire Agreement. This Agreement shall be binding on the parties, their assigns and successors. This Agreement and the documents referenced in this Agreement constitute the entire agreement between the parties and supersede any previous negotiations. This Agreement shall not be modified except in writing signed by the parties.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed as of the dates written below.

VILLAGE OF ROSELLE, an Illinois Municipal Corporation

By: _____
Mayor

ATTEST:

By: _____
Village Clerk

SIGNATURE(S) OF PROPERTY OWNER(S)

ACKNOWLEDGEMENTS

STATE OF ILLINOIS)
)
COUNTY OF DUPAGE)

I, the undersigned, a Notary Public, in and for the County and State aforesaid, DO HEREBY CERTIFY that Gayle Smolinski, personally known to me to be the Mayor of the Village of Roselle, and Patty Burns, personally known to me to be the Village Clerk of said municipal corporation, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Village Clerk, they signed and delivered the said instrument and caused the corporate seal of said municipal corporation to be affixed thereto, pursuant to authority given by the Board of Trustees of said municipal corporation, as their free and voluntary act, and as the free and voluntary act and deed of said municipal corporation, for the uses and purposes therein set forth.

GIVEN under my hand and official seal, this _____ day of _____, _____.

Commission expires _____, _____.

Notary Public

STATE OF ILLINOIS)
) SS
COUNTY OF DUPAGE)

I, the undersigned, a Notary Public, in and for the County and State aforesaid, DO HEREBY CERTIFY that the above-named _____, personally known to me to be the same persons whose name are subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that they signed and delivered the said instrument as their own free and voluntary act for the uses and purposes therein set forth.

GIVEN under my hand and official seal, this _____ day of _____, _____.

Commission expires _____, _____.

Notary Public

PROJECT APPROVED AND PERMITTED THIS _____ DAY OF
_____, 20____)

SIGNATURE Village Engineer: _____



DRAINAGE COMPLAINTS
YARD NUISANCE FLOODING
REAR YARD SEWERS

INTRODUCTION

This white paper reviews current practices in the Village of Niles (Village) and surrounding communities with regard to private property drainage issues. There is a need to formalize the Village policy with regard to rear yard non-structural flooding (nuisance flooding). For the purpose of this paper any reference to rear yards will include side yards as applicable. A formal policy will provide Village staff with guidance on how to assist residents as well as assign responsibility for resolving problems. The following white paper outlines the issues and challenges related to rear yard flooding.

GOALS AND OBJECTIVES

The Yard Nuisance Drainage Policy is needed to provide a consistent approach to how the Village addresses nuisance flooding on private property. The goal is for the Village to develop consistent policies and procedures for conducting inspections and maintenance relating to stormwater concerns raised by property owners.

Throughout the process, Village staff shall be guided by the Code of Ordinances.

BACKGROUND INFORMATION

The Northwest Municipal Conference (NWMC) recently performed two surveys to determine how Communities in the area address these common problems. 25 Communities responded to a survey regarding rear yard flooding which resulted in the following statistics:

- 6 of 25 (24%) communities provide financial assistance to residents to design or construct improvements related to nuisance flooding. Conversely 76% of communities provide no assistance other than code review and general recommendations.
- 11 of 25 (44%) assist residents with providing information about design engineers, landscapers, or plumbers qualified to prepare a design solution. 8 of 25 Communities provide preapproved standard details for typical solutions.
- 15 of 25 (60%) allow staff to perform simple topographic survey to diagnose problems.

Twenty two (22) Communities responded to the drainage complaint survey which resulted in the following statistics:

- 10 communities specifically indicated these issues are handled by public works/engineering, 10 communities referred to a "Village" response, and 2 communities had no identified procedure.
- 19 Communities indicate they required permits for landscaping of which 13 indicated they only required permits for "major" landscaping.

In summary, the majority of communities respond to nuisance flooding drainage complaints, require permits for grading, and do not provide financial assistance to homeowners to resolve private

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property nuisance flooding. These practices are consistent with Niles informal procedures.

The discussion at the August 12, 2016 Stormwater Commission indicated that nuisance flooding is a low priority stormwater issue. Nuisance flooding was deemed a low priority stormwater problem due to the other significant problems in town. As such, the Village does not provide financial assistance to help property owners with nuisance flooding at this time. The Commission felt it was a good idea to provide some assistance to homeowners through engineering standard details and basic consultation. The Commission indicated that the in-house staff could be supplemented with consultants when the workload required extra manpower. Design and implementation of private property nuisance flooding solutions remains a property owner responsibility. The Commission also felt that code violators must be held responsible for correcting recent violations as a separate issue.

The Village of Niles Flood Control Assistance Program (FCAP) addresses structural flooding issues in the Village. As of 6/16/16, total payouts for the programs are \$1,558,000 for flood control reimbursement. For fiscal year 2018, \$50,000 is budgeted which will be used to serve approximately twelve homes. Approximately 478 homes have been served to date via FCAP. The FCAP currently serves residents through Sewer Back Flow Protection and Overland Flood Protection. The program does not address nuisance yard flooding.

The Village of Niles consists of many residential areas that were developed without drainage easements. Despite the lack of easements many areas in town have areas of rear yard surface drainage. The Village topography is generally flat with areas of low overland slope. All these factors combine to create areas of poor drainage and nuisance yard flooding.

Rear-yard drainage is not specifically addressed within the Village of Niles Code of Ordinances. There are miscellaneous drainage provisions addressed in the code including:

ARTICLE II

- ***Sec. 102-42. - Obstructing drainage.***

No person shall willfully or maliciously stop or obstruct the passage of natural drainage of the water of any street or public sewer, culvert, water pipe or hydrant.

- ***Sec. 102-59. - Connecting downspouts to sewers.***

(a) No building or structure erected in the village shall be built or constructed in such a manner that the downspouts of the building or structure are connected to the sewers servicing such building or structure.

(b) It shall be unlawful for any person to connect the downspouts of any building or structure to the sewer servicing such building or structure.

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(c) All downspouts shall be directed towards the front and/or the rear yards of the building property unless directed otherwise by the department of code enforcement.

(d) All discharge shall be located as not to damage or create a nuisance to the property.

- **Sec. 102-65. - Same—Connection of footing drains; discharge.***(a) Footing drains shall be connected to sump pumps and splashed out to rear yard for further discharge into storm sewer or drainage ditches wherever possible. No footing drain or drainage tile shall be connected to the sanitary or combined sewer system.*

(b) No concentrated discharge from footing drains shall be made which adversely impacts any adjacent property.

(c) Discharge shall occur within six to ten feet of the building to allow the ground water to be absorbed into the majority of the front or rear yard prior to being collected into a catch basin.

- **Sec. 102-101. - Maintenance.**

Maintenance of stormwater management facilities located on private property shall be the responsibility of the owner of that property

ARTICLE XI. – GRADES

- **Sec. 18-375. - Grading requirements.***(a) A grading plan is required for all land improvements. This would consist of existing and proposed contours for grading and drainage facilities within 100 feet of the site in all directions in USGS datum. All existing and proposed conditions must also be shown. Grading plans and erosion control plans shall be on separate sheets.*

(b) No proposed grade shall impede or divert the flow of water through any property unless by proper investigation it can be shown to the satisfaction of the Director of Public Services that the grade will not adversely impact any adjoining property owner and will contribute to an improvement in the overall drainage system.

- **Sec. 18-376. - General lot grade maximums.**

No lot shall be graded in such a manner as to raise the grade of such lot to any point higher than a continuous grade level between the grade of the lots on either side abutting such lot.

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Public Service's records indicate 60 drainage complaints have been received in the past two years (2014-2016) for an average of 30 complaints per year. The average complaint takes 3-4 hours of staff time to resolve.

Private property drainage complaints generally fall into one of three categories:

- I. Complaint regarding neighbor performing work which affects drainage
- II. Request for assistance regarding drainage problem
- III. Request for maintenance of rear yard sewer

CATEGORY 1: CODE ENFORCEMENT

The most common complaints received are:

- Neighbor's downspout or sump pump is creating a nuisance.
- Neighbor has graded land to block drainage path.

Regarding sump pump discharge the code is fairly clear and these complaints are handled by the Community Development Department.

Drainage complaints with regard to alterations of grade are more difficult to address. Rear yard drainage-ways often do not contain drainage easements. Complaints are routinely made about past work that cannot be documented. Claims of grade change are hard to substantiate years after the work was complete. Further complicating the matter is that differential lot settlement over time can contribute to nuisance flooding. Often multiple properties are affected by blocked rear yard drainage paths, and multiple properties would require regrading to solve one localized issue. As properties turn over and are redeveloped the history of grade changes cannot be determined. Due to the complications in resolving Yard Drainage problem, Village staff will limit their involvement in yard drainage problems to enforceable code violations only.

The following course of action is recommended for resolving code enforcement drainage complaints:

1. Village staff to meet with homeowner or discuss issue over the phone.
2. Village staff to investigate nature of concern and determine validity.
3. Village to present findings to home owner using standardized form.
4. If a code violation is present and unable to be resolved between neighbors then the Village will step in as code enforcement entity.*

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- * The most effective way to resolve nuisance drainage problems is for neighbors to work together. Residents must take this first step to attempt to address the concern with their immediate neighbors, particularly when the solution is fairly simple in nature. If the Village proceeds directly to writing a code violation then the drainage issue becomes much more difficult and time consuming to resolve.

The following tools are available for the Village staff to investigate concerns:

- a. Cook County Contour maps
- b. Overland flow path maps
- c. Sewer maps
- d. Inundation maps
- e. Historic call records
- f. Historic subdivision maps (limited coverage)
- g. Rear yard overland flow maps (to be developed)

In the past the Village has provided information in the Village newsletter regarding rear yard drainage. Updated information should be provided in the newsletter, as well as informational fliers to provide to help with code enforcement.

CATEGORY 2 REQUESTS FOR VILLAGE ASSISTANCE PRIVATE PROPERTY NUISANCE FLOODING

The following course of action is recommended for resolving nuisance flooding drainage assistance requests:

1. Staff investigates property using existing records (overland flow path maps, contour maps, Inundation maps, historic drawings, sewer atlases, etc...). Staff performs a site visit and meets with resident as necessary. Staff provides summary of findings to resident including nature of drainage problem and possible solutions. Staff will respond to requests for assistance when nuisance water remains for 48 hours or longer after a rain event. Nuisance water that remains less than 48 hours is considered extremely minor and is not addressed by the Village staff. During periods of heavy work load or heavy call volume this process can be delegated by staff to a consultant engineer using the Overland Flood Assistance on-call engineer contract. Staff will develop a standardized check sheet to make the communication with residents more efficient and consistent.
2. The resident is ultimately responsible for designing, permitting, constructing, and maintaining improvements to their property to improve drainage. Staff will prequalify consulting engineers or non-profit organizations and contractors to perform this work, and this list will be provided upon request.

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3. Staff will develop standard details to assist homeowners with visualizing what potential options exist including: 1) Passive drains 2) Rain gardens 3) Dry well/french drains 4) Permeable pavements 5) Storm sewer connection 6) Temporary provisions for pumping out yard.

FUNDING

No new capital funds are proposed to be directed toward these issues. Any additional funding for investigation, design, or construction to improve private property drainage will be borne by the private property owner.

Outside consulting assistance, when required, will draw on previously budgeted items for Overland Flood Assistance if the funding is available.

CATEGORY 3 REQUESTS FOR VILLAGE ASSISTANCE REAR YARD SEWERS

A review of the Code of Ordinances indicates that sewers on private property are the responsibility of the owner of the property

- **Sec. 102-101. - Maintenance.**

Maintenance of stormwater management facilities located on private property shall be the responsibility of the owner of that property.

(Ord. No. 2011-18, § 1, 3-22-11)

A legal review of the above language was performed and the language found in Section 102-101 is sufficient to divest the Village from Maintenance of storm sewers that are serving the private owners regardless of past practices or which entity originally installed the sewer.

A best practice would be to publish notice of the code and policy in the Village newsletter to further establish the standard. Future work performed on private property should be invoiced to the homeowner to further establish responsibility and ownership.

Future permitted private sewers should be placed in easements with the maintenance responsibility clearly spelled out in the easement language.

The stormwater commission recommended that Village Public works staff avoid working on private property for legal, liability, and insurance reason. Exceptions to this policy could only be made in the case of emergencies to avoid damage to physical property.

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OTHER OPPORTUNITIES AND CONSIDERATIONS

There are other opportunities for the Village to consider regarding providing service, expanding regulation, and balancing work load.

- a. Expanded regulatory program for rear yard drainage.

Beyond regulating the blocking of drainage paths, additional regulations and requirements are necessary for areas identified as prone to overland flooding. The Village of Niles engineering staff mapped all areas of rear yard drainage so additional care can be taken when reviewing permits in those areas, however sufficient code protections do not exist. Village staff will recommend revision to the code to improve performance of private yard overland flood routes.

- b. Lower level of service – 72 hours of persistent nuisance water

The Village will respond to complaints involving standing water persisting more than 48 hours. All cases of structure flooding will continue to be addressed as part of the flood control assistance program.

- c. Mediation

Currently stormwater commission recommends neighbors to work together to develop a solution based on the problem as diagnosed. The recommendation of the stormwater commission is for Village Staff to limit involvement in back yard drainage problems to enforceable code violations only.

- d. Rain Ready Home

This program was reviewed by the Stormwater commission and was not recommended to be pursued.

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DRAINAGE COMPLAINTS YARD NUISANCE FLOODING REAR YARD SEWERS

DEFINITIONS

Community Development Department

The Community Development Department for the Village of Niles. The Department that is generally responsible for Building and Property Standards within the Village of Niles.

Flood Control Assistance Program

As part of the Stormwater Relief Program the Village Budgets annually to provide direct assistance to residents for Sewer Backflow Protection and Overland Flood Protection. <https://www.vniles.com/493/Flood-Control-Assistance>

Niles, Illinois - Code of Ordinances

Codified and not yet codified ordinances enacted by the Village Board of Trustees.

Nuisance Flooding

Non-structural flooding which results in standing water typically over 1" in depth that persists for 48 hours after a qualifying rainfall event. Qualifying rainfall event shall be based on a range of storms including Bulletin 70 depth and duration definitions for a 1-year to 10-yr storm event.

Public Services

The Department of Public Services for the Village of Niles. The Department that is generally responsible for maintenance and upkeep of Village of Niles property and infrastructure.

Right-of-way

Land dedicated for use as a public roadway, parkway, sidewalk, or Village utility within the incorporated limits of the Village of Niles.

Structural flooding

Flooding of occupied building structures. Structural flooding is currently addressed by the Flood control Assistance Program to include Sewer Backflow Protection and Overland Flood Protection.

Urban Flooding

Non Riverine flooding of urban areas due to overland flow, undersized infrastructure, and general poor surface drainage.

REFERENCES .

The following communities have policies and level of service similar to or less than Niles for addressing rear yard flooding.

Barrington

Carpentersville

Evanston

Grayslake

Hanover Park

Highland Park

Hoffman Estates

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Lake Forest – Flier provided in appendix
Lake Zurich
Libertyville
Lincolnshire
Morton Grove
Park Ridge
Rolling Meadows
Schaumburg
Streamwood
Wheeling
Wilmette
Winnetka

The following examples are for programs some from regional communities that are generally more extensive than Niles:

DesPlaines

<http://www.desplaines.org/civicax/filebank/blobdload.aspx?blobid=24262>

Downers Grove:

<http://www.downers.us/res/stormwater-management/lpda-amp-flood-plain>

Glenview:

<http://www.glenview.il.us/Documents/Overhead%20sewer%20forms/Local%20Drainage%20Inspectin%20Program%20Flyer%20-%201-31-17.pdf>

Lombard

<http://www.villageoflombard.org/DocumentCenter/Home/View/949>

Skokie

https://www.egovlink.com/public_documents300/skokie/published_documents/Public%20Works%20Department/yarddrainageprogram.pdf

Non-Profit Center for Neighborhood Technology

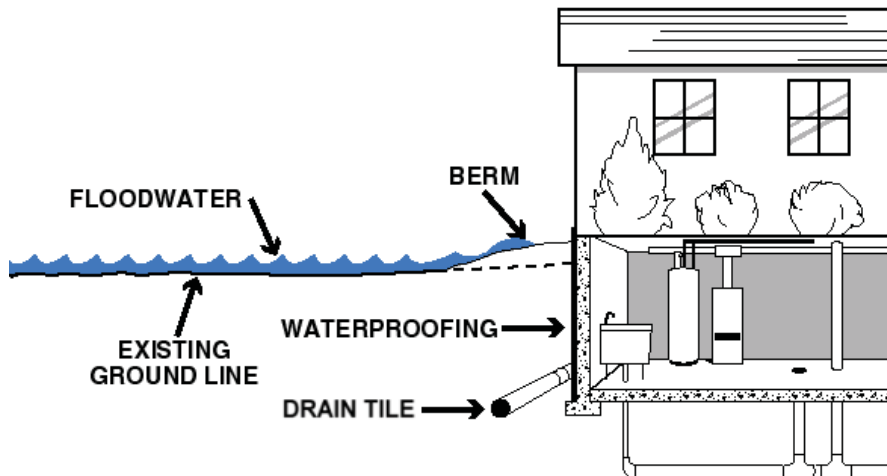
<http://rainready.org/>

APPENDIX 6

GUIDE TO FLOOD PROTECTION IN NORTHEASTERN ILLINOIS



Guide To Flood Protection In Northeastern Illinois



March 2006



The Illinois Association for
Floodplain and
Stormwater Management

Important Numbers

Police and fire emergencies: **911** Gas hazards: 1-888/642-6748 (1-888/NICOR4U)

Ambulance: **911** Electrical hazards: 1-800/334-7661 (1-800/EDISON-1)

Family meeting place after a flood: _____

Insurance agent: _____

Homeowner's insurance: Company: _____ Policy No. _____

Flood insurance: Company: _____ Policy No. _____

Neighbors: _____

How to use this Guide

What's your situation now?

- ✓ Has a **flood watch or warning** just been issued or do you see flooding start? If so, go to Section 5, "During a Flood" on page 17. Later on, read section 6 on "After A Flood" to prepare for when you go back to your flooded property.
- ✓ Have you **just been flooded**? If so, start with section 6 "After A Flood" on page 20. Then look through the rest of this *Guide*.
- ✓ If you're not in a rush and want to know **how to protect yourself from the next flood**, start on page 2.

If you would like more information on flood protection, visit the following websites:

- www.floods.org
- www.IllinoisFloods.org
- www.louisianafloods.org (although in Louisiana, it has many useful links)

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This guide was prepared with funding support from the Kane County Division of Environmental Management and the Illinois Emergency Management Agency and is being distributed by the Illinois Association for Floodplain and Stormwater Management.

Disclaimer

This guide is designed to give the reader an overview of steps that can be taken to protect a property from damage from the type of surface water flooding and sewer backup that faces most of northeastern Illinois. The information provided is based on careful research and input from experienced professionals.

The reader must assume responsibility for adapting this information to fit his or her conditions. This guide is not intended to replace the advice and guidance of an experienced professional who is able to examine a building and assess the needs of the particular situation.

1. Flooding in Northeastern Illinois

Illinois can flood in any season. Floods have been caused by localized storms, rain over several days on saturated ground, snow melt, and ice jams. Over the last two decades, a significant flood has occurred somewhere in the state each year. Many of them received a state or federal disaster declaration.

Overbank flooding: The most common and most damaging floods occur along the state's rivers and streams and this is called overbank flooding. Most floods are caused by too much precipitation in the watershed. Larger rivers respond more slowly to rain and runoff than do the smaller streams. But when floods do occur on the large rivers, they can last for days or weeks.

In urban areas, flash flooding can occur where impervious surfaces, gutters and storm sewers increase rain and snowmelt runoff to the receiving stream. Flash floods also can be caused by dam failure, the release of ice-jam flooding, or the collapse of a debris dam.

Drainage problems: Flooding can also occur in streets when rainwater can't flow into a storm sewer. Basements can flood when rainwater can't flow away from the house or when the sewers back up. These problems are usually caused by heavy local rains and are often not related to overbank flooding or floodplain locations.

Sewer backup: Sanitary sewers should not be affected by stormwater because they are separate from the storm sewers. However, there can be cross connections and leaks in sewer pipes that receive inflows and infiltration which can overload a sanitary line during wet weather. With no place to go, sewers back up and flow into the lowest opening in the sewer line. Sanitary sewers back up into basements and storm sewers back up into streets.

Impact of flooding: Most flooding in northeastern Illinois is slow moving and shallow. However, this does not mean that floodwaters are safe. A car will float in less than 2 feet of moving water and can be swept downstream into deeper waters (see graphic). This is one reason floods kill more people trapped in vehicles than anywhere else.

Water weighs 62.4 lbs. per cubic foot and typically flows downstream at 6 to 12 miles an hour.

When a vehicle stalls in the water, the water's momentum is transferred to the car. For each foot the water rises, 500 lbs. of lateral force are applied to the car.

But the biggest factor is buoyancy. For each foot the water rises up the side of the car, the car displaces 1,500 lbs. of water. In effect, the car weighs 1,500 lbs. less for each foot the water rises.

Two feet of water will carry away most automobiles.

Effects of shallow water on cars

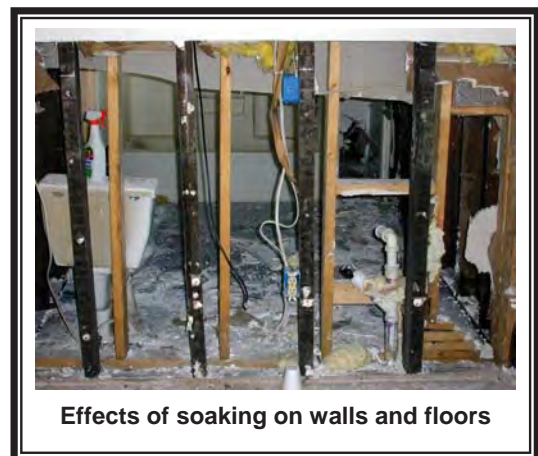
People die of heart attacks, especially from exertion during a flood fight. Electrocution is a cause of flood deaths, claiming lives in flooded areas that carry a live current created when electrical components short out. Floods also can damage gas lines, floors, and stairs, creating secondary hazards such as gas leaks, unsafe structures, and fires.

Health: Floodwaters carry whatever was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where cattle and hogs are kept can contribute polluted waters to the receiving streams. Overloaded sewer lines back up into low lying areas and some homes. Even though diluted by flood waters, raw sewage can be a breeding ground for bacteria, such as e coli, and other disease causing agents.

Another type of health problem comes after the water is gone. Stagnant pools become breeding grounds for mosquitoes, and wet areas of a building that have not been cleaned breed mold and mildew. A building that is not thoroughly and properly cleaned becomes a health hazard, especially for small children and the elderly. Another health hazard occurs when heating ducts in a forced-air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants.



Buildings: Due to the relatively low velocities and shallow flood depths in the area, the most common type of building damage inflicted by a flood is caused by soaking. When soaked, many materials change their composition or shape. Wet wood will swell and, if dried too quickly, will crack, split or warp. Plywood can come apart. Gypsum wallboard will fall apart if it is bumped before drying out. The longer these materials are wet, the more moisture, sediment and pollutants they will absorb.

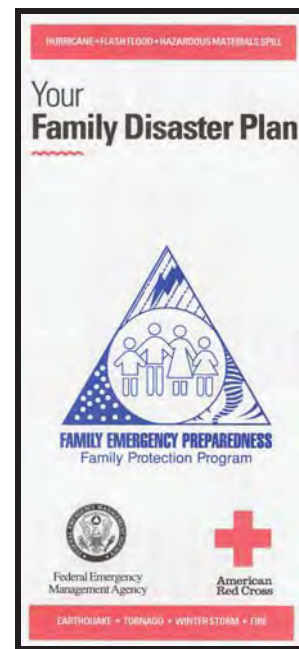


Soaking can cause extensive damage to household goods. Wooden furniture may become so badly warped that it cannot be used. Other furnishings such as upholstery, carpeting, mattresses, and books usually are not worth drying out and restoring. Electrical appliances and gasoline engines will not work safely until they are professionally dried and cleaned.

In short, while a building may look sound and unharmed after a flood, the waters can cause a lot of damage. As shown in the above photo, to properly clean a flooded building, the walls and floors should be stripped, cleaned, and allowed to dry before being recovered. This can take weeks and is expensive. It is better to be prepared and prevent flood damage.

2. Flood Protection Checklist

1. Check with your local building, planning or engineering department on flooding in your area.
 - ✓ Where does the water come from?
 - ✓ Are you in the mapped Special Flood Hazard Area or floodway?
 - ✓ How bad has it been in the past?
 - ✓ How bad could it be? (Remember, the next flood can be worse than the last one.)
 - ✓ What is an appropriate flood protection level? (How high should you prepare for?)
2. Check out your local drainage situation.
 - ✓ Does water flow away from your house or does it tend to stand next to your walls?
 - ✓ Is the ditch, stream or storm sewer that takes water away clear of debris or obstructions?
 - ✓ Do the downspouts from your roof gutters direct water well away from your house?
 - ✓ Do you have a sump pump? If so, does it direct water well away from your house?
 - ✓ If you are in a city or village, ask your local public works office if your area is served by a combined or separate sewer system.
3. Prepare for flooding by doing the following:
 - ✓ Know the flood safety guidance on the back of this guide.
 - ✓ Mark your fuse or breaker box to show the circuits to the floodable areas.
 - ✓ Know how to shut off the electricity and gas to your house when a flood comes.
 - ✓ Make a list of emergency numbers and identify a safe place to go to (see inside cover).
 - ✓ Make a household inventory, especially of basement contents.
 - ✓ Put insurance policies, valuable papers, medicine, etc., in a safe place.
 - ✓ Develop a disaster response plan – get a copy of the brochure “Your Family Disaster Plan” from your local Red Cross chapter or check the Red Cross’ website for ideas: www.redcross.org/services/disaster/beprepared/familyplan.html
 - ✓ Put cleaning supplies, batteries, camera, waterproof boots, etc. in a safe place.
4. Read the next section on construction and stream dumping regulations. Follow these rules, get permits for all your work, and report violations to your building department.
5. Construct or install appropriate flood protection measures (see section 4 – Protecting Your Property, page 6).
6. Purchase flood insurance coverage (see page 16).



3. Flood Protection Laws

Development in floodprone areas is development in harm's way. New construction in the floodplain increases the amount of development exposed to damage and can aggravate flooding on neighboring properties.

Development outside a floodplain can also contribute to flooding problems. Stormwater runoff is increased when natural ground cover is replaced by urban development. Development in the watershed that drains to a river can aggravate downstream flooding, overload the drainage system, cause erosion, and impair water quality. Accordingly, most communities have enacted several ordinances to protect people from activities that may cause flooding or drainage problems.

- ✓ **Before you build on, fill, alter, or regrade** your property, always check with your building department. A permit is probably needed to ensure that such projects do not cause problems on other properties.
- ✓ **Do not dump or throw anything into the storm sewers, inlets, ditches or basins.** Dumping in ditches, storage basins, and wetlands is a violation of local codes.
- ✓ **Every piece of trash** can contribute to flooding. Even leaves, grass clippings and branches can accumulate, plug storm drain inlets and channels, or kill vegetation and contribute to erosion. If your property is next to a ditch or storage basin, do your part and keep the banks clear of brush and debris.
- ✓ **If you see dumping or debris** in the ditches or basins, filling or construction near property lot lines, or filling or construction in a mapped floodplain without a permit sign posted, contact your building department. The debris or project may cause flooding on your property.

New buildings in the floodplain must be protected from flood damage. Local laws require that the lowest floor (including basement) of new residential buildings must be elevated above the base (or 100-year) flood level. There are additional local and state restrictions on filling, grading or building in a mapped floodway.

Local codes also require that substantial improvements to a building be treated as a new building. A substantial improvement is when the value of an addition, alteration, repair or reconstruction project equals or exceeds 50% of the value of the existing building. In the case of an addition, only the addition must be protected. In the case of an improvement to the original building, the entire building must be protected.

For example, if a house in the floodplain is flooded, has a fire, is hit by a tornado, or is otherwise damaged so that the value of the repairs equals or exceeds 50% of the value of the building before the damage, then the house must be elevated above the base flood level. In some communities, improvements are cumulated, so small projects add up to 50% over time.

*These regulations are designed to protect you and your neighbors.
By keeping the drainage system clear and getting the proper permits before you build,
you can help prevent flooding and other drainage problems.*

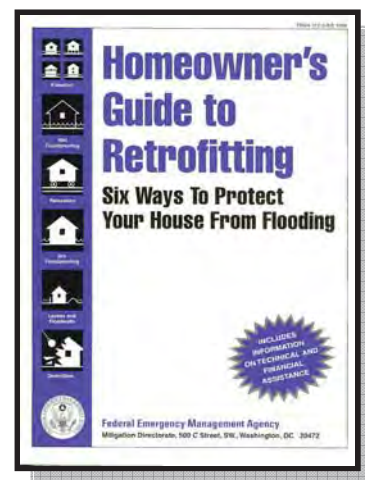
4. Before the Flood - Protecting Your Property

Because most flooding is shallow and slow moving, there are many ways you can protect your home, garage or other property from flood damage. Different techniques are appropriate for different types of buildings. Use the following as a guideline:

- ✓ If your house is on a *crawlspace* → Read the sections on elevation, barriers, and wet floodproofing (pages 6, 7 and 9)
- ✓ If your house is on a *slab* foundation → Read the sections on barriers and dry flood proofing (pages 7 and 8)
- ✓ If you have a *basement*, split level, or other floor below ground level → Read the sections on barriers, wet floodproofing, and basement protection (pages 7, 9 and 10 – 14)

Additional information on flood protection is available from FEMA publications, including *Homeowner's Guide to Retrofitting: Six Ways to protect Your House from Flooding*. This publication can be viewed on FEMA's website: www.fema.gov/hazards/floods/lib312.shtm. Another good publication is FEMA's *Protecting Building Utilities From Flood Damage*, which is at www.fema.gov/hazards/floods/pbuffd.shtm

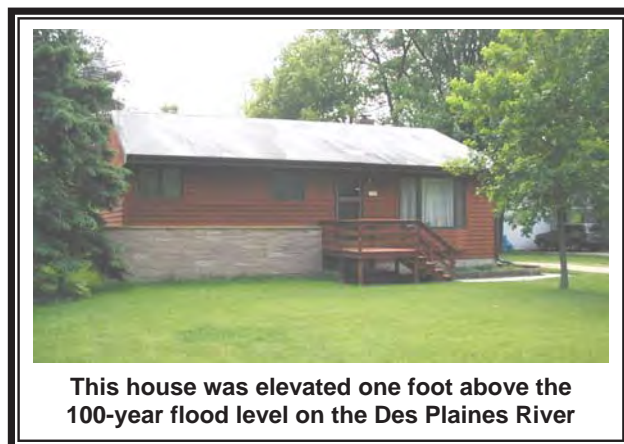
It is important to note that these protection measures are for existing buildings. There are different requirements for new buildings. These measures will not relieve you from the need to buy flood insurance if your building is in a mapped floodplain.



Elevation

Short of removing it from the floodplain, the best way to protect a house from surface flooding is to raise it above the flood level. The area below the flood level is left open to allow floodwaters to flow under the building, causing little or no damage. Elevation is required by law whenever a new house is constructed in the floodplain.

Elevation is usually most cost-effective for buildings on crawlspaces because it is easiest to get lifting equipment under the floor and disruption of the habitable part of the house is minimal. Because northeastern Illinois floodwaters are usually not very deep, the appearance of the elevated house is similar to that of a house on a two- or three-foot crawlspace. If the house is raised two feet, the front door would be three steps higher than before.



This house was elevated one foot above the 100-year flood level on the Des Plaines River

Barriers

Barriers keep surface floodwaters from reaching a building. A barrier can be built of dirt or soil (“berm”) or concrete or steel (“floodwall”). The standard design for earthen berms is three horizontal feet for each vertical foot (3: 1 slope). As a result, you should plan on needing an area six feet wide (at a minimum) for each foot in height.



Depending on how porous your ground is, if floodwaters will stay up for more than an hour or two, your barrier will need to handle leaks, seepage of water underneath, and rainwater that falls inside the perimeter. You will need a sump and/or drain to collect the internal groundwater and surface water. A pump and pipe is also needed to pump the internal drainage over the barrier.

A berm or floodwall should be as far from the building as possible to reduce the threat of seepage and hydrostatic pressure. However, it must not interfere with drainage along your property line. Where the house is close to the property line, you may need place the berm next to the wall as discussed on page 14.

Don't forget: a permit is needed for filling or regrading a yard. There may be restrictions on bringing fill onto your site if it blocks the flow of flooding or displaces floodwater storage areas. For example, state regulations require that barriers located within the regulatory floodway be within ten feet of the structure (as in the example on the right, above).

Precautions: Barriers can only be built so high. They can be overtopped by a flood higher than expected. Earthen berms are susceptible to erosion from rain and floodwaters if they are not properly sloped and covered with grass and maintained. Don't plant trees or shrubs on a berm (their roots can cause leaks). Barriers can settle over time, lowering their protection levels.

Some barriers have openings for driveways and sidewalks (as in the example on the right, above). Closing these openings is dependent on someone being available and strong enough to put the closure in place. You also need to account for water in the sewer lines that may back up under the barrier and flood inside your house (see the sewer backup section on page 12).

Dry Floodproofing

This term covers several techniques for sealing up a building to ensure that floodwaters cannot get inside it. For dry floodproofing, all areas below the flood protection level are made watertight. Walls are coated with waterproofing compounds or plastic sheeting. Openings (doors, windows, and vents) are closed, either permanently, with removable shields, or with sandbags. Many dry floodproofed buildings do not look any different from those that have not been modified.

Dry floodproofing is only appropriate for buildings on concrete slab floors (without basements) and with no cracks. To ensure that the slab is watertight and sound, an engineering analysis is recommended.

The maximum flood protection level is two feet above the slab (see below, left). The walls and slab floor were not built to withstand the type of pressures exerted by deeper water. It is smarter to let deep water into your house than to risk losing your walls or floor (see below, right).



Precautions: It is very tempting for the owner of a dry floodproofed building to try to keep the flood out if floodwaters get deeper than two or three feet. This can result in collapsed walls, buckled floors, and danger to the occupants.

It is difficult to waterproof a crawl space to protect it from underseepage. Basements should not be dry floodproofed to protect them from surface flooding because of the water pressure on the walls and floors. See page 14 on the basement protection berm for an alternative approach.

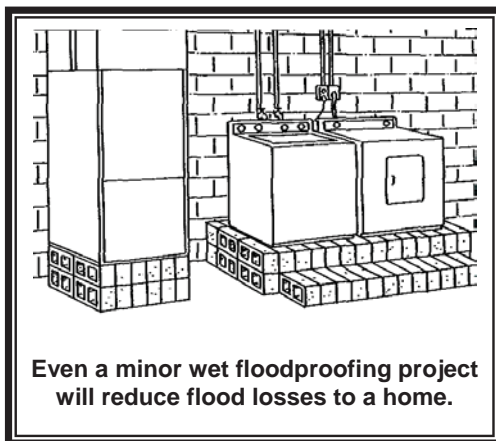
Many commercial waterproofing compounds are made to protect wood from rain, but they will not withstand the pressures of standing water. Some deteriorate over time, so check with the supplier to be sure the waterproofing compound is appropriate for sealing your basement walls from water. Installing closures and seals over doors and windows requires enough warning and having someone at the building who knows what to do.

Wet Floodproofing

Wet floodproofing means letting the water in and removing everything that could be damaged by a flood. There are several ways to modify a building so that floodwaters are allowed inside, but minimal damage is done to the building and its contents. These techniques range from moving a few valuable items to rebuilding the floodprone area.

In the latter case, structural components below the flood level are replaced with materials that are not subject to water damage. For example, concrete block walls are used instead of wooden studs and gypsum wallboard. The furnace, water heater, and laundry facilities are permanently relocated to a higher floor. Another approach is to raise these items on blocks or platforms where the flooding is not deep (see photo).

Wet floodproofing is not feasible for one-story houses because the flooded areas are the living areas. However, many people wet floodproof their basements, garages, and accessory buildings simply by relocating all hard-to-move valuables, such as heavy furniture and electrical outlets. Light or moveable items, like lawn furniture and bicycles, can be moved if there is enough warning. Fuse and electric breaker boxes should be located so you can safely turn the power off to the circuits serving floodprone areas.



Another approach is to wet floodproof a crawlspace. If your crawlspace has a furnace in it or is used for storage, these items could be moved to the first or second floor. Vents should be placed on the foundation walls to ensure that floodwaters can get into the crawlspace to equalize water pressure.

Wet floodproofing has one advantage over the other approaches: no matter how little you do, you will reduce your potential for damage. Thousands of dollars in damage can be prevented by simply moving furniture and electrical appliances out of a basement.

Precautions: Moving contents is dependent on adequate warning and the presence of someone who knows what to do. Flooding a basement or garage where there is electricity, paint, gasoline, pesticides, or other hazardous materials creates a safety hazard. There will still be a need for cleanup, with its accompanying health problems. **Moving water lines, furnaces, or electric service boxes requires a permit from your building department.**

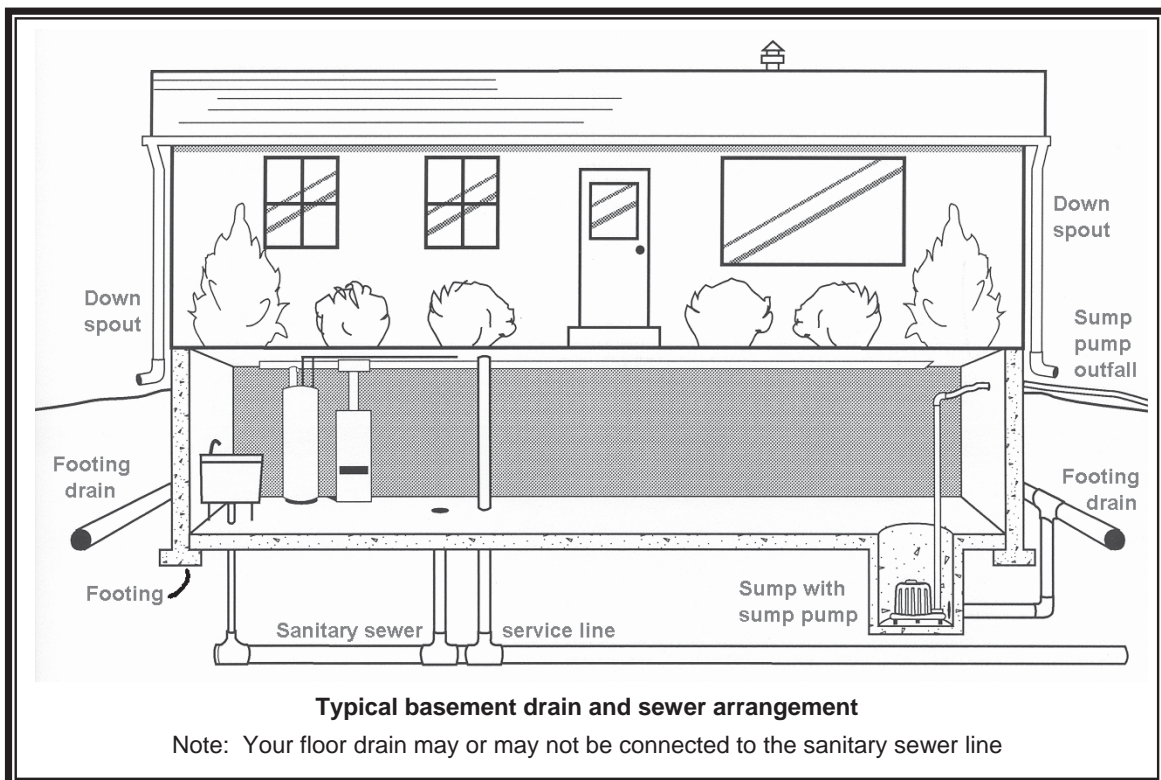
Basement Problems: Sump Flooding

Basement flooding caused by saturated ground can be corrected by installing a footing drain around the foundation (see illustration below). The drain collects groundwater and directs it to a sump. When the sump fills, water is pumped out, usually onto the ground away from the building. Depending on local conditions, the drain and pumping system may have to handle large volumes of water.

If the pump gets overloaded, or if there is a loss of power, the system designed to keep groundwater out of your basement can act as a conduit to bring water in. You can prevent sump flooding by doing one or more of these floodproofing projects:

- ✓ Install a larger sump pump,
- ✓ Add a second battery backup sump pump,
- ✓ Be certain that downspouts are not connected to the footing drain,
- ✓ Make sure the downspouts drain away from the house,
- ✓ Redirect the downspouts and sump pump outfall farther away from the house, and/or
- ✓ Run the sump pump outfall above ground level or use a check valve to prevent back flow.

Precautions: When there is water in your basement, it is hard to tell how it got in. It's a good idea to check for cracks in the walls and install sewer backup protection, too. Using a battery backup sump pump is the safest alternative, plus you do not have to be home to start it. If your existing backup sump pump uses a generator for a power source, be sure the generator is set up outside (where it won't flood) or vented to the outside to direct deadly carbon monoxide exhaust fumes outdoors.



Basement Problems: Cracks

Groundwater can seep into your basement around pipes or through cracks in the walls or floor. This may be difficult to determine if the walls have been covered with paneling or other finishing. The best way to deal with a groundwater problem is to waterproof the walls and relieve the water pressure through a footing drain system and sump (see previous page). Footing drains are typically installed around the perimeter of the house, along the foundation. If this is not possible, drains can be installed on the interior of the basement, along the basement walls, and directed toward the sump pump pit.

Cracks can be repaired and the walls can be waterproofed from inside or outside. Waterproofing on the outside is more effective because groundwater pressure forces the sealer into the foundation. The best technique is to dig a ditch around the basement wall so that you can apply an epoxy sealant to the exterior walls. This can be done by the handy person (many home maintenance manuals have instructions for this) or a commercial waterproofing company.

Precautions: Waterproofing alone is only recommended for groundwater problems. Surface water will put much more pressure on the building's walls and can even break them. If the building is affected by surface flooding, you should also install a barrier (see pages 7 and 14).

Basement Problems: Sewer Backup

The illustration on the previous page shows the sewer arrangements for a typical house with a basement. The sanitary sewer line drains toilet waste, laundry tubs, and (sometimes) the basement floor drain to the sanitary sewer main in the street. Clean stormwater and groundwater is handled by downspouts, footing drains, and sump pumps.

Often basement flooding is caused by these two sewer systems being interconnected. Some houses have the downspouts, footing drain, and/or the sump pump connected to the sanitary sewer service. During a heavy rain, stormwater enters the sanitary sewers, causing backups into one house and overloading the main lines, contributing to backups in other houses.

Sewer backups can also be caused by events not related to storms or flooding. Individual service lines can be plugged by grease, waste, tree roots, breaks in the pipe, or saturated ground. Proper maintenance, like pouring tree root killer down the toilet or floor drain can prevent most of these problems.

Don't cause your own flood! Keep your sewer lines clear

- ✓ Keep roots from trees and shrubs out with root killer.
- ✓ Make sure your yard clean-out vent will keep debris out.
- ✓ Don't pour dangerous liquids down the drain (motor oil, paint, pesticides, poisons, epoxies, etc.).
- ✓ Don't pour grease, fat or cooking oil down the drain (they solidify later).
- ✓ Don't flush large solids, such as diapers, down the toilet.

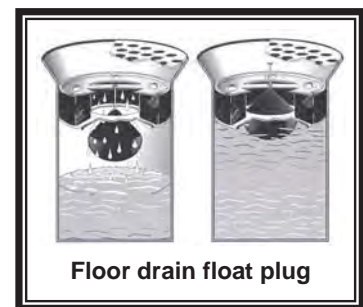
The sewer mains can also be plugged by the same causes, or by vandalism or illegal dumping in manholes. These problems can be fixed by the owner or your municipality, depending on where the stoppage occurs.

Sanitary Sewer Backup Protection

The next three sections of this *Guide* focus on protection measures that deal with sanitary sewer backup that occurs when the sewer main is overloaded and backs up through the sanitary service line into the house. There are four ways to stop sewer backup: floor drain plug, floor drain standpipe, overhead sewer, and backup valve. Each of these measures work for buildings with basements or below-grade floors.

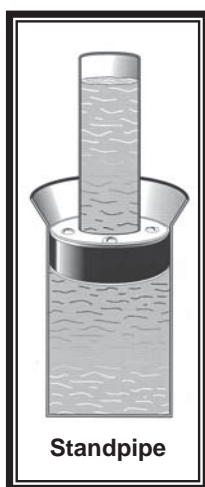
Floor Drain Backup Prevention: The simplest way to stop sewer backup is to plug the opening where it first occurs. This is at the floor drain, the sanitary sewer system's lowest opening in the house. Two inexpensive measures can be used: a plug or a standpipe. Both can be purchased at local hardware stores and are easy for the handy person to install.

Plug: The floor drain plug stops water from flowing in either direction. Therefore, if the laundry tub overflows or other spillage occurs, it will stay in the basement unless the plug is removed. Because of this, it may be best to leave the plug out under normal circumstances and put it in place only during heavy rains.



One variation is a plug with a float. It allows water to drain out of the basement (see illustration, left side). When the sewer backs up, the float rises and plugs the drain (see illustration, right side). A float plug permanently installed will not interfere with the floor drain's normal operation.

If the plug is not tight enough, pressure can eject it. Therefore, a plug is not recommended for flood depths greater than one foot.



Standpipe: A standpipe is an inexpensive alternative to a floor drain plug. When the sewer backs up, the water moves up the pipe. If properly installed, water pressure cannot build up to blow a standpipe out of the floor drain. The system works unless the backup is so deep that it goes over the top of the pipe.

Precautions: A plug left in the floor drain may contribute to a wet basement if water from a laundry tub spill or a leaky pipe cannot drain out. Float plugs are known to have been jammed open by a small amount of debris. A plug does not tell you if there is a problem in your sewer service line.

Neither the plug or standpipe stops backup from coming out of the next lower opening, like a laundry tub or basement toilet. Sealing the base of the toilet to the floor will protect you until the water backs up higher than the top of the bowl.

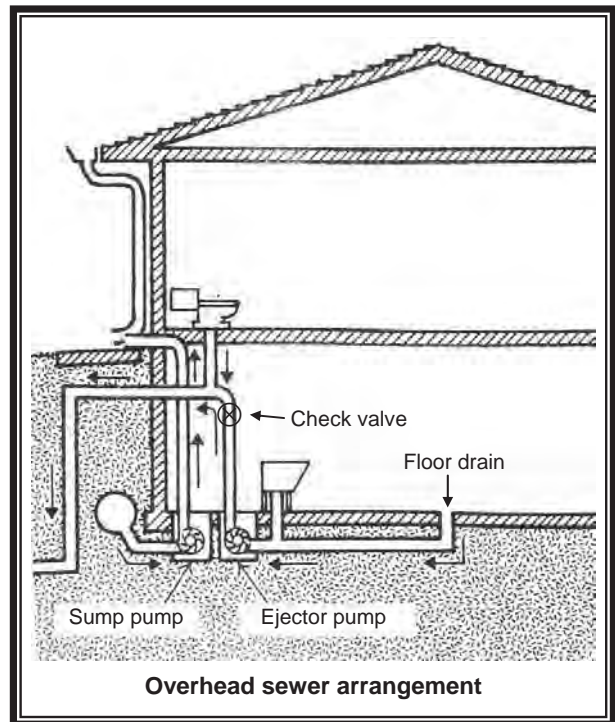
Because water pressure depends on the height of water in the pipes, a standpipe does not reduce the pressure in the pipes (or under the floor, if the pipes leak). Because the pressure under the floor is the same with a standpipe or a plug, standpipes and plugs are only recommended for flood depths of one foot or less and for buildings with cast iron sewer lines underneath the floor.

Overhead Sewer: An overhead sewer is generally viewed as the most effective sewer backup protection measure. It acts like a standpipe but without the shortcomings. A sump is installed under the basement floor to intercept sewage flowing from basement fixtures and the basement floor drain. An ejector pump in the sump pushes sewage up above the flood level. From there it can drain by gravity into the sewer service line. Plumbing fixtures on the first floor continue to drain by gravity to the service line.

Unless the house is subject to overbank flooding, it is unlikely that the sewers will back up above ground level. If water does go higher, a check valve in the pipe from the ejector pump keeps it in the pipes. Backed up sewage is enclosed in the sewer pipes and doesn't overflow laundry tubs or basement toilets.

Although more dependable than a standpipe, an overhead sewer is more expensive. A plumbing contractor must reconstruct the pipes in the basement and install the ejector pump. It can cost \$3,000 – \$7,000.

Precautions: The ejector pump requires electricity to work, so battery backups are recommended. The basement is disrupted during construction and the ejector pump needs periodic maintenance. **This work requires a licensed plumber and a permit from your building department.**



Sewer Backup Valve: A backup valve stops the water in the sewer pipes. While not as foolproof as an overhead sewer, their installations are less disruptive of the basement.

Older versions of this approach were located in the basement floor and relied on gravity to close the valve. If debris got caught in the flapper, the valve did not close tight. Because of its unreliability, valves were discouraged and even prohibited in some communities. Today's systems are more secure. They include installing two valves in line, using better, more watertight materials, or counterweights that keep the valve open all the time so debris won't catch and clog it.

Larger valve systems are usually installed in a manhole in the yard, well away from the basement wall, so there is less disruption during construction and no concerns over breaking the pipes under the basement floor. The cost of this type of backup valve is comparable to the cost of an overhead sewer, in the \$4,000 – \$6,000 range.

Precautions: The ejector pump and the valve require maintenance. **This work requires a licensed plumber and a permit from your building department.**

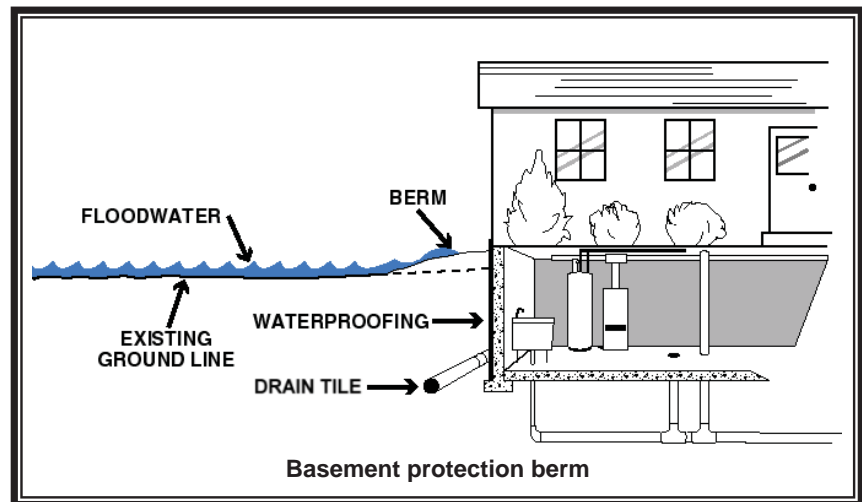
Basement Protection Berm

Basements and the lower floors of split levels can be protected from surface water by construction of low walls around stairwells or using backfill. Waterproofed walls, sewer backup protection, drain tile and a sump pump are a must. The drains and pumps can keep up with the seepage before it gets through the berm and reaches your house.

Walls are built up around the window wells and basement stairwells (don't block basement windows that are needed for emergency exits). An earthen berm can be filled against the waterproofed side of the house.

A subsurface drain and one or two correctly sized sump pumps are a must. The drains and pumps can keep up with the seepage before it gets through the berm and reaches your house.

The objective is to not let floodwaters touch the house. If water on the surface of the ground gets up against the house, it probably will seep down the gap between the basement walls and the surrounding soil. This will greatly increase the amount of water pressure against the basement walls.



Sump pumps cannot keep up with surface water. If you have sandy or permeable soil, you should consult an engineer or soils expert to ensure that the berm will extend far enough away from the walls. **Don't forget: filling or grading in your yard requires a permit.**



Precautions: The berm can only be built so high. It can be overtopped by a flood higher than expected. Being made of earth, it is susceptible to erosion from rain and floodwaters if not properly sloped and covered with grass and maintained. A berm can settle over time, lowering its protection level. The small floodwalls can crack and lose their watertight seals.

You also need to account for water in the sewer lines, footing drain and sump pump outfall. They may carry water under the barrier and flood inside your house. See the section on sewer backup prevention on page 12.

Dealing with Contractors

Most building departments in northeastern Illinois require that certain work be done only by licensed contractors. Building departments usually have a register of licensed contractors, listed by their areas of expertise.

If you have been satisfied with work done by licensed local contractors, try them first. If they cannot help you, ask them for recommendations. If you must hire a contractor you do not know, talk to several contractors before you sign anything. Reputable contractors agree that you should take the following steps:

- ✓ Check several firms and their reputations: The Better Business Bureau, Home Builders Association, or building trades council are excellent sources.
- ✓ Look out for “special deals” or contractors who want to use your home as a “model home.”
- ✓ Ask for proof of insurance: Worker’s compensation and general liability insurance are essential. If the contractor is not insured, you may be liable for accidents on your property.
- ✓ Ask for references: Contractors should be willing to provide names of previous customers. Call some of the customers and ask if they would hire the contractor again.
- ✓ Ask for a written estimate and check it carefully.
- ✓ Ask for a contract: Never sign a blank contract or one with blank spaces. If a lot of money is involved, it may be worth your while to have the contract reviewed by a lawyer.
- ✓ Avoid cash payments: Beware if you are asked to pay cash on the spot instead of a check made out to the contracting company. A reasonable down payment is 10%–30% of the total cost of the project.
- ✓ Don’t sign off before the job is finished: A reputable contractor will not threaten you or pressure you to sign if the job is not finished.
- ✓ Get your permits: Most plumbing work, home improvements, filling, fences, and other yard work require a permit from your building department to be sure that it meets code and will not cause a drainage problem on your neighbors.
- ✓ Get your inspections: When the project is finished make sure your contractor calls you and the building department to inspect work before it is covered over. Some will be hidden from view and you won’t know if there is a problem until the next flood.
- ✓ Get help: If you are a victim of fraud or have problems with a less than reputable contractor, check with the Illinois Attorney General’s Consumer Protection Division (312/345-2400 or www.illinoisattorneygeneral.gov/consumers/index.html). Your building department would also like to know of problems in case it needs to revoke a license.

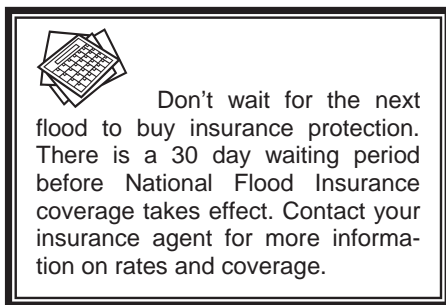
Insurance

Flood insurance: Flood insurance is highly recommended. Remember, even if the last storm or flood missed you and even if your home has been floodproofed, the next flood could be worse. Most homeowners insurance policies do not cover property for flood damage.

Almost all of the communities in northeastern Illinois participate in the National Flood Insurance Program. Local insurance agents can sell a flood insurance policy under rules and rates set by the Federal government. Any agent can sell a policy and all agents must charge the same rates.

Any house can be covered by a flood insurance policy. It does not matter if it is in the mapped floodplain or out of it. Detached garages and accessory buildings are covered under the policy for the lot's main building. Separate coverage can be obtained for the building's *structure* and for its *contents* (except for money, valuable papers, and the like). The *structure* generally includes everything that stays with a house when it is sold, including the furnace, cabinets, built-in appliances, and wall-to-wall carpeting.

There is no coverage for things outside the house, like the driveway and landscaping. Renters can buy contents coverage, even if the owner does not buy structural coverage on the building.



Some people have purchased flood insurance because it was required by the bank when they got a mortgage or home improvement loan. *If you have a policy, check it closely.* You may only have structural coverage (because that's all that banks require). During the kind of flooding that happens in northeastern Illinois, there may be more damage to the furniture and contents than there is to the structure.

Sewer backup insurance: Several insurance companies have sump pump failure or sewer backup coverage that can be added to a homeowner's insurance policy. Each company has different amounts of coverage, exclusions, deductibles, and arrangements. Most are riders that cost extra. Most exclude damage from surface flooding that would be covered by a National Flood Insurance policy. The cost varies from nothing to up to about \$75 for a rider on your homeowner's premium.

Basements, split levels and bilevels: There is limited coverage for basements and the below grade floors of bilevels and trilevels. The National Flood Insurance Program defines "basement" as "any area of the building, including any sunken room or sunken portion of a room, having its floor below ground level (subgrade) on all sides." This includes split levels and bilevels.

Coverage under building or structural coverage is limited to specific items needed for the operation of the building, such as a furnace, water heater, clothes washer and dryer. There is very limited coverage for finishings, such as wallpaper and carpeting, and contents. Flood insurance only covers damage when there is a general condition of surface flooding in the area.

5. During a Flood

While it can take several days for the larger rivers to flood, flooding caused by ice jams, flooding on the smaller streams, local drainage problems, and sewer backup can come with little warning. If weather conditions look like flooding, the National Weather Service issues two types of flood notices:

- ✓ *Flood watch*: flooding is possible within the area described by the notice.
- ✓ *Flood warning*: flooding is imminent or occurring.

To stay abreast of weather warnings, listen to NOAA Weather Radio. This is a radio station operated by the Weather Service. You can buy a special battery-operated weather radio at a local electronics store for \$20–\$35. It issues an alert signal if a watch or warning is being issued. (see also www.crh.noaa.gov/lot/nwr.php).

There are several locations on the larger rivers where the Weather Service monitors river levels. You can see their “real time” levels at www.crh.noaa.gov/ahps2/index.php?wfo=lot. These can tell you if the streams are rising or falling.

If you hear a siren or a severe weather watch or warning, check the latest instructions on local radio and TV stations. Once the emergency management agencies are sure that the danger has passed, they will issue an “all clear” message. Remember: You may not get a flash flood warning before flooding actually begins. Play it safe in stormy weather, and read the next section.

What You Should Do

Once you hear a flood watch or warning, you should take the following steps:

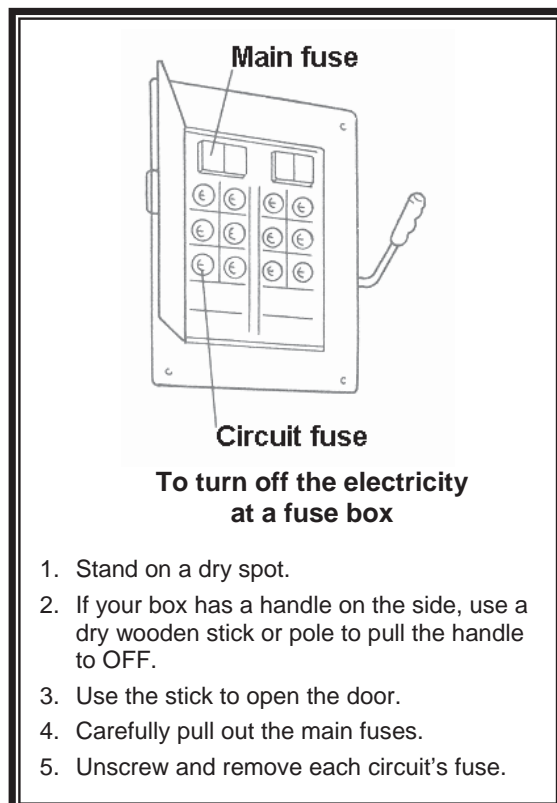
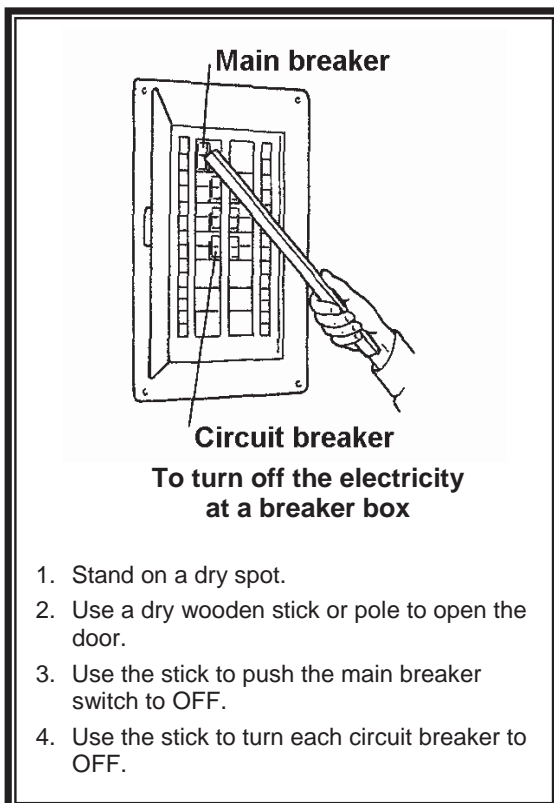
1. If the radio, television, or emergency vehicle announced what to do, **follow those instructions**.
2. **Implement your flood response plan**, if you have one. If a flood watch was issued, you can still make a flood response plan that includes the items in section 3 on see page 4.
3. If you are in the mapped floodplain or suspect you are subject to **deep flooding** that will get inside your house:
 - a. Turn off the electricity and gas (see pages 18 – 19).
 - b. Read “Flood Safety Outdoors” on the back cover.
 - c. Lock your doors and evacuate
4. If you don’t have a place on high ground where you can stay, listen to the radio or TV for information on public shelters.

5. If you are not in the mapped floodplain, it is unlikely that you will be flooded deeply. **If the streets are underwater, you are better off staying in your house** (See the graphic on page 2). Read “Flood Safety Indoors” on the back cover.
6. If you are not in the mapped floodplain, but you know that your **basement floods**:
 - a. Turn off the basement electricity (see below).
 - b. Turn off the gas (see the next page).
 - c. Move any valuables upstairs.
 - d. Stay out of the basement if the water outdoors is touching the house (the water pressure could collapse the walls).

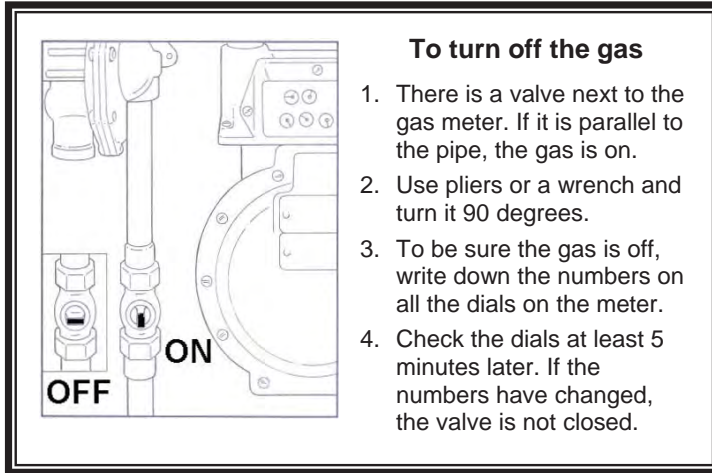
Turning Off the Utilities

If your house or basement could get flooded, turn off your utilities to prevent greater damage. This section provides directions on how you can do this safely. If you are unsure of how to do these things, ask a friend or neighbor to help you, or don't do them at all.

Electricity: The most important utility to turn off is electricity. You have a fuse box or a breaker box in the house. The breaker box is more common in newer buildings or if you have had some electrical work done in the last 10 – 20 years. The illustrations below shows how to turn off the power.



Gas: Floodwaters may knock out pilot lights and silt may get into burners. To prevent a fire and safety hazard, you should turn off the gas before you leave. There is a valve next to the gas meter. If the valve handle is parallel to the pipe, the gas is on. You may need a pair of pliers or a wrench to turn the valve. Turn it 90 degrees (a quarter turn) so the handle is perpendicular to the pipe to shut the gas off.



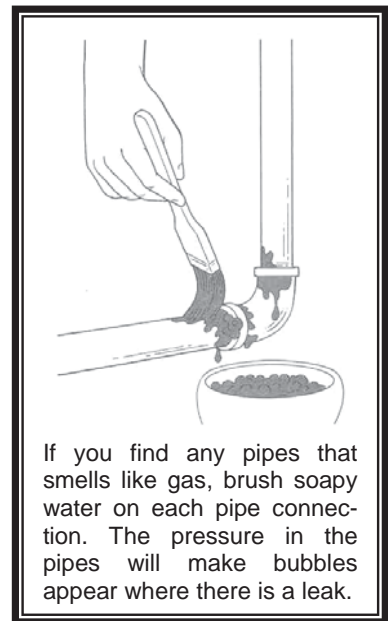
Most gas meter valves have a hole in the handle that lines up with a hole in the valve body when the gas is shut off. This hole is used by the gas company to lock or seal the valve closed when the building is vacant. When the holes are lined up, you know that the gas supply has been shut off. If you have any doubts, play it safe and call your gas company.

Fuel oil tanks: If you have a fuel oil or propane tank, turn off the fuel valve at the tank.

Gas or oil leaks: Check for leaky fuel pipes by smelling for gas. A chemical that has a disagreeable, distinctive odor is added to natural gas and propane to tell you if there is a leak. If you have any doubts, have a professional check for you. Do not use open flames.

Make sure the valve that leads to each appliance is closed. If you find any pipes that moved or any area that smells like gas, brush soapy water on each pipe connection (as illustrated). The pressure in the pipes will make bubbles appear where there is a leak.

If you find a leak, turn off the gas. Unscrew the pipe connection, clean the joint, and apply pipe joint compound or pipe tape (available at hardware stores) on the threads. Screw the pieces back together tightly. Turn on the gas and check the connection again with soapy water. If you have a leak, or you are not sure your system is safe, turn off the gas and call a professional immediately.



Water. Since your water faucets are usually turned off, you shouldn't have to worry about turning all the water to the house off. However, if your washing machine is in the basement, or if the floodwaters around your house could be several feet deep, the floodwaters could get into the water lines through the appliances. If you have the time, turn off the water to the house. There should be a valve near the water meter, similar to a faucet knob. Turn it all the way clockwise.

6. After a Flood

If you've been flooded, your home and its contents may look beyond hope, but many of your belongings can be restored. If you do things right, your flooded home can be cleaned up, dried out, rebuilt, and reoccupied sooner than you think.

You should get a copy of *Repairing Your Flooded Home* (ARC4477), published jointly by the American Red Cross and the Federal Emergency Management Agency. Copies of the book are available free from your local Red Cross chapter or you can see it at www.redcross.org/services/disaster/ (go to "after a disaster," then "floods").

Here are some of the first things you can do after a flood. The next steps are explained (along with more details) in *Repairing Your Flooded Home*.

Ask for help. Many people can do a lot of the clean up and repairs discussed in this guide. But if you have technical questions or do not feel comfortable doing something, get professional help. If there is a federal disaster declaration, a telephone "hotline" will often be publicized to provide information about public, private, and voluntary agency programs to help you recover.

Step 1. Take Care of Yourself First

You and your family have been through a disaster. Your life has been disrupted and you must allow time for things to return to normal. You should recognize that the flood can take its toll on you as well as your property. You need to look after yourself and your family while you focus on cleanup and recovery.

Play it safe. The dangers are not over when the water goes down. Your home's foundation may have been weakened, the electrical system may have shorted out, and floodwaters may have left behind things that could make you sick. When in doubt, throw it out. Don't risk injury or infection.

Watch for signs of stress. Your hidden enemy is stress. Watch for signs of trouble like short tempers, getting upset over little things, having difficulty sleeping, bad dreams, aches, pains, stomach problems, apathy, and depression. These are ways your body tells you that times are difficult. Reactions to stress are common and usually temporary. If you cannot shake feelings of despair or other telltale signs of stress, get professional help.

Care for your children. Watch your children closely. You can expect to see them display fear or symptoms of stress. Be understanding. Remember, they are going through a rough time too.

Important Health Notes

- ✓ Wash your hands thoroughly. This is especially important before eating, cooking, or smoking.
- ✓ Confirm that the water is clean and safe. Don't drink it or wash dishes until you're sure.
- ✓ Disinfect dishes and all items that floodwaters touched.
- ✓ Watch out for fatigue. When your body is tired, you are more prone to accidents, back strain, and depression.
- ✓ Report health hazards. Call your local health department if there are animal carcasses, rats, dangerous chemicals, or other hazards on your property.

Step 2. Give Your Home First Aid

Read the safety precautions on the back cover of this guide. Each year about 150 people die because of floods. Many of those fatalities are due to electrocution or other accidents that occur after the floodwaters have gone down. Your first job is to make sure everything is safe. Follow these steps:

Check with your insurance agent to see if some of your cleanup and repair work is covered. If so, you may want to hire professional help for the rest of these steps.

Walk around the outside of your house and check for loose power lines and gas leaks. You can detect leaking gas by the putrid, rotten egg smell of chemicals that have been added to it to make a leak noticeable. If you find downed lines or leaks, call the power or gas company (see “Important Numbers” inside the front cover). Remove tree limbs or other trash that may have landed on or floated into the house.

Check the foundation for cracks or other damage. Examine porch roofs and overhangs to be sure they still have all their supports. Look for gaps between the steps and the house. If you see obvious damage, have a building inspector check the house before you go in.

Turn off the electricity at your house, even if the power company has turned it off (they may turn it back on when you’re not ready). If you have to go through water to get to your fuse box or breaker box, if the boxes are wet, or if you’re not comfortable with electrical matters, call an electrician. Otherwise, you can follow the instructions on page 18.

Turn off the gas. See the instructions on page 19.

Go inside carefully. It may be easier to enter your house through a window if the door won’t open easily. Look carefully at the ceiling before you go in to be sure it is not ready to fall. Do not smoke or use candles, gas lanterns, or other open flames until the house has been well ventilated. There may be explosive gas.

Rescue the most valuable items. Find and protect the “irreplaceables,” like money, jewelry, insurance papers, photographs, and family heirlooms. Wash the mud off before they have a chance to dry. Put them in a safe place like the upper story (if it’s dry), a plastic bag, or take them to a friend’s home. Wash the mud off photographs and papers and put them in a freezer for clean up later when you have the time to do a careful job.

Keep the damage from getting worse. Open the windows and doors (if weather permits) to reduce the moisture and get rid of any gas. Cover holes in the roof, walls, or windows with boards, tarps, or plastic sheeting to keep out the wind and rain.

Check for broken or leaking water pipes. If you find any, cut off the water supply by turning off the valve at your water meter. If sewer and water lines are damaged, don’t use toilets or sinks. If the water pipes are not leaking, you can use your tap water for hosing things down and cleaning. But do not drink or cook with tap water until the health department declares it safe.

Step 3. Start Cleaning

Drain your basement carefully. Water in the saturated ground puts tremendous pressure on your basement walls and floors (see the photo on page 8). The water inside your flooded basement is counteracting this pressure. If you don't follow the instructions in the box for emptying the basement gradually, your walls and floor will lose the support they need to counteract the pressure from the water outside. The weight of the saturated earth could then cause the walls to crack and collapse, buckling the floors and seriously damaging your home.

Get rid of the mud and silt. Most of the health hazards brought by a flood are in the mud and silt that is left after the water drains away. It is therefore very important to clean it out as soon as possible. This is a lot easier if you do it before the mud dries out. Follow these steps:

- ✓ First, **shovel out the mud.**
- ✓ Next, make sure the electricity is turned off. Remove all light bulbs from sockets that have been flooded. Throw away flooded wall switches and outlets. They should be replaced later with new ones.
- ✓ **Hose the house down**, inside and out. If you have an attachment that sprays soap, wash and then rinse the walls and floors. Hose the furniture, too, and other major items that got muddy.
- ✓ Double check that the electricity is off, then thoroughly hose out the electrical outlets, switch boxes, and light sockets that you opened up.
- ✓ **Don't let the water sit on the floor** too long. Mop it up right away, especially if your floor is particle board or another wood product that tends to fall apart when wet.

Clean everything that got wet. Flood waters have picked up sewage and chemicals from roads, farms, factories, and storage buildings. Spoiled food and flooded cosmetics and medicines are health hazards. **When in doubt, throw them out.**

Follow the rest of the guidance in *Repairing Your Flooded Home* (see box).

How to Drain a Basement

Pumping a basement out too fast can result in broken walls and floors if there is still water in the ground. To do it safely, follow these steps:

1. Make sure the electricity is off.
2. If there is no floodwater on top of the ground, start pumping the water out of the basement.
3. Pump the water level down two to three feet. Mark the level and wait overnight.
4. Check the water level the next day. If the water went back up, it's still too early to try to drain the basement.
5. Wait overnight. Then pump the water down two to three feet again. Check the level the next day.
6. When the water stops going back up, pump down another two to three feet and wait overnight. Repeat steps 4 through 6 until all water is pumped out of the basement.

*Repairing
Your
Flooded
Home*



Repairing Your Flooded Home can be obtained free from your local Red Cross chapter or you can see it at www.redcross.org/services/disaster/ (go to "after a disaster," then "floods").

Steps to File Your Flood Insurance Claim

Step 1. Contact your agent to report your loss: Have ready the name of your insurance company (your agent may write policies for more than one company), policy number and a phone number and/or e-mail address where you can be reached. If you get in touch with your agent or company representative directly, they will advise you how to file your notice of claim. Otherwise, you must send a written notice to your insurance company with your policy number.

Step 2. Separate your property: Your policy requires you to separate damaged property from undamaged property. But don't throw anything away before an adjuster has seen it. If local officials require damaged items to be thrown out, take photos before disposing of them and keep samples for the adjuster to see (for example, cut out a piece of wall-to-wall carpet). Do all you can to protect undamaged property.

Step 3. Make a list of damaged contents: If you have contents coverage, make a list of damaged property. List the quantity of each item, a description, brand name, where purchased, its cost, model and serial number (if appropriate) and your estimate of the loss amount. Attach your bills, receipts, photos and any other documents.

Step 4. List areas of structural damage: As you look over your property, make a list of any areas of structural damage you want to point out to the adjuster. If you have damage estimates prepared by one or more contractors, provide them to the adjuster since they will be considered in the preparation of your repair estimate.

When the adjuster comes: Generally, your adjuster will contact you within 48 hours after receiving your notice of loss. However, depending on local conditions and the severity of flooding, it may take more time. Once the adjuster reaches you, a time will be set for the adjuster to view your property.

During the visit to your property, the adjuster will take measurements and photographs and note the flood damage. This is called "scoping" a loss. Your adjuster will be an experienced claims professional and will notice many points of damage you could overlook. However, you are encouraged to point out all damage you have noticed.

The adjuster uses the knowledge gained from the visit(s) – and the documentation you provided – to complete a detailed estimate of damage. You will get a copy. You may ask the adjuster for an advance or partial payment. If you have a mortgage, your mortgage company will need to sign to sign building property advance check.

Your official claim for damage is called a Proof of Loss. It includes a detailed estimate to replace or repair the damaged property. It must be fully completed, signed, and in the hands of your insurance company within 60 days after the loss occurs. In most cases, the adjuster, as a courtesy, will provide you with a suggested Proof of Loss. However, you are responsible for making sure that it is complete, accurate and filed in a timely manner. Be sure to keep a copy of the Proof of Loss and all supporting documents for your records.

Flood Safety

Outdoors

Do not walk through flowing water. Drowning is the number-one cause of flood deaths. Currents can be deceptive; six inches of moving water can knock you off your feet. Use a pole or stick to ensure that the ground is still there before you go through an area under water.

Do not drive through a flooded area. More people drown in their cars than anywhere else. Don't drive around road barriers; the road or bridge may be washed out. A car can float in as little as two feet of water (see page 2).

Stay away from power lines and electrical wires. The number two flood killer after drowning is electrocution. Electrical current can travel through water. Report downed power lines to Commonwealth Edison at 1-800/334-7661 ("1-800/Edison-1").

Indoors

Turn off your electricity if your building is flooded. See the instructions on page 18. If you don't feel safe doing this, call an electrician. Some appliances, such as television sets, can shock you even after they have been unplugged. Don't use appliances or motors that have gotten wet unless they have been taken apart, cleaned, dried and inspected by a professional.

Watch for animals. Small animals like rats and snakes that have been flooded out of their homes may seek shelter in yours. Use a pole or stick to poke and turn items over and scare away small animals.

Look before you step. After a flood, the ground and floors are covered with debris including broken bottles and nails. Floors and stairs that have been covered with mud can be very slippery.

Be alert for gas leaks. Use a flashlight to inspect for damage. Don't smoke or use candles, lanterns, or open flames unless you know the gas has been turned off and the area has been thoroughly aired out. See page 19. If you have questions on gas, call 1-888/642-6748 ("1-888/NICOR4U").

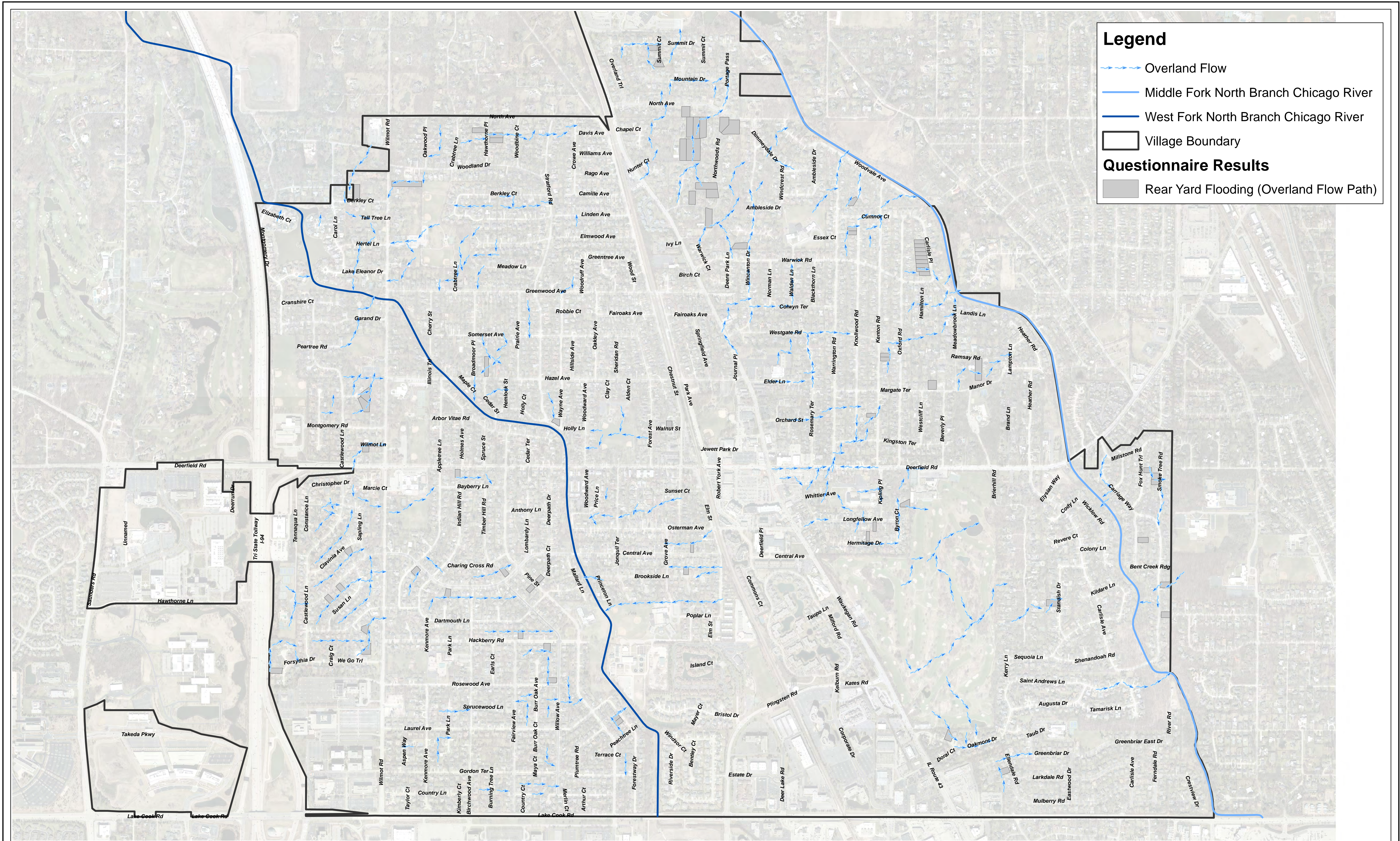
Carbon monoxide exhaust kills. Use a generator or other gasoline-powered machine outdoors. The same goes for camping stoves. Fumes from charcoal are especially deadly — cook with charcoal outdoors.

Clean everything that got wet. Flood waters have picked up sewage and chemicals from roads, farms, factories, and storage buildings. Spoiled food and flooded cosmetics and medicines are health hazards. **When in doubt, throw them out.**

Take good care of yourself. Wear gloves and boots. Wash your hands frequently during clean up. Recovering from a flood is a big job. It is tough on both the body and spirit and the effects a disaster has on you and your family may last a long time. Keep your eyes open for signs of anxiety, stress, and fatigue in you and your family.

APPENDIX 7
OVERALL OVERLAND FLOW EXHIBIT





Legend

- Overland Flow
- Middle Fork North Branch Chicago River
- West Fork North Branch Chicago River
- Village Boundary

Questionnaire Results

- Rear Yard Flooding (Overland Flow Path)

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CLIENT	VILLAGE OF DEERFIELD
TITLE	OVERLAND FLOW MAP

JOB#	190486	DSGN.	CHKD.
1 inch = 650 feet		DATE	05/21/2021