Illinois Environmental Protection Agency

Bureau of Water • 1021 N. Grand Avenue E. • P.O. Box 19276 • Springfield • Illinois • 62794-9276

Division of Water Pollution Control
ANNUAL FACILITY INSPECTION REPORT
for NPDES Permit for Storm Water Discharges from Separate Storm Sewer Systems (MS4)

This fillable form may be completed online, a copy saved locally, printed and signed before it is submitted to the Compliance Assurance Section at the above address. Complete each section of this report.

Report Period: From March, 2015 To March, 2016

Permit No. ILR40 _____

MS4 OPERATOR INFORMATION: (As it appears on the current permit)

Name: Village of Bartlett Mailing Address 1: 228 S. Main Street

Mailing Address 2: _____ County: DuPage

City: Bartlett State: IL Zip: 60103 Telephone: 630-837-0811

Contact Person: Robert Allen, PE - Village Engineer Email Address: rallen@vbartlett.org
(Person responsible for Annual Report)

Name(s) of governmental entity(ies) in which MS4 is located: (As it appears on the current permit)

Village of Bartlett

THE FOLLOWING ITEMS MUST BE ADDRESSED.

A. Changes to best management practices (check appropriate BMP change(s) and attach information regarding change(s) to BMP and measurable goals.)

1. Public Education and Outreach ☐
2. Public Participation/Involvement ☐
3. Illicit Discharge Detection & Elimination ☐
4. Construction Site Runoff Control ☐
5. Post-Construction Runoff Control ☐
6. Pollution Prevention/Good Housekeeping ☐

B. Attach the status of compliance with permit conditions, an assessment of the appropriateness of your identified best management practices and progress towards achieving the statutory goal of reducing the discharge of pollutants to the MEP, and your identified measurable goals for each of the minimum control measures.

C. Attach results of information collected and analyzed, including monitoring data, if any during the reporting period.

D. Attach a summary of the storm water activities you plan to undertake during the next reporting cycle (including an implementation schedule.)

E. Attach notice that you are relying on another government entity to satisfy some of your permit obligations (if applicable).

F. Attach a list of construction projects that your entity has paid for during the reporting period.

Any person who knowingly makes a false, fictitious, or fraudulent material statement, orally or in writing, to the Illinois EPA commits a Class 4 felony. A second or subsequent offense after conviction is a Class 3 felony. (415 ILCS 5/44(h))

Robert Allen 5-23-16

Owner Signature: Date:

Robert Allen Village Engineer

Printed Name: Title:

EMAIL COMPLETED FORM TO: epa.ms4annualinsp@illinois.gov

or Mail to: ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
WATER POLLUTION CONTROL
COMPLIANCE ASSURANCE SECTION #19
1021 NORTH GRAND AVENUE EAST
POST OFFICE BOX 19276
SPRINGFIELD, ILLINOIS 62794-9276

DuPage River /Salt Creek Special Conditions Report March 31, 2016

This report is intended to fulfill certain reporting requirements contained in certain NPDES permits' Special Conditions entitled DuPage River/Salt Creek Special Requirements (attachment 1). These conditions are contained in, or are expected to be contained in, NPDES Permits identified in the following table. Certain permittees are required to ensure completion of projects and activities identified in the table in Special Condition paragraph 2; certain permittees are required to participate in a watershed chloride abatement program. Table 1 identifies the current status of funding participation by each permittee.

POTW Owner/ Facility Name	NPDES No.	Membership Dues Paid 2015-2016	Assessment Paid For Paragraph 2 Table Project Funding	Assessment Paid for Chloride Reduction/NIP/QUAL 2k/Trading Program
Addison North STP	IL0033812	Yes	YES	YES
Addison South - AJ LaRocca	IL0027367	YES	YES	YES
Bartlett WWTP	IL0027618	YES	YES	YES
Bloomingdale-Reeves WRF	IL0021130	YES	YES	YES
Bolingbrook STP#1	IL0032689	YES	YES	YES
Bolingbrook STP#2	IL0032735	YES	YES	YES
Carol Stream WRC	IL0026352	YES	YES	YES
Downers Grove SD	IL0028380	YES	YES	YES
DuPage County Woodridge	IL0031844	YES	YES	YES
Elmhurst WWTP	IL0028746	YES	YES	YES
Glenbard WW Authority STP	IL0021547	YES	YES	YES
Glendale Heights STP	IL0028967	YES	YES	YES
Hanover Park STP#1	IL0034479	YES	YES	YES
Roselle-Devlin STP	IL0030813	YES	YES	YES
Roselle-J Botterman WWTF	IL0048721	YES	YES	YES
Salt Creek SD	IL0030953	YES	YES	YES
West Chicago STP	IL0023469	YES	YES	YES
Wheaton SD	IL0031739	YES	YES	YES
Wood Dale North STP	IL0020061	YES	YES	YES
Wood Dale South STP	IL0034274	YES	YES	YES
Bensenville South STP	IL0021849	YES	N/A	YES
Itasca STP	IL0079073	YES	N/A	YES
MWRDGC Egan WRP	IL0036340	YES	N/A	Currently Under Review
MWRDGC Hanover Park STP	IL0036137	YES	N/A	Currently Under Review

Table 1. Participation in the DRSCW Special Conditions 2015-2016. N/A means that the agency does not have that condition in their permit.

Each listed permittee is participating in the DuPage River Salt Creek Workgroup, working with other watershed members of the DRSCW to determine the most cost effective means to remove dissolved oxygen (DO) and offensive condition impairments in the DRSCW watersheds.

All POTWs in the DRSCW watersheds are members of the DRSCW and are participating in the special conditions.

The specific reporting requirements addressed herein include annual progress reporting for the projects listed in the table of paragraph 2, and preliminary reporting for the Chloride Reduction Program.

1. Progress on Projects Listed in Paragraph 2

Expenses for project activities are identified in the current DRSCW 5-year financial plan, page 21 "NPDES Permit Special Condition Project Fund – Eight Year Summary," attachment 2.

1.1 Table Items 1 and 2: Oak Meadows Dam Removal and Stream Restoration Permit Completion Date – December 2016, December 2017

The objective of the project is to improve Qualitative Habitat Evaluation Index scores and Macro-Invertebrate Index of Biological Integrity scores in a 1.3 mile stretch of Salt Creek main stem, and dissolved oxygen (DO) scores directly upstream of the existing dam. The project is being managed by the Forest Preserve District of DuPage County (FPDDC) with support from the DRSCW. Project planning, design and permitting is complete. Earth was officially broken on the Oak Meadows dam removal and stream restoration construction on the 7th of August 2015. Project construction is still ongoing at this time, with the stream restoration portion of the project scheduled to be completed before December, 2016. A funding reimbursement agreement has been executed between the FPDDC and the DRSCW, and the reimbursement schedule is reflected in the DRSCW 5-year financial plan, page 21 "NPDES Permit Special Condition Project Fund – Eight Year Summary," (attachment 2).

The extensive surface water management work is part of a redesign of the entire reserve which includes shrinking and changing the golf course foot print so as to reduce flooding impacts on playable surfaces. DRSCW is funding, in collaboration with the Forest Preserve of DuPage County, the removal of two dams at the site, reconfiguration of the channel geometry, regrading and reconstruction of channel banks, placement of gravel runs and expansion and improvement of riparian vegetation and wetland areas. This report will focus only on the river restoration and dam removal aspects. It should be noted that the site's redesign will also improve the ecological function of the upland area. The design was crafted to address shortcomings in the site's habitat function noted in 2007 and 2010 DRSCW basin surveys. The project's construction plans are shown in attachment 3 of this report.

In September 2015, the flow of Salt Creek was diverted into a temporary diversionary channel constructed parallel to the river (see plate 1).

Plate 1. Oak Meadows Construction Site September 2015. Looking south from northmost project limit. The empty diversion channel can be seen to the viewer's right (image FPDDC).

The redirection of flow allowed excavation and construction to take place in dry conditions. Prior to the project, a large section of Salt Creek's banks had been stabilized with A-Jacks and sheet pile walls, all of which were removed prior to starting in-channel work (see plate 2). Such armoring did stabilize the banks, but provided minimum habitat value and did not provide the pollutant assimilation water quality benefits of other bioengineering-type stabilization practices. In addition, dam removal lowered the average high water level in parts of the channel, causing the A-Jacks and sheet pile walls to no longer function.

Plate 2. Pre existing conditions downstream of the principle dam at RM 22.7 looking north. The ubiquitous A-Jacks (viewer's left) and sheet piling (viewer's right) are clearly visible.

Banks have been re-graded and stabilized with bioengineering stabilization methods that provide enhanced water quality benefits. Stabilization practices utilized in the project include surface fabric bank treatment, fabric encapsulating soil (FES) lifts with log/rock toe. The log/rock toe practice was applied at and below the water line and provides scour protection at sensitive river bank areas. Several sections of gravel run were added to increase diversity of stream bed, which pre-project, was dominated by muck substrates. Increasing coarse substrates is considered critical to increasing the biodiversity of lotic macroinvertebrates, which DRSCW surveys have found to be lacking at the site. The dam at river mile 22.7 was removed, as was a second structure at river mile 23.4 that was discovered only during preliminary field work carried out by the DRSCW in 2012. Attachment 3, table 2 below and plates 3 & 4, illustrate and detail these activities.

Practice	Units	Notes
Dam Removal	2	Improve DO and habitat values in impoundment
Ajax Removal	6,175 linear feet	Allow for increase in bank habitat values
Sheet Pile Removal	1,190 linear feet	Allow for increase in bank habitat values

Soil Lifts Installed	7,530 linear feet	Allow for increase in bank habitat values
Bank Protection Fabric Installed	13,740 square yards	Erosion Control
Cobble Installed	9,400 Tons	Increase steam bed habitat values
Boulders Installed	105 Tons	Increase steam bed habitat values
Root Wads Installed	3,765 linear feet	Allow for increase in bank habitat values

Table 2. Summary of Oak Meadows River Restoration Activities as of March 2016.

Plate 3. Deconstruction of the dam at RM 22.7 (image FPDDC).

Plate 4. Work in the drained Salt Creek channel showing root wads and bank protection fabrics (image FPDDC).

1.1.2 Impact Evaluation

The project's impacts are being evaluated in three categories, matching the short term and long term objectives of the project identified in the permit:

- Qualitative Habitat Evaluation Index – QHEI measures sinuosity, bed and bank conditions, gradient, riparian and pool and riffles conditions. The site was evaluated at two locations and scored 51 (SC34) and 52 (SC35) placing it in the poor category of QHEI. The project aims to improve scores in all categories except gradient. It should be noted that the low gradient at the site also limits the possibilities for riffle construction at the site. An additional monitoring location was added in the project foot print in 2014.

- Biological Communities: Macroinvertebrates – Project aims to increase mIBI and individual taxa presence at the site. Pre-project mIBI at the sample sites scored 21 (SC34) and 24 (SC35) in 2012. For individual taxa, the site is being compared to two reference sites on Salt Creek that were picked for having both high habitat (QHEI) and macroinvertebrate scores. Fourteen rheobiotic and hard or coarse substrate associated taxa were identified (see Table 1 in attachment 4). All 14 were found at one or both of the reference sites, but only six have been

collected from SC34 and SC35, sites in the project footprint. Attachment 4 lists the species found at the project and reference sites. Fish monitoring will also occur post project, but here the change is likely to be one of abundance rather than species diversity, given that upper Salt Creek's fish population is constrained as a whole by downstream barriers. Pre-project fIBI at the project sample sites scored 20 (SC34) and 20 (SC35) in 2012.

- Dissolved Oxygen – DRSCW continuous DO data records exist for the project site 2009-2013. Data collection will resume in 2017. Diel variation and daily and monthly averages and minimums will be compared in the pre and post project data sets.

The biological and QHEI evaluation of the site, along with the Salt Creek basin, is due to occur in June 2016. A review of project site conditions will occur in the next 6 weeks to ascertain whether the site will be amenable to the survey. Conditions for the survey in 2016 include having flow restored to the channel and allowing the survey teams to access the site safely. If either of these conditions are not present, then the first post project survey will be moved to 2017.

1.2 Table Item 3. Fawell Dam Modification Permit Completion Date – December 2018

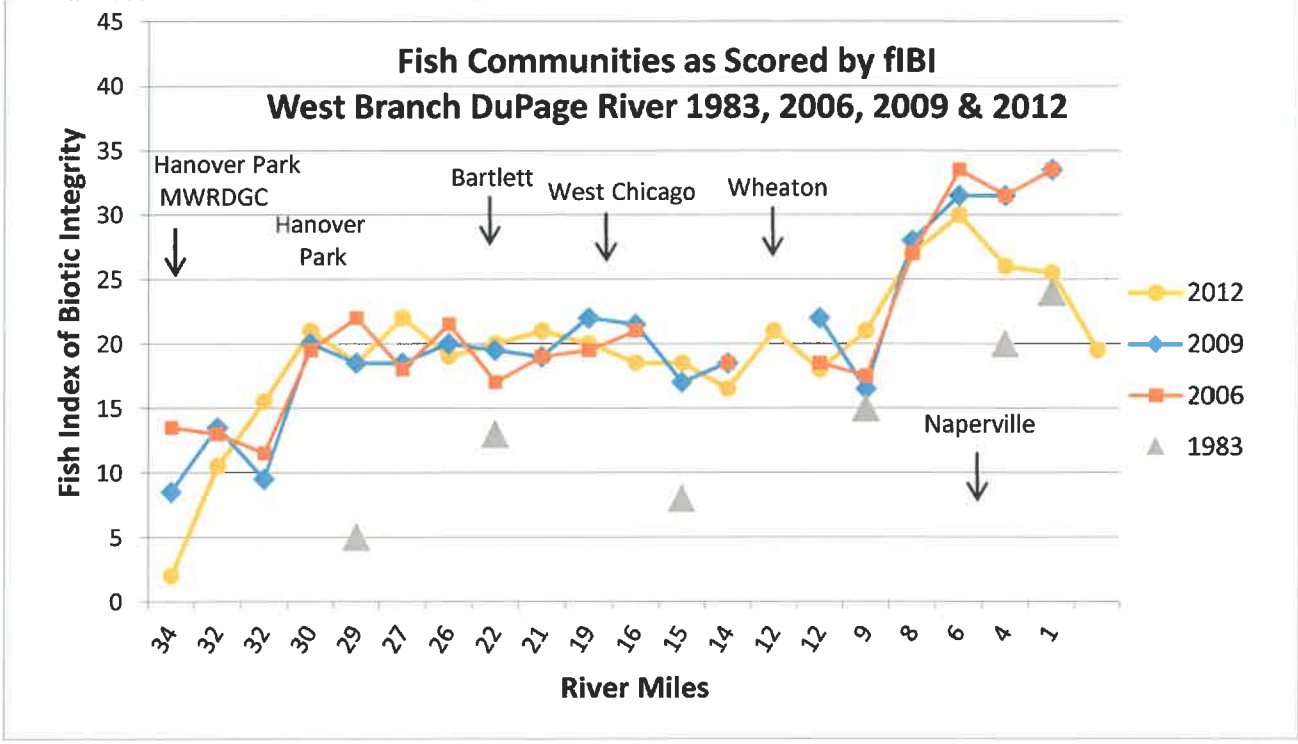


Plate 5. Fish IBI in the West Branch DuPage River 1983, 2006, 2009 & 2012.

The objective of the project is to raise the fish index of biological integrity scores above the current average of 18.5 for the three main stem survey sites immediately upstream of the dam. This will be accomplished by redesigning the spillway on the dam to allow fish passage. Fawell Dam, at river mile 8 on the West Branch DuPage River, is a functioning flood control structure and must be fully functional post project. The dam creates a barrier to fish passage.

The project is a collaborative effort between DuPage County Stormwater Management (SWM, the dam's manager) and the DRSCW. The project team is currently testing and refining a model to evaluate the impacts of various scenarios on in-culvert velocities and upstream and downstream surface water elevations. SWM is providing the team's modelling expertise, the DRSCW is providing project management and has retained contractors with expertise in hydraulic analysis, channel design, structural modifications and permitting of complex surface water management projects in DuPage County (V3 Companies and Inter-Fluve).

The design team has completed a hydraulic and detailed channel topographic survey (attachments 5 and 5.1), wetland survey and sediment depth of refusal and quality survey for upstream deposits.

A preliminary project schedule has been developed. Key benchmarks are:

- Design completed by November 30th 2016.
- Start permit application process by August 2016, aim to have necessary permits by the end of December 2017.
- Construction bid documents issued by August 2017.
- Construction initiation in January 2018 with completion by December 2018.

DRSCW has allocated $100,000 for the design and permitting phase (2016-2017 inclusive) and $580,000 for the construction phase in 2018.

1.2.1 Impact Evaluation

DRSCW fish surveys will be carried out at WB36 (RM 8.6), WB40 (RM11.7) and WB 12 (RM13.6) for a minimum of two years following the project. Pre-project fIBI scores (2012) at these sites are WB36 (21.0), WB40 (18.0) and WB 12 (16.5). The presence of the taxa listed below will also be used to indicate success of the project; all were noted as absent in the watershed north of the dam in the 2006, 2009 and 2012 surveys:

- Hornyhead chub
- Central stoneroller
- Bigmouth shiner
- Blackstripe topminnow
- Shorthead redhorse
- Emerald shiner
- Largescale stoneroller
- Flathead catfish
- Tadpole madtom
- White perch
- Rock bass
- Longear sunfish

1.3 Table Item 4. Spring Brook Restoration and Dam Removal
Permit Completion Date – December 2019

The objective of the project is to raise QHEI above its current 64, raise fIBI above its current score of 21.5 and to raise mIBI above its current score of 30.1. The project is being managed by the FPDDC. The project design has been completed and permitted and is on schedule for construction to be completed by the target date of Decembers 2019. Construction is being funded by a consortium of agencies including the DRSCW and the Illinois State Toll Highway Authority. DRSCW has budgeted to fund $1,000,000 of construction by December 2019. The project will remove a low head dam, increase river sinuosity, build pool and riffle sequences, increase stream and floodplain connectivity and increase the percentage of river bed covered with sand and gravels.

1.4 Table Items 5, 6 and 7. Fullersburg Woods Dam Modification and Stream Restoration
Permit Completion Date – December 2016, 2021, 2022

The project is on the main stem Salt Creek; objectives are to raise QHEI above the current score of 39.5, raise fIBI above the current score of 19.0, raise mIBI above 35 for approximately 1.5 miles of river and improve Dissolved Oxygen in the impoundment as compared to the 2007-2014 data set. The DRSCW will be partnering with FPDDC and SWM on this project.

A concept plan will be developed with input from stakeholders prior to December, 2016. The DRSCW has budgeted $15,000 for this item. The DRSCW has budgeted $350,000 to fund design and permitting costs between years 2017 to 2021. $2,635,000 has been budgeted for construction in the fiscal year ending 2022. No detailed design work has been completed on this project.

1.5 Table Item 8. Southern West Branch Physical Improvement
Permit Completion Date – December 2022

No work has been completed on this item. The DRSCW has budgeted $500,000 to be spent from the period 2019 to 2021. The effort may be used to improve the channel around the Fawell Dam following dam modification if post project assessments by the project partners identify this area as a priority.

1.6 Table Item 9. Southern East Branch Stream Enhancement
Permit Completion Date – December 2023

No work has been completed on this project. The DRSCW has budgeted $2,500,000 with spending starting in year 2020.

1.7 Table Item 10. QUAL 2K East Branch and Salt Creek
Permit Completion Date – December 2023

Collection of continuous DO data has been conducted for years, and will continue until 2019. Additional water column and side stream input data is collected as part of the ongoing monitoring by the DRSCW. Additional data needs will be identified prior to the modelling effort. Model preparation, calibration, verification, and alternative evaluation is scheduled to begin in 2019. $140,000 is budgeted for this effort, to be spent over the period from 2019 to 2022.

1.8 Table Item 11. NPS Phosphorus Feasibility Analysis
Permit Completion Date – December 2021

The scope for this analysis is intended to be developed in 2016. DRSCW is planning to work collaboratively with SWM to conduct this study. $120,000 is budgeted between 2016 and 2020 by the workgroup to complete this work.

2.0 Chloride Abatement Program

The permit-required Chloride Abatement Program began in the 2015-16 winter season, so the first report on this condition is not due until March 2017.

DRSCW has been conducting chloride abatement activities and monitoring at least since 2007. The principal activity has been sponsoring annual workshops for road deicing personnel, in order to promote improved salt storage, handling and application practices. Data has been collected on practices and usage, along with weather and in-stream chloride measurements, in order to track trends.

Data evaluation has proven to be extremely complex, primarily due to weather variability. Baseline development will be based on trend analysis, with ongoing trend and data analysis expected to improve over time as more and better data is collected, and relationships between variables are better understood.

2.1. Practices Deployed and Application Rates

The 2004 TMDL identified a baseline salt road application rate as 5.6 tons per lane mile per year. Improved practices have resulted in decreased application rates since initiating chloride abatement activities in 2007, as evidenced in survey responses.

Two chloride reduction workshops were held in 2015. The Public Roads deicing workshop was held on September 24, 2015 and the Parking Lot and Sidewalk deicing workshop on October 8, 2015. In total 271 individuals attended these two workshops (representing 78 agencies and companies).

The workshops provide winter deicing agencies information on the following salt reduction steps:

1. Driver training
2. Salt spreader calibration
3. Develop appropriate application rates/level of service
4. Pre-wet de-icer
5. Equipment updates
6. Speed servo controls:
    a. On-board pre-wet
    b. Computer controls
    c. Pavement temperature sensors
7. Coordinate salt application during plowing
8. Control salt spread width
9. Prioritize road system
10. Anti-Ice

The objective of the workshops is to provide practical advice on how to implement improved salt storage, handling and application practices and encourage their adoption.

Utilization of these practices are tracked using questionnaires that have historically been issued roughly every two years. The 2016 questionnaire is attached (attachment 6). Approximately 30 public agencies have responded to the questionnaire in prior surveys. The DRSCW will be issuing the questionnaire each year that the POTW NPDES permit special condition is in place. Results of the 2016 survey will be included in the March, 2017 report.

2.2. Ambient Condition Monitoring

Two data sets have been in development since 2007, and will be used moving forward:

- Winter monitoring is conducted using hourly conductivity monitoring at 6 locations (one near the watersheds' headwaters and the other near the mouths of the watersheds). Winter monitoring is done between December and the end of March of the following year. Conductivity data was correlated with chloride concentration data using data collected in 2007. Conversion of conductivity values to chloride concentrations is made using the ratio developed in 2007. The sample locations and the frequency of the sampling in a typical sample year are shown on map 1.

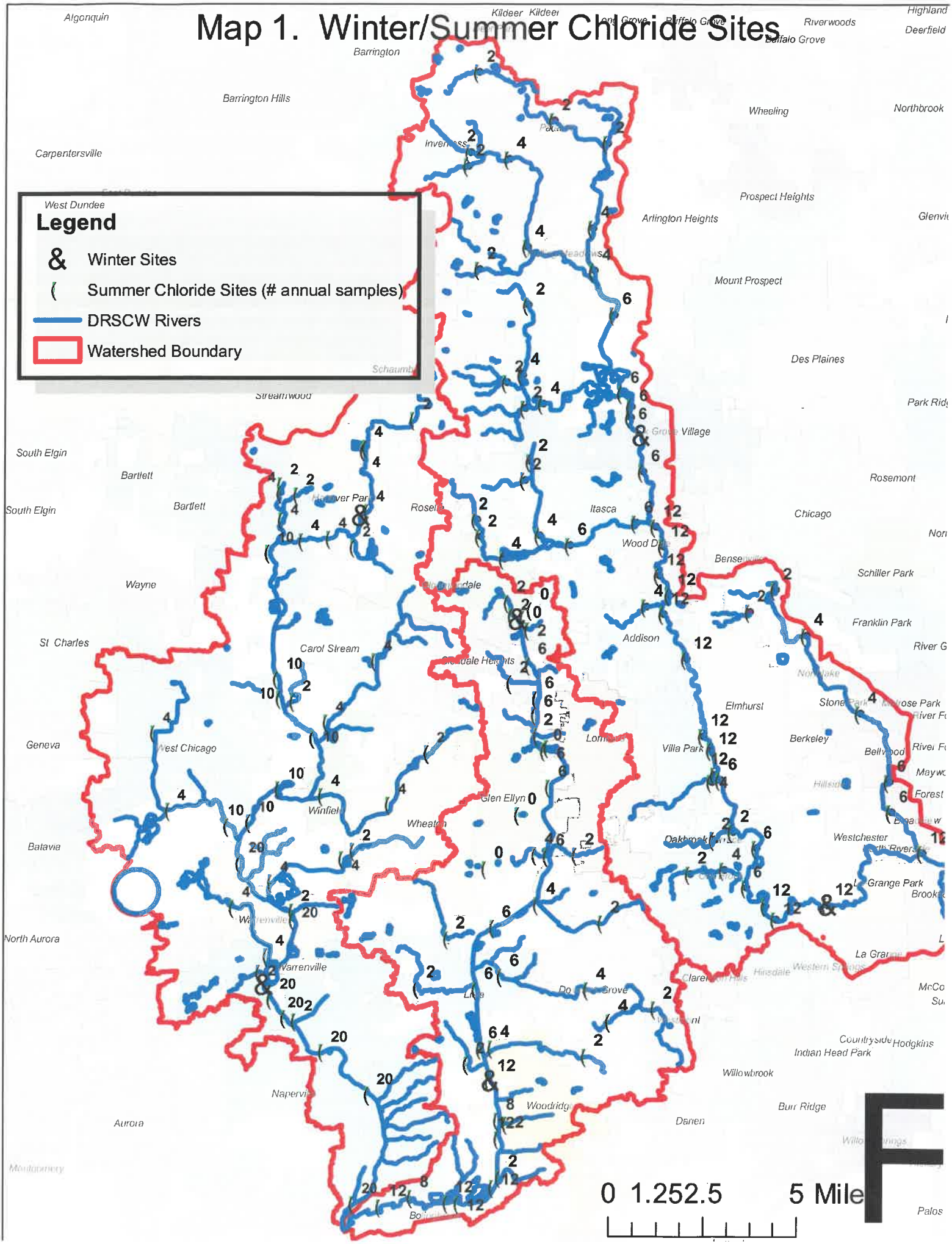
- Summer monitoring is conducted every year in one of the three watersheds on a rolling basis. Data is in the form of grab samples collected between June and September of a given year at multiple locations. The sample locations are shown in map 1.

Stream flow data can be superimposed on concentration data to characterize stream loads. Summer and winter receiving-stream chloride concentrations are highly variable. This variability is a product of variation in precipitation, type of precipitation, frequency and duration of precipitation, dates of precipitation, ground temperatures, stream flow and the use of winter deicing compounds by a number of upstream public agencies and private entities all experiencing significant local variability of weather conditions (i.e. a single stream may experience heavy deicing needs at some locations, and none at others).

2.3. Data Analysis and Program Performance

It is not straightforward to detect a change in salt use from ambient concentrations and usage data, which do not necessarily correlate well in existing data sets. Such data has to be viewed in the context of the numerous variables involved. The best method to characterize performance and reductions may be to compare annual loadings with expected loadings if no management practices had been implemented. Long term data may allow a relationship between the loading data and other variables to be identified. Ongoing data analysis efforts will be documented in the March 2017 report, along with the characterizations of performance and reductions achieved. These characterizations will be made in a historic context as a way of establishing a baseline condition.

Map 1. Winter/Summer Chloride Sites



Attachment 1

Draft DuPage/ Salt Creek Special Condition XX

1. The Permittee shall participate in the DuPage River Salt Creek Workgroup (DRSCW). The Permittee shall work with other watershed members of the DRSCW to determine the most cost effective means to remove dissolved oxygen (DO) and offensive condition impairments in the DRSCW watersheds.

2. The Permittee shall ensure that the following projects and activities set out in the DRSCW Implementation Plan (April 16, 2015), are completed (either by the permittee or through the DRSCW) by the schedule dates set forth below; and that the short term objectives are achieved for each by the time frames identified below:

Project Name	Completion Date	Short Term Objectives	Long Term Objectives
Oak Meadows Golf Course dam removal	December 31, 2016	Improve DO	Improve fish passage
Oak Meadows Golf Course stream restoration	December 31. 2017	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi
Fawell Dam Modification	December 31, 2018	Modify dam to allow fish passage	Raise fiBi upstream of structure
Spring Brook Restoration and dam removal	December 31, 2019	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi
Fullersburg Woods dam modification concept plan development	December 31, 2016	Identify conceptual plan for dam modification and stream restoration	Build consensus among plan stakeholders
Fullersburg Woods dam modification	December 31, 2021	Improve DO, improve aquatic habitat (QHEI)	Raise miBi and fiBi
Fullersburg Woods dam modification area stream restoration	December 31, 2022	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi
Southern West Branch Physical Enhancement	December 31, 2022	Improve aquatic habitat (QHEI)	Raise miBi and fiBi
Southern East Branch Stream Enhancement	December 31, 2023	Improve aquatic habitat (QHEI), reduce inputs of nutrients and sediment	Raise miBi and fiBi

Attachment 1

QUAL 2K East Branch and Salt Creek	December 31, 2023	Collect new baseline data and update model	Quantify improvements in watershed. Identify next round of projects for years beyond 2024.
NPS Phosphorus Feasibility Analysis	December 31, 2021	Assess NPS performance from reductions leaf litter and street sweeping	Reduce NPS contributions to lowest practical levels

3. The Permittee shall participate in implementation of a watershed Chloride Reduction Program, either directly or through the DRSCW. The program shall work to decrease DRSCW watershed public agency chloride application rates used for winter road safety, with the objective of decreasing watershed chloride loading. The Permittee shall submit an annual report on the annual implementation of the program identifying the practices deployed, chloride application rates, estimated reductions achieved, analyses of watershed chloride loads, precipitation, air temperature conditions and relative performance compared to a baseline condition. The report shall be provided to the Agency by March 31 of each year reflecting the Chloride Abatement Program performance for the preceding year (example: 2015-16 winter season report shall be submitted no later than March 31, 2017). The Permittee may work cooperatively with the DRSCW to prepare a single annual progress report that is common among DRSCW permittees.

4. The Permittee shall submit an annual progress report on the projects listed in the table of paragraph 2 above to the Agency by March 31 of each year. The report shall include project implementation progress. The Permittee may work cooperatively with the DRSCW to prepare a single annual progress report that is common among DRSCW permittees.

5. The Permittee shall develop a written Phosphorus Discharge Optimization Plan. In developing the plan, the Permittee shall evaluate a range of measures for reducing phosphorus discharges from the treatment plant, including possible source reduction measures, operational improvements, and minor low cost facility modifications that will optimize reductions in phosphorus discharges from the wastewater treatment facility. The permittee's evaluation shall include, but not necessarily be limited to, an evaluation of the following optimization measures:
    a. WWTF influent reduction measures.
        i. Evaluate the phosphorus reduction potential of users.
        ii. Determine which sources have the greatest opportunity for reducing phosphorus (e.g., industrial, commercial, institutional, municipal, and others).
            1. Determine whether known sources (e.g., restaurant and food preparation) can adopt phosphorus minimization and water conservation plans.
            2. Evaluate implementation of local limits on influent sources of excessive phosphorus.

b. WWTF effluent reduction measures.
   i. Reduce phosphorus discharges by optimizing existing treatment processes without causing non-compliance with permit effluent limitations or adversely impacting stream health.

      1. Adjust the solids retention time for biological phosphorus removal.
      2. Adjust aeration rates to reduce DO and promote biological phosphorus removal.
      3. Change aeration settings in plug flow basins by turning off air or mixers at the inlet side of the basin system.
      4. Minimize impact on recycle streams by improving aeration within holding tanks.
      5. Adjust flow through existing basins to enhance biological nutrient removal.
      6. Increase volatile fatty acids for biological phosphorus removal.

6. Within 24 months of the effective date of this permit, the Permittee shall finalize the written Phosphorus Discharge Optimization Evaluation Plan and submit it to IEPA. The plan shall include a schedule for implementing all of the evaluated optimization measures that can practically be implemented and include a report that explains the basis for rejecting any measure that was deemed impractical. The schedule for implementing all practical measures shall be no longer than 36 months after the effective date of this permit. The Permittee shall implement the measures set forth in the Phosphorus Discharge Optimization Plan in accordance with the schedule set forth in that Plan. The Permittee shall modify the Plan to address any comments that it receives from IEPA and shall implement the modified plan in accordance with the schedule therein.

   Annual progress reports on the optimization of the existing treatment facilities shall be submitted to the Agency by March 31 of each year beginning 24 months from the effective date of the permit.

7. The Permittee shall, within 24 months of the effective date of this permit, complete a feasibility study that evaluates the timeframe, and construction and O & M costs of reducing phosphorus levels in its discharge to a level consistently meeting a limit of 1 mg/L, 0.5 mg/L and 0.1 mg/L utilizing a range of treatment technologies including, but not necessarily limited to, biological phosphorus removal, chemical precipitation, or a combination of the two. The study shall evaluate the construction and O & M costs of the different treatment technologies for these limits on a monthly, seasonal, and annual average basis. For each technology and each phosphorus discharge level evaluated, the study shall also evaluate the amount by which the Permittee's typical household annual sewer rates would increase if the Permittee constructed and operated the specific type of technology to achieve the specific phosphorus discharge level. Within 24 months of the effective date of this Permit, the Permittee shall submit to the Agency and the DRSCW a written report summarizing the results of the study.

8. Total phosphorus in the effluent shall be limited as follows:

    a. If the Permittee will use chemical precipitation to achieve the limit, the effluent limitation shall be 1.0 mg/L on a monthly average basis, effective 10 years after the effective date of this permit unless the Agency approves and reissues or modifies the permit to include an alternate phosphorus reduction program pursuant to paragraph c or d below that is fully implemented within 10 years of the effective date of this permit.
    b. If the Permittee will primarily use biological phosphorus removal to achieve the limit, the effluent limitation shall be 1.0 mg/L monthly average to be effective 11 years after the effective date of this permit unless the Agency approves and reissues or modifies the permit to include an alternate phosphorus reduction program pursuant to paragraph c or d below that is fully implemented within 11 years of the effective date of this permit.
    c. The Agency may modify this permit if the DRSCW has developed and implemented a trading program for POTWs in the DRSCW watersheds, providing for reallocation of allowed phosphorus loadings between two or more POTWs in the DRSCW watersheds, that delivers the same results of overall watershed phosphorus point-source reduction and loading anticipated from the uniform application of the applicable 1.0 mg/L monthly average effluent limitation among the POTW permits in the DRSCW watersheds and removes DO and offensive condition impairments and meet the applicable dissolved oxygen criteria in 35 IL Adm. Code 302.206 and the narrative offensive aquatic algae criteria in 35 IL Adm. Code 302.203.
    d. The Agency may modify this permit if the DRSCW has demonstrated and implemented an alternate means of reducing watershed phosphorus loading to a comparable result within the timeframe of the schedule of this condition and removes DO and offensive condition impairments and meet the applicable dissolved oxygen criteria in 35 IL Adm. Code 302.206 and the narrative offensive aquatic algae criteria in 35 IL Adm. Code 302.203.

9. The Permittee shall monitor the wastewater effluent, consistent with the monitoring requirements on Page 2 of this permit, for total phosphorus, dissolved phosphorus, nitrate/nitrite, total Kjeldahl nitrogen (TKN), ammonia, total nitrogen (calculated), alkalinity and temperature at least once a month. The Permittee shall monitor the wastewater influent for total phosphorus and total nitrogen at least once a month. The results shall be submitted on NetDMRs to the Agency unless otherwise specified by the Agency.

10. The Permittee shall submit a Nutrient Implementation Plan (NIP) for the DRSCW watersheds that identifies phosphorus input reductions by point source discharges, non-point source discharges and other measures necessary to remove DO and offensive condition impairments and meet the applicable dissolved oxygen criteria in 35 IL Adm. Code 302.206 and the narrative offensive aquatic algae criteria in 35 IL Adm. Code 302.203. The NIP shall also include a schedule for implementation of the phosphorus input reductions and other measures. The Permittee may work cooperatively with the DRSCW to prepare a single NIP that is common among DRSCW permittees. The NIP shall be submitted to the Agency by December 31, 2023.

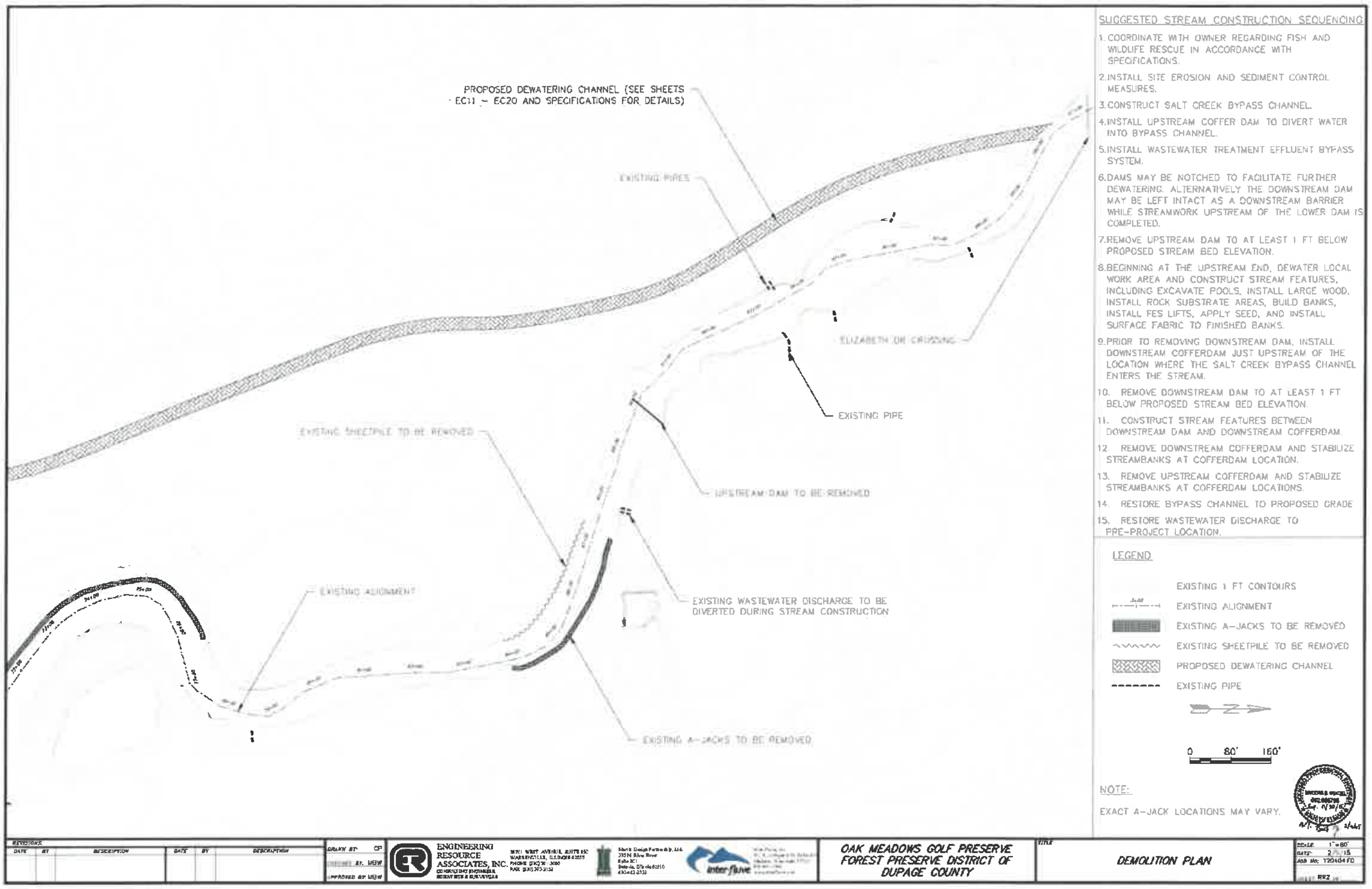
Attachment 2: NPDES Permit Special Condition Project Fund - Eight Year Summary

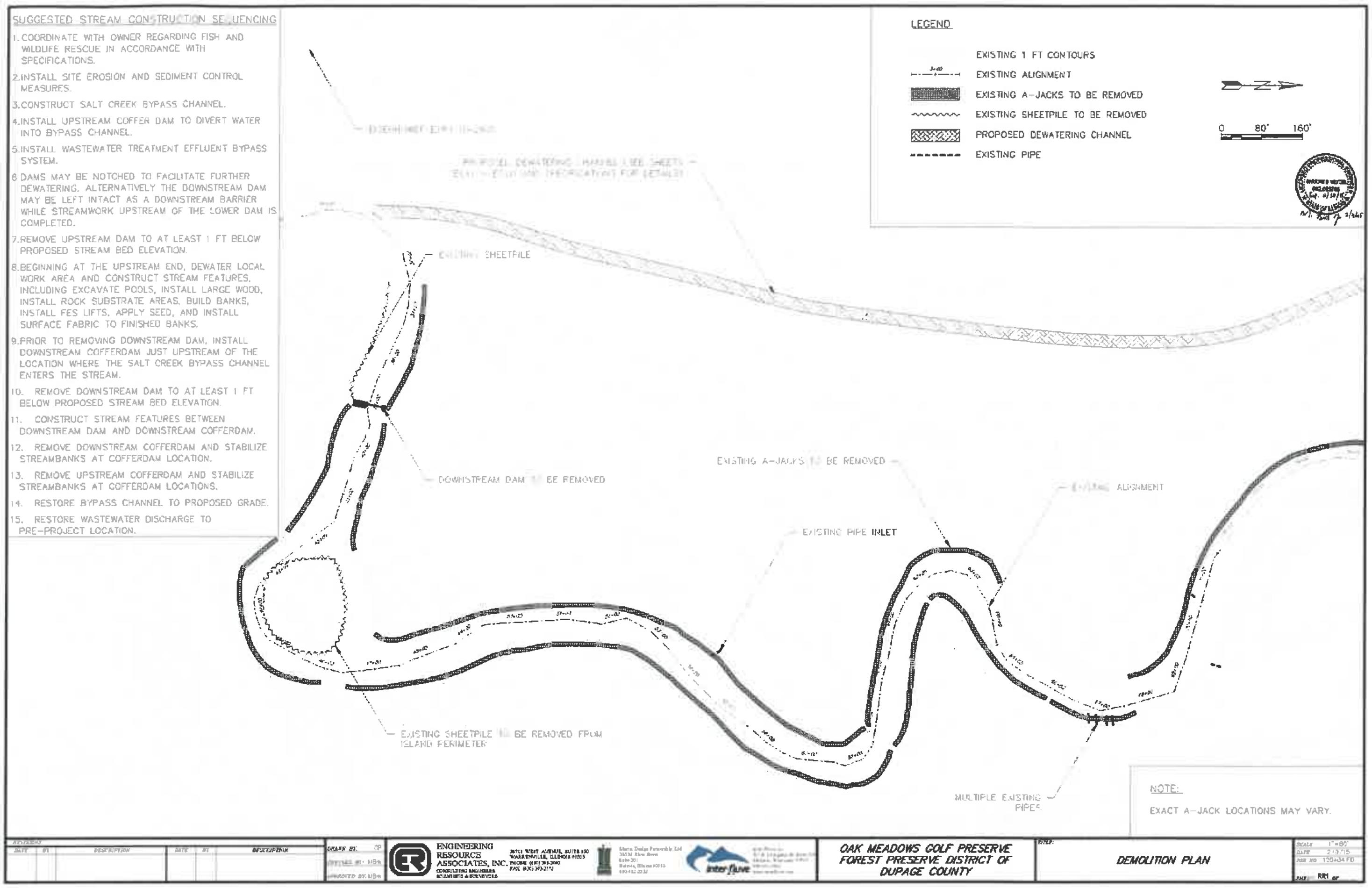
DuPage River Salt Creek Workgroup								
Preliminary Five Year Budget								
February 24, 2016								
NPDES Permit Special Condition Project Fund								
Eight Year Summary								
Revenues, Project Costs and Fund Balances								
	FY 15-16	Projected						
	To Date	Actual	**Budget**	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY
Items	02/08/16	FY 15-16	**FY 16-17**	Estimated	Estimated	Estimated	Estimated	Esti
Project Fund Revenues								
Agency member project fund assessments	$572,450	$604,817	**$682,430**	$1,086,740	$1,117,940	$1,816,620	$1,869,900	$1,92
Project sponsorships/local matches		0						2,0(
Total Revenues	$572,450	$604,817	**$682,430**	$1,086,740	$1,117,940	$1,816,620	$1,869,900	$3,92
Project Fund Costs								
Oak Meadows - dam removal			**$1,000,000**	$1,250,000				
Fullersburg Woods - concept plan			**15,000**					
Oak Meadows - stream restoration								
Fawell Dam Modification			**65,000**	35,000	$580,000			
Spring Brook						$1,000,000		
Fullersburg Woods - dam removal				40,000	110,000	150,000	$50,000	2,6
NPS Phosphorus Feasibility Analysis			**20,000**	20,000	20,000	60,000		
Fullersburg Woods - stream restoration								
Southern West Branch stream enhancement						100,000	400,000	
Southern East Branch stream enhancement							150,000	$1
QUAL 2K stream models						40,000	60,000	
Nutrient Implementation Plan (NIP)			**20,000**	40,000	40,000	30,000	30,000	
Phosphorus trading program for POTWs			**10,000**	40,000	50,000	33,000	33,000	
Chloride reduction program			**20,410**	22,300	22,970	23,660	24,370	
Contingency and scope expansions						200,000	1,100,000	1,0(
Total Project Costs	$0	$0	**$1,150,410**	$1,447,300	$822,970	$1,636,660	$1,847,370	$3,9(
Net - Revenues over Expenses	$572,450	$604,817	**($467,980)**	($360,560)	$294,970	$179,960	$22,530	$2
Project Fund Balances								
Cumulative Fund Balance		$604,817	**$136,837**	($223,723)	$71,247	$251,207	$273,737	$2(

Attachment 2: ... Summary

[illegible] Five Year [illegible]												
E Permit [illegible] Fund												
	FY [illegible]	Actual FY15-16	Budget	FY17	FY18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
[illegible] matches												
T[illegible]												
[illegible] Meadows - dam removal			[illegible]								[illegible]	1[illegible]/1
[illegible] W[illegible]			[illegible]								[illegible]	12/31/1
[illegible] Meadows - stream restoration												1[illegible]1/17
[illegible]			[illegible]	[illegible]	[illegible]						[illegible]	12/31/18
[illegible] Brook						[illegible]					[illegible]	1[illegible]/1
[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	12/31/21
[illegible] P[illegible] F[illegible] A[illegible]			26	[illegible]	[illegible]	[illegible]					[illegible]	1[illegible]1
[illegible] W[illegible]												12/31/22
Southern West Branch stream enhancement						[illegible]	[illegible]				[illegible]	12/31
[illegible]							[illegible]	[illegible]	[illegible]		[illegible]	12/31
QUAL 2k stream models						[illegible]	[illegible]	[illegible]			[illegible]	1
[illegible] P[illegible]			20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	1[illegible]/1/3
[illegible] for POTWs			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	1[illegible]
[illegible]			20[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
[illegible]						[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
T[illegible]	[illegible]	50	1,180,[illegible]	1,447[illegible]	[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]		
Net - [illegible]	[illegible]	[illegible]	[illegible]87[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]6[illegible]	[illegible]		50	
[illegible]												
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]71[illegible]	[illegible]	[illegible]7[illegible]	[illegible]				

Attachment 3: Oak Meadows Construction Plans


PROPOSED DEWATERING CHANNEL (SEE SHEETS EC11 – EC20 AND SPECIFICATIONS FOR DETAILS)
EXISTING PIPES
ELIZABETH DR CROSSING
EXISTING PIPE
EXISTING SHEETPILE TO BE REMOVED
UPSTREAM DAM TO BE REMOVED
EXISTING ALIGNMENT
EXISTING WASTEWATER DISCHARGE TO BE DIVERTED DURING STREAM CONSTRUCTION
EXISTING A-JACKS TO BE REMOVED
SUGGESTED STREAM CONSTRUCTION SEQUENCING
1. COORDINATE WITH OWNER REGARDING FISH AND WILDLIFE RESCUE IN ACCORDANCE WITH SPECIFICATIONS.
2. INSTALL SITE EROSION AND SEDIMENT CONTROL MEASURES.
3. CONSTRUCT SALT CREEK BYPASS CHANNEL.
4. INSTALL UPSTREAM COFFER DAM TO DIVERT WATER INTO BYPASS CHANNEL.
5. INSTALL WASTEWATER TREATMENT EFFLUENT BYPASS SYSTEM.
6. DAMS MAY BE NOTCHED TO FACILITATE FURTHER DEWATERING. ALTERNATIVELY THE DOWNSTREAM DAM MAY BE LEFT INTACT AS A DOWNSTREAM BARRIER WHILE STREAMWORK UPSTREAM OF THE LOWER DAM IS COMPLETED.
7. REMOVE UPSTREAM DAM TO AT LEAST 1 FT BELOW PROPOSED STREAM BED ELEVATION.
8. BEGINNING AT THE UPSTREAM END, DEWATER LOCAL WORK AREA AND CONSTRUCT STREAM FEATURES, INCLUDING EXCAVATE POOLS, INSTALL LARGE WOOD, INSTALL ROCK SUBSTRATE AREAS, BUILD BANKS, INSTALL FES LIFTS, APPLY SEED, AND INSTALL SURFACE FABRIC TO FINISHED BANKS.
9. PRIOR TO REMOVING DOWNSTREAM DAM, INSTALL DOWNSTREAM COFFERDAM JUST UPSTREAM OF THE LOCATION WHERE THE SALT CREEK BYPASS CHANNEL ENTERS THE STREAM.
10. REMOVE DOWNSTREAM DAM TO AT LEAST 1 FT BELOW PROPOSED STREAM BED ELEVATION.
11. CONSTRUCT STREAM FEATURES BETWEEN DOWNSTREAM DAM AND DOWNSTREAM COFFERDAM.
12. REMOVE DOWNSTREAM COFFERDAM AND STABILIZE STREAMBANKS AT COFFERDAM LOCATION.
13. REMOVE UPSTREAM COFFERDAM AND STABILIZE STREAMBANKS AT COFFERDAM LOCATIONS.
14. RESTORE BYPASS CHANNEL TO PROPOSED GRADE
15. RESTORE WASTEWATER DISCHARGE TO PRE-PROJECT LOCATION.
LEGEND
EXISTING 1 FT CONTOURS
EXISTING ALIGNMENT
EXISTING A-JACKS TO BE REMOVED
EXISTING SHEETPILE TO BE REMOVED
PROPOSED DEWATERING CHANNEL
EXISTING PIPE
0 80' 160'
NOTE:
EXACT A-JACK LOCATIONS MAY VARY.
REVISIONS
DATE BY DESCRIPTION DATE BY DESCRIPTION
DRAWN BY: CP
CHECKED BY: MBW
APPROVED BY: MBW
ENGINEERING RESOURCE ASSOCIATES, INC.
OAK MEADOWS GOLF PRESERVE
FOREST PRESERVE DISTRICT OF DUPAGE COUNTY
DEMOLITION PLAN
SCALE: 1"=80'
JOB No: 120404 FD


SUGGESTED STREAM CONSTRUCTION SEQUENCING
1. COORDINATE WITH OWNER REGARDING FISH AND WILDLIFE RESCUE IN ACCORDANCE WITH SPECIFICATIONS.
2. INSTALL SITE EROSION AND SEDIMENT CONTROL MEASURES.
3. CONSTRUCT SALT CREEK BYPASS CHANNEL.
4. INSTALL UPSTREAM COFFER DAM TO DIVERT WATER INTO BYPASS CHANNEL.
5. INSTALL WASTEWATER TREATMENT EFFLUENT BYPASS SYSTEM.
6. DAMS MAY BE NOTCHED TO FACILITATE FURTHER DEWATERING. ALTERNATIVELY THE DOWNSTREAM DAM MAY BE LEFT INTACT AS A DOWNSTREAM BARRIER WHILE STREAMWORK UPSTREAM OF THE LOWER DAM IS COMPLETED.
7. REMOVE UPSTREAM DAM TO AT LEAST 1 FT BELOW PROPOSED STREAM BED ELEVATION.
8. BEGINNING AT THE UPSTREAM END, DEWATER LOCAL WORK AREA AND CONSTRUCT STREAM FEATURES, INCLUDING EXCAVATE POOLS, INSTALL LARGE WOOD, INSTALL ROCK SUBSTRATE AREAS, BUILD BANKS, INSTALL FES LIFTS, APPLY SEED, AND INSTALL SURFACE FABRIC TO FINISHED BANKS.
9. PRIOR TO REMOVING DOWNSTREAM DAM, INSTALL DOWNSTREAM COFFERDAM JUST UPSTREAM OF THE LOCATION WHERE THE SALT CREEK BYPASS CHANNEL ENTERS THE STREAM.
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11. CONSTRUCT STREAM FEATURES BETWEEN DOWNSTREAM DAM AND DOWNSTREAM COFFERDAM.
12. REMOVE DOWNSTREAM COFFERDAM AND STABILIZE STREAMBANKS AT COFFERDAM LOCATION.
13. REMOVE UPSTREAM COFFERDAM AND STABILIZE STREAMBANKS AT COFFERDAM LOCATIONS.
14. RESTORE BYPASS CHANNEL TO PROPOSED GRADE.
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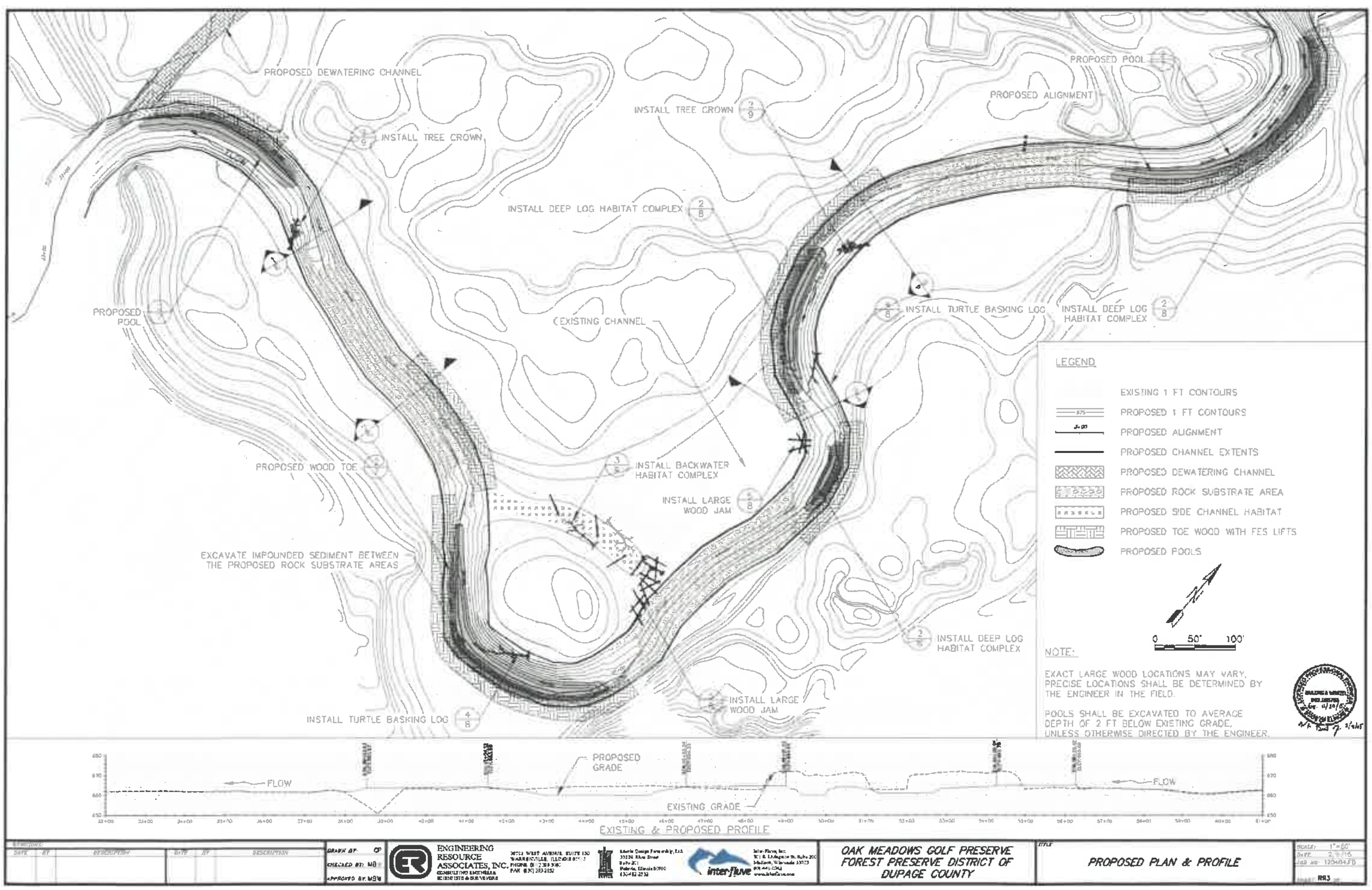
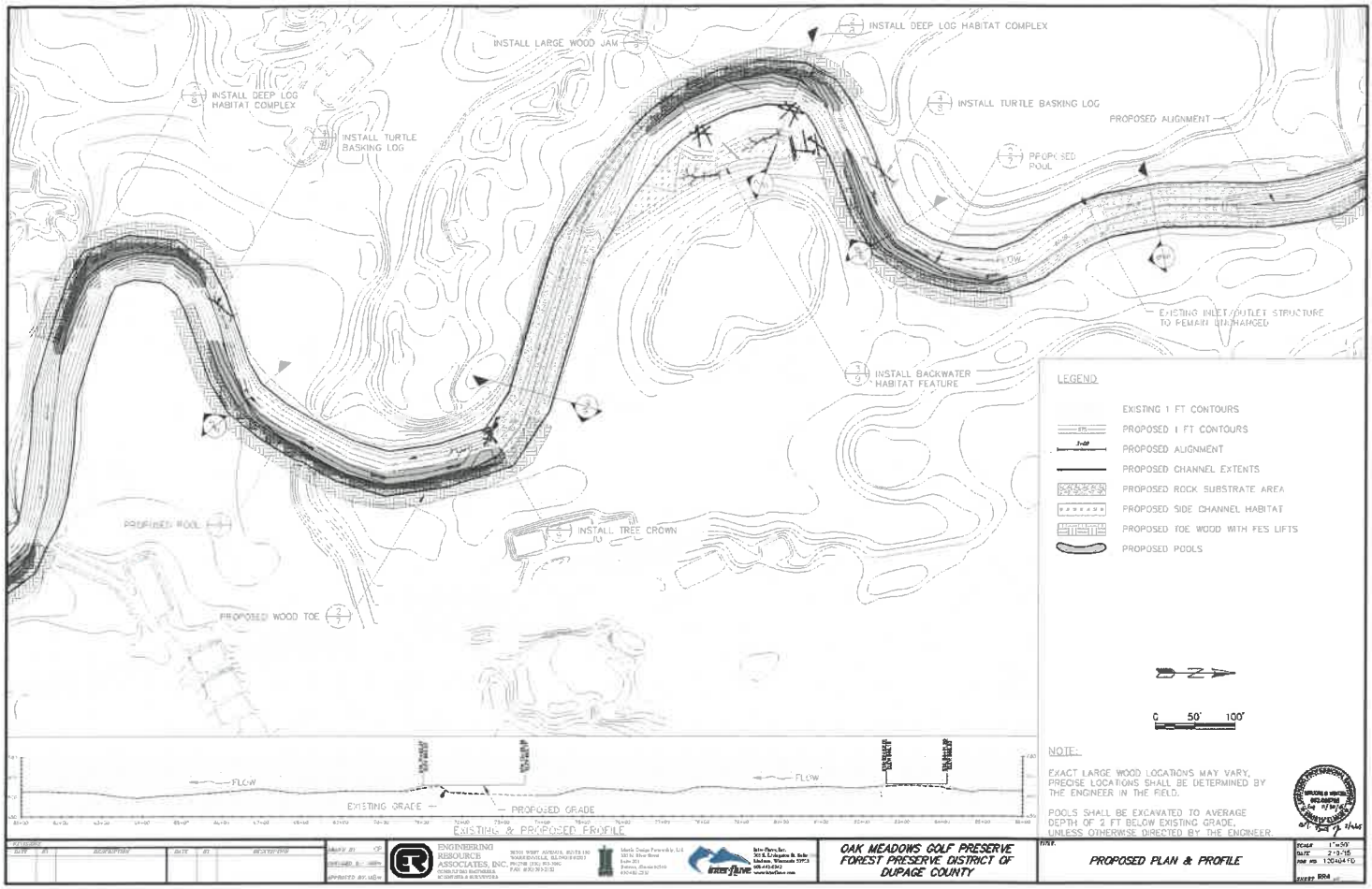
LEGEND
EXISTING 1 FT CONTOURS
EXISTING ALIGNMENT
EXISTING A-JACKS TO BE REMOVED
EXISTING SHEETPILE TO BE REMOVED
PROPOSED DEWATERING CHANNEL
EXISTING PIPE
0 80' 160'
EXISTING SHEETPILE
DOWNSTREAM DAM TO BE REMOVED
EXISTING A-JACKS TO BE REMOVED
EXISTING ALIGNMENT
EXISTING PIPE INLET
EXISTING SHEETPILE TO BE REMOVED FROM ISLAND PERIMETER
MULTIPLE EXISTING PIPES
NOTE:
EXACT A-JACK LOCATIONS MAY VARY.
ENGINEERING RESOURCE ASSOCIATES, INC.
CONSULTING ENGINEERS SCIENTISTS & SURVEYORS
OAK MEADOWS GOLF PRESERVE
FOREST PRESERVE DISTRICT OF DUPAGE COUNTY
DEMOLITION PLAN
RR1

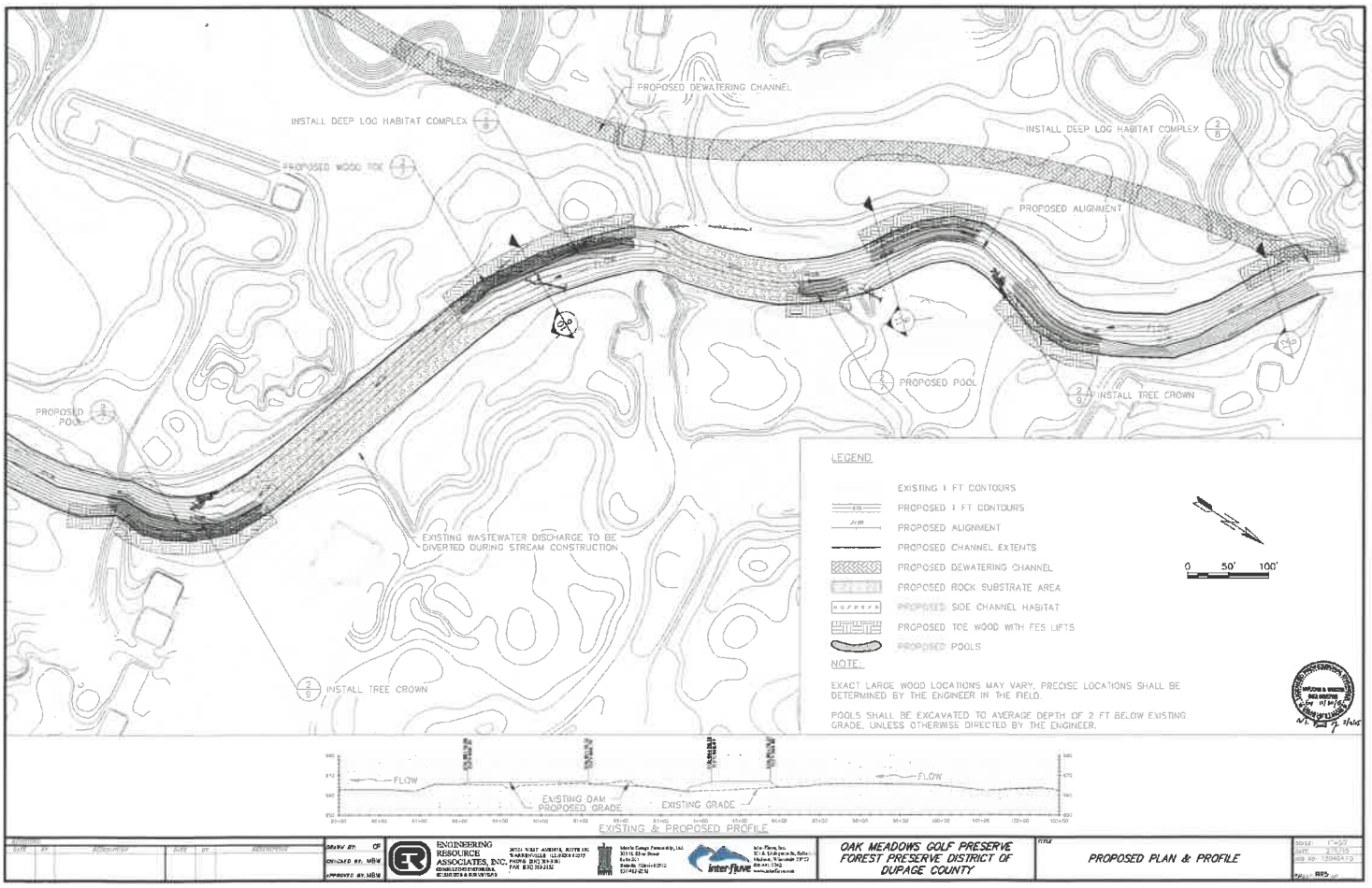

PROPOSED DEWATERING CHANNEL
INSTALL TREE CROWN
INSTALL TREE CROWN
PROPOSED POOL
PROPOSED ALIGNMENT
INSTALL DEEP LOG HABITAT COMPLEX
PROPOSED POOL
EXISTING CHANNEL
INSTALL TURTLE BASKING LOG
INSTALL DEEP LOG HABITAT COMPLEX
PROPOSED WOOD TOE
INSTALL BACKWATER HABITAT COMPLEX
INSTALL LARGE WOOD JAM
EXCAVATE IMPOUNDED SEDIMENT BETWEEN THE PROPOSED ROCK SUBSTRATE AREAS
INSTALL DEEP LOG HABITAT COMPLEX
INSTALL LARGE WOOD JAM
INSTALL TURTLE BASKING LOG
LEGEND
EXISTING 1 FT CONTOURS
PROPOSED 1 FT CONTOURS
PROPOSED ALIGNMENT
PROPOSED CHANNEL EXTENTS
PROPOSED DEWATERING CHANNEL
PROPOSED ROCK SUBSTRATE AREA
PROPOSED SIDE CHANNEL HABITAT
PROPOSED TOE WOOD WITH FES LIFTS
PROPOSED POOLS
0 50' 100'
NOTE:
EXACT LARGE WOOD LOCATIONS MAY VARY. PRECISE LOCATIONS SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD.
POOLS SHALL BE EXCAVATED TO AVERAGE DEPTH OF 2 FT BELOW EXISTING GRADE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
FLOW
PROPOSED GRADE
EXISTING GRADE
FLOW
EXISTING & PROPOSED PROFILE
ENGINEERING RESOURCE ASSOCIATES, INC.
OAK MEADOWS GOLF PRESERVE
FOREST PRESERVE DISTRICT OF DUPAGE COUNTY
PROPOSED PLAN & PROFILE
RR3



ENGINEERING RESOURCE ASSOCIATES, INC.

OAK MEADOWS GOLF PRESERVE
FOREST PRESERVE DISTRICT OF DUPAGE COUNTY

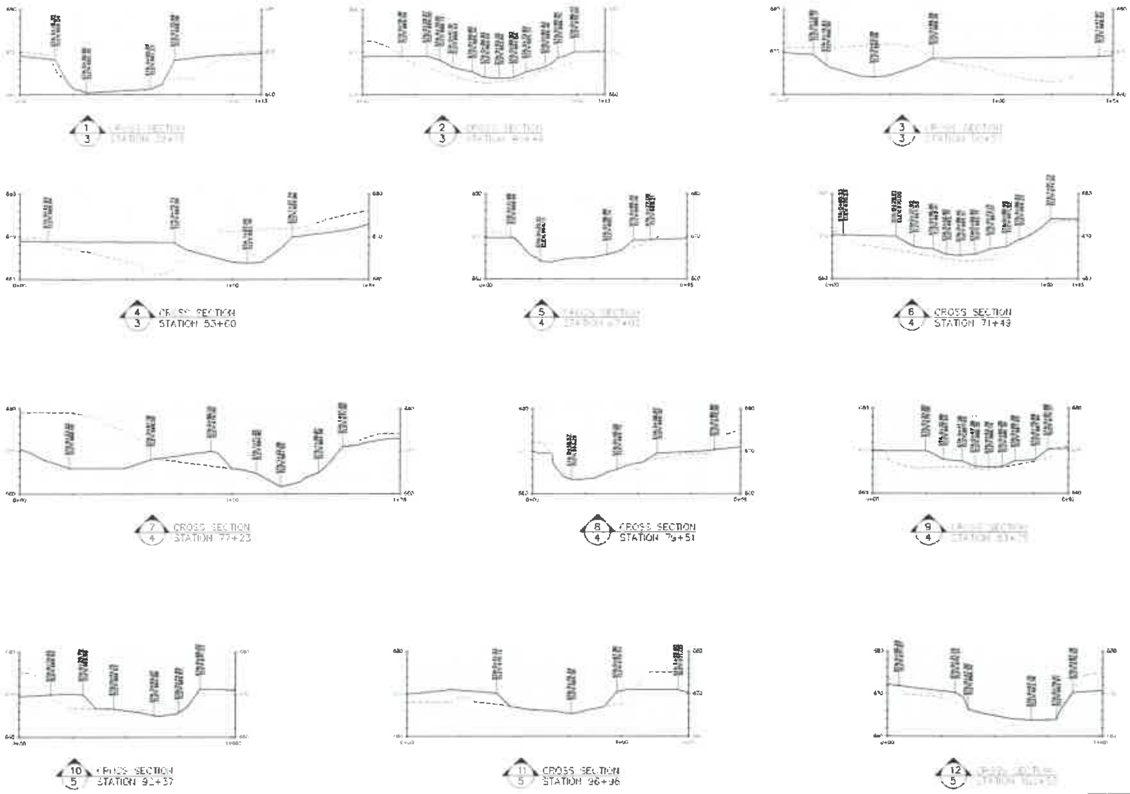
PROPOSED PLAN & PROFILE



ENGINEERING RESOURCE ASSOCIATES, INC.

OAK MEADOWS GOLF PRESERVE
FOREST PRESERVE DISTRICT OF DUPAGE COUNTY

PROPOSED PLAN & PROFILE



ENGINEERING RESOURCE ASSOCIATES, INC.
CONSULTING ENGINEERS, SCIENTISTS & SURVEYORS

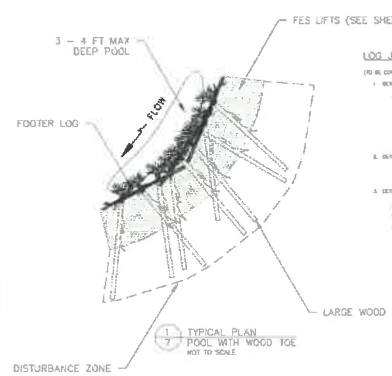
3S701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

inter-fluve

OAK MEADOWS GOLF PRESERVE
FOREST PRESERVE DISTRICT OF
DUPAGE COUNTY

CONSTRUCTION CROSS SECTIONS

SCALE: NTS
JOB NO: 120404.FD



1 / 7 TYPICAL PLAN
POOL WITH WOOD TOE
NOT TO SCALE

LOG JAM STABILITY ANALYSIS

(TO BE CONFIRMED BY THE ENGINEER AT THE TIME OF CONSTRUCTION)

1. DETERMINE DISLODGING FORCES ACTING ON JAM:
   a. FOR EACH LOG IN THE JAM, LOOK UP THE BUOYANT FORCE IN TABLE 1. MULTIPLY BY 0.50 DIVIDED BY THE SPECIFIC GRAVITY OF THE LOG SPECIES USED (USE TABLE 5).
   b. FOR EACH LOG IN THE JAM, LOOK UP THE LIFT FORCE IN TABLE 2.
   c. FOR EACH LOG WITH A ROOT WAD, LOOK UP THE BUOYANT FORCE IN TABLE 3. MULTIPLY BY 0.50 DIVIDED BY THE SPECIFIC GRAVITY OF THE LOG SPECIES USED (USE TABLE 5).
   d. SUM THE TOTAL BUOYANT AND LIFT FORCES ON ALL LOGS IN THE JAM (TOTAL DISLODGING FORCE).
2. DETERMINE THE RESISTIVE FORCES ACTING ON JAM:
   a. FOR EACH LOG IN THE JAM, LOOK UP THE SOIL BALLAST FOR THE BURIED PORTION OF THE LOG IN TABLE 4.
   b. SUM THE RESISTIVE FORCES FOR ALL BURIED LOGS IN THE JAM THAT ARE CABLED TOGETHER.
3. DETERMINE FACTOR OF SAFETY
   a. DIVIDE THE TOTAL RESISTIVE FORCES (STEP 2.B) BY THE TOTAL DISLODGEMENT FORCES (STEP 1.D)
   b. THE FACTOR OF SAFETY SHALL BE 1.5 OR GREATER
   c. IF THE FACTOR OF SAFETY IS LESS THAN 1.5, ADD LOGS WITH SOIL COVER. REPEAT THE ANALYSIS UNTIL THE FACTOR OF SAFETY IS AT LEAST 1.5.

TOE WOOD STATIONING & ELEVATION

UPSTREAM STA.	DOWNSTREAM STA.	ELEV. OF TOP OF TOE WOOD
103+08	95+78.97	668.7
94+74.15	94+16.42	668.6
86+18.06	84+11.20	667.5
82+10.54	73+55.36	667.3
71+03.37	36+38.42	666.7
54+38.04	45+08.78	[illegible]
48+55.11	41+54.13	665.5
34+53.63	35+00	664.6

Table 1.

NET BUOYANT FORCES FOR LOGS WITH SG=0.60

DBH X LOG LENGTH (FT)	FORCE (LBS)	DBH X LOG LENGTH (FT)	FORCE (LBS)	DBH X LOG LENGTH (FT)	FORCE (LBS)	DBH X LOG LENGTH (FT)	FORCE (LBS)	DBH X LOG LENGTH (FT)	FORCE (LBS)	DBH X LOG LENGTH (FT)	FORCE (LBS)
0.75 X 14	193	1 X 14	343	1.25 X 14	536	1.5 X 14	772	1.75 X 14	1051	2 X 14	1372
0.75 X 16	221	1 X 16	392	1.25 X 16	613	1.5 X 16	882	1.75 X 16	1201	2 X 16	1568
0.75 X 18	248	1 X 18	441	1.25 X 18	689	1.5 X 18	992	1.75 X 18	1351	2 X 18	1764
0.75 X 20	276	1 X 20	490	1.25 X 20	766	1.5 X 20	1103	1.75 X 20	1501	2 X 20	1960
0.75 X 22	303	1 X 22	539	1.25 X 22	842	1.5 X 22	1213	1.75 X 22	1651	2 X 22	2156
0.75 X 24	331	1 X 24	588	1.25 X 24	919	1.5 X 24	1323	1.75 X 24	1801	2 X 24	2352
0.75 X 26	358	1 X 26	637	1.25 X 26	995	1.5 X 26	1434	1.75 X 26	1951	2 X 26	2548
0.75 X 28	386	1 X 28	686	1.25 X 28	1072	1.5 X 28	1544	1.75 X 28	2101	2 X 28	2744

Table 2

LIFT FORCES ASSUMING LOG IS PERPENDICULAR TO FLOW DIRECTION

DBH X LOG LENGTH (FT)	FORCE (LBS)	DBH X LOG LENGTH (FT)	FORCE (LBS)	DBH X LOG LENGTH (FT)	FORCE (LBS)	DBH X LOG LENGTH (FT)	FORCE (LBS)	DBH X LOG LENGTH (FT)	FORCE (LBS)	DBH X LOG LENGTH (FT)	FORCE (LBS)
0.75 X 14	148	1 X 14	193	1.25 X 14	247	1.5 X 14	296	1.75 X 14	345	2 X 14	395
0.75 X 16	169	1 X 16	226	1.25 X 16	282	1.5 X 16	338	1.75 X 16	395	2 X 16	451
0.75 X 18	190	1 X 18	254	1.25 X 18	317	1.5 X 18	381	1.75 X 18	444	2 X 18	507
0.75 X 20	211	1 X 20	282	1.25 X 20	352	1.5 X 20	423	1.75 X 20	493	2 X 20	564
0.75 X 22	233	1 X 22	310	1.25 X 22	388	1.5 X 22	465	1.75 X 22	543	2 X 22	620
0.75 X 24	254	1 X 24	338	1.25 X 24	423	1.5 X 24	507	1.75 X 24	592	2 X 24	677
0.75 X 26	275	1 X 26	366	1.25 X 26	458	1.5 X 26	550	1.75 X 26	641	2 X 26	733
0.75 X 28	296	1 X 28	395	1.25 X 28	493	1.5 X 28	592	1.75 X 28	691	2 X 28	789

Table 3

ROOT WAD BUOYANCY
40% POROSITY, 2 FT LENGTH

DIAMETER (FT)	FORCE (LBS)
3	300
4	500
5	750
6	1100
7	1450
8	1900

Table 4

SOIL BALLAST

1 FOOT COVER

LOG LENGTH (FT)	LOG DIAMETER (FT) 0.75	1	1.25	1.5	1.75	2
5	271	304	389	453	527	590
10	[illegible]	843	772	895	1019	1142
15	775	950	1144	1327	1511	1694
20	1027	1272	1516	1759	2002	2246
25	1278	1584	1889	2191	2494	2797

2 FEET COVER

LOG LENGTH (FT)	LOG DIAMETER (FT) 0.75	1	1.25	1.5	1.75	2
5	759	858	1026	1160	1294	1434
10	1391	1650	1910	2171	2424	2684
15	[illegible]	2418	2800	3175	3557	3930
20	[illegible]	3180	3688	4147	[illegible]	5187
25	3284	3947	4572	5164	5819	[illegible]

3 FEET COVER

LOG LENGTH (FT)	LOG DIAMETER (FT) 0.75	1	1.25	1.5	1.75	2
5	[illegible]	1666	1917	2155	2354	2571
[illegible]	2653	3042	3455	3860	4261	4651
[illegible]	3792	4397	4992	5581	6165	6746
20	4984	5746	6527	7301	8069	8838
25	6113	7066	8060	9051	9973	10916

4 FEET COVER

LOG LENGTH (FT)	LOG DIAMETER (FT) 0.75	1	1.25	1.5	[illegible]	2
5	2473	2796	3111	3423	3732	4040
10	[illegible]	4584	5434	5867	[illegible]	[illegible]
15	[illegible]	[illegible]	7789	8654	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	10058	11132	12142	[illegible]
25	[illegible]	11054	12363	13656	14966	[illegible]

5 FEET COVER

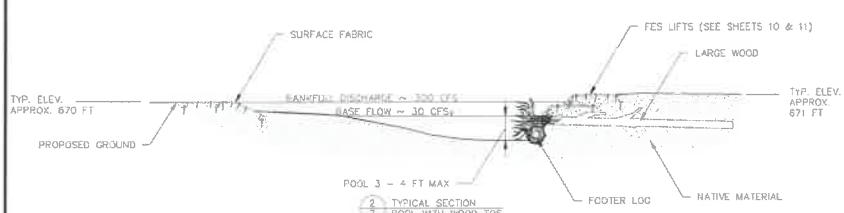
LOG LENGTH (FT)	LOG DIAMETER (FT) [illegible]	1	1.25	1.5	[illegible]	2
5	3797	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	8619	[illegible]	[illegible]
15	[illegible]	[illegible]	11114	12184	13203	14233
20	11529	12960	14306	15706	[illegible]	18066
25	14101	15865	17560	19246	20910	22567

6 FEET COVER

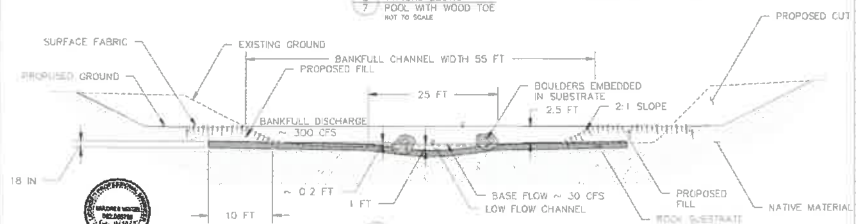
LOG LENGTH (FT)	LOG DIAMETER (FT) 0.75	1	1.25	1.5	[illegible]	2
5	5481	6032	6568	7096	7618	8131
[illegible]	8621	9615	10651	11766	12870	13585
15	12426	13790	15119	16417	[illegible]	[illegible]
20	15892	17657	19375	21055	22709	24378
25	19364	21522	23633	25716	[illegible]	29776

TABLE 5.

COMMON NAME	SG
Box elder	0.46
Norway maple	0.52
Red maple	0.54
Silver maple	0.47
Sugar maple	0.63
River or Paper birch	0.56
Shagbark or Pignut hickory	0.72
Northern catalpa	0.41
Hackberry	0.53
White ash	0.6
Black ash	0.49
Green ash	0.56
Ginkgo	0.46
Honey locust	0.66
Black walnut	0.55
Cedar	0.30
Apple	0.67
Red mulberry	0.58
Spruce	0.4
Red pine	0.46
White pine	0.35
American sycamore	0.49
Eastern cottonwood	0.4
Black cherry	0.5
White oak	0.68
Swamp white oak	0.72
Bur, Pin or Red oak	0.63
Black oak	0.61
Black willow	0.39
American elm	0.5



2 / 7 TYPICAL SECTION
POOL WITH WOOD TOE
NOT TO SCALE



3 / 7 TYPICAL SECTION
ROCK SUBSTRATE AREAS
NOT TO SCALE

ENGINEERING RESOURCE ASSOCIATES, INC.
CONSULTING ENGINEERS, SCIENTISTS & SURVEYORS

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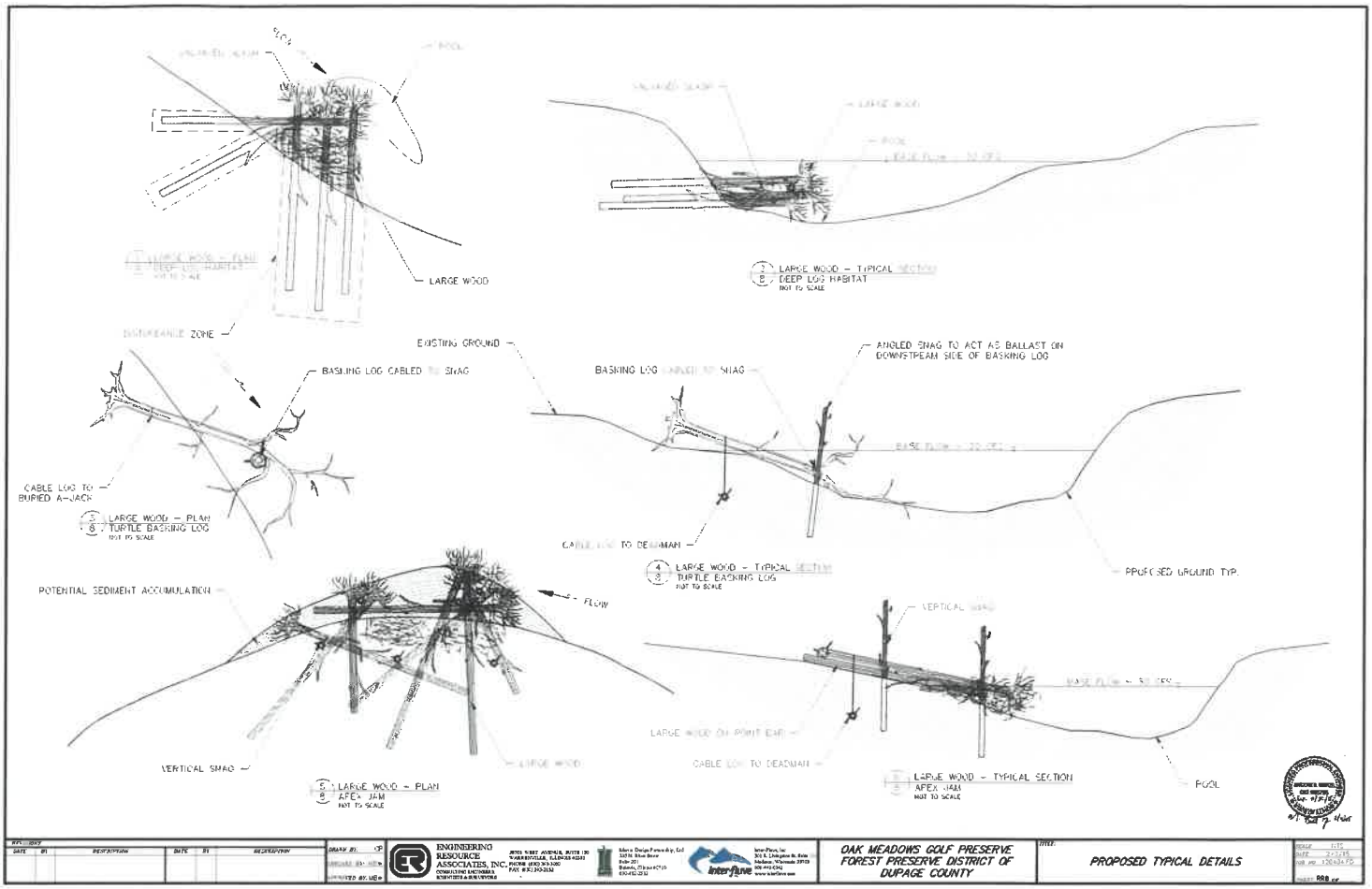
inter-fluve

OAK MEADOWS GOLF PRESERVE
FOREST PRESERVE DISTRICT OF
DUPAGE COUNTY

PROPOSED TYPICAL DETAILS

SCALE: NTS
DATE: 2/ /15
JOB NO: 120404.FD
SHEET RR7



REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY: CP
CHECKED BY: MEB
APPROVED BY: MEB

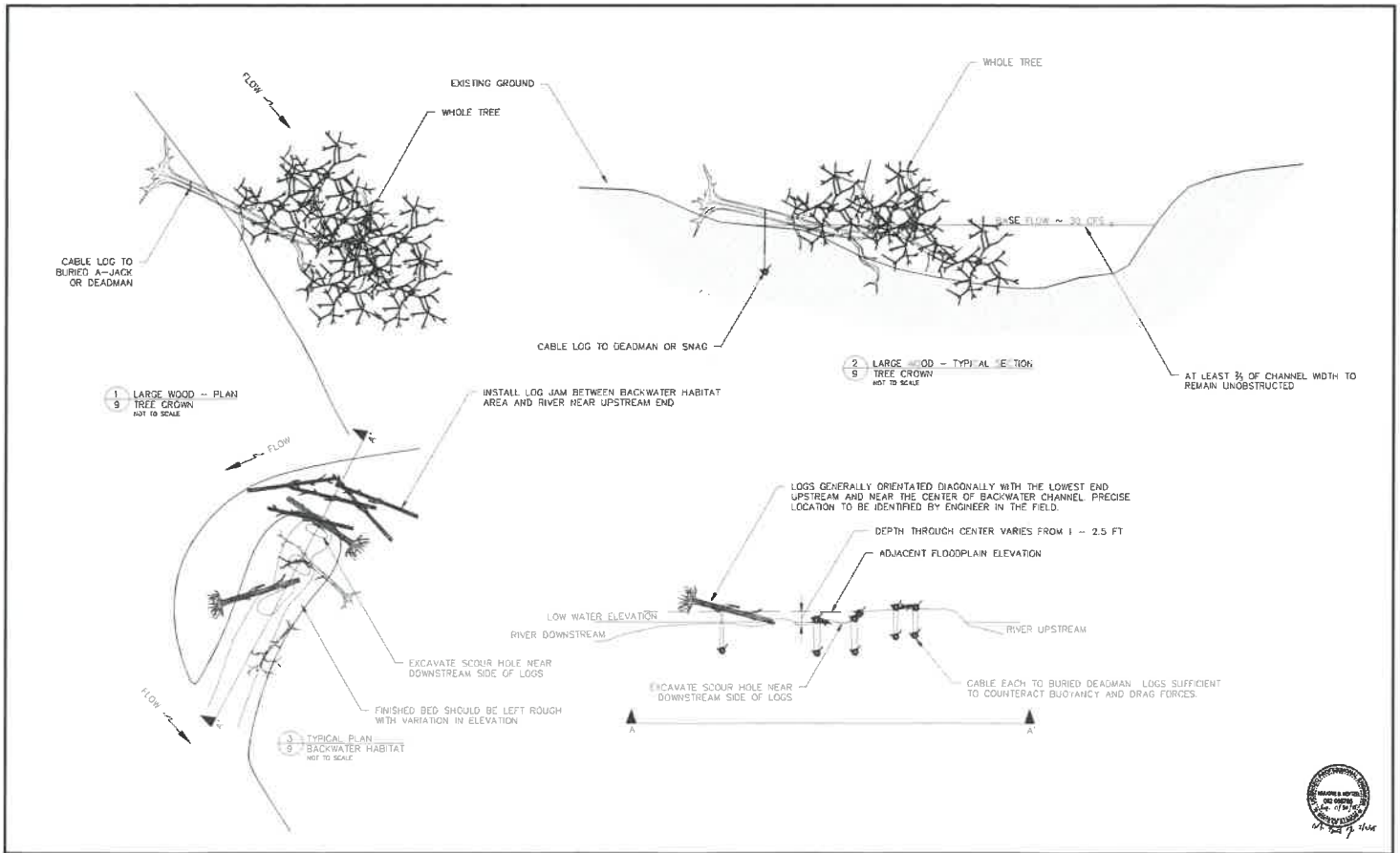
ENGINEERING RESOURCE ASSOCIATES, INC.
CONSULTING ENGINEERS & SCIENTISTS

Interflow

OAK MEADOWS GOLF PRESERVE
FOREST PRESERVE DISTRICT OF DUPAGE COUNTY

TITLE: PROPOSED TYPICAL DETAILS

SCALE: NTS
DATE: 2-15-15
JOB NO: 12040.FD
SHEET: RRB OF



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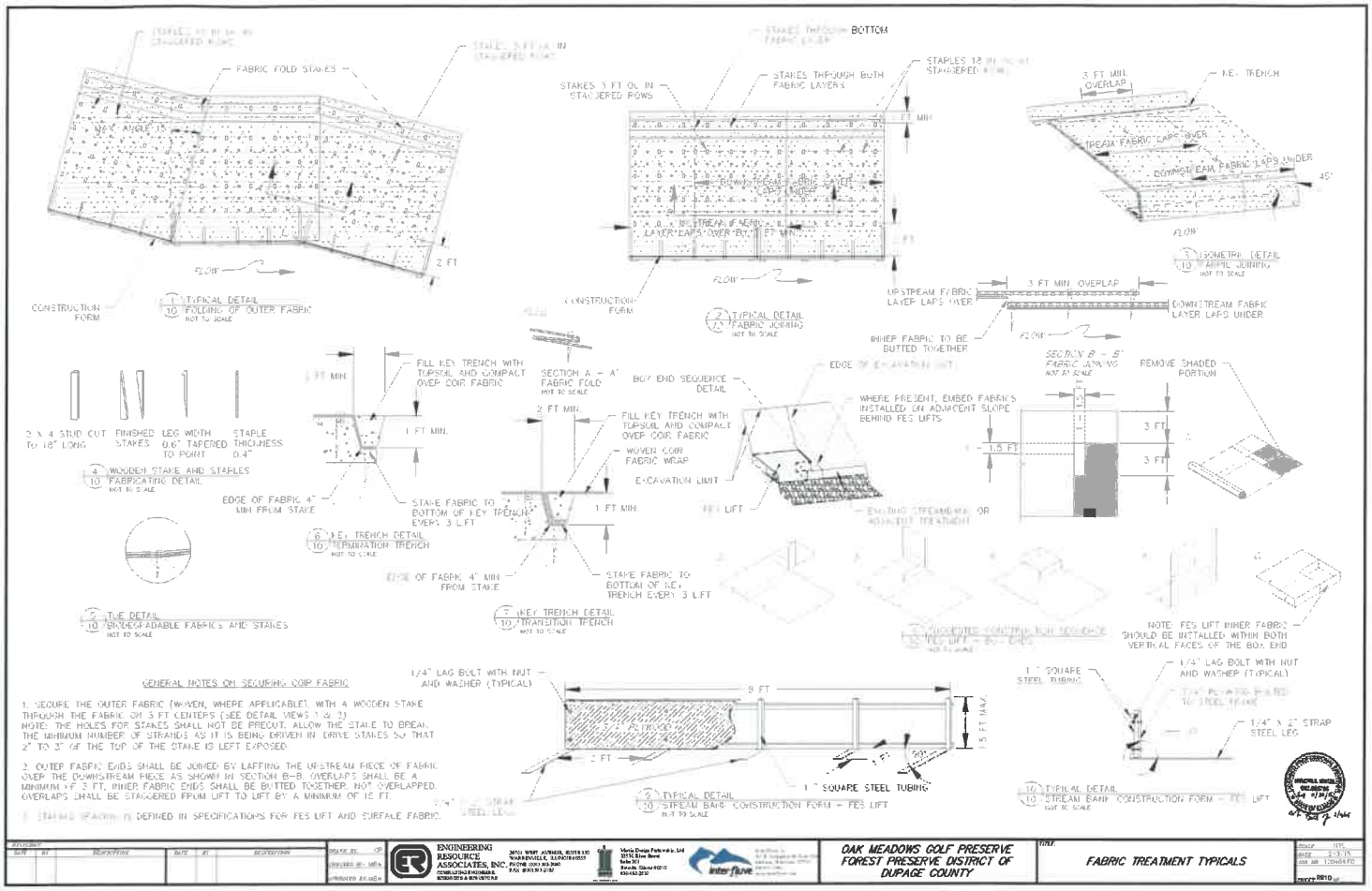


Attachment 4

Using Individual Taxa to evaluate Macro Invertebrate Biodiversity change at Oak Meadows Golf Preserve

Two sites have historically been surveyed for biological communities in the Oak Meadows preserve, sites SC24 and SC26. Two other sites in the Salt Creek basin were chosen to act as reference sites for the project (SC37 and SC41). SC37 and SC41 each have lotic, free-flowing qualities that include some riffle or run habitats and coarse substrates. In contrast, the candidate sites are more sluggish and packed with soft bottoms of mostly silt, peat and muck. The re-engineering of the candidate channels and the introduction of coarse substrates should increase current velocities and habitat heterogeneity. Ideally, re-engineering should also result in an increase in the diversity and abundance of macroinvertebrate populations associated with the enhanced habitat features.

For this exercise, taxa typically associated with strong current, coarse substrates, or both, were selected from the historical collection lists and comparisons were made between the reference and candidate sites. Organisms associated with lentic environments, fine soft substrates, or populations typically found in aquatic vegetation, root matsand margins were excluded.

Fourteen rheobiotic and hard or coarse substrate associated taxa were identified (see Table 1 below). All 14 were found at one or both of the reference sites, while only six have been collected from SC24 and SC26.

A description of the 14 taxa are as follows:

1) Two mayfly taxa:
   a) Beatis intercalaris – A facultative species typically found in riffles or swift current and associated with firm, rocky substrates.
   b) Baetis sp. – A facultative genus (family Heptageniidae) typical of pools or sluggish current that is found on coarse substrates

2) Five caddisfly taxa:
   a) Cheumatopsyche sp. Ceratopsyche minnes group, Hydropsyche simulans, Hydropsyche bidentata/orris - These 4 net-spinning hydropsychid caddisfly larvae generally require a minimum 0.3 Sec current velocity. The larvae inhabit riffles and runs where they construct their nets and retreats on firm, often rocky, substrates.
   b) Hydroptila sp – TCN "purse net" caddisfly is found under variable current conditions but anchors its case to rocks and coarse substrates as it grazes on attached filamentous algae.

3) Six Diptera (fly) taxa:
   a) Simulium sp – A filter-feeding blackfly larvae that, while often considered pollution tolerant, inhabit areas of swift current and anchor themselves to coarse substrates.
   b) Four rheobiotic midge taxa: Polypedilum (Uresipedilum) flavum, Rheocricotopus robacki, Thienemanniella xena (Diamesinae), and Rheotanytarsus sp.
   c) Stenochironomus sp – The wood boring rat midge is included because, from our experience, it is often collected from stable deposits of woody debris

Attachment 4

4) One beetle taxa:
   a) Stenelmis sp – A genus typically found on rocky substrates in riffles and runs.

Table 1. Select, macroinvertebrate taxa associated with stream, current or coarse substrates collected from Salt Creek stations SC37, SC41, SC24, and SC26 in 2007 and 2010.

		Salt Creek Sites			
Taxa code	Taxa	SC37	SC41	SC24	SC26
Mayflies					
11100	Baetis intercalaris	x	x		x
11400	Baetis sp	x		x	
Caddisflies					
52200	Cheumatopsyche sp	x	x	x	x
52431	Ceratopsyche morosa group	x	x		
52521	Hydropsyche bidens or H. orris	x	x		
52570	Hydropsyche simulans		x		
53800	Hydroptila sp	x	x	x	x
Beetles					
60400	Stenelmis sp	x	x		
Dipterans					
71100	Simulium sp	x	x		
73525	Rheocricotopus (Rheocricotopus) robacki	x	x		
73141	Thienemanniella xena	x	x	x	
64460	Polypedilum (Uresipedilum) flavum	x	x	x	x
64700	Stenochironomus sp	x			
66025	Rheotanytarsus sp	x	x		
TOTAL		13	12	5	4

In addition to more diverse taxa at reference sites compared to candidate sites (14 vs 5), flow and substrate dependent taxa were also much more abundant. The populations accounted for 61.4% at the reference sites versus 2.8% at the candidate sites. Also, based on ICs evaluating biological assessment, tolerance levels amongst all taxa at its populations were generally more sensitive than the candidate site populations. Overall, the enhanced habitat conditions that would follow the proposed stream restoration should result in the increased abundance of these higher quality populations.

1 The two species, H. orris and H. bidentata grouped together as one taxa because of increasing uncertainty about the reliability of separating the larvae based on larval characteristics.

Attachment 4

Using Individual Taxa to evaluate Macro Invertebrate Biodiversity change at
Oak Meadows Golf Preserve

Two sites have historically been surveyed for biological communities in the Oak Meadows preserve, sites SC34 and SC35. Two other sites in the Salt Creek basin were picked to act as reference sites for the project (SC37 and SC41). SC37 and SC41 sites have lotic, free-flowing qualities that include some riffle or run habitats and coarse substrates. In contrast, the candidate sites are more sluggish and pooled with soft bottoms of mostly silt, peat and muck. The re-engineering of the candidate channels and the introduction of coarse substrates should increase current velocities and habitat heterogeneity. Ideally, re-engineering should also result in an increase in the diversity and abundance of macroinvertebrate populations associated with the enhanced habitat features.

For this exercise, taxa typically associated with strong current, coarse substrates, or both, were selected from the historical collection lists and comparisons were made between the reference and candidate sites. Organisms associated with lentic environments, fine soft substrates, or populations typically found in aquatic vegetation, root mats and margins were excluded.

Fourteen rheobiotic and hard or coarse substrate associated taxa were identified (see Table 1 below). All 14 were found at one or both of the reference sites, while only six have been collected from SC34 and SC35.

A description of the 14 taxa are as follows:

1) Two mayfly taxa:
   a) Baetis intercalaris – A facultative species typically found in riffles or swift current and associated with firm, rocky substrates.
   b) Stenacron sp – A facultative genus (Family Heptageneiidae) typical of pools or sluggish current that is found on coarse substrates.

2) Five caddisfly taxa:
   a) Cheumatopsyche, Ceratopsyche morosa group, Hydropsyche simulans, Hydropsyche bidens/orris - These 4 net-spinning hydropsychid caddisfly larvae generally require a minimum 0.3' □sec current velocity. The larvae inhabit riffles and runs where they construct their nets and retreats on firm, often rocky, substrates.
   b) Hydroptila sp – T□is "purse net" caddisfly is found under variable current conditions but anchors its case to rocks and coarse substrates as it grazes on attached filamentous algae.

3) Six Dipteran (fly) taxa:
   a) Simulium sp – A filter-feeding blackfly larvae that, while often considered pollution tolerant, inhabit areas of swift current and anchor themselves to coarse substrates.
   b) Four rheobiotic midge taxa; Polypedilum (Uresipedilum) flavum, Rheocricotopus robacki, Thienemanniella xena (feeds on diatoms), and Rheotanytarsus sp.
   c) Stenochironomus sp – The wood boring red midge is included because, from our experience, it is often collected from stable deposits of woody debris.

Attachment 4

4) One beetle taxa:

a) Stenelmis sp – A genus typically found on rocky substrates in riffles and runs.

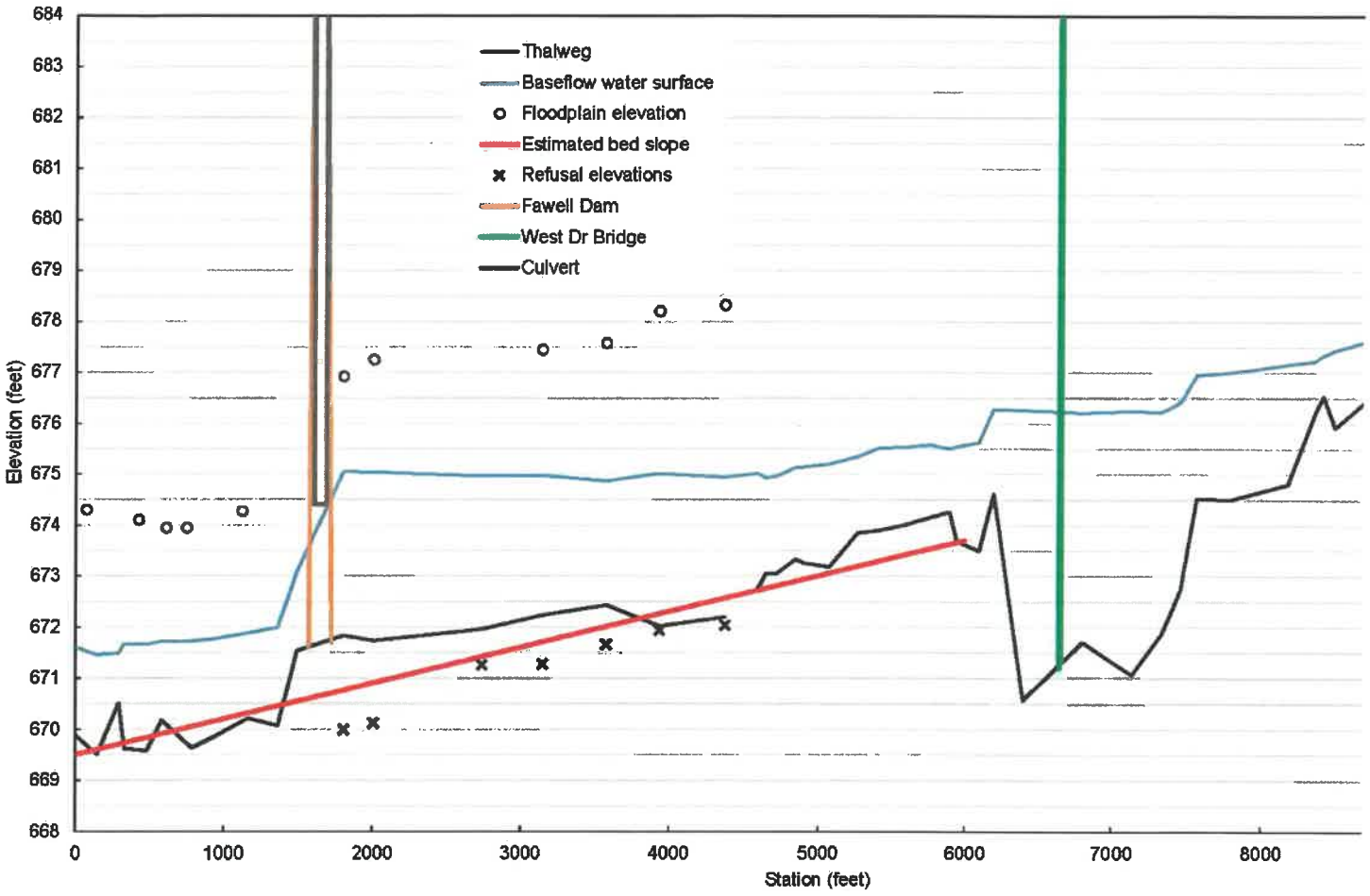
Table 1. Select macroinvertebrate taxa associated with stream current or coarse substrates collected from Salt Creek stations SC37, SC41, SC34, and SC35 in 2007 and 2010.

		Salt Creek Sites			
Taxa code	Taxa	SC37	SC41	SC34	SC35
Mayflies					
11130	Baetis intercalaris	x	x		x
13400	Stenacron sp	x		x	
Caddisflies					
52200	Cheumatopsyche sp	x	x	x	x
52431	Ceratopsyche morosa group	x	x		
52521	Hydropsyche bidens or H. orris	x	x		
52570	Hydropsyche simulans		x		
53800	Hydroptila sp	x	x	x	x
Beetles					
69400	Stenelmis sp	x	x		
Diptera/ flies					
74100	Simulium sp	x	x		
81825	Rheocricotopus (Psilocricotopus) robacki	x	x		
82141	Thienemanniella xena	x	x	x	
84450	Polypedilum (Uresipedilum) flavum	x	x	x	x
84700	Stenochironomus sp	x			
85625	Rheotanytarsus sp	x	x		
TOTAL		13	12	5	4

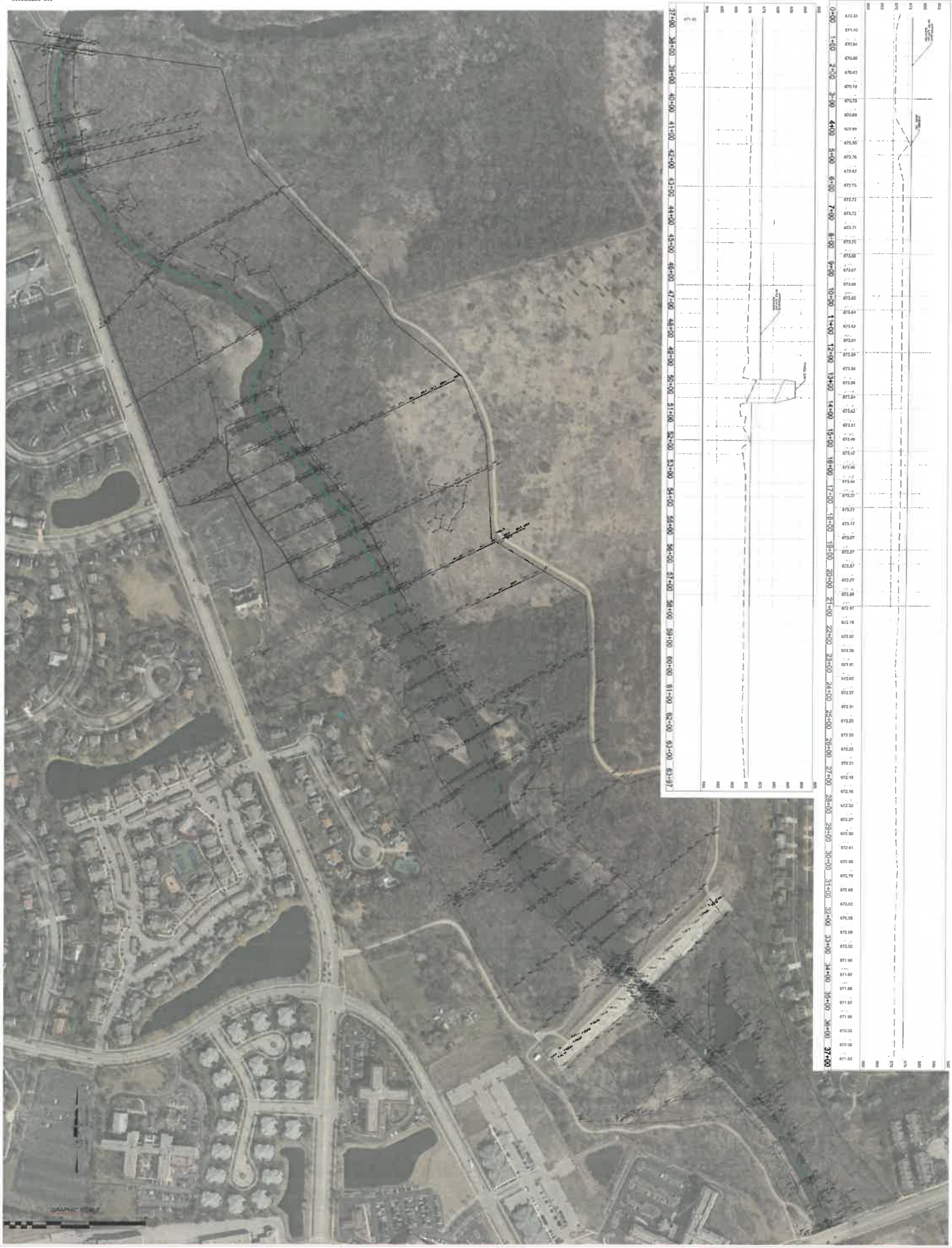
In addition to more diverse taxa at reference sites compared to candidate sites (14 vs 6), flow and substrate dependent taxa were also much more abundant. The populations accounted for 61.4% at the reference sites versus 2.6% at the candidate sites. Also, based on the evaluating biologists' experience, tolerance levels among reference site populations were generally more sensitive than the candidate site populations. Overall, the enhanced habitat conditions that would follow the proposed stream restoration should result in the increased abundance of these higher quality populations.

[ii] The two species, H. orris and H. bidens are grouped together as one taxa because of increasing uncertainty about the reliability of separating the larvae based on larval characteristics.

Attachment □ Fawell Dam Stream Profile Through Impoundment



Attachment 5.1



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NO.	DATE	DESCRIPTION	NO.	DATE	DESCRIPTION

TOPOGRAPHIC MAP

Powell Dam Modifications

Attachment 6

WINTER 2015/16 PUBLIC AGENCY DEICING QUESTIONNAIRE

The DuPage River Salt Creek Workgroup (DRSCW) is collecting data on current deicing and snow-fighting practices from public agencies in the DuPage River and Salt Creek watersheds. Information will be compiled and provided as a report to participating agencies and can be used for NPDES reporting purposes. Please contact Tara Neff to receive a copy of your agency's previous response (2007, 2010, 2012, 2014) and to return your questionnaire by June 1, 2016: PH 630.428.4500x123, FX 630.428.4599, tneff@theconservationfoundation.org.

Contact Information

Contact Name: _____ Agency: _____

Contact Phone: _____ E-mail: _____

1. Deicing and Snow Removal

My agency's annual salt usage in tons per year (snow season):

2015/16 _____ 2014/15 _____ 2013/14 _____ 2012/13 _____ 2011/12 _____

Per event, my agency performs the following maintenance:

Surface Type	Total Maintained	With Pre-Wetted Salt	With Anti-Icing Before Event
Roadways (Total Lane Miles)			
Parking Lots (sq.feet)			

My agency has a maximum application rate. ☐ Yes ☐ No If yes, please provide rate. ___lbs/lane-mi

The average time per deicing route pass is: _____ Minutes

My agency uses the following practices and application rates for differing storm events:

Storm Event	Anti-Ice?	Pre-Wet?	Our target application rate is	
Long Duration Freezing Rain Event	☐	☐	☐ <200 lbs/lane-mile	☐ 200-300 lbs/lane-mile
			☐ 300-400 lbs/lane-mile	☐ >400 lbs/lane-mile
Small 1" Storm Event	☐	☐	☐ <200 lbs/lane-mile	☐ 200-300 lbs/lane-mile
			☐ 300-400 lbs/lane-mile	☐ >400 lbs/lane-mile
2"-3" Storm Event	☐	☐	☐ <200 lbs/lane-mile	☐ 200-300 lbs/lane-mile
			☐ 300-400 lbs/lane-mile	☐ >400 lbs/lane-mile
6" or greater Storm Event	☐	☐	☐ <200 lbs/lane-mile	☐ 200-300 lbs/lane-mile
			☐ 300-400 lbs/lane-mile	☐ >400 lbs/lane-mile

My agency uses (D)ry solids, (P)re-wetted solids, and/or (L)iquids deicing agents (check all that apply):

D	P	L	Deicing Agent	D	P	L	Deicing Agent	D	P	L	Deicing Agent
☐	☐	☐	Rock salt	☐	☐	☐	Calcium magnesium acetate	☐	☐	☐	Abrasives
☐	☐	☐	Calcium chloride	☐	☐	☐	Potassium acetate	☐	☐	☐	Urea
☐	☐	☐	Magnesium chloride	☐	☐	☐	Potassium chloride	☐	☐	☐	Organics
☐	☐	☐	Other: _____								

My agency's pre-storm anti-icing practices include (methods, materials, mix/blend): _____

_____

_____

Anti-icing has helped my agency's overall program by: _____

_____

_____

My agency does not implement anti-icing practices because of the following barriers: _____

_____

_____

Prices for salt or deicing products have: □ Decreased □ Increased □ Not changed
My agency uses weather forecasting service. □ Yes □ No
My agency makes use of pavement temperature sensing data. □ Yes □ No
My agency changed deicing practices in the past year. □ Yes □ No
My agency communicates winter maintence policies to residents. □ Yes □ No
If yes, what method(s)? _____
My agency is considering adjusting winter maintenance policies. □ Yes □ No
If yes, in what ways? _____

2. Deicing and Snow Removal Equipment

Our agency uses the following types and numbers of snow/ice removal equipment:
Number of mechanically controlled spreaders for: _____ Number of snow plows
_____ Dry solids _____ Pre-wetted solids _____ Liquids _____ Number with Automatical Vehicle Locating (AVL)
Number of computer/sensor controlled spreaders for: _____ Other vehicle-mounted equipment (please describe):
_____ Dry solids _____ Pre-wetted solids _____ Liquids _____

New or innovative equipment used: _____

Our agency calibrates deicing equipment. □ Yes □ No If yes, how often? _____

3. Salt Storage

Total number of salt storage areas. _____
Salt is stored in fully enclosed structures □ Yes □ No □ N/A
Salt is stored on an impervious pad. □ Yes □ No □ N/A
Number of salt storage areas without a fully enclosed storage structure or impervious storage pad? _____
Residual salt in loading areas is swept up after usage. □ Yes □ No □ N/A
If we have a surplus of salt, we store it (where and how): _____
_____
Other deicing and snow removal agents chemicals/compounds are stored (where and how): _____
_____

4. Equipment Maintenance

My agency washes equipment:
□ Interior garage or wash rack that drains to sanitary sewer □ Commerical wash facility
□ Exterior area that drains to sanitary sewer □ Undercarriage wash
□ Exterior area that does not drain to sanitary sewer □ Other: _____
My agency collects deicing equipment wash water for reuse (making brine). □ Yes □ No
If yes, how many gallons annually (estimated)? _____

5. Management and Record-Keeping

My agency controls and monitors the use of salt and/or other agents by (check all that apply):
Training occurs: □ at start of employment □ annually □ other: _____
Application rate is established by: □ director □ supervisor □ operator □ other: _____
Application rate is controlled: □ by operator □ automatically □ fixed rate □ other: _____
Product use records are kept for each: □ truck □ event □ winter □ none
□ other: please explain. _____