

SECTION 3: DRAINAGE AND ENVIRONMENTAL

RECOMMENDATION FOR ALLOWABLE DISCHARGE RATES

The City of Joliet Stormwater Detention Regulations (Code of Ordinances, Section 31-205 as amended) currently requires that new development provide a restricted release rate of 0.15 cubic feet per second (cfs) per acre of property drained for the 100 year storm event and 0.04 cfs per acre for the 2 year storm event. These values are in concurrence with the recommendations of the Northeastern Illinois Planning Commission's study entitled "Evaluation of Stormwater Detention Effectiveness in Northeastern Illinois." However the City Ordinance also states that the allowable release rate can be more restrictive when the City Manager concludes that the capacity of the receiving stream is less than 0.15 cfs per acre. The intent of this restricted release rate is to maintain the existing regulatory flow rate and consequently the 100 year flood elevation.

PROPOSED STORMWATER MANAGEMENT PLAN

Based on the 100 year floodplain and floodway limits calculated as described in the Existing Conditions portion of this study (the restricted release rate of 0.15 cfs per acre for the 100 year, 24 hour storm event and 0.04 cfs per acre for the 2 year 24 hour storm event) and the study area topography, a proposed drainage plan has been developed. The plan locates proposed sub-basins, approximate locations of stormwater detention facilities and outfall storm sewer or ditches for each basin not located adjacent to a defined waterway. The proposed detention volumes shown on the plan are based on the modified rational method for detention volume calculation, and are based on assumed development characteristics. The detention volumes, stormwater storage unit sizes and locations are for general planning purposes. Each development will be analyzed in detail using site specific characteristics during the permitting process. The attached Proposed Stormwater Management Plan shows the application of the proposed design criteria for individual parcels. A proposed storm sewer outfall system for parcels within the study area is also shown.

-See Exhibit 3-2, Proposed Stormwater Management Plan for visual representation.

At various locations on the plan, stormwater storage units are shown to be located within the floodplain. The City of Joliet ordinances currently allow for the construction of stormwater storage basins within the floodplain, provided compensatory storage is provided at a ratio of 1.5:1 (Section 31-205(g)(1)). The storage volumes noted on the plan do not reflect the additional storage volume required for floodplain compensatory storage. Careful review of any proposal to provide stormwater storage within the floodplain should be conducted by City staff prior to approval of proposals to provide stormwater storage in floodplain areas.

City of Joliet Southside Comprehensive Plan Proposed Stormwater Management Plan

Legend

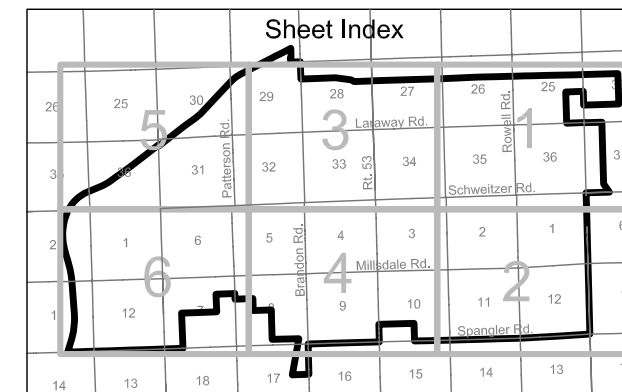
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- Recommended Location of Stormwater Management Unit (Detention)

Drainage Area Information

- Proposed Storm Structure Number and Invert Elevation

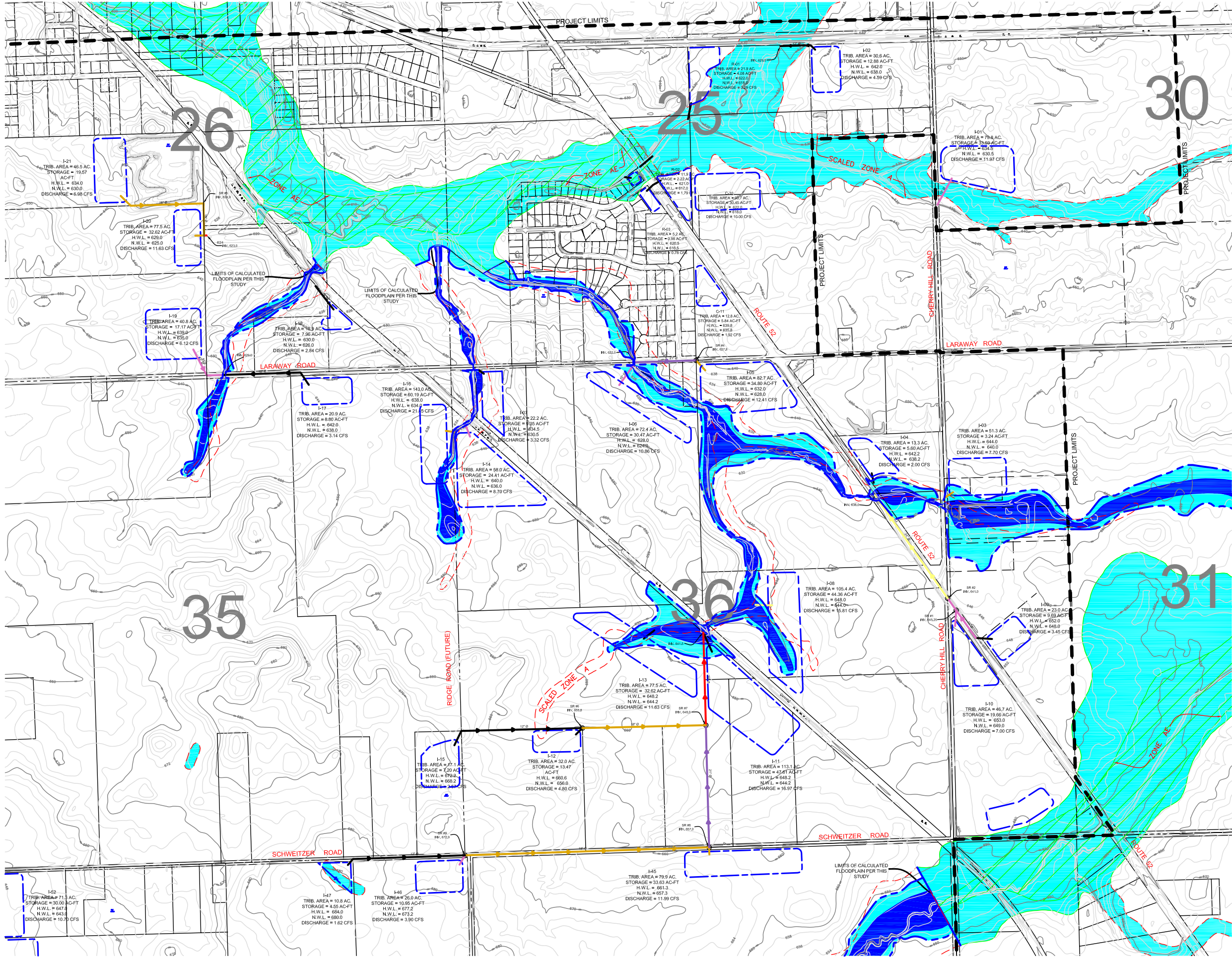
- Approximate Floodplain Boundary as Calculated by This Study (Non-regulatory)
- Area with Potential for Floodplain Reclamation
- Floodplain
- Floodway
- Scaled Zone A Floodplain



- NOTES:**
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 - ALLOWABLE RELEASE RATE OF 0.15 CFS/ACRES BASED ON STREAM CAPACITY.

NORTH

EXHIBIT 1
SHEET 1 OF 6













(See Sheet 3)


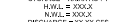
(See Sheet 2)


City of Joliet
 Southside Comprehensive Plan
**Proposed Stormwater
 Management Plan**


(See Sheet 1)




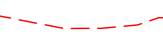
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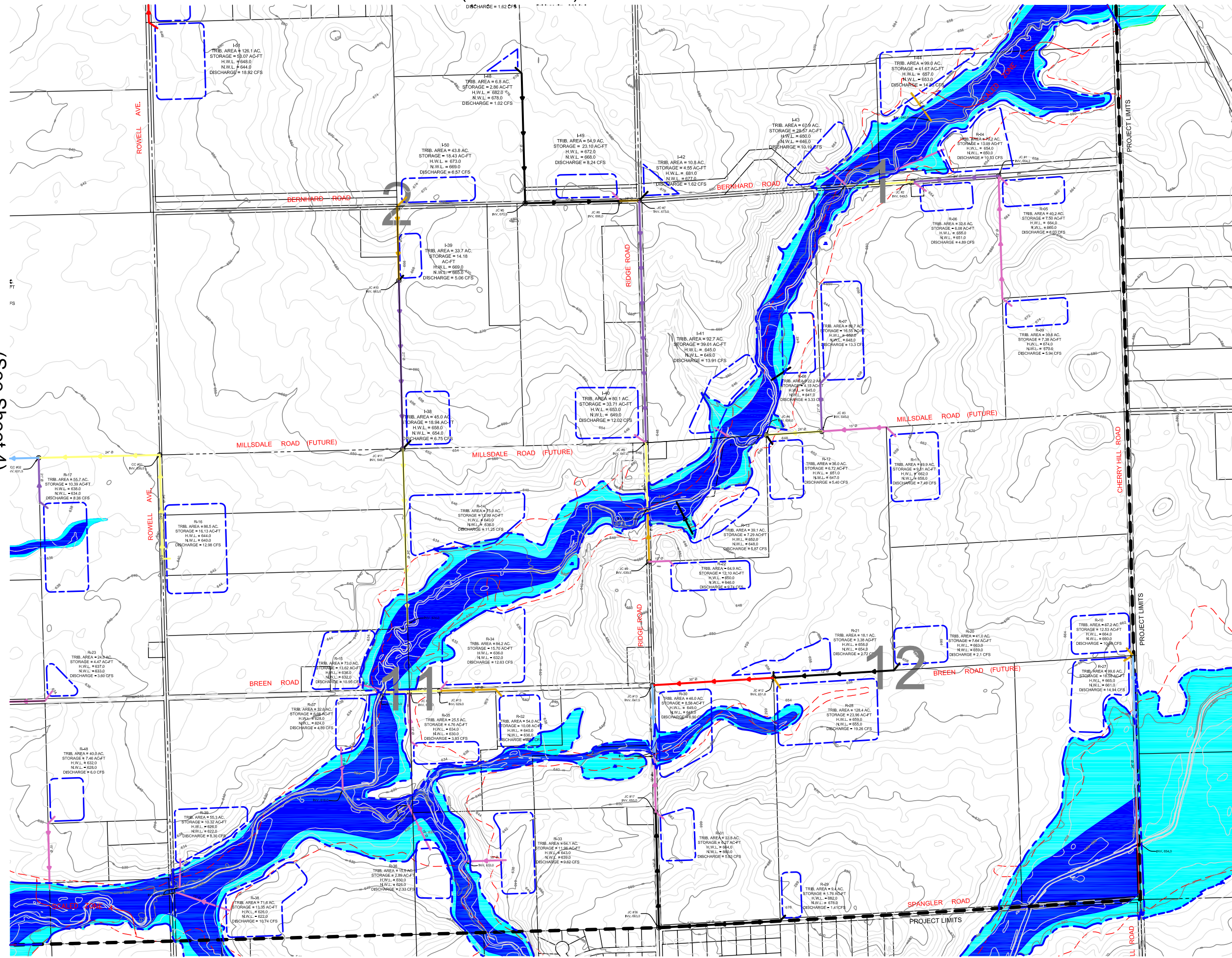
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EXHIBIT 1
 SHEET 2 OF 6

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(See Sheet 4)

City of Joliet
 Southside Comprehensive Plan
 Proposed Stormwater
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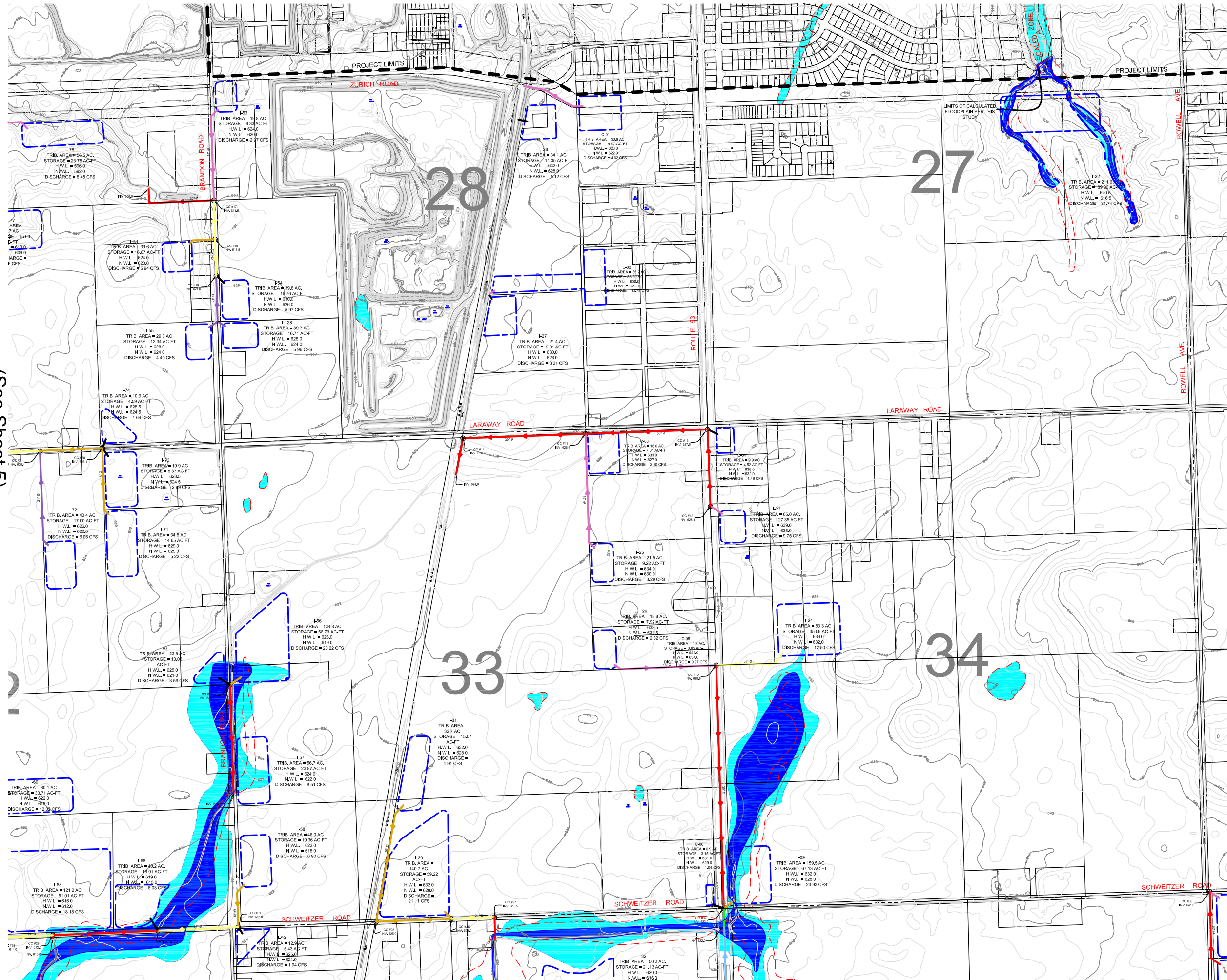
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(See Sheet 5)












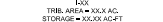
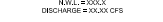





(See Sheet 1)

(See Sheet 4)

(See Sheet 3)

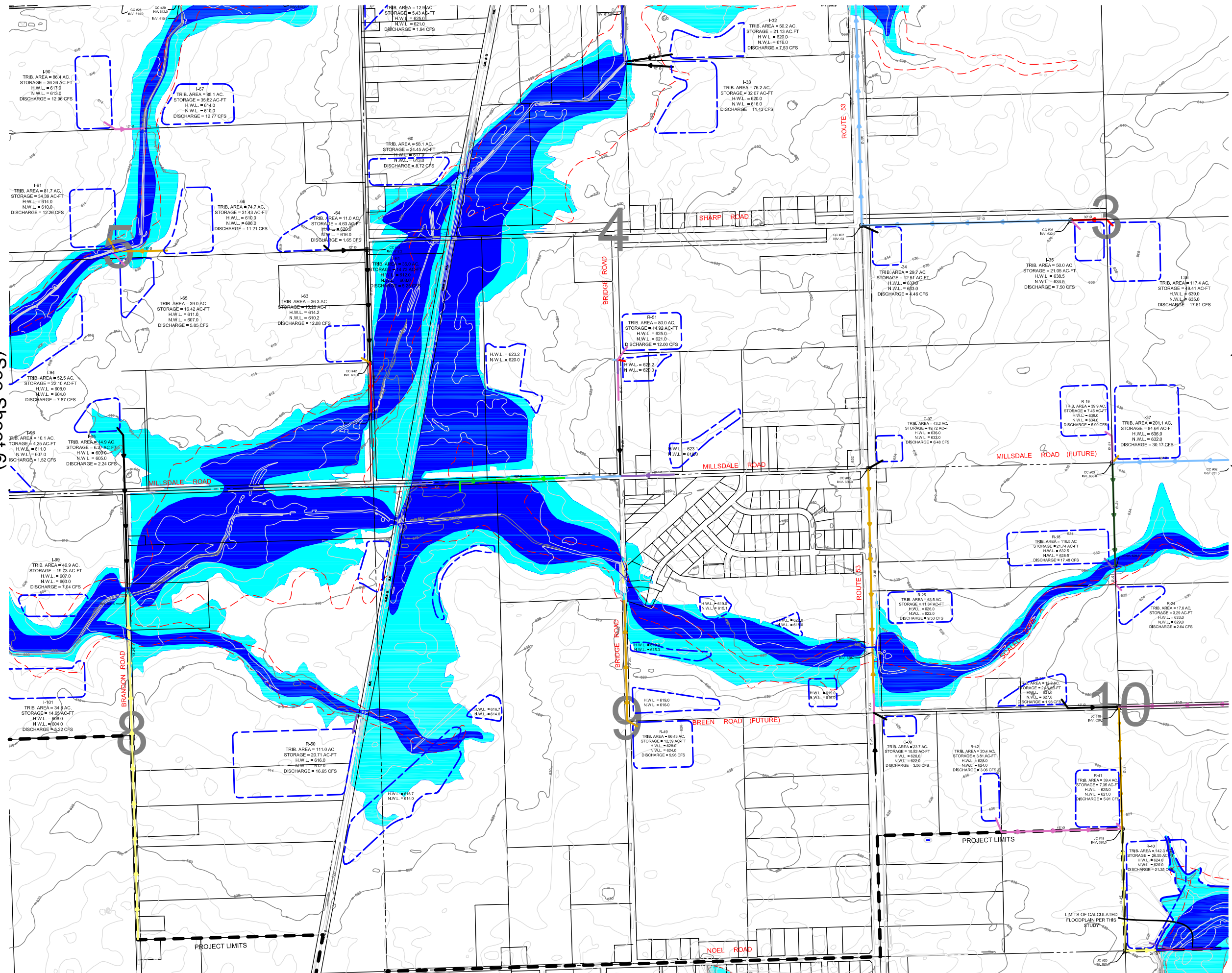
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(See Sheet 6)

(See Sheet 2)

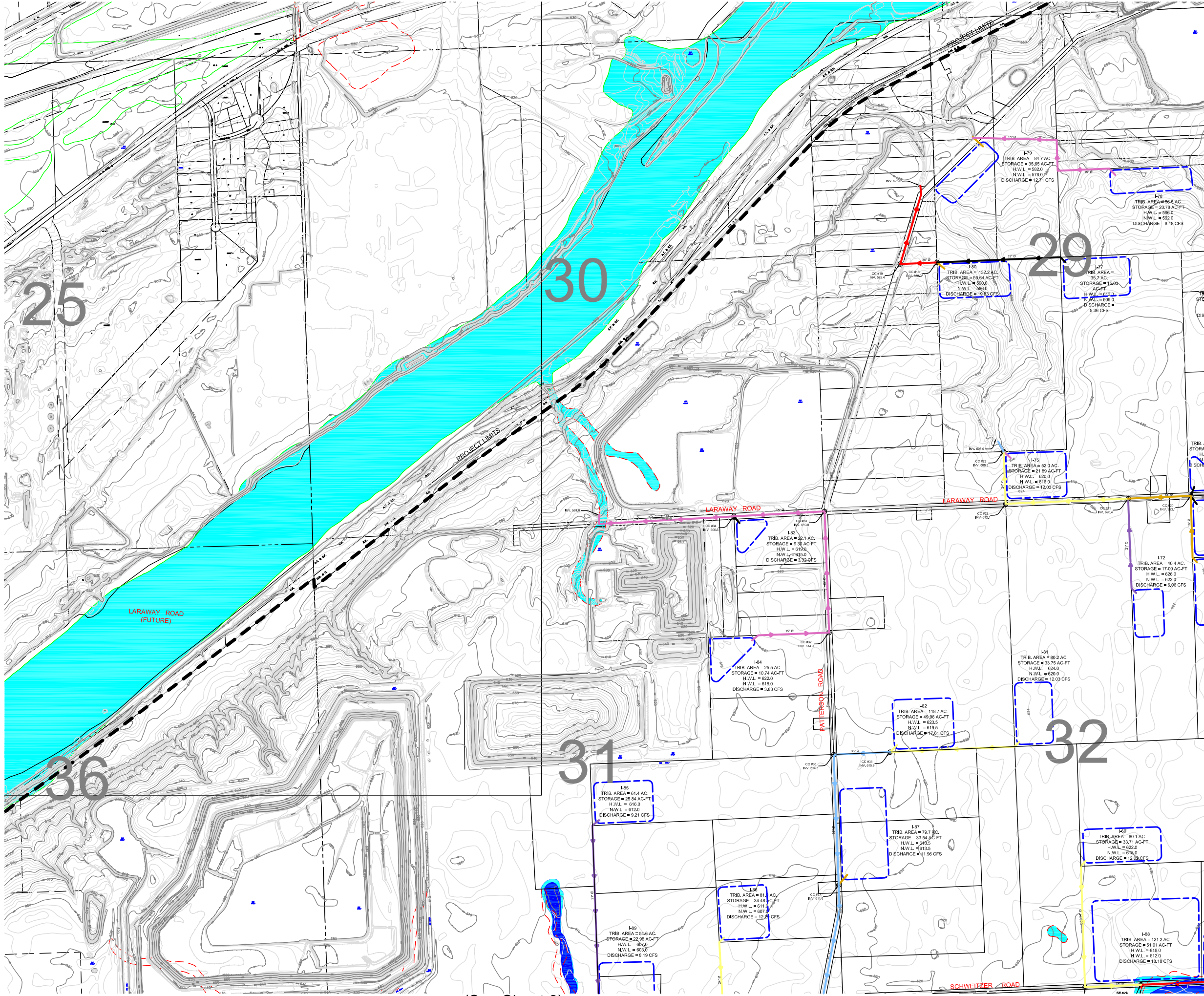


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EXHIBIT 1
SHEET 4 OF 6

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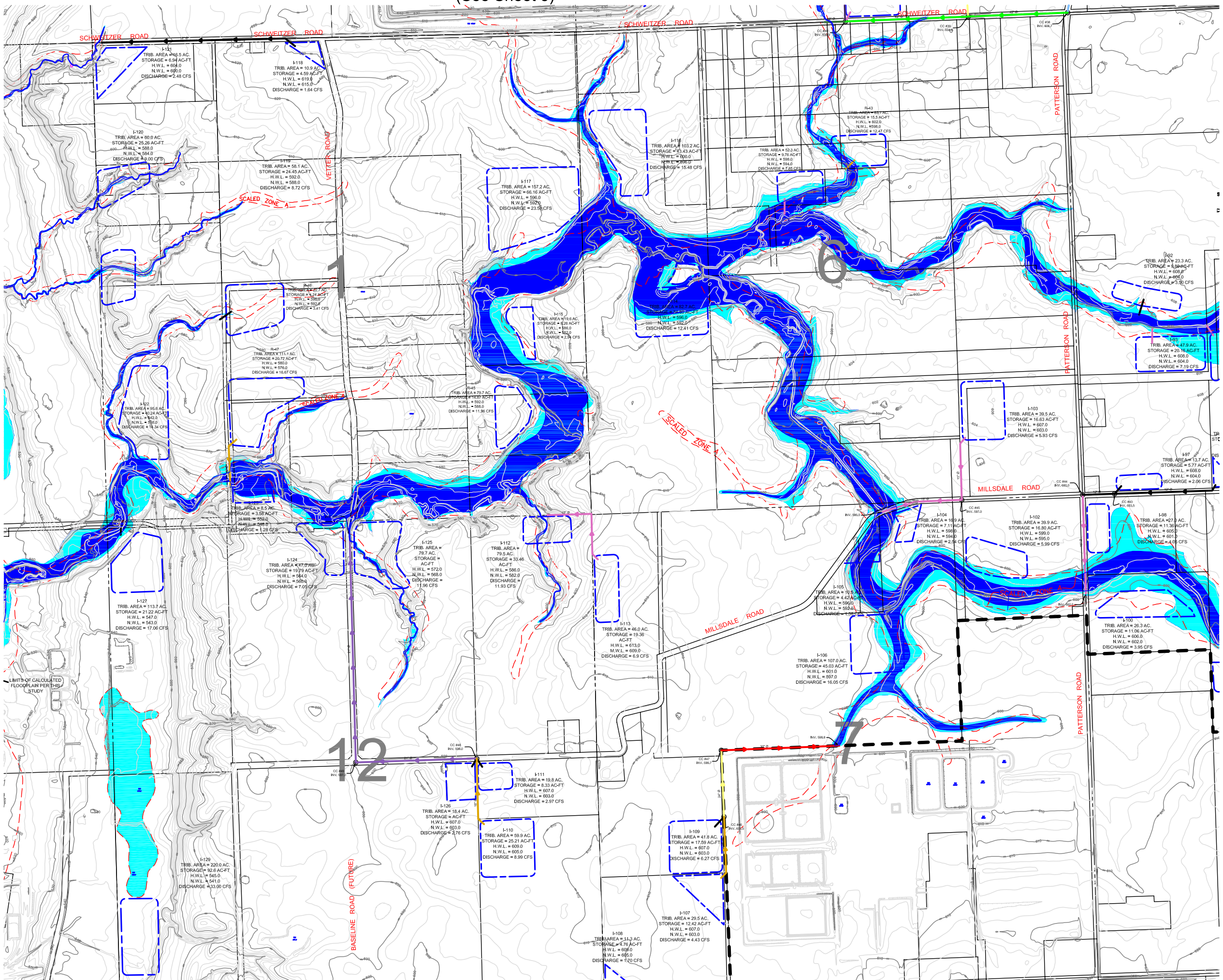


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SECTION 3: DRAINAGE AND ENVIRONMENTAL

The City stormwater ordinance also allows stormwater storage in the floodway, but this practice is strongly discouraged. This study does not recommend stormwater storage within the designated floodway area and recommends adoption of an ordinance prohibiting stormwater storage in the floodway.

Depressional storage volumes are not defined in this study due to the level of detail of available topography. Depressional storage should be addressed at the time of engineering plan review in accordance with applicable regulations and good engineering practice. Depressional storage areas shall be preserved at a ratio of 1:1.

ENVIRONMENTAL ANALYSIS

Summary of Natural Resources

A total of 108 wetlands were mapped by the U.S. Fish and Wildlife Service National Wetland Inventory (NWI). A statistical analysis of existing water features is as follows:

- Cedar Creek: 46,878 linear feet within the study area
- Sugar Creek: 13,454 linear feet within the study area
- Jackson Creek: 9,600 linear feet within the study area
- Jackson Branch: 14,918 linear feet within the study area

See Exhibit 3-3 Natural Resource Area Map for visual representation

Additionally, because there are so few existing wooded areas, the City of Joliet promotes incorporation of this resource into land planning. A tree survey identifying quality, large diameter trees should be completed during the preliminary planning phases of development. Incorporation of mature trees into the planned development is strongly recommended.

Applicable Regulations

Federal

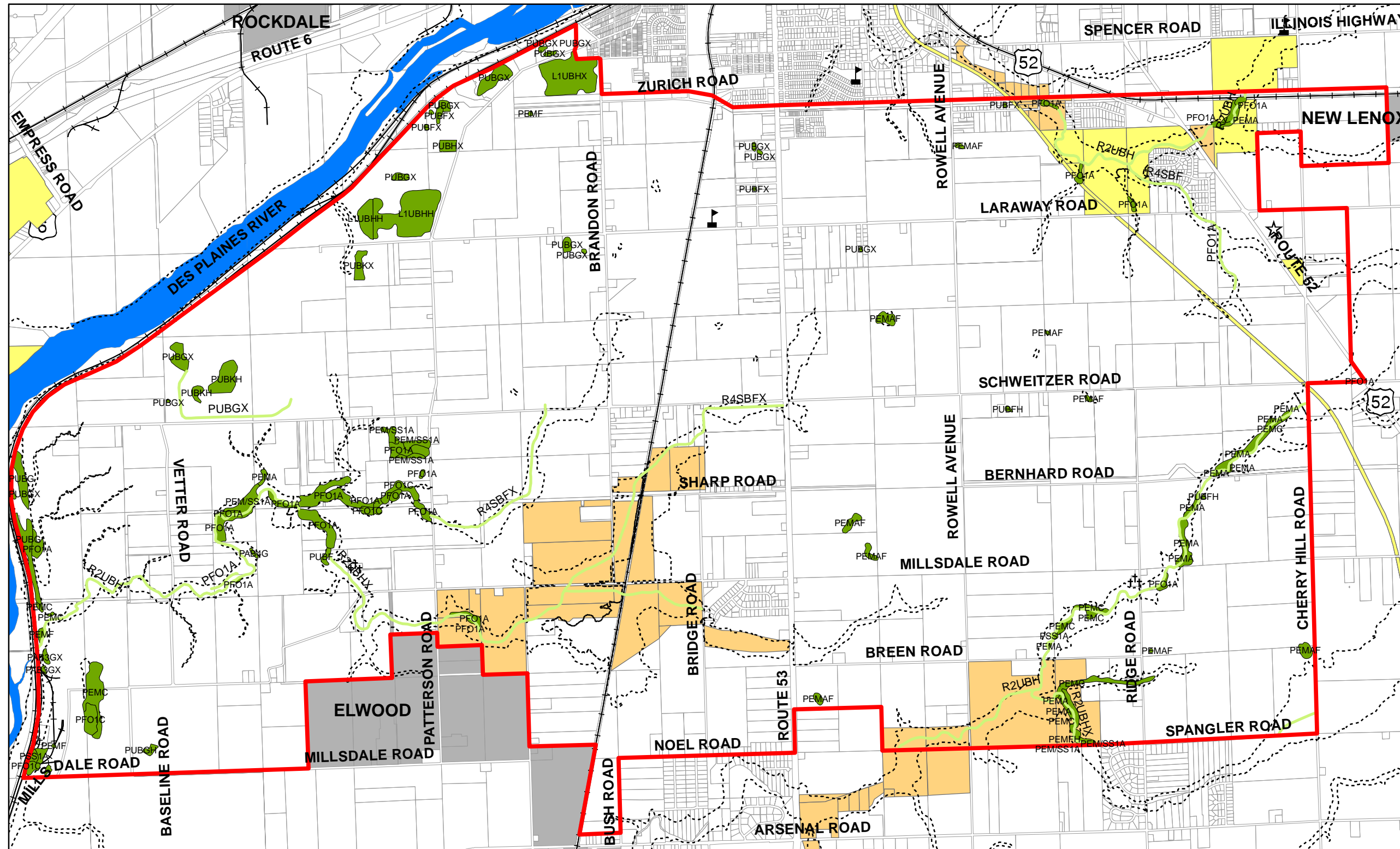
The U.S. Army Corps of Engineers, Chicago District administers a Regional Permit Program (RPP) that includes a set of Regional Permits for activities with minimal individual and cumulative impacts on the aquatic environment in Cook, DuPage, Kane, Lake, McHenry and Will Counties, Illinois.

The RPP authorizes activities that involve structures or work in or affecting navigable waters of the United States (U.S.) under Section 10 of the Rivers and Harbors Act of 1899 and/or discharges of dredged or fill material into waters of the U.S. under Section 404 of the Clean Water Act

All projects requiring a federal permit are required to utilize Best Management Practices (BMP) to protect water quality and minimize impacts of stormwater on aquatic resources. BMP(s) may



EXHIBIT 3-3
NATURAL RESOURCE
AREA MAP



Legend

- PLANNING AREA
- MUNICIPALITIES
- NWI WETLANDS
- NWI LINEAR WETLANDS
- FLOODPLAIN
- EXISTING FOREST PRESERVE LAND
- PROPOSED FOREST PRESERVE LAND

NOTES

- PROPOSED FOREST PRESERVE LANDS ARE PER THE FOREST PRESERVE DISTRICT OF WILL COUNTY'S 2005 LAND ACQUISITION PLAN
- WETLANDS SHOWN PER NATIONAL WETLAND INVENTORY, PREPARED BY THE U.S. FISH AND WILDLIFE SERVICE. TO DETERMINE THE PRESENCE, BOUNDARY AND LOCATION OF A WETLAND, A WETLAND DELINEATION IS REQUIRED.

SYSTEM	R - RIVERINE							
SUBSYSTEM	1 - TIDAL	2 - LOWER PERENNIAL	3 - UPPER PERENNIAL	4 - INTERMITTENT	5 - UNKNOWN PERENNIAL			
CLASS	RB - ROCK BOTTOM	UB - UNCONSOLIDATED BOTTOM	*SB - STREAMBED	AB - AQUATIC BED	RS - ROCKY SHORE	US - UNCONSOLIDATED SHORE	**EM - EMERGENT	OW - OPEN WATER/Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Bedrock 2 Rubble 3 Cobble-Gravel 4 Sand 5 Mud 6 Organic 7 Vegetated	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent	

SYSTEM	P - PALUSTRINE								
CLASS	RB - ROCK BOTTOM	UB - UNCONSOLIDATED BOTTOM	AB - AQUATIC BED	US - UNCONSOLIDATED SHORE	ML - MOSS-LICHEN	EM - EMERGENT	SS - SCRUB-SHRUB	FO - FORESTED	OW - OPEN WATER/Unknown Bottom
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MODIFIERS			
In order to more adequately describe the wetland and deepwater habitats one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The farm modifier may also be applied to the ecological system.			
WATER REGIME		WATER CHEMISTRY	
Non-Tidal	Tidal	Coastal Salinity	Inland Salinity
A Temporally Flooded B Saturated C Seasonally Flooded D Seasonally Flooded/Wall Drained E Seasonally Flooded/Saturated F Seasonally Flooded/Intermittently Exposed G Intermittently Exposed U Unknown	H Permanently Flooded J Intermittently Flooded K Artificially Flooded L Subtidal M Irregularly Exposed N Regularly Exposed P Irregularly Flooded	1 Hypersaline 2 Eusaline 3 Mesohaline (Brackish) 4 Polyhaline 5 Mesohaline 6 Oligohaline 0 Fresh	7 Hypersaline 8 Eusaline 9 Mesohaline 0 Fresh
		pH Modifiers for all Fresh Water	Soil
		a Acid c Circumneutral i Alkaline	g Organic m Mineral b Beaver d Partially Drained/Ditched f Farmed
		Special Modifiers	
		h Diked/Impounded i Artificial Substrate s Spoil x Excavated	



NOT TO SCALE

SECTION 3: DRAINAGE AND ENVIRONMENTAL

be located in upland buffers adjacent to wetlands and other waters of the U.S. To the maximum extent practicable, the applicant shall incorporate the following into the preparation of development plans:

- 1) Preservation of natural resource features such as floodplains, streams, lakes, steep slopes, significant wildlife areas, wetlands, prairies, woodlands, sensitive aquifers and their recharge areas and native soils;
- 2) Site development shall conform to the existing topography and soil so as to create the least potential for vegetation loss and site disturbance and,
- 3) Site design shall maintain natural drainage patterns and watercourses.

Activities to be covered under the RPP will fall under one of two categories:

Category I

Activities with minimal impacts requiring review by the District. Authorization may include special conditions to ensure compliance with the RPP.

Category II: Activities with minimal impacts requiring more rigorous review by the District and coordination with resource agencies. Authorization may include special conditions to ensure compliance with the RPP.

Individual Permit: Activities that do not fall into one of the above categories by definition have more than minimal impacts and are therefore subject to the individual permit review process.

Any federal permit requirements, impacts to waters of the U.S. shall be avoided and minimized to the maximum extent practicable at the project site. Avoidance and minimization shall be attempted before compensatory wetland mitigation is considered. Compensatory mitigation will be accomplished by establishing a minimum ratio of 1.5 acres of mitigation for every 1.0 acre of waters of the U.S. impacted by the project. Furthermore, the District has the discretion to require additional mitigation to ensure that the impacts are no more than minimal. Mitigation shall be consistent with the Memorandum of Agreement (MOA) between the Department of the Army and the Environmental Protection Agency Concerning the Determination of Mitigation under the Clean Water Act Section 404(b)(1).

For the most recent information on the U.S. Army Corps of Engineers, Chicago District Regulatory Program, applicants should review the District website at <http://www.lrc.usace.army.mil/co-r/>.

SECTION 3: DRAINAGE AND ENVIRONMENTAL

State

The Illinois Department of Natural Resources (IDNR) is the primary regulating body in matters of state wetland protection. The Interagency Wetlands Policy Act (IWPA) of 1989 established the state-wide goal of, “no overall net loss of state wetland acreage or its functional value due to state-supported activities” (State of Illinois 1989). Any projects that involve state agency participation or funding must go through a two-part review process. First, projects are reviewed by the Division of Natural Resources Review and Coordination to identify any potential wetland impacts. If no such threat is evident, projects are allowed to begin. If negative impacts are deemed imminent, the building entity must develop a plan for remediation/compensation before work can continue. All plans for resolving wetland concerns must be approved by IDNR, and all guidelines for these plans are contained in the IWPA Act of 1989.

More detailed descriptions of the State’s regulatory policy on wetland protection and remediation can be found at the Illinois Department of Natural Resources website: <http://dnr.state.il.us>.

County

The Will County Stormwater Management Ordinance currently regulates the unincorporated portions of the study area. “The principal purpose of this Ordinance is to promote effective, equitable, acceptable, and legal Stormwater Management measures by establishing reasonable rules and regulations for development” (Will County, 2004).

Local

The City of Joliet adopted their Consolidated Stormwater Management, Soil Erosion and Sediment Control, and Floodplain Management Regulations in 1993, and amended it to current specifications in 2003. The outlined purpose of this document is, “To diminish threats to public health safety and welfare caused by runoff or excessive stormwater from new development and redevelopment. (City of Joliet, 2003)”

Proposed Stream Protection Plan

Portions of the existing stream network are more susceptible to various forms of environmental harm as a result of nearby development. This plan has subsequently identified varying levels of protection for certain stream segments. The classifications are discussed in more detail below.

Class I: Main Channel Protection

This designation has been utilized for portions of the stream channels that are to be preserved. This most restrictive class of protection allows for virtually no alterations to be made to existing stream channels.

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Class II: Branch Tributary

Protection of the various branch tributaries is an important component of this plan. However, this class is less restrictive, and allows for slight modifications to the channel. Generally, these types of alterations would need to be accompanied by channel substitution, open space supplements or enhanced plantings.

Class III: Tributary Areas

The least restrictive form of protection called for in this plan, *Class III* allows for interruption of existing channels, upon completion of some form of mitigating action.

-The Stream Protection Plan Map, presented as Exhibit 3-4, illustrates the respective areas, and their levels of protection. The stream protection ordinance text can be found as Appendix A



Proposed Trail Along Existing Creek

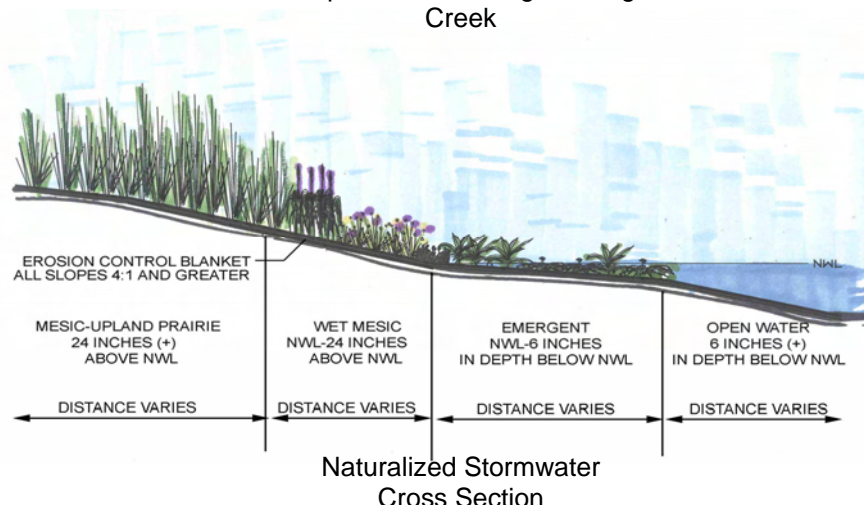







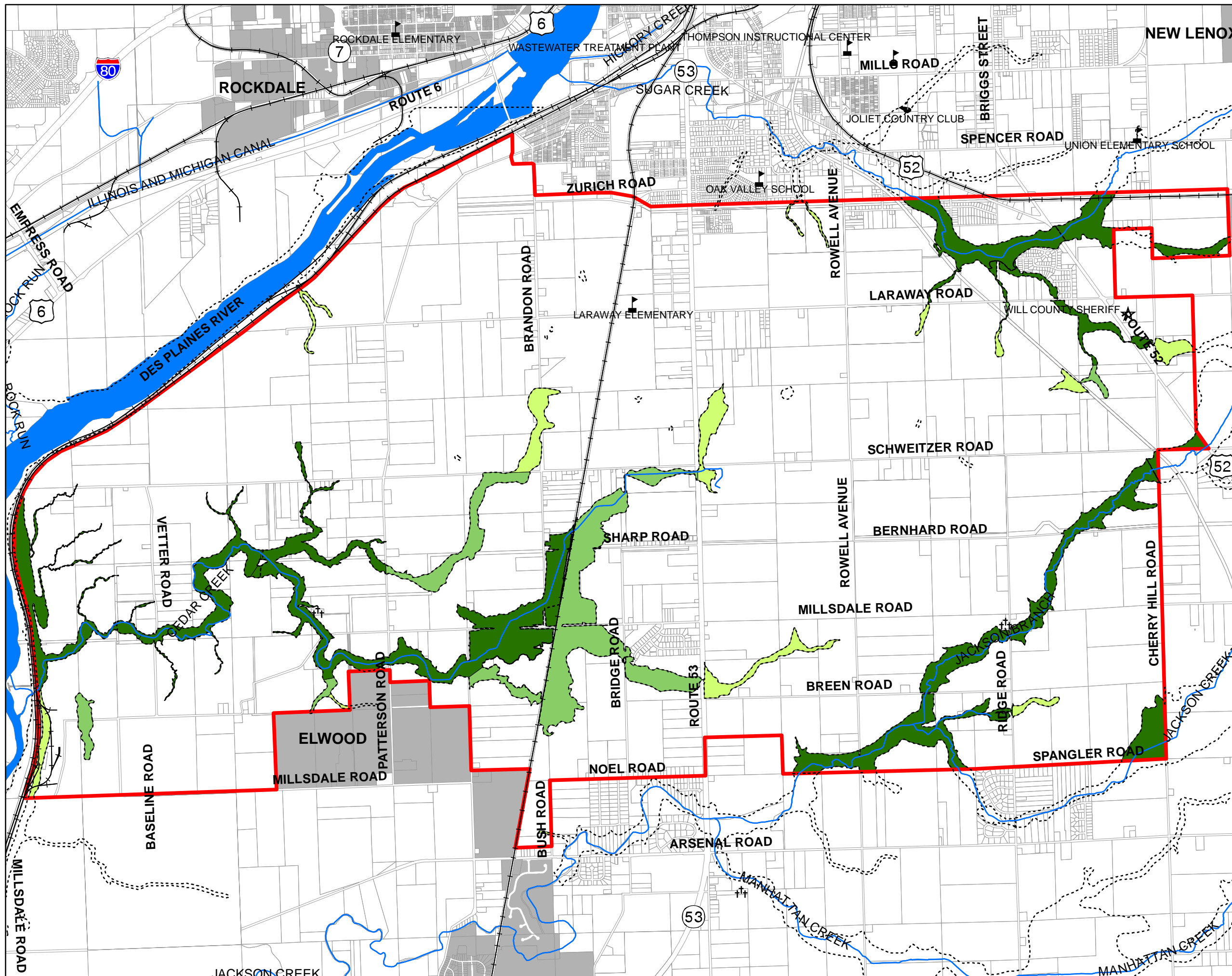
EXHIBIT 3-4
STREAM PROTECTION PLAN

Legend

-  PLANNING AREA
-  MUNICIPALITIES
-  WATERWAYS
-  FLOODPLAIN

STREAM PROTECTION

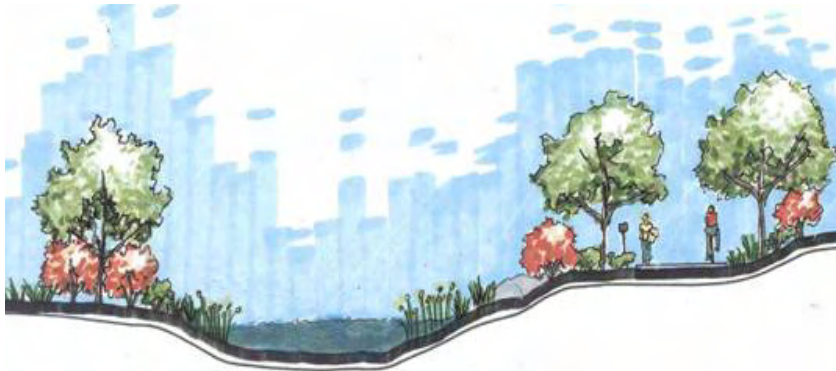
-  CLASS I: MAIN CHANNEL
-  CLASS II: BRANCH TRIBUTARY
-  CLASS III: TRIBUTARY AREA



NOT TO SCALE



SECTION 3: DRAINAGE AND ENVIRONMENTAL



Existing Stream Channel to be
Enhanced

Best Management Practices Recommendations

Protection of Wetland, Riparian, and Woodland Environments

The City protects and encourages the preservation of wetlands, woodlands, and riparian environments. The natural functions of these areas include: improved water quality, stormwater storage, groundwater recharge, filtering of sediment and pollutants, and provide wildlife habitat.

Minimization of Impervious Surfaces

Reduction of impervious surfaces within the City of Joliet Standards should be considered during planning. Minimization of impervious surfaces avoids generating excess stormwater runoff and reduces impacts to ecologically sensitive areas. Recent Ordinances adopted by the City of Joliet require larger lot sizes, larger park donations, and increased open space. Concrete channels will not be allowed in dry bottom detention basins. Where concrete channels have historically been used, pervious materials will be substituted.

Naturalized Stormwater Management

Naturalization of on-site stormwater management features should be implemented during development whenever possible. Stormwater storage basins and vegetated outfall swales should be planted with native prairie and wetland vegetation. Native vegetation adds environmental benefits that conventional basins utilizing rip-rap and/or turf grass do not. Native vegetation provides greater soil stabilization, increased water infiltration, filtering of sediment and pollutants, wildlife habitat and an aesthetically pleasing landscape.

Management of these areas is essential to the success of the native plantings. Typically, a minimum of three years is required for native vegetation to become adequately established. Management is significantly reduced as the native area matures. Assigning performance standards for the first three years to naturalized stormwater features ensures success of the native plant community.

SECTION 3: DRAINAGE AND ENVIRONMENTAL

Soil Erosion Control and Stabilization

Applicable recommendations of the “Standard Specifications for Soil Erosion and Sediment Control” and City of Joliet standards should be followed during and after site construction to minimize erosion impacts to the existing creeks and the Des Plaines River. Numerous practices are recommended in the standard specifications and a site specific plan should be developed in accordance with City of Joliet ordinances. Where current watercourses show evidence of streambank erosion, a site specific plan shall be developed to stabilize critical locations.

Site-Level Requirements

The Illinois Urban Manual prepared by the United States Department of Agriculture, Natural Resource Conservation Service, shall be used as a basis for specific best management practices to be implemented at any specific site. At a minimum, the following practices should be considered:

- Vegetated strips / bioswales at storm detention outfalls to creeks or their tributaries
- Spreader boxes or level spreaders
- Depressed landscape islands in parking lots with parking lot runoff directed through curb openings to storm inlets in the center of the islands
- Infiltration trenches
- Grassed filter strips
- Stream bank stabilization.
- Pervious pavement

More information on the above best management practices can be found on the NRCS website (www.il.nrcs.usda.gov).

Species Recommendations for Naturalized Areas

The following species are recommended to be planted within naturalized areas including detention ponds, creek banks and other areas as noted and referenced on Exhibit 6-1. These species are native to this region and typically do well in naturalized stormwater management applications. An environmental consultant or landscape architect experienced in planting of native species shall determine which species and planting methods are most appropriate for specific site conditions and anticipated water regimes. This general list should not be considered all inclusive. Additions and/or substitutions that are native to this region are permissible.

SECTION 3: DRAINAGE AND ENVIRONMENTAL

Native Grasses:

Scientific Name	Common Name
<i>Andropogon gerardii</i>	Big Bluestem Grass
<i>Andropogon scoparius</i>	Little Bluestem Grass
<i>Bouteloua curtipendula</i>	Side-Oats Gramma
<i>Calamagrostis canadensis</i>	Blue Joint Grass
<i>Glyceria striata</i>	Fowl Manna Grass
<i>Panicum virgatum</i>	Switch Grass
<i>Sorghastrum nutans</i>	Indian Grass
<i>Spartina pectinata</i>	Prairie Cord Grass
<i>Sporobolus heterolepis</i>	Prairie Dropseed
<i>Elymus canadensis</i>	Canada Wild Rye

Native Forbs:

Scientific Name	Common Name
<i>Asclepias incarnata</i>	Swamp Milkweed
<i>Aster novae-angliae</i>	New England Aster
<i>Cassia fasciculata</i>	Partridge Pea
<i>Coreopsis tripteris</i>	Tall Coreopsis
<i>Echinacea purpurea</i>	Purple Coneflower
<i>Epilobium coloratum</i>	Cinnamon Willow Herb
<i>Eryngium yuccifolium</i>	Rattlesnake Master
<i>Eupatorium maculatum</i>	Spotted Joe Pye Weed
<i>Eupatorium perfoliatum</i>	Common Boneset
<i>Helenium autumnale</i>	Sneezeweed
<i>Iris virginica shrevei</i>	Blue Flag
<i>Lespedeza capitata</i>	Round-Headed Bush Clover
<i>Liatris spp.</i>	Blazing Star Species
<i>Lobelia cardinalis</i>	Cardinal Flower
<i>Lobelia siphilitica</i>	Great Blue Lobelia
<i>Lycopus americanus</i>	Common Water Horehound
<i>Monarda fistulosa</i>	Wild Bergamot
<i>Panicum virgatum</i>	Switch Grass
<i>Petalostemum purpureum</i>	Purple Prairie Clover
<i>Physostegia virginiana</i>	Obedient Plant
<i>Pycnanthemum virginianum</i>	Common Mountain Mint
<i>Ratibida pinnata</i>	Yellow Coneflower
<i>Rudbeckia hirta</i>	Black-eyed Susan
<i>Silphium laciniatum</i>	Compass Plant

SECTION 3: DRAINAGE AND ENVIRONMENTAL

<i>Silphium perfoliatum</i>	Cup Plant
<i>Silphium terebinthinaceum</i>	Prairie Dock
<i>Solidago graminifolia</i>	Grass-leaved Goldenrod
<i>Solidago nemoralis</i>	Old-Field Goldenrod
<i>Solidago riddellii</i>	Riddell's Goldenrod
<i>Solidago rigida</i>	Stiff Goldenrod
<i>Tradescantia ohiensis</i>	Common Spiderwort
<i>Verbena hastata</i>	Blue Vervain
<i>Verbena stricta</i>	Hoary Vervain
<i>Vernonia fasciculata</i>	Common Ironweed
<i>Veronicastrum virginicum</i>	Culver's Root
<i>Zizia aurea</i>	Golden Alexander

Native Shrubs:

Scientific Name	Common Name
<i>Amelanchier arborea</i>	Serviceberry
<i>Amorpha fruticosa</i>	Indigo Bush
<i>Amorpha canescens</i>	Lead Plant
<i>Ceanothus americanus</i>	New Jersey Tea
<i>Cephalanthus occidentalis</i>	Buttonbush
<i>Cornus stolonifera</i>	Red-osier Dogwood
<i>Cornus obliqua</i>	Silky Dogwood
<i>Corylus americana</i>	Hazelnut
<i>Hamamelis virginiana</i>	Witch Hazel
<i>Hypericum prolificum</i>	Shrubby St. John's Wort
<i>Ilex verticillata</i>	Winterberry
<i>Rhus glabra</i>	Smooth Sumac
<i>Rhus typhina</i>	Staghorn Sumac
<i>Spiraea alba</i>	Meadowsweet
<i>Viburnum acerifolium</i>	Maple-leaved Arrowwood
<i>Viburnum rafinesquianum</i>	Downy Arrowwood
<i>Viburnum trilobum</i>	Highbush Cranberry

SECTION 3: DRAINAGE AND ENVIRONMENTAL

Native Trees:

<i>Scientific Name</i>	Common Name
<i>Acer nigrum</i>	Black Maple
<i>Acer saccharum</i>	Sugar Maple
<i>Betula nigra</i>	River Birch
<i>Carya ovata</i>	Shagbark Hickory
<i>Celtis occidentalis</i>	Hackberry
<i>Juglans nigra</i>	Black Walnut
<i>Juniperus virginiana</i>	Red Cedar
<i>Malus ioensis</i>	Iowa Crab
<i>Pinus strobus</i>	White Pine
<i>Quercus alba</i>	White Oak
<i>Quercus bicolor</i>	Swamp White Oak
<i>Quercus coccinea</i>	Scarlet Oak
<i>Quercus imbricaria</i>	Shingle Oak
<i>Quercus macrocarpa</i>	Bur Oak
<i>Quercus rubra</i>	Red Oak
<i>Quercus velutina</i>	Black Oak
<i>Tilia americana</i>	American Basswood

Management Recommendations for BMPs

Management activities should be conducted for a minimum of three years following planting. This is the typical period required for establishment of native species. As a native plant community matures, required management needs are typically reduced. A professional trained in evaluation of native plant communities should determine appropriate management measures for site specific conditions. Common management activities are as follows:

- Seasonal Prescribed Mowing: The naturalized area should be mowed to a height of six inches one to four times during the growing season if an abundance of annual weeds are present. This is especially important during the first two years after planting so that the success of the native plantings is not compromised. Mowing shall take place prior to or when non-native and weedy species are flowering so as to prevent seed set.
- Herbicide Application: Perennial weeds will initially grow faster than native vegetation and aggressively compete for sunlight, nutrients, and space if left unmanaged. Perennial weeds within naturalized areas should be treated with appropriate herbicide as necessary. Herbicide should be applied with utmost caution by a trained and licensed applicator. Appropriate herbicide techniques include spot treatments, backpack/spray bottle treatments, and/or hand-wicking. Site specific weather conditions including rain, wind speed and direction and temperature must also be considered when using herbicide.

SECTION 3: DRAINAGE AND ENVIRONMENTAL

Common non-native and weedy species requiring herbicide management include but are not limited to: Canada Thistle (*Cirsium arvense*), Bull Thistle (*Cirsium vulgare*), Reed Canary Grass (*Phalaris arundinacea*), Purple Loosestrife (*Lythrum salicaria*) and Common Reed (*Phragmites australis*).

- **Burning:** As appropriate, fire can be introduced to the naturalized area as an additional management tool. Trained professionals experienced in herbaceous fuel types shall conduct burning. State and local permits shall be obtained prior to prescribed burning. Surrounding property owners as well as local police and fire departments shall be notified prior to a prescribed burn. A burn plan designating the preferred wind direction and speed, location of firebreaks, and necessary personnel and equipment shall be prepared and utilized in planning and burn implementation.

The initial burn shall be dependant on fuel availability that is directly related to the quantity and quality of the graminoid species (e.g. grasses and sedges) present within the planting area. The recommended burn season is November 1 through April 30. Generally, a new prairie/wetland area shall be burned annually for two years after the second or third growing season and then every other year thereafter burning approximately 50-75% of the area.

Prescribed burning simulates historical processes that once maintained prairies in this area prior to European settlement. Burning reduces invasive woody species and promotes the growth of native herbaceous species. Prescribed burning is the best management practice for native plant communities. However, when burning is not practical due to site constraints or local restrictions, implementation of the above management techniques can be utilized as an alternative.



A quality native plant community creates an attractive landscape and provides habitat for local wildlife.

SECTION 3: DRAINAGE AND ENVIRONMENTAL

Maintenance Guidelines and Performance Expectations of Native Plant Communities During the First Three Growing Seasons

Year 1

Perennial wildflowers and grasses grow slowly. Annual and biennial weeds will grow much more quickly in the first two years. Most native wildflower and grass seedlings will not grow taller than 6 inches in the first growing season and therefore rarely are damaged by mowing. Keeping weeds cut back during that first year prevents the production of more weed seeds that could cause problems in the second growing season. Consistent mowing during the first growing season of a prairie is the most important element in the successful development of the prairie planting.

During the first year, weeds should be cut back when they have reached a height of 12 inches. Tall weeds create shade for seedlings thus slowing their growth. Also, large quantities of mowed weed material can smother small seedlings. It is expected that monthly mowing will occur during the growing season. The actual mowing frequency depends upon rainfall and the actual weed density and height.

If a nurse crop such as Annual Rye is planted along with the prairie seed, the nurse crop should also be cut back in the first year. This will not jeopardize the effectiveness of the nurse crop. The purpose of a nurse crop is to rapidly stabilize the soil, prevent erosion and provide cover for the newly-germinated prairie seedlings. Once weeds have reached 12 inches in height and require mowing, the nurse crop already will have fulfilled its purpose.

Year 2

Midway through spring of the second growing season, the prairie slopes should be mowed down to within an inch of the ground surface. At this stage, the prairie plants are still small and have not yet gained full control of the soil environment. The weeds often will be dominant again in the second season. Since many prairie seeds germinate over a two year period (or longer), burning in the spring of the second year is not recommended as it could kill new seedlings. Spring mowing exposes the soil and stimulates germination of dormant prairie seeds, as well as growth of the prairie plants that germinated in the first year.

If weeds are a problem in the second year, they need to be mowed in late spring or early summer to a height of twelve inches. Biennial weeds (i.e. Burdock, Wild Parsnip, Bull Thistle, Curly Dock and Queen Anne's Lace) can be competitive in the second year. Mowing them to a height of twelve inches when they are in full bloom (early to late June) will either kill them or set them back severely. The prairie plants rarely are more than a foot tall in June of the second year so will experience minimal damage, if any.

SECTION 3: DRAINAGE AND ENVIRONMENTAL

A biennial weed of concern is Sweet Clover. This weed must be controlled because its seeds are stimulated to germinate by fire. In prairies that are managed with burning, this weed can become a long-term management problem if it is not handled early. Mowing in midsummer of the second year when Sweet Clover is in full bloom generally will kill the plants and prevent them from making seeds that will reinfest the prairie. If Sweet Clover appears in the third year, it will probably be limited and can be managed via hand-pulling.

Year 3

Prescribed Burning

Burning a prairie slope on a regular basis helps ensure continued success. Burning or mowing is usually, but not always, conducted November through April. A spring prairie fire sets back undesirable “cool season” weeds (e.g. Quack Grass, Blue Grass, Brome Grass, Clover) which emerge earlier and get a head start on the prairie plants. By waiting until these undesirable plants have initiated spring growth before burning, the fire will destroy their new growth. Most warm season prairie plants, however, remain dormant under the soil and thus remain unharmed by the fire.

Burning also removes the plant litter that has accumulated from the previous year’s growth and exposes the soil surface to the warming rays of the sun. Most prairie plants are “warm season” plants and respond favorably to warm soil temperatures. Burning encourages earlier soil warming and typically increases growth, flowering and seed production of native flowers and grasses.

Spring Mowing as an Alternative to Burning

In the event that burning the prairie slope is not an option, mowing can be substituted. Although not quite as effective as burning, mowing and raking off the cut material is a good substitute. The prairie slope must be mowed right down to the soil surface, or at least to within an inch of the ground surface. The cuttings are raked off to expose the soil to the sun. Mowing in midspring will mimic the effects of fire by removing the previous year’s vegetation and by cutting back cool season grasses and weeds that have already begun to actively grow. It is important to remove the mowed material to expose the soil surface and encourage soil warming. Once new plant growth has reached a height of one foot or taller, mowing or burning is not recommended as it could damage the prairie plants. In addition, many ground-nesting birds build their nests in late spring and mowing or burning at this time could destroy nests. Spring burning or mowing allows sufficient time for birds to re-nest and successfully raise their young.

Regular spring or fall burning should be instituted at the beginning of the third growing season. Sufficient combustible plant matter is usually present from the previous year’s growth to sustain a fire. If there is insufficient fuel to support a burn, mowing should be substituted.

SECTION 3: DRAINAGE AND ENVIRONMENTAL

Controlling Persistent Perennial Weeds:

Certain invasive perennial weeds may find their way into a prairie slope and become evident in the second or third year. Although burning and mowing will control most weedy species, a few perennial weeds may require spot treatment or removal. These include such weeds as Canada Thistle, Horsenettle and Spotted Knapweed. Canada Thistle and Horsenettle are tap-rooted weeds and cannot effectively be pulled since they will re-sprout. The only effective way to control these problem weeds is to treat them with herbicide. A manufacturer recommended solution of Roundup or other appropriate herbicide in a back pack sprayer will be applied on invasive perennials. This method is only recommended on cool, windless days. Herbicides volatilize on warm days and the wind can blow the mist onto adjacent plants.

Minimum Performance Criteria:

It is recommended that performance criteria be created that is specific to the proposed native plant community. For example, a large naturalized detention area should have specific goals and objectives regarding plant species diversity and habitat value that would not be appropriate for a vegetated swale. Below are minimum performance criteria that should be applied to most BMPs that utilize native vegetation.

- All vegetated zones within the upland or wet meadow plant communities shall exhibit a minimum of 85% cover.
- The emergent zone shall achieve 60% aerial coverage.
- By the end of the third year, a minimum of 75% of the vegetative coverage within the mitigation wetland and buffer must consist of native, non-invasive species
- Should the above performance standards be met and an overall FQI no less than 15 as determined by the floristic quality assessment method is described in Swink and Wilhelm, Plants of the Chicago Region prior to the termination of the specified maintenance and monitoring period; early sign-off can be considered. This standard should not be applied to BMPs with designed low diversity (e.g. rear yard swale with one or few grass species).
- By the end of the third year, none of the three most dominant plant species in the BMP may be non-native or weedy species, including but not limited to Common Reed (*Phragmites australis*), Canada Blue Grass (*Poa compressa*), Kentucky Blue Grass (*Poa pratensis*), Purple Loosestrife (*Lythrum salicaria*), Sandbar Willow (*Salix interior*), or Reed Canary Grass (*Phalaris arundinacea*). Cattail species (*Typha* spp.) will be allowed as a dominant within the wetland areas as they provide high water quality functions, provided that they are not the sole dominant species.

SECTION 4: TRANSPORTATION

PURPOSE

The purpose of the proposed transportation plan is to define the size and location of major roadways in order to efficiently carry traffic through and within the study area. Advanced planning for the orderly development of a transportation network is necessary to guide the City in decisions regarding development.

EXISTING TRANSPORTATION NETWORK

The current roadway network consists of mostly two lane roadways with bituminous or gravel surfaces. All roads are under the jurisdiction of the Joliet and Jackson township highway departments or the City of Joliet with the following exceptions:

- **US Route 52** - 2 lane highway, Illinois Department of Transportation
- **Illinois Route 53** - 4 lane divided highway, Illinois Department of Transportation
- **Arsenal Road** (CH 17) - lies to the immediate south of study area, Will County Highway Department
- **Brandon Road** (CH 42) - North of Laraway Rd., Will County Highway Department
- **Laraway Road** (CH 74) - From Brandon Rd. to Route 53 and east of route 52, Will County Highway Department
- **Mills Road** (CH 51) - From Route 53 to Cherry Hill Rd., Will County Highway Department
- **Cherry Hill Road** (CH 86) - From Mills Rd. to Washington St., Will County Highway Department. Additionally, a small segment north of Laraway Rd. falls under the jurisdiction of the New Lenox Township.

The planning area is also accessed by US Interstates I-55 (to the west) and I-80 (to the north). A new interchange for I-55 at Arsenal Road has been proposed, as well as expansions to the Interstate itself. Roadway expansions of Arsenal Road have already begun.

A total of approximately 36 drainage structures were inventoried by this study. Structures range from 30 inch diameter culverts to multi-span bridges. There are 18 bridge structures and 18 culverts identified by the study.

PROPOSED TRANSPORTATION NETWORK

Road Classifications

The purpose of the proposed transportation network is to efficiently move traffic thru the study area, as well as from one destination to another within the study area. In order to accomplish this, the following functional roadway classifications have been identified and proposed:

- **Major Route** - specifications of details vary. Designs, improvements, maintenance and planning are carried out by respective state or county jurisdictions.

SECTION 4: TRANSPORTATION

- **Major Arterial 63'** - five lanes (2 in each direction plus a turn lane) designed to carry large volumes of traffic thru and between regions within study area.
- **Arterial 53'** - four lanes (2 in each direction) designed to carry large traffic volumes within the study area and feed into the major routes.
- **Minor Arterial 45'** - four lanes of traffic (2 in each direction) designed to service internal area traffic patterns.
- **Minor Arterial 63' Boulevard** - four lanes of traffic (2 in each direction) and a 16' planted median. Designed to move traffic through designated portions of the study area, and out to major thoroughfares.
- **Collector 38'** - one parking lane and two traffic lanes (1 in each direction) designed to move local traffic to the larger roadway network.

Typical pavement cross sections for each of the functional classifications is provided as Exhibit 4-3 of this study. Ridge Road, Rowell Road from Arsenal to Schweitzer, and both Breen and Millsdale Roads from Route 53 to Cherry Hill Road shall have a 16 foot, landscaped center median.

Roadway Network Improvements

Several logical expansions of the existing roadway network will be necessary to effectively circulate the expected increases in traffic volumes. This plan has recommended the following roadway extensions be made. These suggestions are indicated on the Transportation Plan as dotted lines.

North/South Extensions

- **Ridge Road** should extend north beyond Schweitzer, ultimately ending at Laraway Road (aligning slightly to the west to avoid disturbing the Wauponsee Glacial Trail).
- **Brandon Road** should be realigned to allow traffic to connect from Route 6 to Arsenal Road without jogging, thus removing traffic from the portion of Millsdale Road that currently serves in this capacity.
- **Baseline Road** should continue from the south side of Arsenal Road north to align with Vetter Road. This must be coordinated with the Army, as Vetter ultimately runs through to their property north of Arsenal Road.

East/West Extensions

- **Laraway Road** should extend westward beyond Patterson Road. A bridge crossing the DesPlaines River has been identified for this extension as a potential major access point to the area, linking up with Empress Road on the northwest side of the river. Any proposed work on the bridge expansion will be subject to respective environmental and engineering studies.
- **Millsdale Road** should continue east beyond Route 53, ending at Cherry Hill Road. A proposed bridge crossing of Jackson Creek Branch will be necessary for this segment.
- **Breen Road** should have an additional segment added to connect to Cherry Hill Road.

SECTION 4: TRANSPORTATION

- **Schweitzer Road** should extend east beyond Cherry Hill Road, in order to meet up with Route 52.

-See Exhibit 4-1 Proposed Transportation Plan for visual representation.

-Below are summary tables for all drainage structures called out in the planning area. Locations can be found in Exhibit 4-2 Existing Bridge and Culvert Inventory.

SUMMARY OF MAJOR BRIDGE STRUCTURES							
<i>Structure No.</i>	<i>Road Name</i>	<i>No. of spans</i>	<i>Structure Length (ft)</i>	<i>Deck Type</i>	<i>Existing Design Load</i>	<i>Structure No.</i>	<i>Proposed Roadway Section</i>
6	Cherry Hill Rd.	2	20	Concrete	N/A	-	Minor Arterial (45')
7	Bernhard Rd.	1	18	Concrete	N/A	-	Collector (38')
8	Ridge Rd.	1	31	Concrete	HS 20	099-4502	Minor Arterial (63' Boulevard)
9	Breen Rd.	1	33	Concrete	HS 20	099-4503	Minor Arterial (63' Boulevard)
11	Spangler Rd.	3	35	Concrete	HS 20	099-4501	Collector (38')
12	Rowell Rd.	2	20	Concrete	N/A	-	Minor Arterial (63' Boulevard)
14	Patterson Rd.	2	18	Concrete	N/A	-	Minor Arterial (45')
15	Vetter Rd.	1	37	Concrete	N/A	-	Arterial (53')
17	US Route 52	3	40	Concrete	HS 20-44	099-0255	Major Route
20	US Route 52	2	45	Concrete	HS 20	099-0129	Major Route
21	Cherry Hill Rd.	1	20	Concrete	N/A	-	Minor Arterial (45')
22	Ridge Rd.	1	30	Concrete	HS 20	099-4505	Minor Arterial (63' Boulevard)
23	Arsenal Rd.	1	35	Concrete	HS 20	099-3053	Major Route
24	IL Route 53 (Southbound)	2	45	Concrete	HS 20	099-0086	Major Route
25	IL Route 53 (Northbound)	2	45	Concrete	HS 20	099-0087	Major Route
26	Arsenal Rd.	3	35	Concrete	HS 20	-	Major Route
28	Brandon Rd.	1	25	Concrete	N/A	-	Arterial (53')
35	Patterson Rd.	1	18	Concrete	N/A	-	Minor Arterial (45')


















SECTION 4: TRANSPORTATION

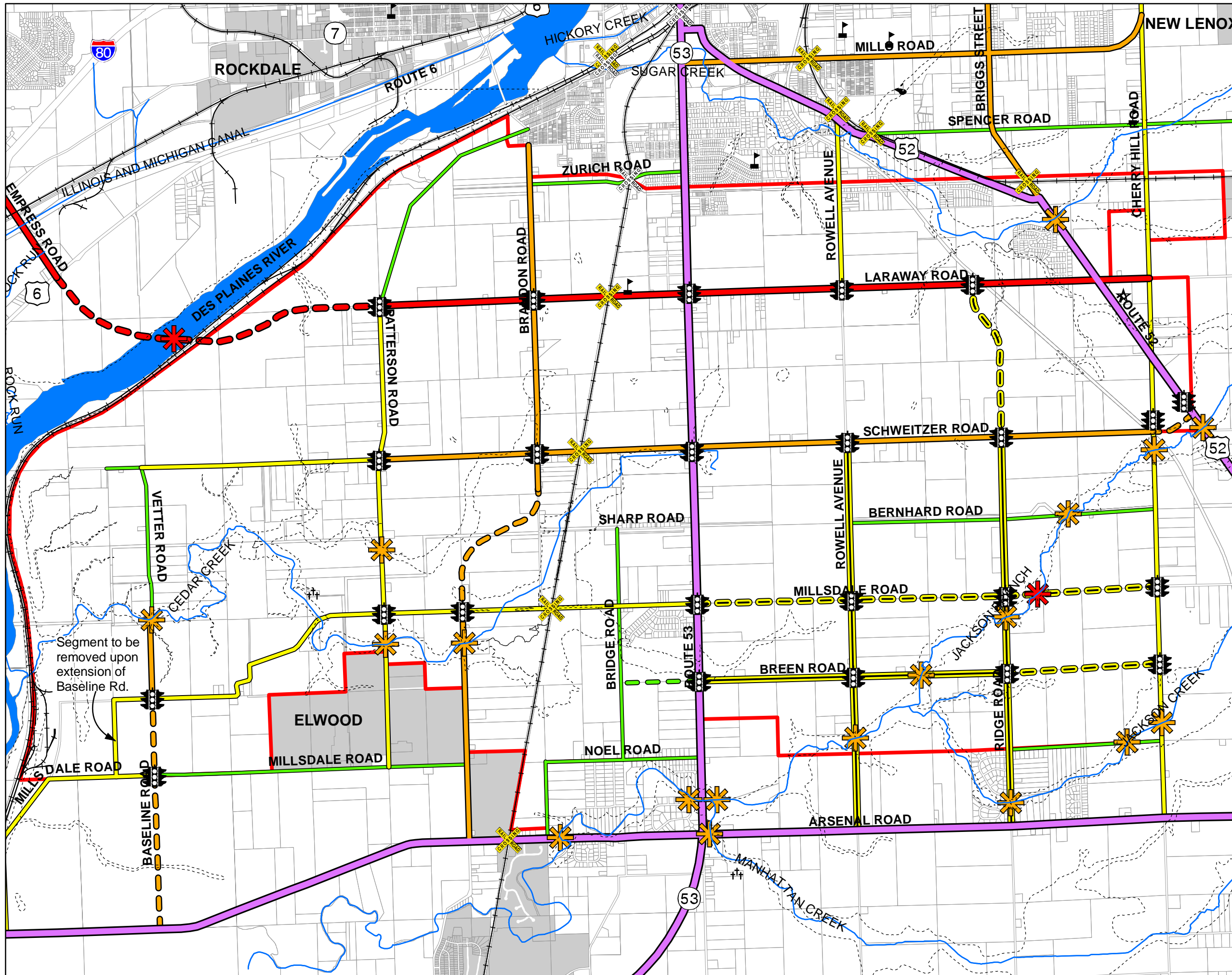
SUMMARY OF MAJOR CULVERT STRUCTURES							
<i>Structure No.</i>	<i>Structure Type</i>	<i>Road Name</i>	<i>Proposed Roadway Section</i>	<i>No. of Barrells</i>	<i>Opening Height (ft)</i>	<i>Opening Width (ft)</i>	<i>Wingwalls</i>
1	Concrete Box Culvert	Laraway Rd.	Major Arterial (63')	1	5	12	45 degrees
2	Concrete Box Culvert	Laraway Rd.	Major Arterial (63')	1	4	8	45 degrees
3	Elliptical CMP	US Route 52	Major Route	1	2.83	4.5	None
4	Concrete Box Culvert	US Route 52	Major Route	1	3	10	45 degrees
5	CMP Pipe Arch	Cherry Hill Rd.	Minor Arterial (45')	1	4.5	6	None
10	CMP	Ridge Rd.	Minor Arterial (63' Boulevard)	2	4	4	None
13	Concrete Box Culvert	IL Route 53	Major Route	1	4	10	45 degrees
16	CMP	Schweitzer Rd.	Minor Arterial (45')	1	2.5	3.5	None
18	Concrete Box Culvert	Cherry Hill Rd	Minor Arterial (45')	1	3	3	None
19	Concrete Box Culvert	Laraway Rd.	Major Arterial (63')	1	4.25	12	45 degrees
27	Concrete Box Culvert	Millsdale Rd.	Minor Arterial (45')	2	8.33	12	45 degrees
29	CMP	Millsdale Rd.	Minor Arterial (45')	2	4	4	None
30	CMP	Brandon Rd.	-	2	4	4	None
31	Concrete Box Culvert	Sharp Rd.	-	1	3	6	None
32	RCP	Patterson Rd.	Collector (38')	1	3.5	3.5	None
33	Concrete Box Culvert	Bridge Rd.	Collector (38')	2	4	12	45 degrees
34	Concrete Box Culvert	IL Route 53	Major Route	1	4	10	45 degrees
36	Concrete Box Culvert	Brandon Rd.	Arterial (53')	1	3'	10'	None



**EXHIBIT 4-1
PROPOSED TRANSPORTATION
PLAN**

Legend

-  PLANNING AREA
- ROADWAYS**
-  EXISTING ALIGNMENT
-  PROPOSED ALIGNMENT
- PROPOSED CONDITIONS**
-  MAJOR ROUTE
-  MAJOR ARTERIAL 63' SECTION
-  ARTERIAL 53' SECTION
-  MINOR ARTERIAL 45' SECTION
-  MINOR ARTERIAL 63' BOULEVARD
-  COLLECTOR 38' SECTION
- INTERSECTION IMPROVEMENTS**
-  TRAFFIC SIGNALS
- BRIDGES**
-  EXISTING
-  PROPOSED
- RAILROAD CROSSINGS**
-  AT GRADE
-  SEPARATED
-  WATERWAYS
-  FLOODPLAIN
-  MUNICIPALITIES











NOT TO SCALE

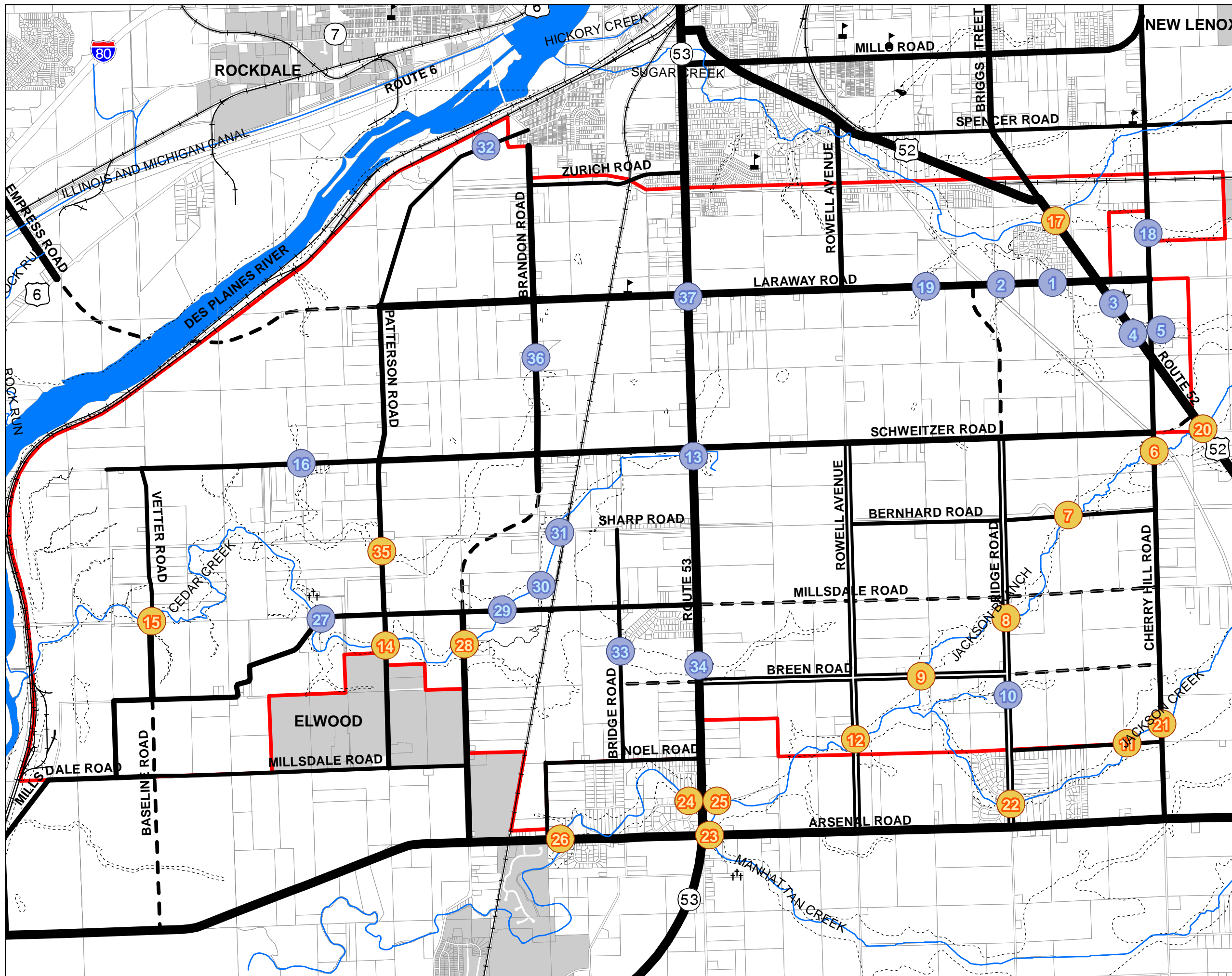


**EXHIBIT 4-2
EXISTING BRIDGE AND
CULVERT INVENTORY**

Legend

-  PLANNING AREA
- ROADWAYS**
-  EXISTING ALIGNMENT
-  PROPOSED ALIGNMENT
- DRAINAGE STRUCTURES**
-  BRIDGE
-  CULVERT
-  WATERWAYS
-  FLOODPLAIN
-  MUNICIPALITIES

NOTE:
STRUCTURE NUMBER DETAILS CAN BE
FOUND WITHIN TEXT (SEE PAGES 4-3 & 4-4).



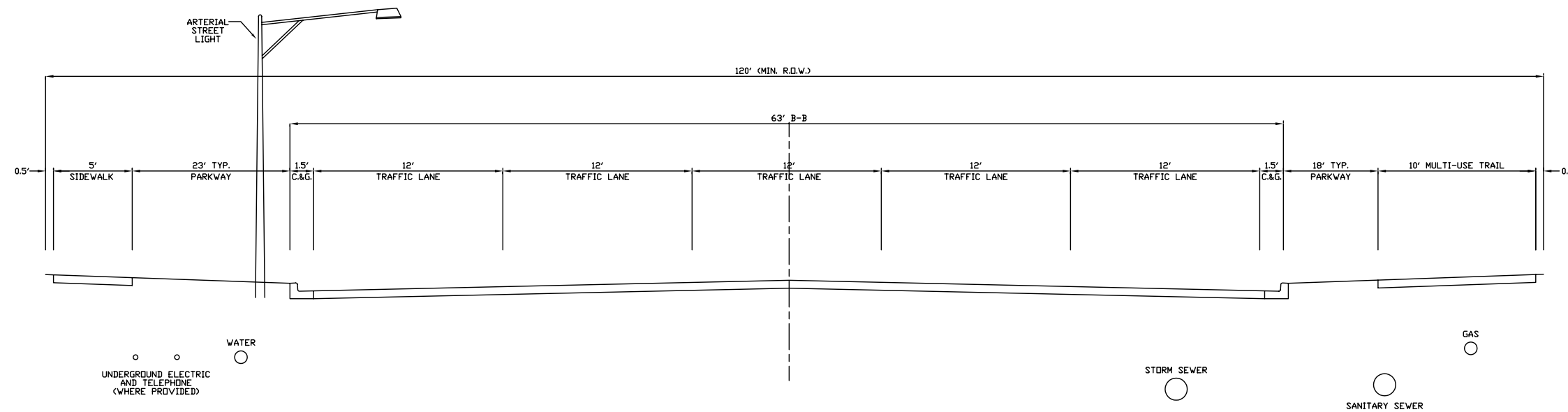
NOT TO SCALE



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Exhibit 4-3
Proposed Road
Cross Sections

Major Arterial Roads
63' SECTION

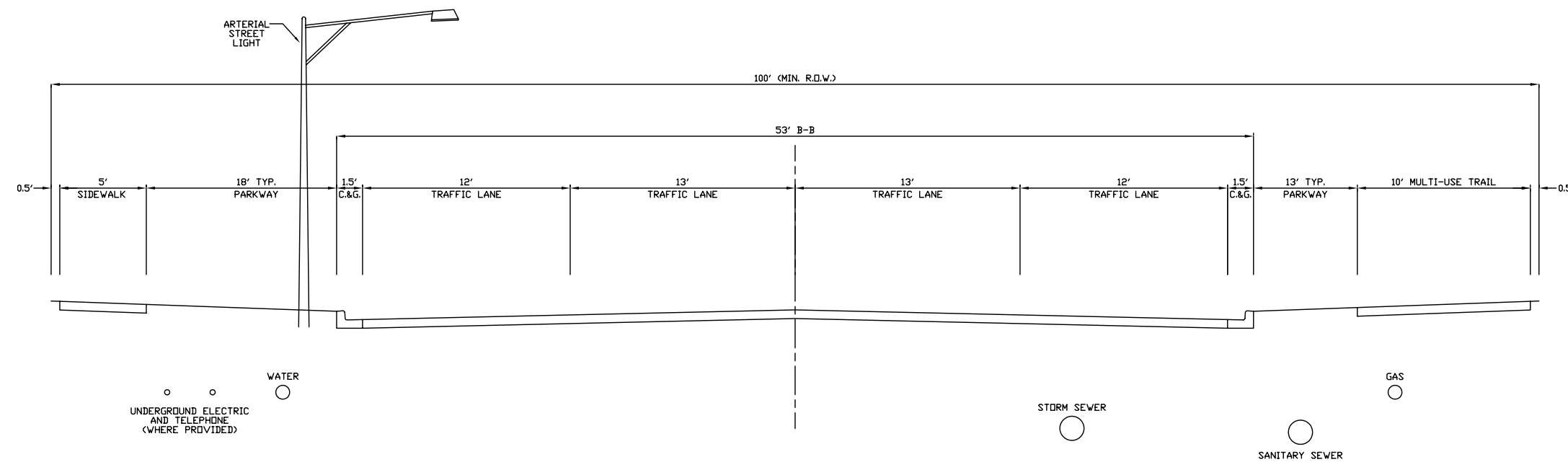


MAJOR ARTERIAL ROADS
LARAWAY ROAD
(NOT TO SCALE)

Exhibit 4-3 Proposed Road Cross Sections

Arterial Roads

53' SECTION

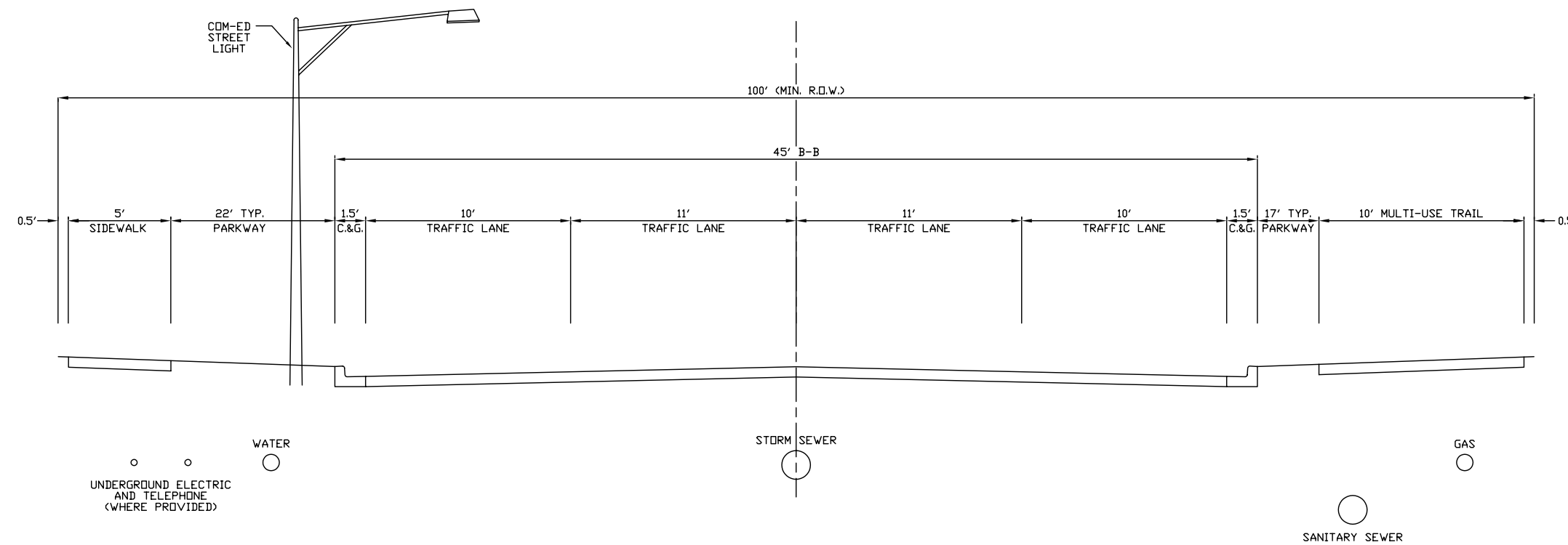


ARTERIAL ROADS
BASELINE, BRANDON, SCHWEITZER (PATTERSON TO CHERRY HILL)

(NOT TO SCALE)

Exhibit 4-3
Proposed Road
Cross Sections

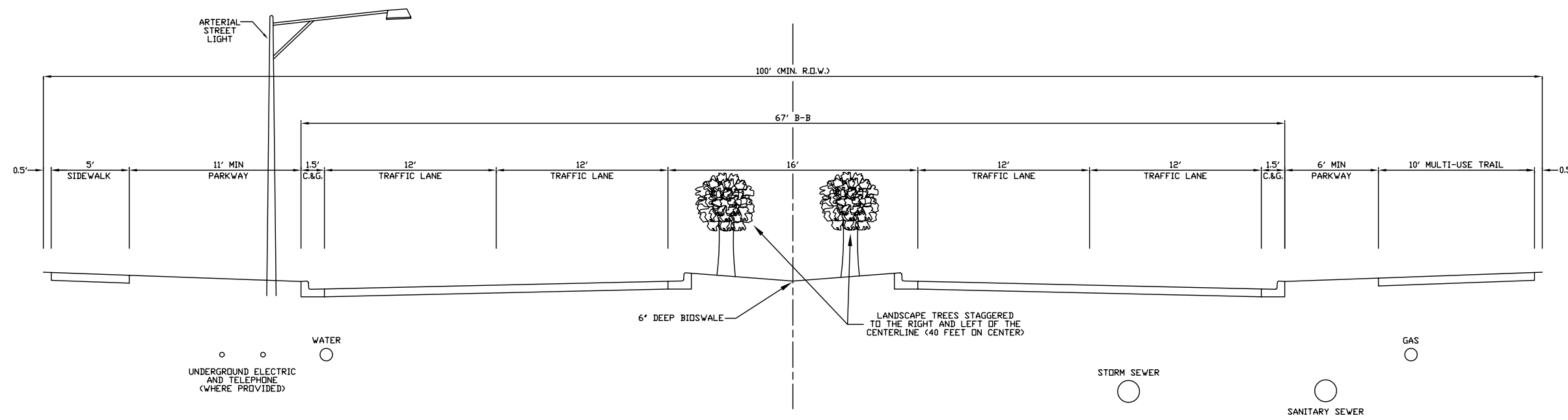
Minor Arterial Roads
 45' SECTION



MINOR ARTERIAL ROADS
 MILLSDALE (WEST OF IL 53), PATTERSON (BRANDON TO BREEN),
 SCHWEITZER (PATTERSON TO VETTER),
 ROWELL (LARAWAY TO IL 53), CHERRY HILL
 (NOT TO SCALE)

Exhibit 4-3
Proposed Road
Cross Sections

Boulevard
67' SECTION

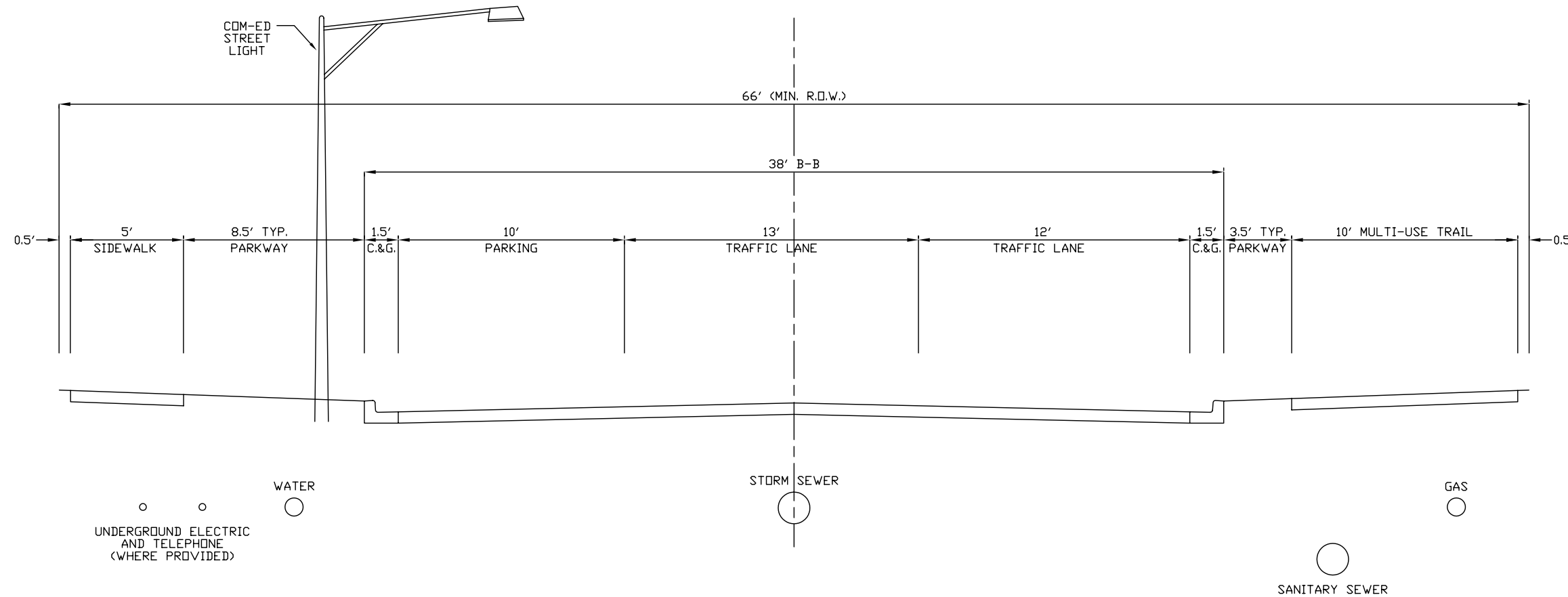


BOULEVARD
ROWELL (ARSENAL TO SCHWEITZER), BREEN (IL 53 TO CHERRY HILL),
RIDGE (ARSENAL TO LARAWAY), MILLSDALE (IL-53 TO CHERRY HILL)
(NOT TO SCALE)

Exhibit 4-3
Proposed Road
Cross Sections

Collector Roads

38' SECTION



COLLECTOR ROADS
 BUSH, NOEL, BRIDGE, VETTER, ZURICH,
 PATTERSON (LARAWAY TO BRANDON), BERNHARD,
 BREEN (WEST OF IL 53), MILLSDALE (SOUTH),
 SCHWEITZER (WEST OF VETTER),
 SPANGLER (RIDGE TO CHERRY HILL)
 (NOT TO SCALE)