CITYWIDE DRAINAGE ASSESSMENT REPORT

Department of Community Services
Engineering Division

November 2012

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INTRODUCTION

This report serves as an active list of the various drainage problems throughout the City. The list is a working or "living" document and shall be revised on an annual basis. The locations are grouped by both the severity of the problem and magnitude of the solution into three main categories:

Category I locations include flooding of streets, private property and structures that require a significant engineering study and design to develop solutions. Typically, Category I locations would involve multi-phase projects.

Category II locations include flooding of streets and private property and other drainage related issues. Construction projects are typically single contract projects.

Category III locations include minor drainage issues or issues on streets with construction remedies occurring as part of a larger project like a road improvement.

Criteria considered:

- Flooding of private structures
- Flooding of private land
- Street flooding
- Ice hazards
- Continuously wet pavement conditions

What follows is some general discussion for each location in no particular order other than the category grouping.

This report was originally completed in August 2007. The report has been revised to reflect the completed projects, project updates, and new projects as of November 30, 2012.

SUMMARY

Since the creation of this report in June 2007, the Engineering Division has identified twenty-two (22) locations throughout the City that are in need of a drainage improvement project. The projects vary significantly in size, cost, and type. At some locations, such as the Bellevue Avenue area, a cost cannot be calculated until further studies are performed and analyzed. Most of these studies have begun and will be utilized as a tool to incorporate drainage projects into the Capital budget for future years. Other projects will be combined and completed under the Capital budget line item "Various Drainage Improvements" which is requested each year.

The following is a summary of the forty-seven (47) projects listed in this report:

- 47 Total Projects
- 25 Projects completed
- 2 Projects ready for construction.
- 1 Project designed but will not be completed due to difficulties because of easements.
- 1 Project is being discussed with residents and consulting engineers
- 8 Projects under design (several to be a part of one project this winter)
- 2 Projects under construction.

The remaining projects will be evaluated over the next year and determined if they will become part of the next drainage improvement project or if a design/study should be undertaken. Additionally, the list will be given to Public Works for their verification and insight as to other locations that should be analyzed, and to determine if they are able to complete some of the projects in-house. All projects shall be updated in the Citywide Drainage Assessment Report on an annual basis.

The following policy is being implemented for new drainage issues that are presented to the Engineering Division:

1. Drainage problems reported to the division will be logged into Qalert.
2. The Engineering Division will investigate whether the issue requires an improvement project or if it can be handled by Public Works or if it is the responsibility of the resident.
3. If it cannot be quickly repaired or addressed by Public Works, the project will be added to the list of project in the Citywide Drainage Assessment Report.

Category I

1. Waldron Avenue System

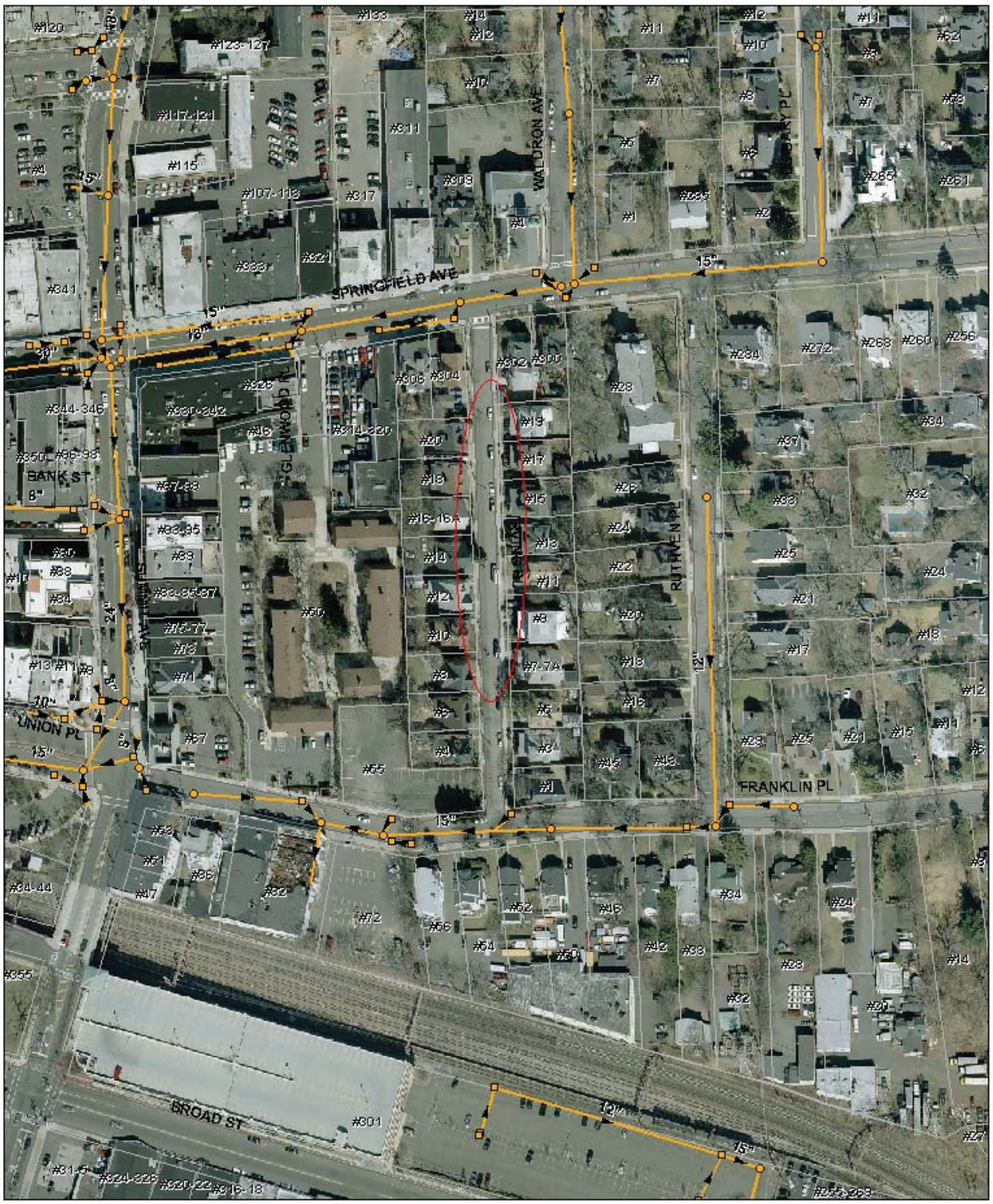
The drainage system within Waldron Avenue consists of several undersized pipes with inadequate slopes. During significant rain events, surcharging of the storm sewer floods the street and then overtops the sidewalk and floods several private structures and properties near 12-14 Waldron Avenue and across the street.

The hydraulic restriction that existed within the storm sewer at Springfield Avenue was removed which nearly doubled the capacity of the existing storm sewer. To further reduce runoff directed to this drainage system, the City is working with the County to implement a drainage project that will extend a storm sewer on Summit Avenue. This project complements two projects previously completed. The Whittredge Avenue Drainage Project (2007) and the Hobart Avenue Project (2009). Cumulatively, these projects will reduce the drainage area to Waldron Avenue by approximately 16 acres. The existing drainage within Waldron Avenue was approved in the 2012 Capital Plan.

The current schedule for Waldron Avenue is as follows:

- Design and construct the proposed storm sewer on Summit Avenue to further reduce runoff contributing to the Waldron Avenue system. (Winter 2012-2013)
- Reconstruct the intersection of Whittredge Road and Fernwood Road, install curbing and drainage within Waldron Avenue, and paving of Whittredge Road and Waldron Avenue. (Summer 2013)
- Complete Drainage construction along Summit Avenue to further reduce runoff quantity in the Waldron Avenue System. (Summer 2013 as part of the Waldron Avenue Project).

WALDRON AVENUE



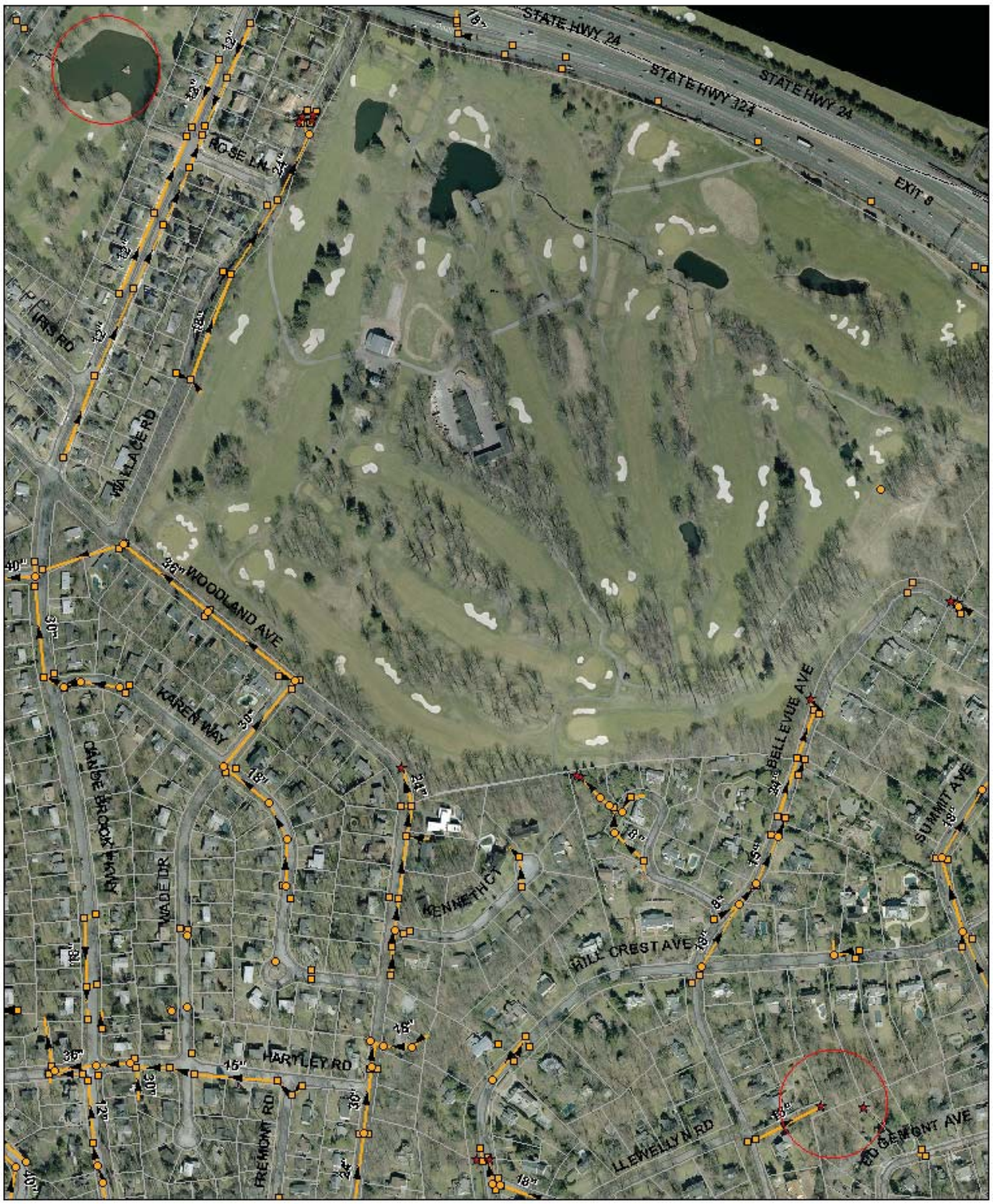
2. 55 Bellevue Avenue

In the area of the former Lyric Lane, the City storm sewers discharge onto private property in a low lying area in the center of Block 2006. Drainage then flows under an old railroad berm into a 100 year old clay pipe through private property. Eventually this drainage flows into the Canoe Brook Country Club golf course, through a culvert at Wallace Road, another culvert at Canoe Brook Parkway and into the pond at the City's Golf Course.

The existing dam at the Golf Course Pond has been analyzed to evaluate what improvements can be completed to the dam and pond to increase capacity of the drainage watershed. The next step will be to propose projects based on the report while working with the Department of Community programs and their Master Plan for the golf course. All options will most likely have high construction costs and be multi-year projects. The design will begin at the beginning of 2013.

Currently, drainage improvements to Bellevue Avenue are under construction. This project will upgrade the existing drainage system within Bellevue Avenue and install a new system where drainage is currently lacking. This project will greatly reduce flooding within Bellevue Avenue and will be followed by the reconstruction of the road in 2013.

55 BELLEVUE & GOLF COURSE POND



0 200 400 800 Feet

CITY OF SUMMIT

3. Golf Course Pond

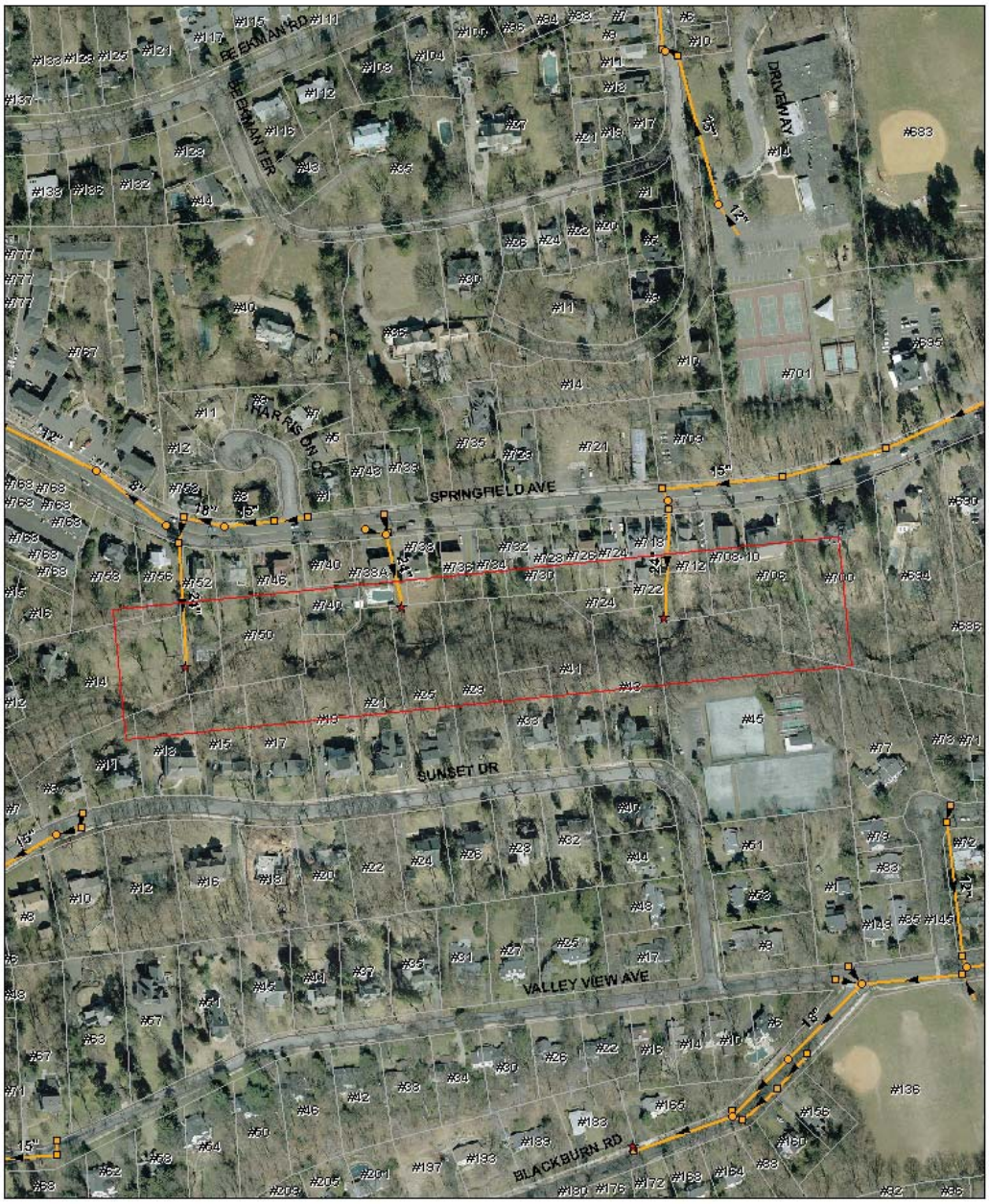
Residents that live along the stream on Canoe Brook Parkway and Wallace Road experience flooding. In order to reduce the occurrence of flooding in this area the spillway for Golf Course Pond at the Municipal Golf Course must be redesigned. Any increase in flow will alleviate upstream flooding by increasing the size of the weir at the Golf Course and by raising the elevation of the low chord of the pedestrian bridge in the Golf Course. Both contribute to restricting flow upstream and flooding. Design for both will begin in 2013.

55 BELLEVUE & GOLF COURSE POND

4. Salt Brook Erosion

Erosion is evident along the banks of the Salt Brook and private properties flood during heavy storms. The Division has begun discussions with the most affected residents and a consulting Engineer hired by a resident. An investigation into the responsibility of the maintenance of the stream is underway. A neighborhood information meeting will be held in the winter of 2013. A survey of the Brook along portions that are City property has been requested and is currently being prepared. A full evaluation and recommendation will be completed during the first quarter of 2013.

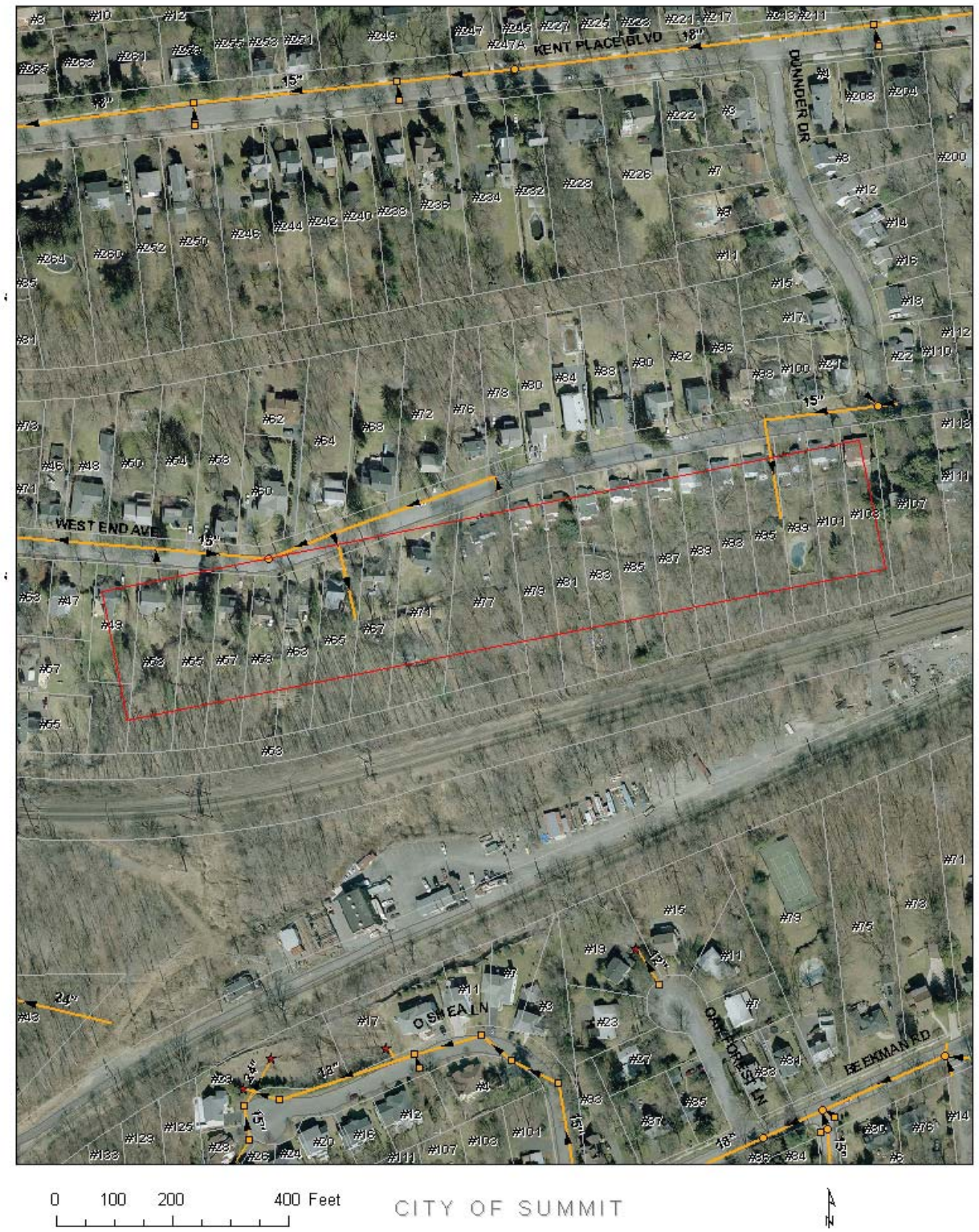
SALT BROOK EROSION



5. West End Avenue

Erosion is evident along the banks of the brook and private properties flood during heavy storms. The brook is located entirely on private properties.

WEST END AVENUE



Category II

6. 3 Edgemont Road

The grade of the pavement and sidewalk and the lack of adequate drainage inlets allow runoff to flow off the street onto private properties. The driveway of #3 floods and runoff continues through the rear yard of the next house causing erosion around the foundation and deck footings of #15 Edgemont Avenue. This project will be address when Edgemont Road is reconstructed which is currently in the 2013 Capital Plan.

3 EDGEMONT AVENUE

7. Myrtle Avenue

The open channel in front of the Cornog building floods, overtopping the channel walls and has reached into Brayton School through the door on the west side. The culvert has been cleaned and inspected and no significant deficiencies were discovered. A project to repair the culvert and desnag the stream is scheduled for the spring of 2013.

5 MYRTLE AVENUE

8. Tulip Street and New England Avenue

In the area of Tulip Street and New England Avenue the intersection floods during heavy rains. The storm sewer runs through the hotel property to the Salt Brook. A contract was awarded to have all drainage lines within this system cleaned and inspected. A Survey has also been completed of the City's utilities in this area. The Division is currently working on potential options to redirect storm water during rain events.

TULIP STREET AND NEW ENGLAND AVENUE

9. Lenox Road

A low area at the intersection with Prospect Hill Avenue is subject to flooding during heavy rains. The existing drainage system is outdated and undersized. This will be addressed when the road is reconstructed which is currently in the 2015 Capital Plan. The area shall be monitored to determine if any short term solutions can be completed.

LENOX ROAD

10. Blackburn Road (Twombly to Division)

In the area of Blackburn Road between Twombly Drive and Division Avenue, the brook will top its banks during severe rain events, but the continuous erosion is more problematic and may impact the private bridges. The brook is located entirely on private property.

BLACKBURN ROAD - TWOMBLY DRIVE TO DIVISION AVENUE

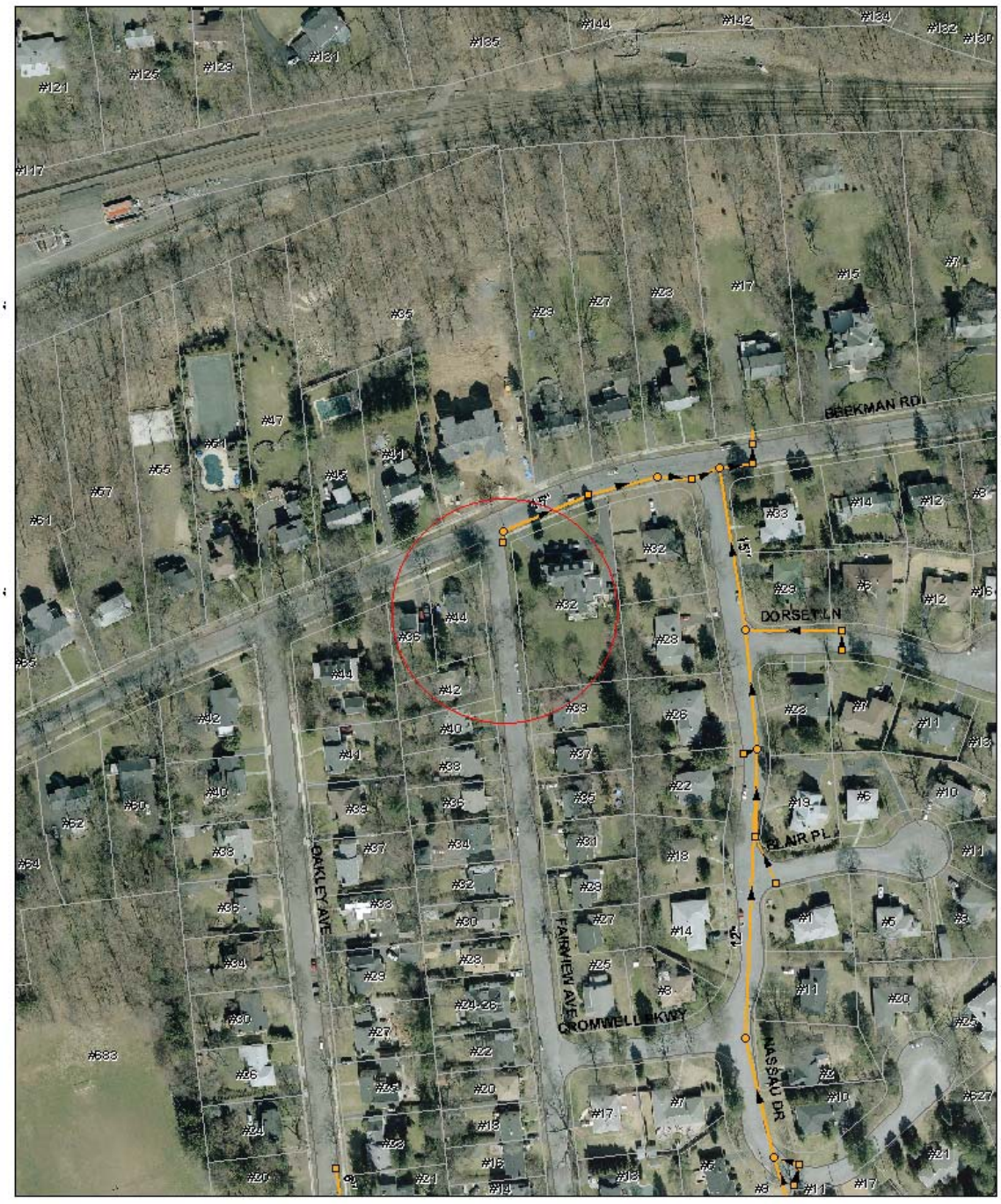
11. Portland Road at Dorchester Road

During extreme rain events the storm sewer catch basins cannot handle the flow of rain water coming down Portland Road, Dorchester Road and Winchester Road. Flooding has occurred twice during Hurricane Floyd and Hurricane Irene.

12. Fairview Avenue

Ponding occurs along the roadway edge on the north end of Fairview Avenue caused by leader drains discharging out on to the road. A drainage system was recently extended to the intersection of Fairview Avenue and Beekman Road during the Beekman Road reconstruction project. A new storm sewer system can now be extended up Fairview Avenue to capture the leader drains. This project is currently being designed and should be completed during the summer of 2013.

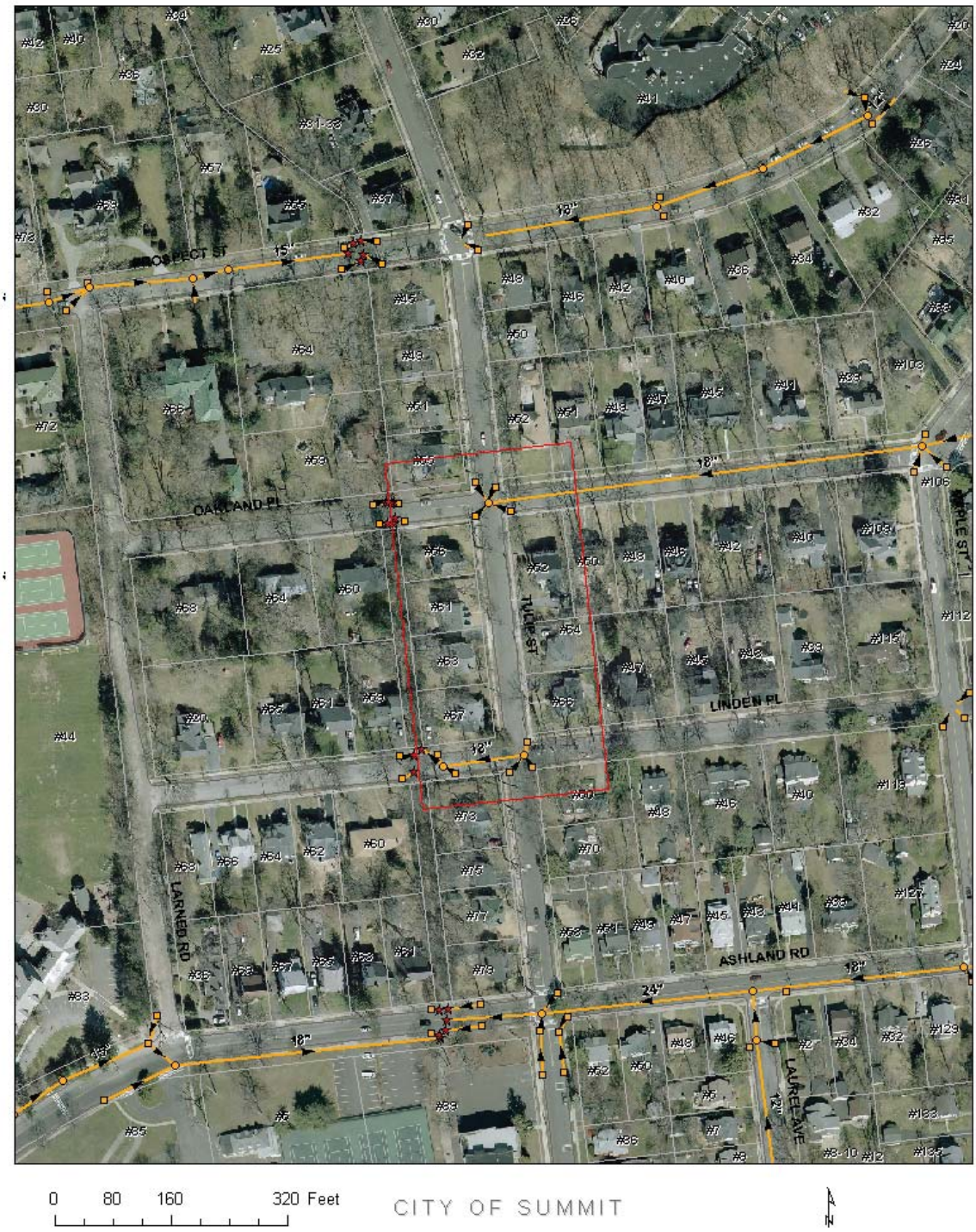
FAIRVIEW AVENUE



13. Tulip Street. Oakland Place to Linden Place

Tulip Street floods during intense rains at the intersections of Oakland Place and Linden Place. This appears to be a localized condition resulting in undersized catch basins and lateral lines. Further investigation is required. A contract was awarded to have these storm sewers inspected and cleaned. The footage has been reviewed and several undersized lines exist along with numerous utility blockages in the system. A final design of repairs is being prepared and shall be completed during the winter of 2012.

TULIP STREET - OAKLAND PLACE TO LINDEN PLACE



14. Kenneth Court and Crest Acre Court

In the area Kenneth Court and Crest Acre Court, the storm sewer from Crest Acre Court discharges into a private system and then a poorly defined ditch behind 14 Kenneth Court. Flow eventually makes its way to the ditch near #199 Woodland Avenue creating a mosquito breeding condition on private property. No easements exist which is problematic.

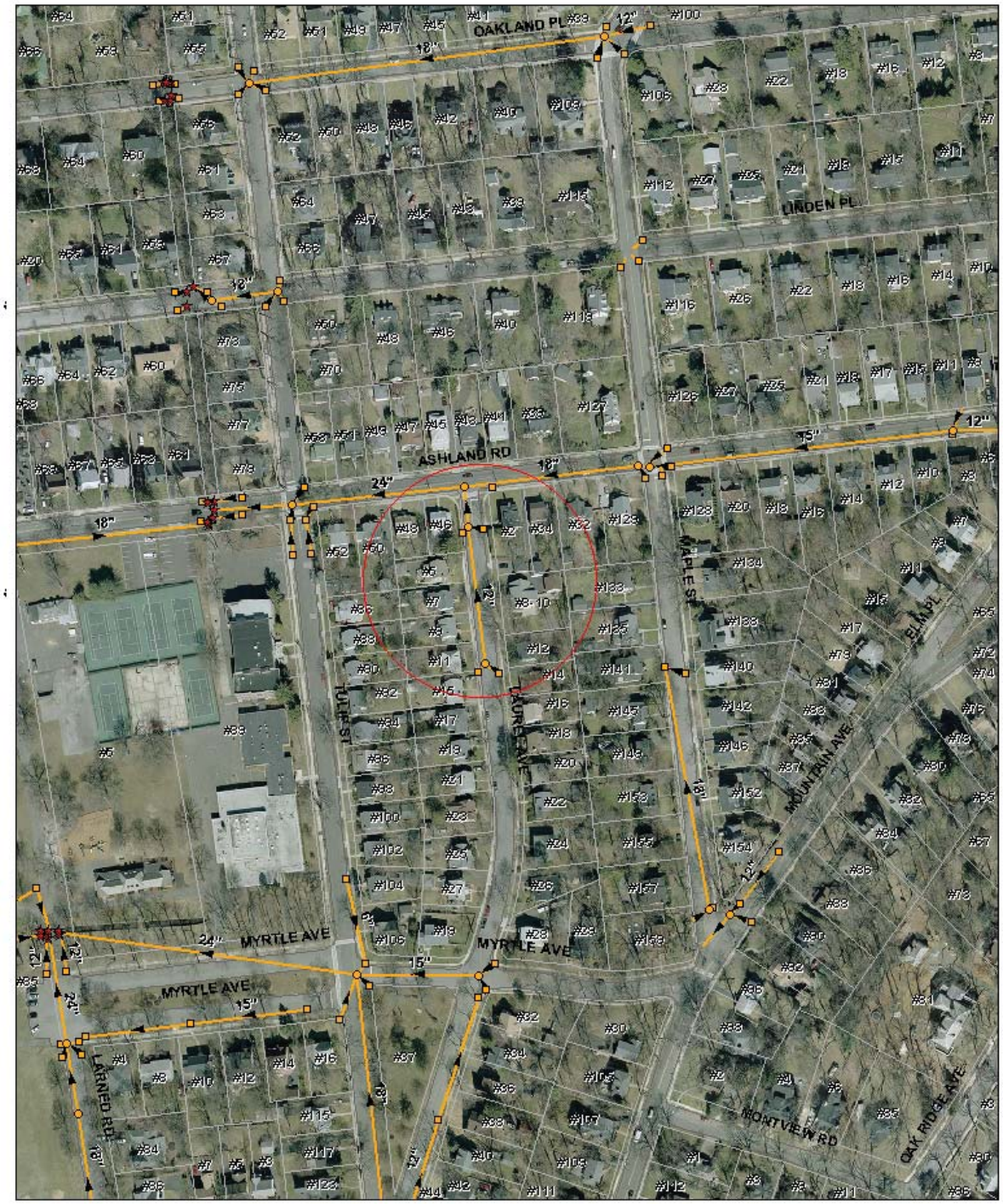
KENNETH COURT AND CREST ACRE COURT

Category III

15. Laurel Avenue

During significant rain events the storm sewer inlets on Laurel Avenue become inundated and do not drain. The issues with the storm sewer system on Ashland Road have been addressed (see #6). Upgrades to the undersized pipes on Laurel Avenue are currently being designed and construction is expected during the spring of 2013.

KENNETH COURT AND CREST ACRE COURT



16. Prospect Hill Avenue – South of Glendale Road

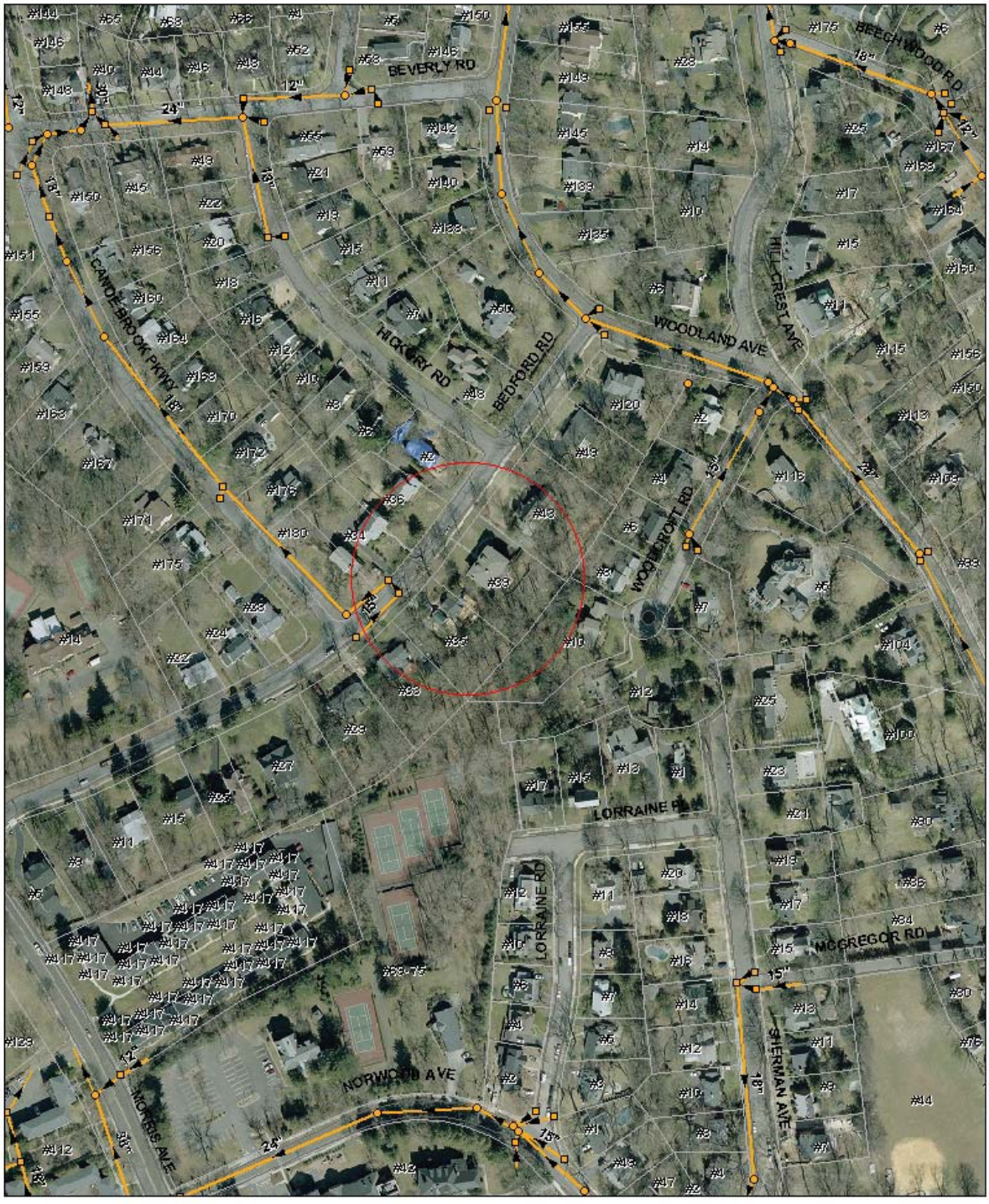
In the area of Prospect Hill Avenue , south (uphill) of Glendale Road, the slope of the street and bend in the road combined with a lack of inlets cause a runoff problem onto #85 Prospect Hill Avenue and the private common drive adjacent to it. Drainage washes out landscaping and floods the common drive.

PROSPECT HILL AVENUE - SOUTH OF GLENDALE AVENUE

17. Bedford Road – Canoe Brook Parkway to Hickory Road.

Ponding occurs year round along the roadway edge on the south end of Bedford Road caused by leader drains discharging out on to the road. A drainage system exists on Bedford Road, which will be extended approximately 100 feet, to capture and prevent the ponding. This project is currently under construction.

BEDFORD ROAD



18. Morris Avenue and Kent Place Boulevard

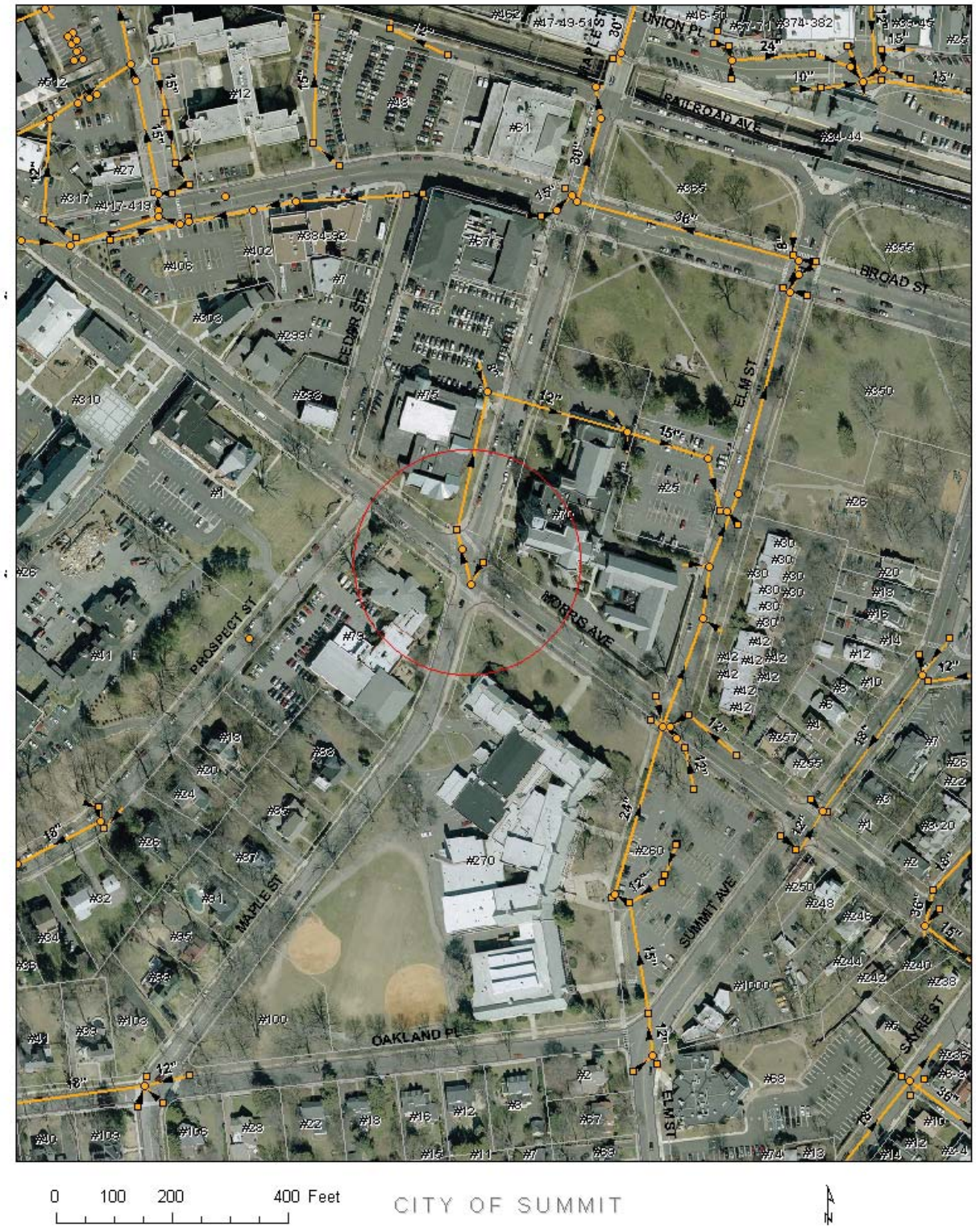
At the Morris Avenue and Kent Place Boulevard intersection, the east side of the floods due to an inadequate storm sewer. The existing inlets discharge through a small diameter pipe on Morris Avenue, through the curb, just north of the intersection. This issue will be resolved with the Morris Avenue Bridge replacement which is scheduled to begin in 2013.

MORRIS AVENUE AND KENT PLACE BOULEVARD

19. Maple Street at the Library

The storm sewer has backups that cause street flooding during heavy storms.

MAPLE STREET AT THE LIBRARY



20. Huntley Road

Due to a lack of catch basins on the street, runoff after storm events is discharged into the road and extreme ponding and wet conditions occur, potentially endangering motorists. A storm sewer system can be extended from either end of the street to capture the majority of the runoff.

21. Gloucester Road

Groundwater reaches daylight at the bottom of a hill along several private properties causing wet conditions during the summer months and icing during the winter months. Catch basins can be extended to capture the groundwater and direct it into our storm system.

GLOUCESTER ROAD

22. Linden Place

During rain events storm runoff from Larned Road drains down Linden Place causing ponding conditions along the edge of the road in front of private residences. A storm sewer can be extended from the culvert on Linden Place to capture this runoff.

LINDEN PLACE

Completed Projects

To date, the following projects have been fully completed and have since been removed from the list.

Edgar Street
Existing storm sewers did not extend to the full depth of the Cul-de-Sac on Edgar Street causing rain water during significant storms to wash down a resident's driveway. The City has now extended an existing storm sewer to prevent this from happening.

Family Aquatic Center
Storms with significant rainfall flood the volleyball court and the pool with silt and debris. In coordination with the Division of Public Works, a storm drain system was installed around the Volleyball Court to capture runoff. This project was completed in 2010.

2 Plymouth Road
A city storm sewer was flooding private property. The City has installed drainage to prevent this from occurring. The project was completed in 2010.

"**The Dell" – 232 Springfield Avenue**
The Engineering Division completed the design for the drainage system along the rear of the properties of Springfield Avenue, Hobart Avenue and Edgewood Road. Unfortunately the easements required to progress with construction were not obtained. All legal channels were pursued to no avail. This project will be considered closed until further notice. Design and easement work was completed in 2010.

Sheffield Road
In the area Sheffield Road – the storm sewer is at the low point of the system on Sheffield Road and surcharges, flooding private property as it runs through to the highway. This project was completed during the fall of 2008**.**

Whittredge Road/Dogwood Drive
In the area Whittredge Road/Dogwood Drive – Street flooding occurs in this intersection where no storm sewer exists. This project was completed in 2007.

Memorial Field Basketball Courts
In Memorial Field basketball courts – Inadequate drainage facilities is one problem prohibiting the replacement of the courts. This project was completed in 2008.

New Providence Avenue
At the railroad overpass flat road grades needed to maintain the bridge clearance create drainage issues at the bridge. This project was completed by the Borough of New Providence as part of the sanitary sewer main replacement in 2007.

Evergreen Road near Madison Avenue
During heavy rain events, the road becomes inundate and the curbing cannot contain the flooding which then enters private property. A lack of inlets at this location contributes to the problem. This project was completed during the fall of 2009.

8 & 12 Sweetbriar Road
Ground water is surfacing in numerous locations from #8 to #12 Sweetbriar which then ponds on the street as a result of insufficient road grade, lack of an inlet, and the continuous flow of water. The condition presents an icing hazard in an area of steep driveways and no sidewalks. This project was completed during the fall of 2009.

Springfield Avenue and Summit Avenue
Ponding on Springfield Avenue occurs due to the flat grade of the road to the inlet on the corner. This project was completed during the fall of 2009.

Parkview Terrace
In Parkview Terrace – street flooding and ice hazards exist in the block along Memorial Field and near #41/#42. Properties along the south side have groundwater issues. This project was completed during the winter of 2010**.**

Laurel Avenue
In the area Laurel Avenue – Myrtle Avenue to Tulip Street – Almost every home in this stretch has a drain that causes an ice hazard and it is located very close to Brayton School. This project was completed during the fall of 2009.

Myrtle Avenue – Larned to Tulip
Similar to Laurel Avenue above, this section of Myrtle Avenue is used for drop-off/pickup of students attending Brayton School and is extremely hazardous to the school age pedestrians. This project was completed during the fall of 2009.

Beverly Road and Freemont Road
This area was subject to significant icing accumulation and ponding due to the lack of inlets at the low spot where the two roads meet. This problem was completed during the summer of 2010.

New England Avenue – Springfield Avenue to High Street
In the area New England Avenue – Springfield Avenue to High Street – Numerous drains and a poor pavement cross section contribute to a sustained wet pavement condition. This problem was completed during the New England Avenue Roadway improvement project this fall.

Oakland Place at Sal Brook Culvert
The culvert was serviced by four (4) undersized, inlets in disrepair. This project was completed during the fall of 2010.

Fay Place
In Fay Place – Lack of inlets at the south end coupled with many private drains and flat pavement grades result in sustained wet pavement conditions and ice hazards. This project was completed during the summer of 2010.

Broad Street and Cedar Avenue
Flat road grades create ponding in the intersection. This project was completed as part of the County's Broad Street improvement project.

61 Edgewood Road
At 61 Edgewood Road, a clogged condition in the storm line causes street flooding that overtops the curb. An easement does exist and a meeting with the homeowner was held. This project was completed during the 2012 spring.

Dunnder Drive at West End Avenue
Due to a lack of catch basins residents' roof leaders and sump pump discharges are creating an icing condition which creates a hazard for pedestrians and vehicular traffic. A system to capture these roof leaders has been designed and is waiting to be bid in conjunction with other work in this report to obtain better, bulk pricing. This project was completed in the 2012 spring.

Oak Ridge Avenue – Rowan Road to Mountain Avenue
The properties along the south side of Oak Ridge Avenue from Rowan road to Mountain Avenue experience flooding during rain events from storm water traveling down Oak Ridge Avenue along the gutter line, which then overtops the curbing and runs down private property. The Division is currently preparing a drainage design to capture the storm water before it can overtop the curb line. This area is known to have significant amounts of rock it the soil and construction may require rock excavation. This project was completed in the 2012 spring.

Blackburn Road (Pine Grove to Oak Knoll School)
At Blackburn Road between Pine Grove Avenue and Oak Knoll School, groundwater at the top of the hill discharges almost continuously during the winter causing an ice hazard. This section of road was improved in 2002 but the rock in this area severely limited options to correct the problem. This project was completed utilizing an alternative design in the 2012 spring.

Canoe Brook Parkway at #125 & #129
In the area of Canoe Brook Parkway thru easement at #125 and #129 Canoe Brook Parkway to Martin's Brook, drainage backs-up in the easements and floods private properties. This includes flooding of the system at Hartley Road and Wade Drive. A contract was awarded to have all drainage lines within this system cleaned and inspected. Construction was completed in the October 2012.

Ashland Road. Tulip Street to Elm Place.
This area is prone to intense flooding for brief periods of time during heavy rainfalls. The drainage system discharges to the Salt Brook. The flooding is a result of a discharge point that becomes inundated with water during rain events. An overflow system has been designed and awarded to the low bid contractor. This project was completed in the spring of 2012 as part of the Ashland Road reconstruction project.