



Niagara Riparian Restoration Program-Phase 2

Annual Progress Report
Year 2

October 24, 2014

1. Describe what progress you have made toward each of your grant objectives since your last status report. Did you meet your goals for this period? Please be specific.

The Niagara Riparian Restoration Program has five main objectives. Over the current reporting period (October 2013-September 2014,) progress has been made on all five Objectives. In January 2014, a revised work plan was developed for the grant based on challenges and opportunities encountered up to that point. Accordingly, the initial timeline for specific deliverables under the grant was revised. Detailed descriptions of progress under each objective are provided below.

1. Implement 5-8 riparian forest buffer and shoreline restoration projects

Over the course of Year 2 Riverkeeper focused on revamping the shoreline restoration program, including re-evaluating and revising the program process, updating education and outreach materials, conducting a massive potential property search, all of which led to the selection and design for one site and initial design work for two other sites. The program was re-branded the “Living Shorelines Program” as a better way to communicate our intent to create a living shoreline environment. Additional accomplishments for this Objective are provided below:

Program Set-up/ Technical Resources & Trainings:

- Researched other similar programs around the country & how they operate.
- Outlined the program’s guiding principles, process and key steps (See Appendix A).
- Created a sell-sheet and power-point overview for property owners.
- Assembled a Technical Advisory Committee consisting of local and regional professionals with relevant expertise to advise program development, site specific design and implementation (See Appendix B).
- Compiled a Technical Resource Library on bioengineering techniques, including resources from University of Michigan’s Living Shorelines Program; NOAA’s Living Shoreline Planning & Implementation; USDA/NRCS Streambank & Shoreline Protection methods, USFS Soil Bioengineering Techniques; and USACOE Great Lakes Habitat Initiative, and over 20 different detailed “cut sheets” on bioengineering techniques.
- Collected resources for Best Management Practices for in-water habitat enhancement, upland and riparian forested buffer design.
- Revisited Site Selection Criteria and developed Site Evaluation Forms based on the program’s guiding principles.
- Program staff members attended two trainings from the ERIE IGERT program at the University at Buffalo: Dave Derrick’s Bioengineers and Stream Stabilization Engineering course and Andrew Simon’s B-Stem Sediment and Erosion Modeling course.

Site Identification, Evaluation, Selection & Landowner Interactions:

- Conducted an ArcGIS inventory and analysis of over 940 waterfront properties to identify all potential sites located within the Greenway Focus Area, resulting in over 94 properties identified.
- Internally narrowed the Potential Sites List to the top 13 locations with input from the Technical Advisory Committee.
- Conducted 27 preliminary site scouting evaluations at 10 locations and selected 7 sites for full site evaluations: Mayors Park, Botanical Gardens (Site B), Sweeney Street Boat Launch, and Hyde Park Lake (Sites A, C & F), and Sandy Beach Park Club. Included full GIS mapping and research into existing data (surveys, soil samples, etc.). The full site evaluations collected information on the site, water course, topography, habitat (existing & potential), implementation/construction considerations, and property owner goals and expectations.
- Riverkeeper's project team selected the first site following site visits and project visioning with the Technical Advisory Committee: North Tonawanda Botanical Gardens.
- Held discussions with the City of North Tonawanda and the Canal Corporation (landowners) and received Letter of Support from the City to move ahead with design stage.
- Held discussions with the City of Niagara Falls regarding sites on Hyde Park Lake, and the Sandy Beach Park Club on Grand Island. Riverkeeper is currently negotiating agreements with these landowners in order to move to design stage.

Project Design Stage:

- Riverkeeper drafted six conceptual designs that were narrowed down with the project team to one final conceptual design*. This design includes a freshwater wetland within the living shoreline and the Conceptual design is provided as Appendix C.

* After completion of concept design for the Botanic Garden site, Riverkeeper learned that repeated aquatic herbicide applications are planned for the Tonawanda Canal and site to treat Hydrilla. As a result of this information, Riverkeeper was not able to proceed with design as planned. This issue is discussed in detail under Question 3.

In anticipation of design and construction of a living shoreline implementation along Hyde Park Lake, Riverkeeper recently met with the US Army Corps of Engineers to contemplate a cost-share assistance agreement for the site which would bring additional technical services and restoration dollars to leverage the living shorelines program. Additional details regarding the feasibility of this agreement are expected to develop over the last quarter of 2014 and into the first quarter of 2015.

2. Implement the Native Niagara: Ready! Set! Grow! Native seed collection and grow-out program.

Riverkeeper continued to develop the Native Niagara program under Year 2 and has successfully established the program with many area collaborations between Riverkeeper staff, interns, volunteers, and the government and business communities. Major project milestones include:

- Conducted 35 Site Assessments to document native plant populations at 11 different natural areas in Western New York, including Amherst State Park, Beaver Island State Park, Chestnut Ridge County Park, Clarence Escarpment Sanctuary, DeVeaux State Park, Ellicott Creek County Park, Great Baehre Conservation Park, Hunters Creek County Park, Nature View Park, Red Jacket River Front Park, Seneca Bluffs Natural Habitat Park, Stiglmeier Town Park, Town of West Seneca Oxbow Wetlands, Whirlpool State Park.
- Continued development of an expansive database of sites, species and seeding times for use during Native Niagara and future native plant propagation projects. (See Appendix D)
- Created approximately 2000 GPS tags for over 80 species of native plants found as seeding adults in natural areas across the WNY region.
- Developed 13 Field Identification Reference Sheets for species identification, for use by project volunteers for Native Niagara and future native plant propagation projects (See Appendix E for example).
- Continued coordination with David Lee of Saratoga Springs NYSDEC Nursery for propagation of seedlings from our 2013 seed collections (See pictures at the end of the report).
- Conducted 9 seed/cutting-collection events on 11/7/2013, 11/9/2013, 11/15/2013, 5/10/2014, 8/20/2014, 10/4/2014, 10/7/2014, 10/11/2014 and 10/13/2014. Partner groups assisting with seed collection included Riverkeeper staff and interns; Spring, Summer and Fall River Academy students; RestoreCorps volunteers; United Way Day of Caring – Erie County Department of Social Services; Oxbow Field Club and ECC Environmental Club.
- Collected seeds from 19 species of native plants from local populations (See Appendix F).
- Conducted educational lectures and discussions on native plant heritage, conservation, biology and ecology for participants at all seed collection events.
- Initiated a partnership with the North Tonawanda Environmental Committee and North Tonawanda Botanical Gardens as a possible local seed propagation site.
- Recruited and managed eight interns to assist with the project.
- Partnered with government, business, and community groups such as ECC, NYSDEC, USFWS, Erie County Parks, Town of West Seneca and HSBC Bank, and leveraged additional funding and in-kind service for related project work through these partnerships

3. Coordinate Nine Water Chestnut Pull events to assist in controlling the invasive species in Tonawanda Creek

Over the course of Project Year 2, Riverkeeper continued to make steady progress on eradicating water chestnut in Tonawanda Creek. Project milestones include:

- Conducted 12 Riverkeeper staff inspections by kayak and canoe of suspected shallow-water Water Chestnut hotspots inaccessible to the USFWS equipment, with a special focus on identifying remnant colonies in Tonawanda Creek and tributaries.
- Recruited and trained members of the local paddling community to conduct Water Chestnut scouting and reporting in the Niagara River watershed.
- Conducted 2 Water Chestnut removal and scouting events on 7/17/2014 and 9/13/2014 with the Summer and Fall River Academy service learning class in partnership with Erie Community College.
- Removed invasive Water Chestnut from Tonawanda Creek (See picture at the end of the report).
- Documented fewer and fewer instances of Water Chestnut within the Lower Tonawanda Creek watershed during this reporting year.

4. Conduct a third-party evaluation of the NRRP program and coordinate the Niagara Greenway Graduate Internship Program to support program development and NRRP implementation.

In July 2014, Buffalo Niagara Riverkeeper contracted with Buffalo State College (BSC) to conduct the third-party evaluation component and graduate internship program work. The purpose of this grant task was to determine the effectiveness of the Phase 1 and Phase 2 restoration projects, as well as to better inform the Program's process and operations moving forward. Dr. Kelly Frothingham and Prof. Dan Potts are leading this effort at Buffalo State College with the inclusion of 3 graduate students, one of which is enrolled in their new Great Lakes Ecosystem Sciences Program.

As part of the contract, BSC developed a protocol for monitoring and evaluating the status of restoration plantings and applied that protocol to the NRRP Phase 1 sites. The evaluation also includes a survey administered to gauge landowner satisfaction with the riparian restoration projects. This summer, Dr. Frothingham and her team visited and evaluated 23 of the 25 sites from Phase 1 of the NRRP Program. The two sites not included in the evaluation were damaged due to issues with maintenance practices following their installation and therefore could not be effectively evaluated. At this time, BSC is in the process of drafting a report on the findings from the Phase 1 sites evaluation. That report is due to Riverkeeper by December 31, 2014.

In addition to the evaluation work, Buffalo Niagara Riverkeeper and Buffalo State College have established a Graduate Internship within the Great Lakes Ecosystem Sciences Program this past summer and fall semesters that supports program development, NRRP implementation, and analyzing the effectiveness of the program's first phase. The internship is overseen by Dr. Frothingham and the NRRP Project Manager. So far this semester, this intern has provided the following elements towards the Living Shorelines Program:

- Initial site scouting along West River Road and Spicer Creek along the shores of Grand Island, identifying an additional 12 potential sites.
- Assisted in the site analysis for Hyde Park Lake.
- Identification of emergent aquatic vegetation and sub-aquatic vegetation appropriate to the Hyde Park Lake and Sandy Beach Park Club projects.
- Investigation of site-specific hydrology and water-current conditions on potential projects sites.
- Research on specific habitat needs of fish populations found in and near project sites.
- Investigation of permitting needs and processes, including those from US Army Corp of Engineers, NYS Dept. of Environmental Conservation, and NYS State Historic Preservation Office.
- Collected BMPs for Riparian Buffer Design for the Technical Resource Library.

5. Utilize the website and educational materials to provide waterfront landowners and stakeholders with technical information and to profile the NRRP projects.

Progress under this objective has focused on revising, printing and distributing the Native and Naturalized Plant Guide for the Buffalo Niagara Region and gathering technical resources for the website.

The new guide, renamed *Western New York Guide to Native Plants for your Garden*, was developed in-house by Buffalo Niagara Riverkeeper staff with 200 hours of volunteer time provided by a local landscape architectural designer. Completely revamped, the guide was designed to be more user friendly, with two pictures depicting each of the book's 90 plant species. The plant list includes only native plants that were vetted through local and regional experts, including Sally Cunningham (Lockwood Nursery), Lyn Chimera (Lessons from Nature), SUNY ESF Professor Don Leopold, and the Lady Bird Johnson Wildflower Center. Organized by groundcovers, perennials, shrubs, trees, and vines, the guide also offers 6 native garden planting plans. The final section of the guide introduces readers to site analyses, site considerations, planting instructions, maintenance instructions, and invasive species alternatives.

Riverkeeper sought print sponsorships to off-set the cost of printing the guide and raised three sponsorships, contributing a total of \$750 to the 500 copy printing. Each sponsor received 25 copies of the guide for their own distribution plus their logo on the back cover. Erie County's sponsorship provided in-kind services in lieu of cash and printed 300 large-format books in-house, 100 of which will be distributed through various county environmentally-focused events. The remaining copies of the guide were distributed through Riverkeeper's office, 5 Riverkeeper events, and at 16 businesses and organizations in Erie and Niagara Counties. The guide is also available digitally on Riverkeeper's website.

The guide was launched in early August 2014 and press was immediately picked up by *Buffalo Rising*, and later *Buffalo Spree* and the *After 50 Newspaper* (See Appendix G). The guide was

extremely popular and shared via our website, Facebook and twitter. By early October, the first 500 copies were fully distributed and organizations were calling to ask for additional copies. At this rate Riverkeeper doesn't expect the 200 larger format guides available through the County to last very long. To date we've applied to two different grant programs to assist us toward being able to further disseminate the important message and tools the guide offers.

In Year 2, Riverkeeper revised the website to reflect the Native Plant Guide's launch. Further website updates will be implemented in early 2015 and continue throughout the life of the grant. Promotion of the NRRP grant is ongoing and matriculated throughout all of Riverkeeper's public engagement initiatives. Targeted outreach will ramp up in early 2015 as Living Shorelines' specific restoration projects begin and will remain consistent throughout the remainder of the grant. To date, Riverkeeper staff has focused on collecting technical resources for the website that need further refinement before they are made available online, such as invasive species BMPs and Bioengineering techniques. Aside from the website, Riverkeeper has promoted other aspects of the NRRP 2 project on Facebook and Twitter, including our Water Chestnut pull events and Native Niagara collection events. Currently Riverkeeper has over 2,200 followers on through these two social networking/media sites. To supplement the outreach efforts necessary provide a high public profile to the pending construction projects, Riverkeeper has applied for a matching grant through NYS Sea Grant to conduct homeowner and municipal outreach for the living shorelines program. Notification regarding the award of funds is expected in early November 2014.

Riverkeeper plans to revise the *Waterfront Landowner Stewardship Guide* in 2015. Printing and distribution for the guide is planned for late summer 2015. We expect the outcomes of the landowner survey, conducted as part of the NRRP Third-Party Evaluation, will influence some of the content revisions in the guide to better serve landowner needs.

2. How did you measure your progress since your last status report? What kind of data has been collected to determine whether progress is being made or not being made? What results have been obtained since your last status report?

This is the second progress/status report submitted under Phase 2 of this grant. Upon establishing the project manager and outlining the Living Shorelines Program structure in late 2013, Riverkeeper redrafted the project schedule. The grant application stated an annual program evaluation and work plan modification would be incorporated throughout the grant as necessary to adjust and adaptively manage the project. This schedule revision was developed to meet the original project milestones/activities as effectively as possible given initial challenges and opportunities that have arisen. This revised timeline is provided as Appendix H.

Data collected under Objectives is measured based on the specific deliverables under each objective. For example, progress under Objective #2 can be measured by the number of sites scouted for seed collection, or the number of meetings held with partners to assist in developing targeted site lists and plant species lists. Since this grant is less about data collection and more

about on the ground progress, we propose that the bullets listed under each objective serve as the measurements of progress towards a specific activity or milestone within each objective.

3. What challenges have you encountered since your last status report? How are you addressing these challenges?

The most significant challenge faced during this reporting period was the delayed knowledge of an herbicide application within the Tonawanda Creek Canal system that would potentially undermine the Living Shorelines project we were designing. Riverkeeper was in the middle of design phase for the North Tonawanda Botanical Gardens site with a final concept prepared and ready for the next stage of engagement with the landowner and TAC when we learned that the Army Corps of Engineers (ACOE) had begun the application of herbicide Aquathol K to Tonawanda Creek.

Riverkeeper received this information from the NYS Canal Corporation in July and learned of the herbicides potential to kill aquatic plants indiscriminately. Since our concepts for Botanical Gardens included a shoreline wetland, Riverkeeper decided to stop work on the project and watch the effect the herbicide has on the other aquatic vegetation on the creek prior to moving forward. The herbicide application is a pilot project and expected to apply 2-3 applications in the creek each summer for the next 5-7 years. The final concept for Botanical Gardens is provided as Appendix C.

The unforeseen circumstances regarding our preferred Year 1 site required the project team to re-evaluate the suite of potential sites and resulted in a setback in overall design/construction progress. Unfortunately, the two selected back-up sites to the North Tonawanda Botanical Gardens are also located on Tonawanda Creek and will receive exposure to the same herbicide. In July, Riverkeeper then went back to our master Potential Site List and flagged a few new sites to evaluate further and scouted a few additional sites on Grand Island.

Presently, we have two sites shortlisted that we are pursuing agreements with the landowners. The first is Hyde Park Lake in Niagara Falls, and the second is the Sandy Beach Park Club on Grand Island. We feel that we can be back on track with the Living Shorelines program by developing concepts and schematics for both late fall of 2014, setting us up for an early summer 2015 construction.

4. Are you on schedule to complete your project in the proposed timeline? If not, please explain why you are ahead or behind schedule.

Despite the challenges identified in Section 3, Riverkeeper anticipates only a minor deviation in the overall project timeline compared to the schedule proposed in the current work plan included in this report. This included work plan was drafted following establishment of the project manager in January 2014 and anticipates the need for a no-cost time extension to complete the project in an exemplary manner (See Appendix H).

5. Please use the table below to report your expenditures since your last status report. Include in-kind support from other resources you have used since your last report below the table. Please explain any differences between anticipated and actual expenditures. Attach copies of any relevant receipts or invoices to this report.

A current snapshot of the grant budget is shown below. When the grant application was submitted, it was anticipated that by the end of Year 2 only \$205,113 would be remaining in the budget. Based on the evolution of the grant objectives to date, the actual remaining budget is more than this at \$435,924.73. The discrepancy between the original grant budget and the current budget can be directly correlated to the inability to hire a project manager during Year 1, setting the Living Shorelines Program back one year. Across the current reporting year (October 2013 – September 2014) major progress has been made on this program, narrowing the budget gap further. Moving forward, the Living Shorelines Program is making major progress and with that will be the corresponding spending of grant funds.

Budget Categories	GESC-approved budget	Funds or in-kind support from other resources	Total expenses to date (as of 9/30/2014)	Remaining balance
Salaries and Benefits	\$437,813.00		\$149,126.93	\$288,686.07
Travel	\$9,900.00		\$4,445.55	\$5,454.45
Supplies	\$13,600.00		\$7,634.79	\$5,965.21
Consultants	\$110,200.00		\$12,950.00	\$97,250.00
Other	\$127,917.00	\$597,000.00	\$89,348.00	\$38,569.00
Total Funds	\$699,430.00	\$597,000.00	\$263,505.27	\$435,924.73

6. What progress toward your objectives do you expect to make before your next status report? Please be specific.

At the beginning of 2014 a revised work plan was developed that outlines the expected progress on Objectives 1-5. A summary of those activities to be completed between October 2014 and September 2015 is provided below.

In addition, Attachment A provides a general overview of the revised grant milestones/activities and timeframes for the life of the grant from the end of 2013 and beyond. In completing this revised chart, it is assumed that a no-cost time extension through 2016 will be requested. This revised schedule was provided to the GESC Chair, Tim DePriest in early 2014.

Objective 1: Living Shorelines Program (shoreline restoration projects)

- Sign Access and Landowner Agreements with Landowners for Sites 1 & 2.
- Tour sites with Technical Advisory Committee

- Pursue additional site evaluation needs (i.e.: soil testing, surveys, etc.), if necessary.
- Develop concepts for Sites 1 & 2 and review with Technical Advisory Committee.
- Develop schematics with preliminary cost estimates for Sites 1 & 2.
- Conduct necessary permitting for sites 1 & 2.
- Meet with GESC on site design approvals and preliminary budget to access final design and construction funding.
- Hire consultant for Construction Document development or complete CDs in-house*.
- Develop & Release Bid Documents for Construction* (consultant or in-house).
- Review Bids and select Contractor for Sites 1 & 2*.
- Sign Contracts with Contractor for Construction of Sites 1 & 2.
- Draft Press Releases and hold Press Events for Sites 1 & 2 prior to construction.
- Oversee construction of Sites 1 & 2, document Site progress.
- Continued internal assessment of potential site locations for sites 3 & 4.
- Initiate baseline mapping for Sites 3 & 4 field analyses.
- Conduct site evaluations for Sites 3 & 4.
- Coordinate with landowners for Sites 3 & 4, establish Access Agreements.
- Tour Sites with Technical Advisory Committee.
- Pursue additional site evaluation needs (i.e.: soil testing, surveys, etc.), if necessary.

*This is dependent upon scope of work, budget remaining and schedule as to whether we will bid out the final design/construction document development or develop the final design in house. Currently we are proposing to go out to bid for consultant final design. All construction will go out for bid.

Objective 2: Native Niagara Program

- Coordinate seed collection events utilizing interns and volunteers (2-3 for the year)
- Communicate and consult with local partners (local nurseries, Saratoga Nursery, River Academy, etc).
- Continue to add to and expand seed database.
- Continue producing species ID sheets for volunteers.
- Purchase back the seedlings from Saratoga Nursery.
- Continue discussions with local partners to host/grow native plants locally (Cooperative Extension, North Tonawanda Botanical Gardens).

Objective 3: Water Chestnut Pull Events

- Continue coordination with project partners (FWS)
- Assess Water Chestnut in Tonawanda Creek and organize and implement 1 Water Chestnut pull event, if necessary.
- Locate a place for gear storage.

Objective 4: Third Party Evaluation

- Receive and review Phase 1 Evaluations report from Buffalo State College
- Coordinate with BSC for Phase 2 site information and continued evaluations.
- Continue involvement with graduate fellowships for program evaluation

Objective 5: Website & Educational Materials

- Create webpages for the Native Niagara and Living Shorelines Programs.

- Conduct monthly updates to the Riverkeeper website regarding project status
- Revise Waterfront Landowner Stewardship Guide content and format
- Add Invasive Species Best Management Practices to the website.
- Further evaluate technical resources for inclusion on the website.

7. Please include 1 to 2 photographs with dates and short descriptions taken since your last project report.

Below are 2 images from the Native Niagara Program's seedlings growing at Saratoga Nursery and a Water Chestnut pull event, demonstrating progress under Objective #2 & 3.

July 2014 – Sycamore Seedlings at Saratoga Nursery



July 17th, 2014 - River Academy Water Chestnut Pull



Appendices:

- A. Living Shorelines Program Goals & Process
- B. Living Shorelines Program Technical Advisory Committee
- C. Living Shorelines Program – Botanical Gardens Final Concept
- D. Native Niagara Program Species Database Snapshot
- E. Native Niagara Program Species Identification Sheet (example)
- F. Native Niagara Program Seed Collection List
- G. Press for the *WNY Guide to Native Plants for your Garden*
- H. Current NRRP 2 Grant Project Timeline (revised in January 2014)

What is a Living Shoreline?

Goals look to...

- 1.) Address the complete land-water interface
- 2.) Restore shorelines to a more naturalized state
- 3.) Create functional, beautiful & convincing spaces
- 4.) Connect to restorative & resilient living infrastructure systems



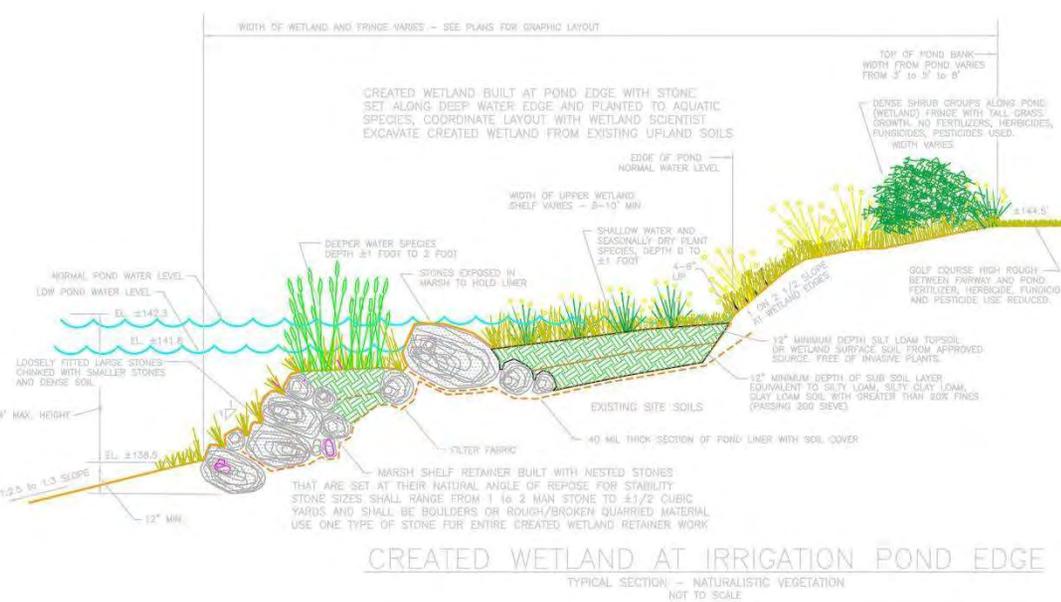
1.) Address the complete land-water interface

- **In-water:** Habitat creation & improvements
- **Shoreline:** Land-water edge stabilization
- **Upland:** Riparian protection, wildlife corridors, public access



2.) Restore shorelines to a more naturalized state

- Transition away from traditional hardened structures, such as bulkheads or rip rap
- Employ bioengineering techniques to address bank stability and erosion issues
- Restore natural slope and utilize native/naturalized plants



3.) Create functional, beautiful & convincing spaces

- Design to meet the largest number of goals/benefits
- Incorporate public access (where desired) and maintain a connection/draw to the water
- Create unique spaces that inform, educate, and build replication



4.) Connect to restorative & resilient living infrastructure

- Create & enhance wetlands, floodplains and riparian corridors.



Living Shorelines Program

*Supporting Healthy Water and Habitat through the
Restoration of the Watershed's Living Infrastructure*

Program Process:

1. Collection of Potential Sites (Mapping/GIS Data/Partner Priorities/Previous Research)
2. Select 8-10 sites to investigate further
3. Gauge Landowner interest
4. Initial Site Tour & Full Assessment
5. Narrow to Top 3 sites (in-house) & Prepare site summaries
6. Select (1-2) sites to move to Concept-Schematic level.
7. Secure Site Access/initial program Agreement
8. Develop Concepts (35%)
9. 1st **TAC** Site-Specific Meeting (including site-visit) & Revision of Concepts
10. Secure any Technical Services needed
11. Develop Schematics (65%)
12. 2nd **TAC** Site-Specific Meeting (may include site-visit) & Revision of Schematics
13. Finalize Schematics & Develop Cost Estimates (65% - heavy contingency)
14. Present Schematics (outlining #'s trees, linear feet, species, etc.) & Cost Estimates to **GESC** (meeting or email TBD for first run).
15. BNRK selection of sites to move to Construction Phase (give GESC budget number for release of funds).

Funding switch to Construction monies

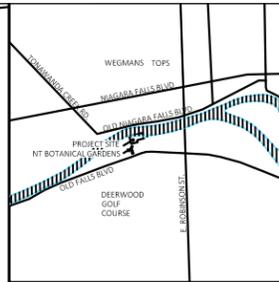
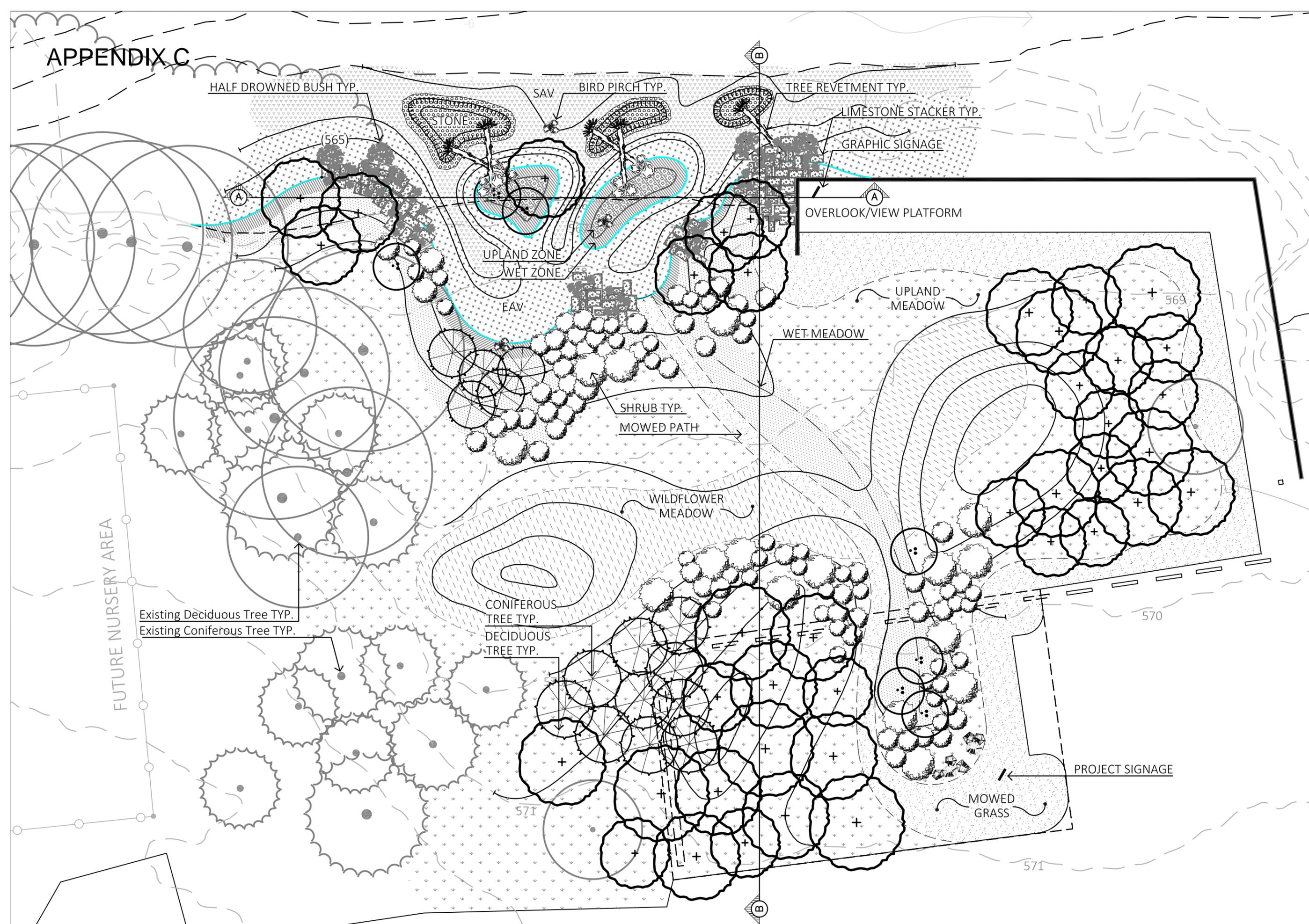
16. Secure final program agreement with Land Owner
17. Finalize permitting
18. 3rd **TAC** Site-Specific Meeting
19. Develop Final Designs for Construction & Refined Construction cost estimates (95% - lower contingency)
20. Notify **GESC** (via email) of refined plans/budget & #'s (trees, linear feet, species, etc.)
21. Develop Construction CDs & Bid Package
22. Bid Project, Select Contractor, Execute Contract & any remaining permitting
23. Construction Oversight (change orders if necessary) – **TAC** Tours if interested
24. Oversee contractor required 1 year maintenance
25. Address any Issues with Contractor & Issue Final Acceptance
26. Provide Landowner with simplified maintenance plan
27. Project Evaluation by Buffalo State College

APPENDIX B

Technical Advisory Committee

	Name	Title	Phone	Email
1	Mark Gaston	District Field Manager	(716) 652-8480	mark.gaston@ny.nacdnet.net
2	Jim Sroka	Water Quality Tech.	(716) 652-8480	james.sroka@ny.nacdnet.net
3	Ryan Perrello	RAP Coordinator	(716) 434-4949 x 114	ryan.perrello@ny.nacdnet.net
4	Tom Hoffman	Fishery Biologist	(585) 948-5445 x2215	thomas_hoffman@fws.gov
5	Tim Depriest	Niagara River Habitat Specialist	(716) 851-7010	ttdeprie@gw.dec.state.ny.us
6	Dan Potts	Associate Professor	(716) 878-5007	pottsd@buffalostate.edu
7	Joseph Rowley	Regulatory	(716) 879-4279	Joseph.M.Rowley@usace.army.mil
8	Josh Repp, PE	Assistant Project Manager	(716) 852-3211 x 290	Jrepp@bergmannpc.com
9	Amy Bartlett	Ecosystem Restoration Program Coordinator	(716) 645-4014	amyb@buffalo.edu
10	Dr. Kelly Frothingham	Chair and Associate Professor	(716) 878-6736	frothikm@buffalostate.edu
11	Scott Rybarczyk, PE LEED AP	Title?	(716) 688-0766	scottry@wendelcompanies.com
12	John Honan, PE	Senior Associate	(716) 206-5112	jhonan@watts-ae.com
13	Daniel Knuth	Owner, Ecosystem Restoration Specialist	(315) 794-2305	danielknuth@yahoo.com

APPENDIX C



KEY MAP: NTS

KEY:

- EX. DECIDUOUS TREE
- EX. CONIFEROUS TREE
- PROPOSED DECIDUOUS TREE
- PROPOSED MULTISTEM DECIDUOUS TREE
- PROPOSED CONIFEROUS TREE
- PROPOSED SHRUB

Buffalo Niagara RIVERKEEPER®
 721 Main Street
 Buffalo New York
 14203
 p: (716) 852-7483
 e: info@bnriverkeeper.org



PROJECT:
North Tonawanda Botanical Gardens
 1825 Sweeny Street
 North Tonawanda New York
 14120

DRAWING TITLE:
PLANTING LAYOUT

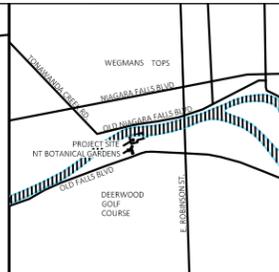
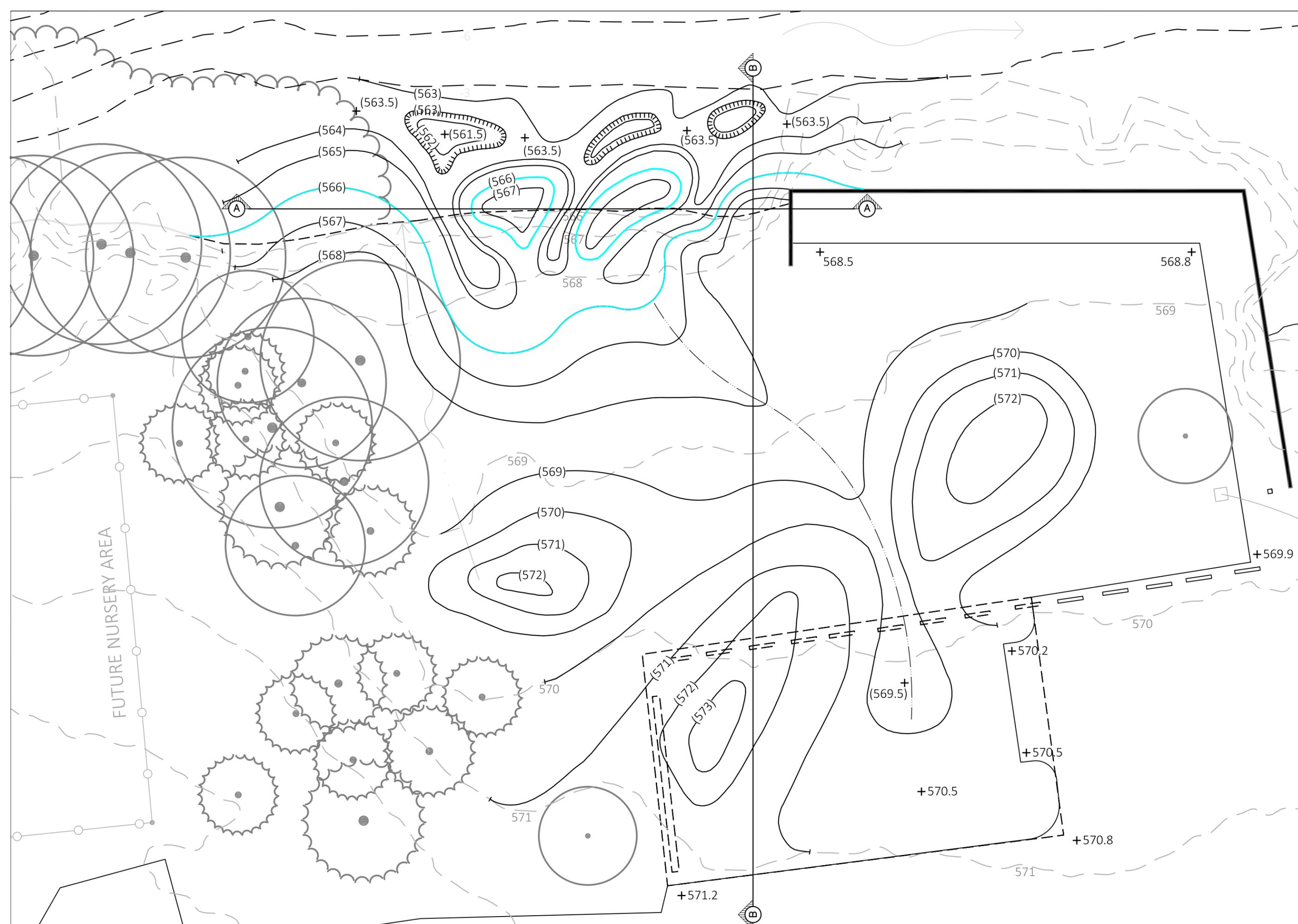
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 CHECKED BY: MM

SCALE: 1"=20'

DATE: JULY 30, 2012

SHEET:
2 of 5

PROJECT NUMBER: 2013004 NRRRP II



KEY MAP: NTS

KEY:

Buffalo Niagara RIVERKEEPER®
 721 Main Street
 Buffalo New York
 14203
 p: (716) 852-7483
 e: info@bnriverkeeper.org



PROJECT:
North Tonawanda Botanical Gardens
 1825 Sweeny Street
 North Tonawanda New York
 14120

DRAWING TITLE:
GRADING AND DEMOLITION PLAN

DRAWN BY: JT/MB

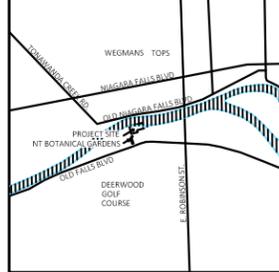
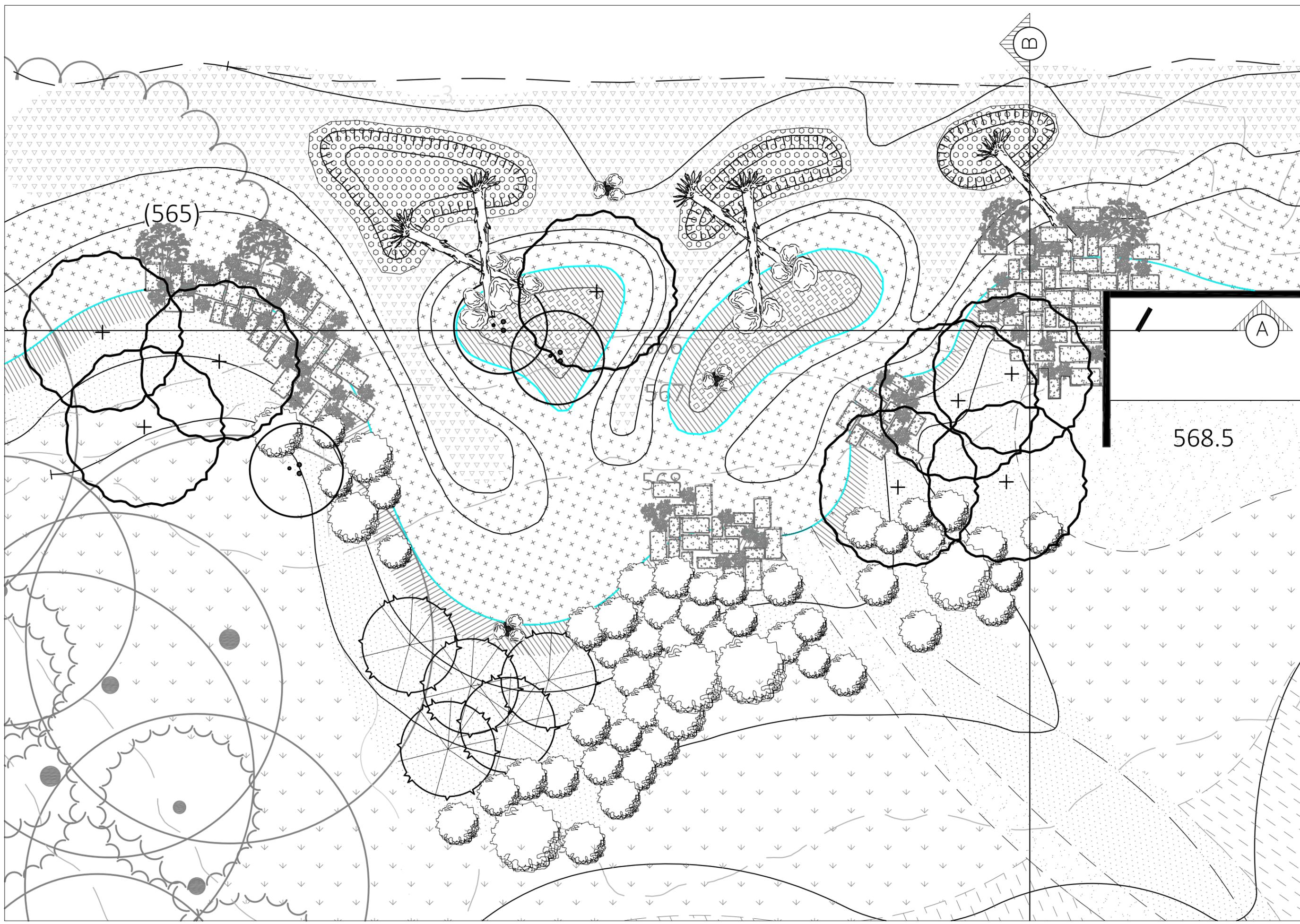
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DATE: JULY 30, 2012

SHEET:
1 of 5

PROJECT NUMBER: 2013004 NRRRP II



KEY MAP: NTS

KEY:

Buffalo Niagara RIVERKEEPER®
 721 Main Street
 Buffalo New York
 14203
 p: (716) 852-7483
 e: info@bnriverkeeper.org



PROJECT:
**North Tonawanda
 Botanical Gardens**
 1825 Sweeny Street
 North Tonawanda New York
 14120

DRAWING TITLE:
PLAN ENLARGEMENT

DRAWN BY: JT/MB

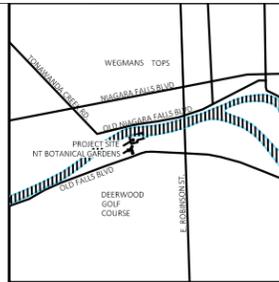
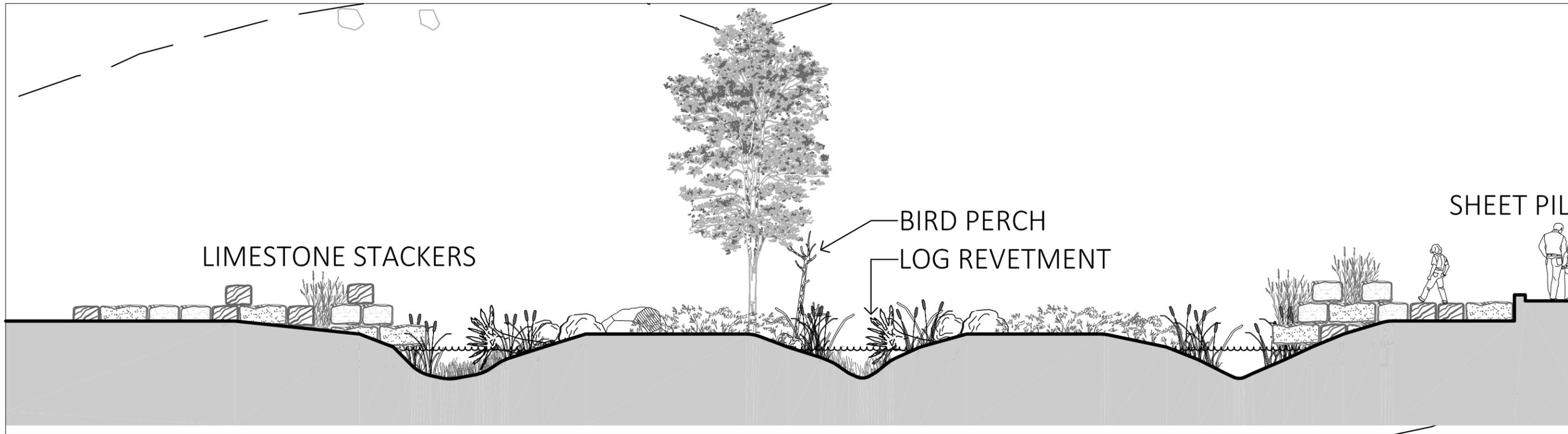
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DATE: JULY 30, 2012

SHEET:
3 of 5

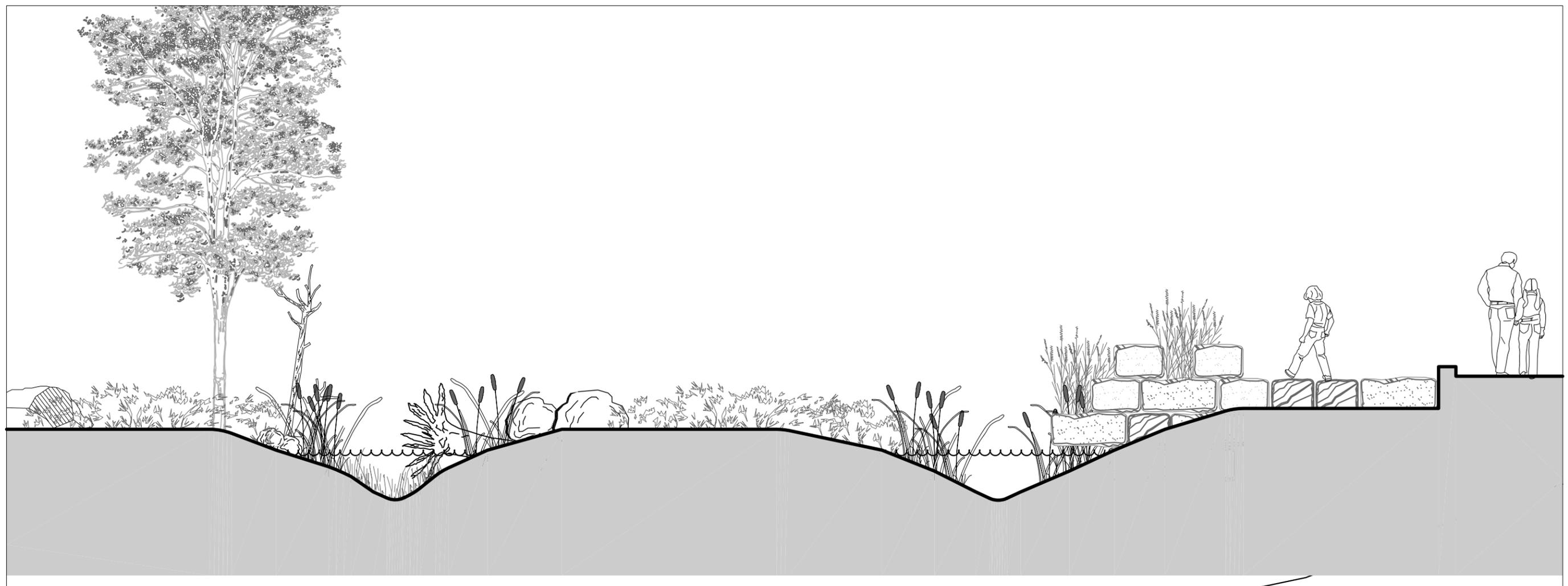
PROJECT NUMBER: 2013004 NRRRP II



KEY MAP: NTS

KEY:

ELEVATION A-A' NTS



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PROJECT:
**North Tonawanda
 Botanical Gardens**
 1825 Sweeny Street
 North Tonawanda New York
 14120

DRAWING TITLE:
ELEVATION A-A'

DRAWN BY: JT/MB

CHECKED BY: MM

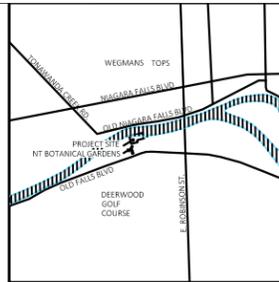
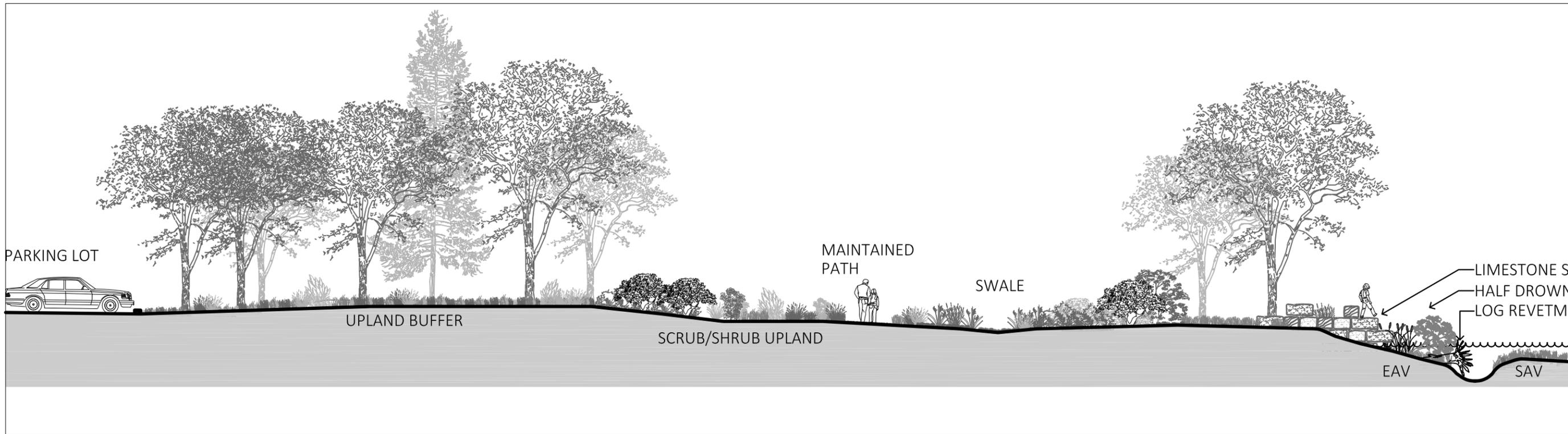
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DATE: JULY 30, 2012

SHEET:
4 of 5

PROJECT NUMBER: 2013004 NRRRP II

ELEVATION A-A' ENLARGEMENT NTS



KEY MAP: NTS

KEY:

ELEVATION B-B' NTS



ELEVATION B-B' ENLARGEMENT NTS

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DRAWING TITLE:
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DRAWN BY: JT/MB

CHECKED BY: MM

SCALE: NTS

DATE: JULY 30, 2012

SHEET:
5 of 5

PROJECT NUMBER: 2013004 NRRRP II

APPENDIX E

Cornus racemosa

Gray dogwood

ID: Gray dogwood seeds are contained within small white fruits called drupes clustered at the terminal ends of branches, looking similar to a bunch of grapes. The berries must be harvested for seed collection before completely ripe, as birds are avidly fond of them. Gray dogwood's flower and berry clusters are conical, whereas other dogwoods have a flattened panicle. The pedicel bearing the fruit may be bright red in color.



Notes: The foliage on dogwoods begins to don its fall adornment as early as August, when the drupes begin to ripen. This is an advertising strategy, to signal birds to 'exit here for a delicious meal!'

Harvesting: Drupes may be picked by hand from accessible branches. As soon as the fruit begins to turn white and its flesh softens they have naturally ripened enough to contain a viable embryo within the seed. Fruit must be collected early to reduce competition from herbivory by birds. Following the harvest, the seeds are to be extracted from the fruit by means of a filter and press to remove the moist flesh of the fruit to minimize loss due to mold and mildew. Remember to limit harvest to 10%!

LEAF



The leaves of dogwoods are simple, smooth edged and oppositely arranged. The veins diverge from the center veins to run parallel. If broken, silky strands are present.

BARK



Gray dogwood is aptly named with its characteristic gray bark. This bark on the older stems is what discerns gray from red-osier and swamp dogwoods which have red and maroon bark.

TWIG

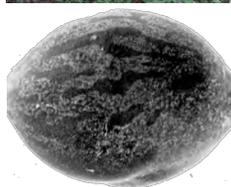


The twigs are arranged in pairs opposite each other along the stem. They are green to brown on young growth, turning gray over the seasons.

Lindera benzoin

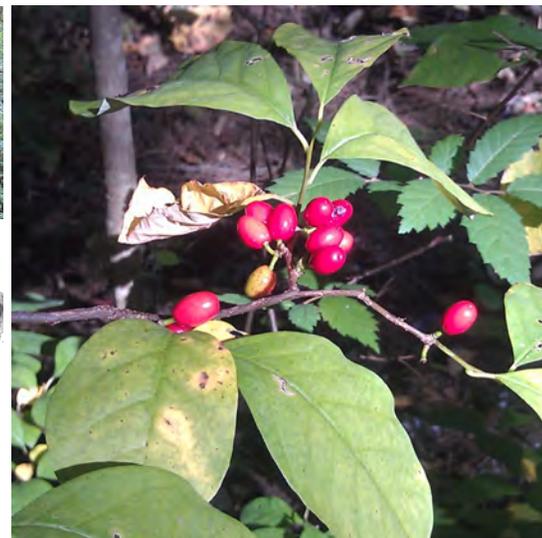
spicebush

ID: Spicebush is a deciduous shrub or small tree in the understory of moist woodlands, swamp margins and stream sides. It will grow to 5 meters tall, and has the potential to form clonal thickets by asexual root sprouting reproduction. Soil tolerance ranges from mildly acidic to mildly basic rich, mesic soils. Due to spicebush's affinity for rich woods, settlers and land surveyors quickly learned to use it as an indicator species for productive agricultural land.



The fruit begins to develop in May, turning from yellow to red at maturity from August to October. Each drupe contains a single seed that is violet-brown speckled with darker flecks.

The name spicebush refers to the aromatic leaves, twigs and fruit that have a spicy-sweet fragrance when bruised.



Harvest: The fruit of spicebush should be collected immediately following ripening from August to October. Immature fruits generally have low to no viability and will not germinate. Attention must be paid to harvestable species as they approach maturity, since loss due to herbivory by birds also narrows the window of opportunity to harvest viable seeds. The 6 to 10 mm long, shiny red ellipsoid drupes grow in short stalked clusters along the branches. The fruit is a prized food source for wildlife, who disperse the seed. Seeds generally germinate in the litter on the forest floor the following spring, but may remain viable in the seed bank for years.

LEAF



Leaves are entire, alternately arranged, thin, glabrous (rarely covered in hairs underneath), elliptical in shape, 6-14 cm long, and pointed at both ends. They are attached to petioles 5-12 mm long, that are a distinctive bright green in color.

BARK



Reddish with conspicuous lenticels on younger branches, the bark matures to a ruddy gray-brown. Spicebush may have an individual or multiple trunks. Understory thickets are also common from vegetative reproduction by root sprouting.

TWIG



Alternately branching, the flowers appear before the leaves in March and April in clusters on nodes of the previous year's growth. The species is dioecious, meaning that there are separate male and female plants.

Rubus occidentalis

Black raspberry

ID: Black raspberries are not a berry by botanical definition, but an aggregate fruit appearing in July and August of up to a hundred drupelets which each surround an individual seed. Black raspberries are differentiated from blackberries in that black raspberries are 'hollow' when removed from the branch. Blackberries also assume a more conical form with fewer drupelets comprising the fruit. Black and red raspberries differ in color.



Notes: The delicious flesh surrounding the seeds is meant to entice consumption by birds and mammals, that the seeds may be passed and thereby distributed. When they go unnoticed, the fruit may dry on the stem and reveal the seeds inside for alternative harvest and propagation.

Harvesting: Careful scrutiny must be employed to ascertain if dried fruit and therefore seeds remain on the plant following the ripening and consumption of most of the fruits. Carefully examine the terminal ends of the canes, and gently brush the seeds from the stem and into the hand. Care is required to brush rather than pick the clusters, since picking at the canes would likely result in the disturbance of the entire plant which would cause the remaining seed to be shaken off of the plant and onto the ground.

LEAF



Raspberry leaves are compound, typically with three to five leaflets. One leaflet is terminally located, with the other two or four oppositely arranged. The undersides of the leaves are white.

BARK



The stems emerge from underground rhizomes, with each 'cane' appearing to be an individual plant. They are covered in spines, though not as extensively as its cousin, the red raspberry, and form thickets of brambles.

TWIG



The twigs and stems are covered in a fungal 'bloom' which provides them with their distinctive whitish to purplish hue which will wipe off if rubbed. This is the same bloom that covers grapes.

Viburnum acerifolium

Maple leaf viburnum

ID: Preferring moist, well-drained soils and shady conditions, *Viburnum acerifolium* may be found in riparian habitats and underneath the canopy of lowland forests. Flowering occurs from May—August, fruit develops from August—October, and dispersion occurs from October—February.

Viburnums produce clusters of fruits in compound cymes. The fruit is a single seeded drupe 6-15 mm long that is covered in a soft pulp and contains a thin stone. The stone is 8-10 mm in diameter and flattened.

Viburnum acerifolium may be differentiated from other viburnum by their maple-like, lobed leaves, shared only by highbush cranberry (*Viburnum trilobum*) which grows on the forest edge or in shrubland and has orange to red fruit clusters.



Harvesting: At maturity, the skin of the fruit will change in color from green to dark blue or black, indicating that it is completely ripe. *Viburnums* will begin to fruit at only several years of age, and continue to produce fruit nearly every year. The fruit of the maple leaf viburnum will often persist on the branches through the winter and into the spring. *Viburnums* have significant habitat and wildlife value, and represent a vital source of winter forage for most mammals and birds in our area. Fruit dispersal is primarily accomplished by animals, and to a lesser extent by gravity.

Unlike most fleshy fruits, maple leaf viburnum does not need to be harvested prior to ripening. Although viburnums are among the most important genera for wildlife for the food and habitat that they provide, they primarily serve as a food source in winter and early spring, months after becoming ripe. As a low growing erect shrub, they are easy to harvest from. Individual drupes, or the clusters thereof may be removed by hand, and branches are readily maneuvered to place cymes within hands reach.

FRUIT



Drupe is any fleshy fruit body that surrounds a hardened stone which contains the seed, such as a cherry.

Compare the image above and to the left of immature fruits of *Viburnum acerifolium* to the image of mature fruit at the top of the page. Note also how they contrast to the fruits of other viburnum, as in above and to the right; in this instance those of *Viburnum lantanoides*. *Viburnum acerifolium* are called maple leaf viburnum due to resemblance of their leaves to those of maples.

LEAF



The leaves of all viburnum are toothed and entire, and they are arranged opposite to each other on the branch. *Viburnum acerifolium* have three-lobed leaves that closely resemble the leaves of maples, the *Acer* genus. The two share several characteristics, but are notably different in that *Viburnum* produce clusters of fleshy fruits, whereas *Acer* species produce dry, winged fruits called samaras. *Viburnum* are deciduous, and the 5-12 mm leaves turn yellow-red to red-purple in autumn before dropping their leaves and going dormant for the winter.

TWIG



The *Viburnums* are members of the honeysuckle family, *Caprifoliaceae*, a distinguishing characteristic of which is opposite branching. Note in the image above that the leaves and branches occur directly opposite each other. The above image also reveals the variability in the leaves of *Viburnum acerifolium*.

Both species of *Acer* (maples) and *Cornus* (dogwoods) exhibit opposite branching. Maples in our area are typically trees, and dogwoods may be differentiated by the smooth margins of their leaves; never toothed.

Photo credits: Flower: Jennifer Anderson, hosted by the USDA-NRCS PLANTS Database. Ripe fruit: 2008 Alina Zienowicz. Others: Joshua Konovitz.

Literature adapted from: USDA-NRCS plant guide and plant fact sheet, USDA-FS Woody Plant Seed Manual, and USDA-FS Silvics Manual vol 2.

Prepared for Buffalo Niagara RIVERKEEPER by Joshua Konovitz under the Niagara River Riparian Restoration Program. Buffer II grant.



Photo credits: Seed: Franklin T. Bonner, John D. Gill, and Franz L. Pogge, USDAFS Seed Manual. All other photos: Joshua Konovitz.

Literature adapted from: USDA-NRCS plant guide and plant fact sheet, USDA-FS Woody Plant Seed Manual, and USDA-FS Silvics Manual vol 2.

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APPENDIX F

Native Niagara

Species Collected, October 2013-October 2014

Alnus rugosa – Speckled Alder

Cephalanthus occidentalis - Buttonbush

Cornus spp. – Dogwood

Cornus racemosa – Grey Twig Dogwood

Crataegus spp – Coxspur Hawthorne

Echinocystis lobata – Wild Cucumber

Juglans cinerea – Butternut or White Walnut

Juglans nigra – Black Walnut

Lindera benzoin – Spice Bush

Liriodendron tulipifera – Tulip Poplar

Monarda fistulosa – Wild Bergamont

Myrica pensylvanica – Northern Bayberry

Nyssa sylvatica – Black Tupolo

Quercus rubra – Red Oak

Rubus occidentalis – Black Raspberry

Salix discolor – Pussy Willow

Staphylea trifolia - Bladdernut

Tilia Americana - Basswood

Viburnum trifolium – American Cranberry Bush

APPENDIX G



Riverkeeper: Guide to Native Plants for your Garden

Aug 11, 2014 Posted by [Queenseyes](#) In [Uncategorized](#) [Comments 7](#)

How often do you plant something in your garden simply because it looks pretty and/or smells nice. In this modern age, we are offered selections of flowers and plants that our ancestors never even dreamed would ever grow in this climate. But just because something is able to grow in Buffalo doesn't mean that it was intended to grow here.

Much of the invasive species that we see today were planted due to their ability to adapt to hardy conditions, yet the repercussions to our natural environment were never considered. Over the years we have been accustomed to planting anything we want, anywhere we want. Unfortunately that's not the best practice, especially when we consider our waterways and the insects that we rely on to pollinate our flowers. Not to mention the indigenous plants that actually help with pest control.

In order to help us understand the importance of indigenous plants, an invaluable guide has been published that shows us the importance of planting the flora that was intended to be here all along. Did you know that native plants need less water?

According to Jill Jedlicka, Executive Director of Buffalo Niagara Riverkeeper, "Landowners can play a significant role in the stewardship of our local waters, especially in the way they design, plant and care for their properties. With this guide we really wanted to help Western New Yorkers create more sustainable landscapes, improving habitat and requiring less maintenance, while also fostering water conservation and pollutant reduction".

Gardens planted with native plants are more sustainable and resilient. They also help to support the local wildlife that relies on the plants to grow. Did you know that milkweed, while not being the most attractive plant, is the nutritious lifeline for Monarch butterfly? For years we have been removing the milkweed (urban sprawl, prettier flowers, etc.) while inadvertently helping to decimate the once flourishing population of Monarchs. Not just the Monarchs, but the pollinators that also depend on native plants and flowers.

"Protecting water quality is a top priority for this administration. The County is happy to partner with the Buffalo Niagara Riverkeeper to help print this important guide so that citizens can plan beautiful native gardens that will

New RiverBend Images Posted on Cuomo's Twitter Feed

EXACTLY...

grovercleveland

"Why We Love The Elmwood Village"

AllentownChris Crosswalk in high-trafficked areas (like Elmwood/Cleveland)...

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The Dirt/Got natives? A local guide makes it easy

BY ELIZABETH LICATA

Whoever planted two Norway maples in front of my house a few decades ago was clearly unaware of the problems that invasive plants like these can cause in the North American landscape and environment. While it's true that these trees provide deep shade fast—which is why they were often used to replace trees lost to Dutch Elm disease—they also drop seedlings all summer long. These seedlings are often the only plants that can survive in the root-ridden, shaded environment that results, and have quickly invaded the forests of the Northeast, displacing native trees, shrubs, and smaller understory plants. Environmentalists condemn Norway maples for their threat to biodiversity, but gardeners have plenty of practical reasons to dislike them. Their leaves are the last to fall in November, it's nearly impossible to grow anything else in their shade, and the copious seedpods are a gutter-cleaning nightmare.

There are plenty of great alternatives to Norway maples and many other invasive plants, as clearly and intelligently detailed in a new local publication, *Western New York Guide to Native Plants for Your Garden*. The booklet is produced by Buffalo Niagara Riverkeeper, and was written under the guidance of local experts like Sally Cunningham and Lynn Chimera; author and professor Donald Leopold, and the Lady Bird Johnson Wildflower Center, which

keeps a reliable and frequently updated database of native plants. As we've discussed here many times, native plants are important because they require less water, need minimal maintenance of any kind, and support local wildlife, including songbirds and butterflies.

I particularly like the book's targeting of *Euonymus alatus* (commonly known as burning bush), which is overused to the point of nausea throughout this area. Instead of this plant (which



Western New York Guide to
Native Plants for your Garden

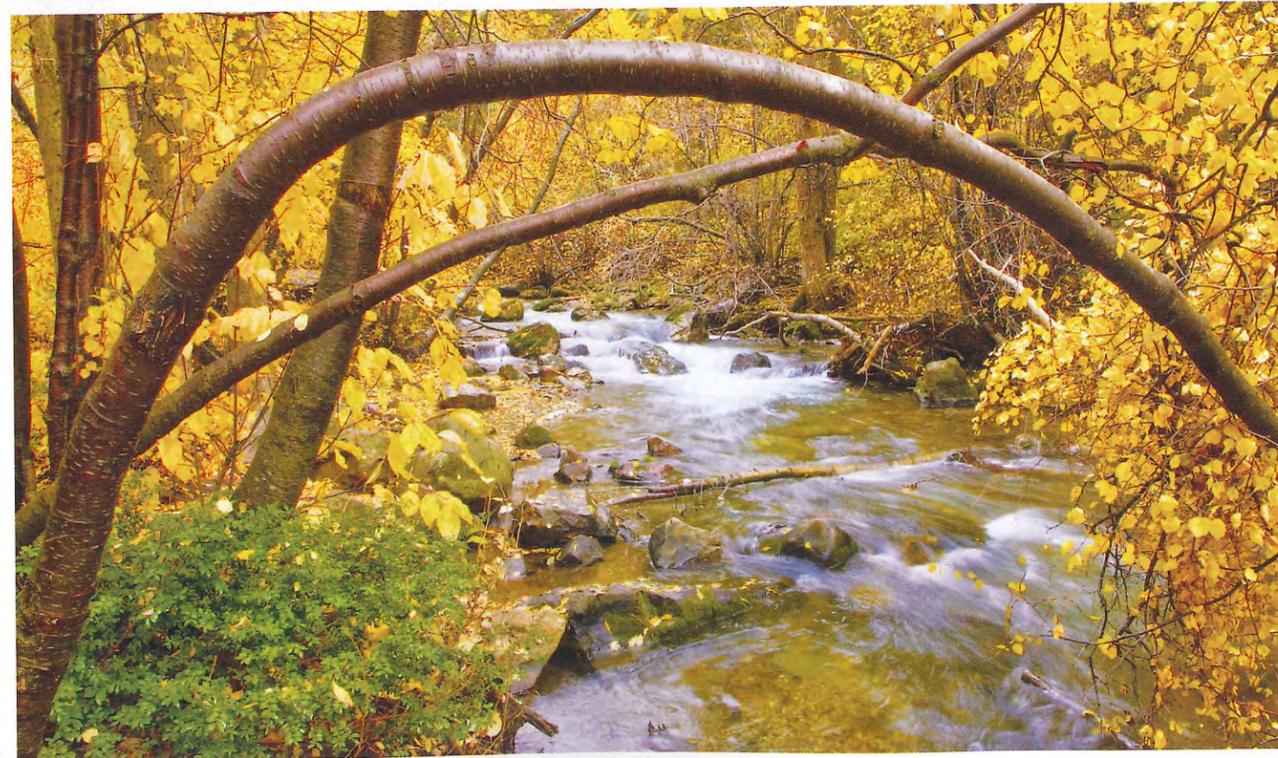


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is interesting for about a week and a half every fall), try *Aronia Melanocarpa* (black chokeberry) or *Viburnum trilobum* (American cranberry).

Both the Norway maple and burning bush examples were found on a final page of common invasives and their native alternatives, but the book contains five sections of plant listings, divided into groundcovers, perennials, shrubs, trees, grasses/ferns, and vines. All the descriptions are accompanied by good color photographs, so gardeners will have no problems finding these plants in nurseries and catalogs.

River birch



Clockwise from top left: tulip tree, Redosier dogwood, Joe-Pye weed, *Anemone canadensis*

Consultant Sally Cunningham has already written about many of the plants in this book in the past, but here are some of my favorites.

***Anemone canadensis* (Canadian anemone):** This is a delightful early summer plant for shaded positions. It's worth tracking down, for its deeply cut foliage and pure white flowers, which shine out brightly in deep shade.

***Podophyllum peltatum* (Mayapple):** These classic Western New York natives can be seen throughout most of the local preserves throughout spring—it's time to create your own carpet of them.

***Eutrochium maculatum* (spotted Joe Pye weed, formerly called *eupatorium maculatum*):** This is tall and showy with wide, flat flower heads; it's a great substitute for the overused 'Autumn Joy' sedum, which is not a native.

***Cornus sericea* (Redosier dogwood):** For those who want some true four-season interest instead of the brief color given by such plants as burning bush, Redosier dogwood has flowers, berries, and, throughout winter,

beautiful red twigs. It's a hard-working shrub and a great native choice.

***Lindera benzoin* (spicebush):** This is one of the few shrubs that will thrive in damp shade, and, like many other native alternatives, it has three seasons of interest, with yellow flowers in spring and yellow foliage in fall.

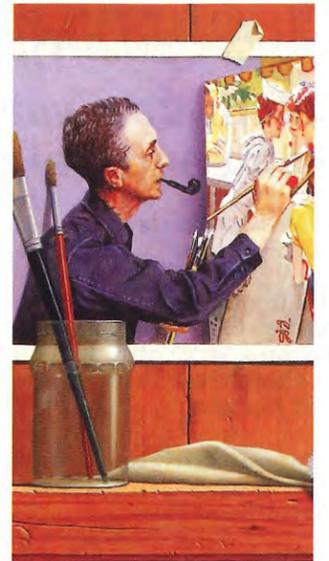
***Betula nigra* (river birch):** This unique multistem tree has beautiful peeling bark and is recommended for rain gardens.

There are many, many other great examples throughout this little book. Most are so beautiful and interesting that they'd be tempting to any gardener, regardless of their helpfulness to biodiversity.

As for Norway maples, there are plenty of excellent alternatives, but my favorites are *Liriodendron tulipifera* (tulip tree) and *Fagus grandifolia* (American beech).

Elizabeth Licata has several beds planted with eupatorium, colonsonia, and aruncus, as well as other natives.

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Project Deliverables

	2013		2014												2015												2016														
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec			
Native Niagara: Ready! Set! Grow! Program																																									
Develop Target Site list & Plant Species (have BUD & ECO review)*																																									
Finalize Site Assessment Form, Assessment Guidelines and Checklist																																									
Conduct additional Site Assessments																																									
Complete species information database & seeding timeframes																																									
Complete Field reference sheets for volunteer species identification																																									
Recruit partners & volunteers for native seed collection efforts																																									
Conduct up to 9 seed collections (2-3 completed Nov)																																									
Track plant species collected & amount to be grown (on-going)																																									
Coordinate with Saratoga on seed collection, native plants growth																																									
Arrange for return of native plants at Saratoga																																									
Create partnerships to house native plant growth locally																																									
Continue Intern training for Seed Collection Events																																									
Develop maps and GIS data set of native seed collections																																									
Develop summary report of Program																																									
Native Niagara Education & Outreach Activities																																									
Create & Update Web Content for Native Niagara Program																																									
Call for volunteers & meetings with potential volunteer orgs																																									
Press Releases & Facebook posts																																									
Invasives Education & Outreach Activities																																									
Create & Update Web Content for Invasives Events																																									
Press Releases & Facebook posts																																									
Water Chestnut Pull Events																																									
Continual Interaction with FWS																																									
Identify new locations for 2014 and 2015 pull events																																									
Scout new areas (if necessary)																																									
Recruit & Organize volunteers for pull events																																									
Conduct another 6 chestnut pull events (3/year)																																									
Document Pull Events (pics, locations, short summary, etc.)																																									

Note: Replace Saratoga Springs with local partnerships in 2015

indicates completed tasks