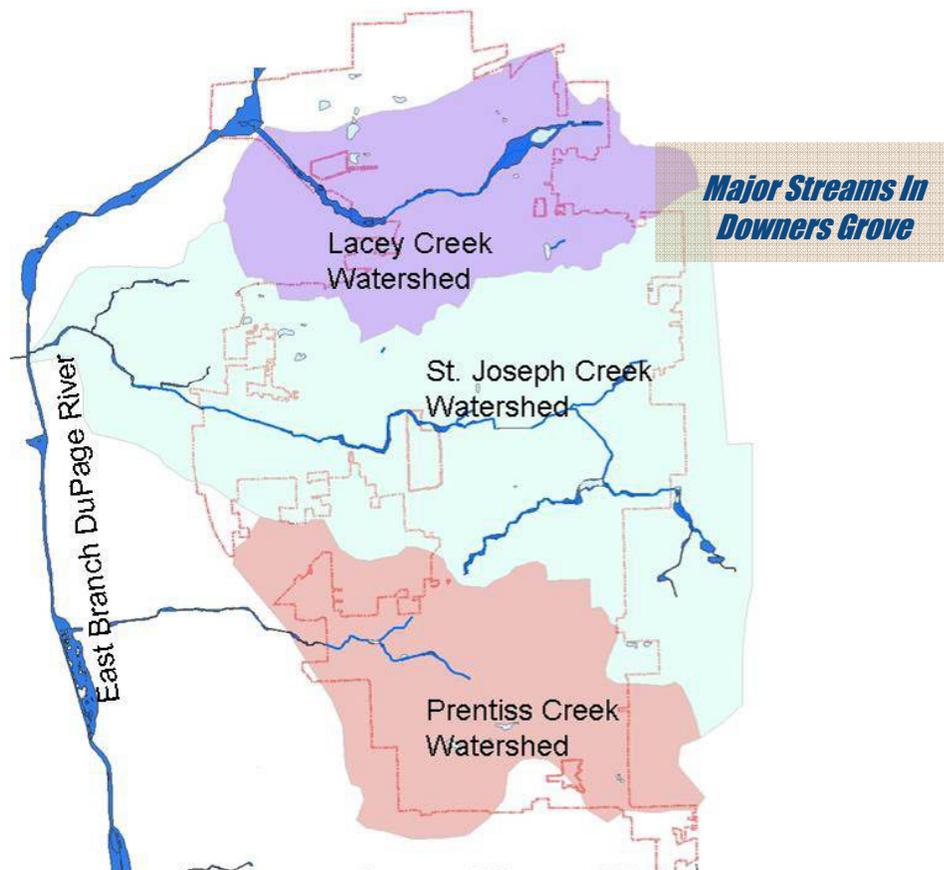


Problem Understanding

Introduction

The Village of Downers Grove stormwater system includes storm sewers, streams, wetlands, roadway ditches, ponds, and other facilities. These components collect, store, and convey stormwater runoff to the East Branch of the DuPage River in one of the three major streams in the Village, shown in the figure below. Some limited areas drain east to Salt Creek.



When it rains, stormwater runoff drains from impervious areas and enters the stormwater system at an inlet on a roadway, a stream, a detention pond, or a ditch. The following figure shows the various components and the approximate number in the Village.

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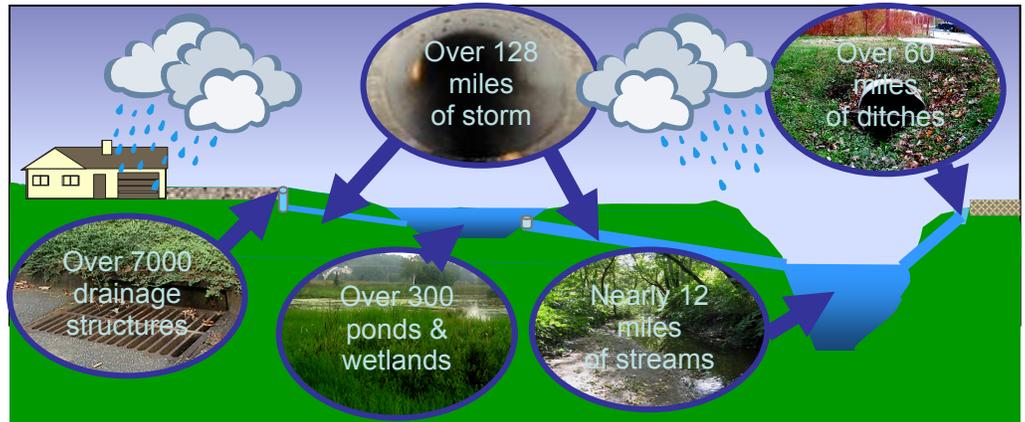
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Stormwater System Components

To gain an understanding of the stormwater problems in the Village, various methods were used to gather information. This data was used to identify stormwater problems and is summarized in this section. Recommendations to address the problems are included in Section 3.

Previous Data and Mapping

Activity – Previously developed data and mapping related to stormwater were collected and reviewed for applicability to this update. Data reviewed included:

- GIS data provided by the Village
- Floodplain and floodway mapping from FEMA and DuPage County
- Previous reports related to local stormwater issues
- Hydrologic and hydraulic models developed for specific sites
- NPDES Phase II Notice of Intent
- Maps, including zoning, land use, and storm sewers
- Village and County stormwater ordinances
- East DuPage River Final TMDL Report (IEPA, 2004)
- Village Engineering Design Manual draft

Findings – Most information was specific to project sites or was general in nature. Data may be useful as baseline information for planning activities.

Known Problem Areas

Activity – A review of information provided by the Village was made to develop an understanding of known problem areas.

Findings – Based on assessment of complaints and field inspections, Village staff have developed a list of stormwater problem areas. Action is dependent on the nature of the problem. A capital improvement project list has been prepared with projects prioritized according to severity.

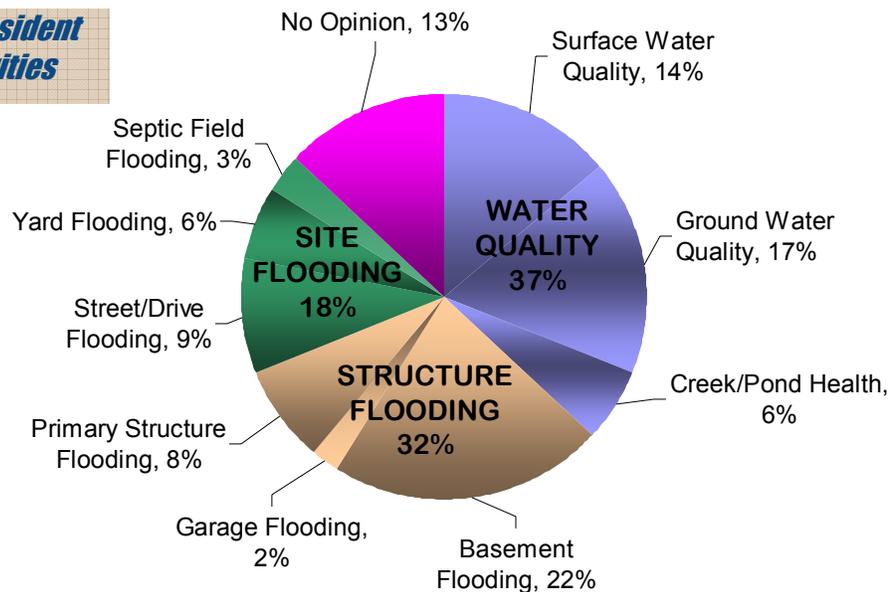
Resident Survey

Activity – In 2005, the Village mailed a “Community Drainage / Flooding Survey” to 16,929 addresses throughout the Village and unincorporated areas. 6,123 responses were returned and the data were entered into a Microsoft® Access database. The survey collected information on a variety of issues related to drainage and flooding throughout the Village.

Findings – Although the response rate for the survey (over 36%) is much greater than the average response for this type of survey, the data collected reflect only about one-third of the residents, most of whom have not experienced a 100-year storm event. The results do provide useful data for identifying stormwater problems and concerns. The residents ranked the importance of various stormwater issues, as shown in the following figure.

Survey responses indicate problems throughout the Village.

Top Resident Priorities



Other findings from the resident survey are summarized below.

Finding

Understanding

Flooding locations are scattered throughout the Village.

Most flooding locations existed prior to ordinances controlling development in floodplain areas.

Street flooding is more frequent in the fall.

Residents indicate that debris in the gutters and inlets is the primary cause of street flooding.

Basement flooding is a major concern.

Residents acknowledge that most basement flooding is due to inoperable sump pumps during extended power outages.

Residents are concerned about problems caused by redevelopment and increased impervious area.

Results indicate that residents without problems and the Village should not have to pay for those with problems.

Water quality issues were most important to residents.

Surface water and groundwater quality affects all residents.

Streams

Activity – An inventory of 6.5 miles of critical streams (about 50% of the total stream miles in the Village) was performed to identify streambank erosion, channel blockages, riparian area degradation, structure undermining, and public safety issues.

Findings – The field inspections of the study segments provided data for condition assessments. Problems identified included:

Problems were identified along all stream segments.



Lack of vegetation



Bank erosion



Dead/undermined trees



Safety



Failed stabilization



Debris



Lack of buffer zone

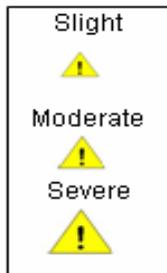
Erosion is severe along St. Joseph Creek North Branch.

Many of the streambanks have little or no vegetation to help hold the soil in place. The primary reason is the lack of sunlight at the ground level caused by the extensive tree canopy. Numerous trees along the banks have been undercut as erosion continues, and many are dead or damaged. Trees that are partially undercut may be toppled by high winds, where the entire root wad is torn from the bank, creating a large, unprotected cavity in the bank and in some locations, damaging utilities.

Most of the stream resources in the Village are owned by individual property owners. Often, the creek is located at the rear property line. In some areas, there are drainage or utility easements in place to provide access for inspection and maintenance activities.

Problem rankings are shown on the following table. In addition, each stream reach has isolated severe erosion problems.

Problem rankings show Lacey Creek with fewest problems.

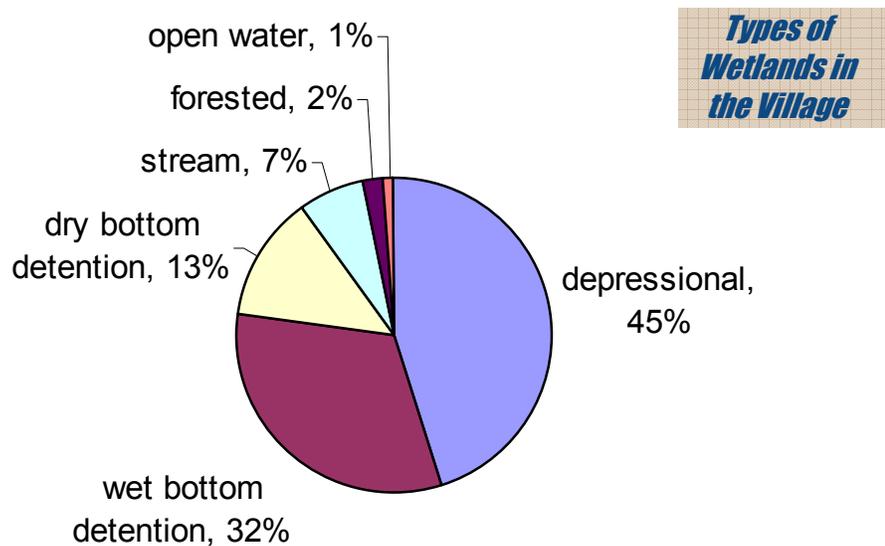


Stream Problem Rankings	St. Joseph Creek	St. Joseph North	St. Joseph South	Lacey Creek	Prentiss Creek
Bank erosion/ sedimentation					
Lack of vegetation					
Dead/undermined trees					
Lack of buffer zone					
Failed stabilization					
Safety concerns					
Debris jams					

Wetlands

Activity – Wetland resources were evaluated using a review of published wetland maps, a review of the threatened and endangered species database, and field verification within the Village limits. During the verification, the location, type, quality and function of each wetland were assessed. The quality of each wetland was based on wetland type, and dominant vegetation.

Findings – The evaluation noted 134 wetlands in the Village. The types of wetlands identified are shown below.



Most wetlands in the Village are low quality.

Most of the wetland areas are classified low quality, with 9 classified as moderate quality. Thirty-two wetlands are located in parks, golf courses, and forest preserves.

Wetland locations are shown on the following map.

Wetlands are located throughout the Village.



*Wetland
Locations*

Storm Sewers

Activity – A review of available information about the Village’s storm sewers was performed to identify problem areas and concerns.

Findings – The Village’s storm sewer system collects and conveys stormwater to the streams. The system includes nearly 130 miles of storm sewer pipe and over 7000 structures such as manholes, inlets, catch basins and end sections.

Extent – About 2/3 of the Village is drained by storm sewers ranging from 4-inch diameter farm tiles to an 11-foot diameter pipe. Areas served by storm sewers are shown shaded on the following map.

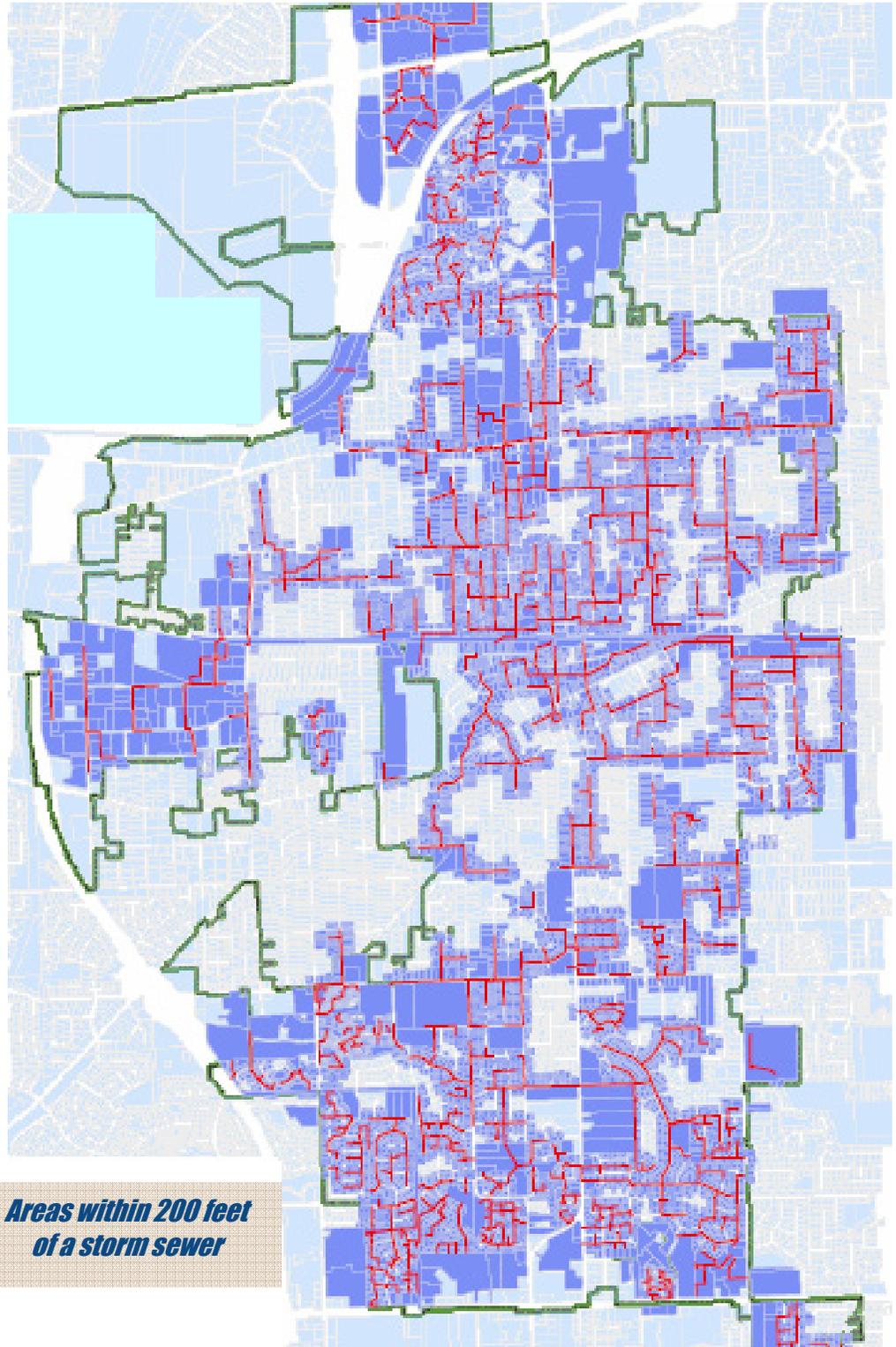
Mapping – Currently, the Village utilizes paper maps of the storm sewer system. Some maps are inaccurate and/or incomplete. As maintenance and repairs are performed, Village staff annotates maps to show updated information. Limited resources have slowed the use of GIS to map the storm sewer system.

Condition – Much of the system was constructed prior to the use of Village standards for sewer design and construction. Generally, the system is functional, but with less than desired capacity. The age and materials of the pipes are often unknown. Throughout the Village, storm sewers flow into open channels and open channels discharge into storm sewers as stormwater flows downstream. Because trash and debris are not collected by trash racks or other methods, it enters the sewer system, increasing maintenance costs.

Location – Most storm sewers are located in the public right-of-way or in drainage easements. However, in some areas, public storm sewers are located on private property along side and rear lot lines.

In some areas, the lack of smaller sewers or drainage paths to carry the stormwater to the storm sewers causes localized flooding. Often, residents have blocked drainage paths with landscaping, fill, or other activities often associated with redevelopment.

Some areas of the Village do not have adequate stormwater infrastructure.



***Areas within 200 feet
of a storm sewer***

Roadway Ditches

Activity – A review of available information about the Village’s roadway drainage system was performed to identify problem areas and concerns.

Findings – About 1/3 of the Village is drained by roadway ditches. The ditches measure over 70 miles along roadways. Over 47,000 feet of culverts carry flows under driveways and roads.

Condition – The roadway ditches range from poor to good condition. Many are overgrown and filled with sediment. Mowing is often difficult because of standing water.

Some ditches have been recently maintained as part of the Village’s ditch cleaning program, which regrades existing ditch lines, replaces driveway culverts, and installs new swales to improve the drainage in a particular area. Areas are prioritized based on occurrence of: flooding of homes, flooding of right-of-way and hazard to vehicular traffic.

***Roadway ditches drain
about one-third
of the Village.***



***At Washington
and Kenyon***

Location – Most ditches are in the public right-of-way. Ditches located on private property are the responsibility of the property owners.

Sump pump discharges are often directed to the roadway ditches. In some older areas of the Village, septic fields slope toward the ditches.

Stormwater Rules

Activity – Local, State and Federal rules governing floodplain management, site runoff and stormwater quality were reviewed.

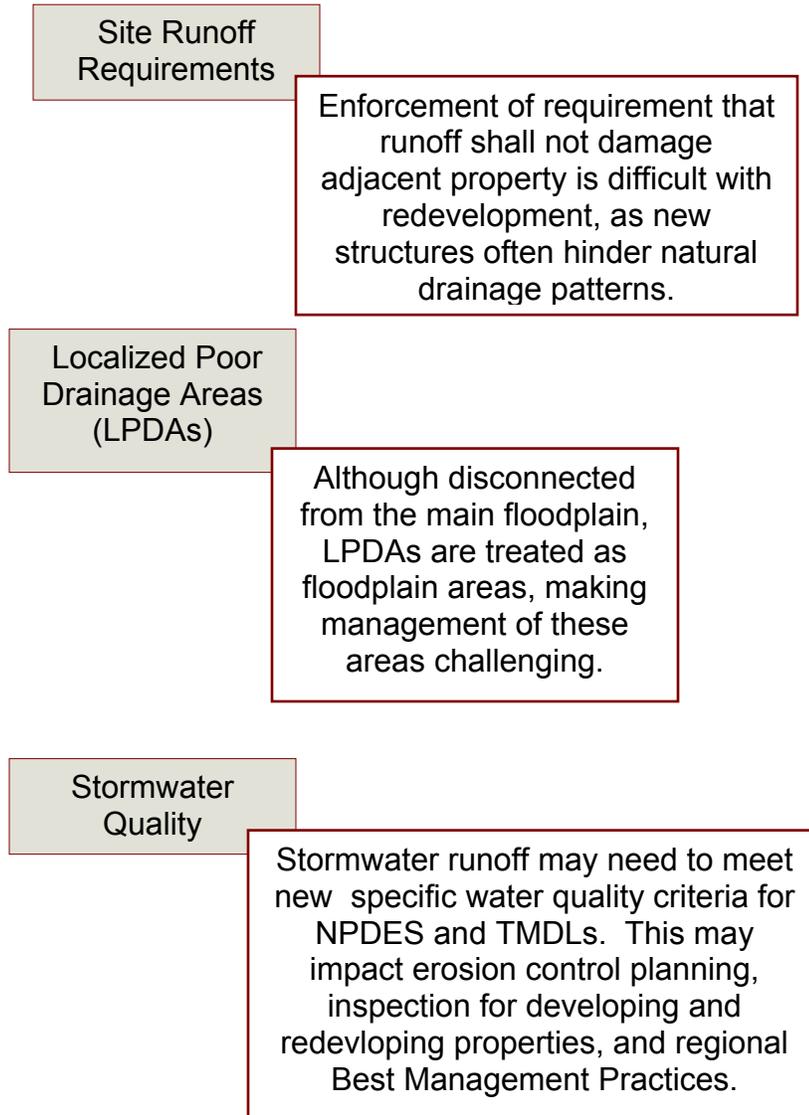
Findings – The Village and its property owners are subject to multiple rules and regulations concerning stormwater. Federal, State, County, and Local requirements govern everything from storm sewer sizing requirements to floodplain regulation to stormwater quality.

Stormwater is regulated by all levels of government.

<i>Regulatory Issues</i>	Federal	State	County	Village
Floodways				
Flood Plains				
Wetlands				
Waters of the US				
Site Runoff				
Soil Erosion Control				
Water Quality				

Regulatory issues impacting the Village are summarized below:

New stormwater quality permit requires additional planning and inspection efforts to maintain compliance.



Stormwater management activities in the Village must be consistent with the DuPage County Countywide Stormwater and Flood Plain Ordinance. These requirements are included in Chapter 26 of the Village code, and cover activities related to site runoff, floodplains, wetlands, and riparian areas. In addition, activities in the Village must meet the watershed-specific requirements of the most recent revision of the East Branch DuPage River watershed plan developed by DuPage County. The Village has the responsibility to ensure that permitted development will not be in conflict with the stated watershed goals as established by DuPage County and as defined in the stormwater ordinance.

The Village is committed to provide effective management of stormwater to the greatest extent possible. Drainage problems that qualify as a public/private partnerships are prioritized as follows:

Priority	Circumstance
1	Flooding of homes rendering them uninhabitable; inundation of septic fields and/or private well heads; flooding within the right-of-way cutting off access to residences
2	Same as Priority 1, but affecting garages or accessory buildings rather than homes
3	Flooding in the right-of-way to the degree the road must be barricaded
4	Flooding on private property on more than one developable lot where no structures are affected

If a project is qualified as a Public/Private partnership, the Village may pay one half of eligible project costs, not exceeding \$1000. For issues such as nuisance flooding on a single property, the Village will provide recommendations, a list of surveyors or consultants, minor elevation survey assistance, but no financial assistance.

In its efforts to manage stormwater to the greatest extent possible, the Village has developed a policy for Flood Plain Land Purchases for stormwater management. On a case by case basis, the impacts on the property and adjacent properties as well as the cost versus benefit of the improvement are weighed in purchase decisions.

Redevelopment Issues

Activity – A review of redevelopment activity in the Village was performed to quantify the amount and rate of redevelopment and to gain an understanding of concerns related to the redevelopment process.

Findings – Redevelopment of individual parcels in the older neighborhoods has increased dramatically in recent years. The houses being demolished for redevelopment are generally small by today’s subdivision standards and are located on lots sized appropriately for the footprint. When redeveloped, the footprint of the house increases dramatically. In addition, accessory structures such as garages, sheds, patios, decks, and driveway extensions are constructed, frequently resulting in over 50% of the lot covered with impervious areas. Often, drainageways along the side and rear lot lines are constricted and nearby storm sewers, if any, do not have capacity for additional flows.

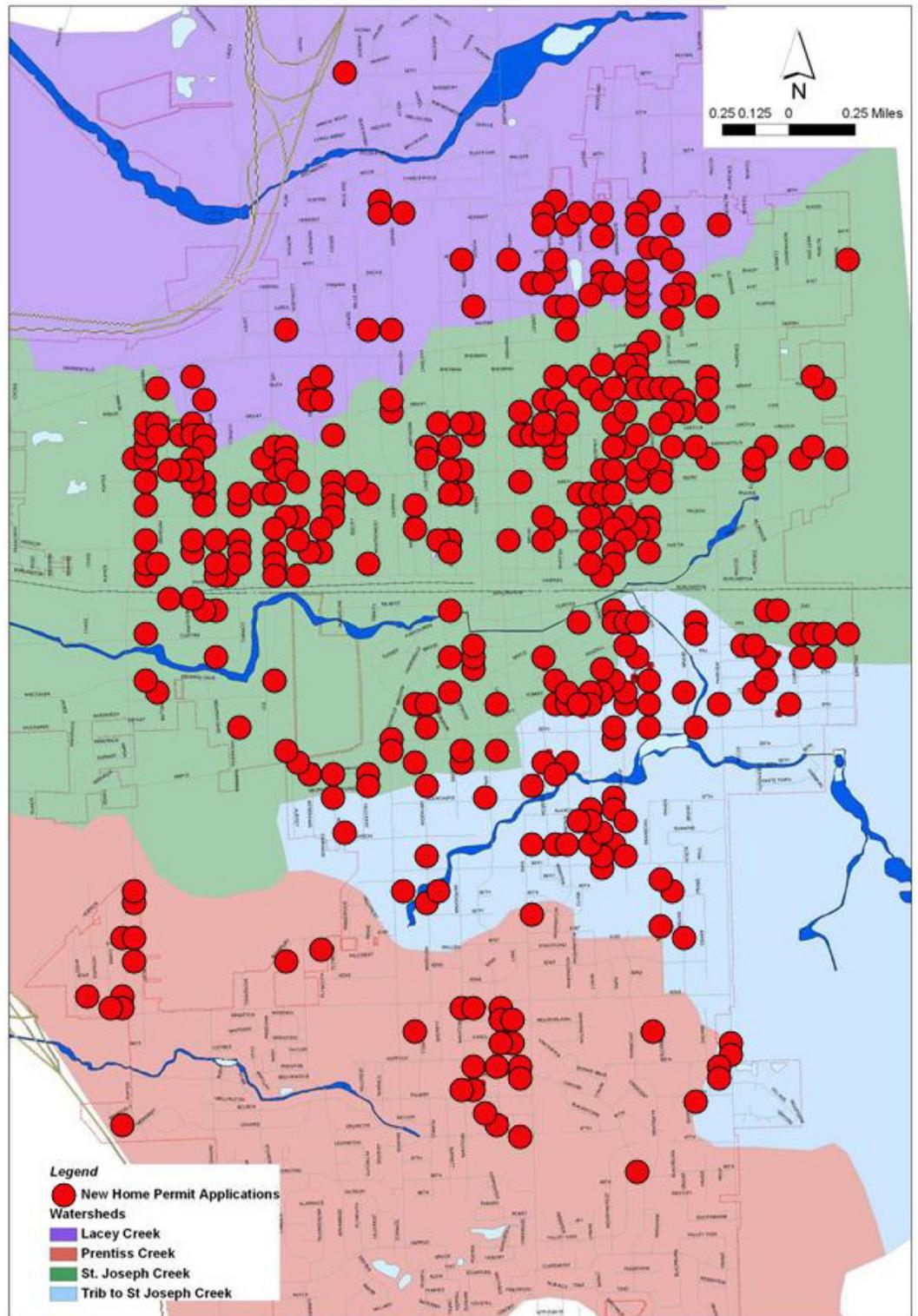
Redevelopment increases flows to the stormwater system.

Redevelopment generally involves regrading the site and increasing the imperviousness of the parcel. The following table provides the statistics for residential redevelopment between 2003 and 2005. These changes impact stormwater runoff rates, velocities and flow patterns.

Residential Redevelopment Statistics					
Year	# of Permits	Average Impervious Area, sq.ft.			Avg. % Increase
		Existing	Proposed	Area Increase	
2003	122	1,613	3,317	1,723	107%
2004	134	1,876	3,673	1,817	97%
2005	136	2,140	3,827	1,688	79%

The following figure illustrates the location of residences for which building permit applications were received from 2003 to 2005. The majority of applications originated from the St. Joseph Creek watershed area.

***New Home Permit
Application Locations
2003-2005***



***The existing
stormwater system
cannot handle
additional flows.***

Village staff has developed an approach for permit reviews for redeveloping properties. Generally, staff looks beyond the property lines of the proposed redevelopment to assist in identifying potential stormwater impacts. As opportunities arise, staff works to manage the stormwater on a more regional basis rather than lot by lot. Limited resources impact the efficiency and effectiveness of this approach.

As part of the Village Ordinances, fees are assessed for redeveloped properties. A fee of \$0.565 per square foot of additional impervious area constructed during redevelopment is assessed. This revenue can be used for detention-related improvements only (conveyance improvements are excluded).

Operation and Maintenance

Activity – A review of current operation and maintenance activities related to the stormwater facilities in the Village was performed.

Findings – The current maintenance activities by the Village are efficiently performed. The activities are generally reactive, responding to a complaint or emergency, although more recently, staff has been proactively implementing maintenance activities.

System Inventory and Maintenance Records - Currently, the Village utilizes paper maps of the storm sewer system. As maintenance and repairs are performed, staff annotates a map to show updated information. Limited resources have slowed the use of GIS to map the stormwater system.



Stormwater Storage Facility Maintenance - The Village maintains 4 detention ponds owned by the Village. The outlet structures for all 310 stormwater basins in the Village are addressed on an emergency basis. After rainfall events, areas with known problems (i.e., excess debris) are inspected and maintained as necessary.

The Village has defined policies on maintenance of Village-owned and shared storm water control structures, right-of-way drainage and channels. Installation of siltation basins, use of wet bottom versus dry bottom storage facilities, easements, culverts, and ditches are addressed by the policy. The Village will also offer to maintain or improve critical storm drainage systems on private property if the homeowner, at no cost to the Village, grants the Village a permanent easement over the storm sewer.

Many maintenance activities tend to be reactive.

Stream Maintenance – The Village currently maintains stream channels on an emergency basis only at locations where the Village has an easement or other right of way for access. Maintenance generally consists of removal of debris jams, which reduce the capacity of the channel and can cause localized flooding.

Street Sweeping – The Village owns and operates two street sweepers throughout the year, supplemented with contracted sweeping. The sweepers improve water quality downstream by cleaning streets with curb and gutter before sediment and debris can accumulate and wash into the stormwater system. Streets with rural cross-sections are not swept because the sweepers need to work against a curb to operate.



Between March and December, the streets located in the downtown area are swept once a week, while the other residential and commercial curb streets are swept once a month. During a normal fall season, the Village sweeps over 6,000 curb miles of street during the months of October through December.

Sewer Cleaning – The Village owns and operates sewer televising equipment to document the condition of stormwater facilities. As much as possible, Village staff coordinates repairs and replacements with the road program to reduce costs. About 50 miles of storm sewers have been televised in the last five years. In concurrence with the televising, the Village hires a contractor for 10 weeks in the summer to clean structures and pipes using high-pressure water jets. The lack of a Village-owned jetting truck limits both cleaning and inspection of the sewer system.

Existing funding does not meet the stormwater system maintenance needs.

The current funding for maintenance activities does not provide adequate resources to properly operate and maintain the infrastructure, as shown below.

Activity	Current Rate
Sewer Cleaning	Once every 40 years
Ditching	Once every 100 years
Sewer Jetting	Once every 20 years
Street sweeping	10 cycles per year
Debris jam removal	Emergency as needed
Detention basins	As required

Safety

Activity – As information was gathered on the various stormwater system components, safety issues were identified.

Findings – Throughout the stormwater system, safety concerns were noted in areas as summarized in the following table.

Location	Concern
Transition basins at each end of the 11-foot diameter downtown storm sewer	Area encircled by chain-link fence with deep, fast-flowing water in pipes and basin
Streambanks	High drop-offs at vertical banks
Stream crossings	Some designed with overland flows across sidewalk with inadequate railing
Pipe inlets, outlets, culverts	Unprotected pipes and pipes protruding from slopes
Detention basins	Fast-flowing water, steep slopes, unprotected outlets

