

Green Vendor Statement of Qualification

RFQ No. P-2634



Prepared for
Milwaukee Metropolitan
Sewerage District
260 West Seeboth Street
Milwaukee, WI 53624



Prepared by
Cardno, Inc.
5307 S. 92nd St., Suite 123
Hales Corners, WI 53130
414.858.9320
www.cardno.com



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Qualifications and Experience

Founded in 1945, Cardno is a professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage and deliver sustainable projects and community programs.

In the Americas Region, Cardno offers services through five operating Divisions. The Engineering and Environmental Services Division provides multidisciplinary services to public and private clients. Key areas of specialization include a full range of ecological consulting and restoration services, with expertise in watershed planning, stream and ecosystem restoration, mitigation design, full wetland services, endangered species consulting, natural systems for stormwater/wastewater, archaeology, and green infrastructure, as well as streamlined regulatory permitting and compliance. The Cardno Native Plant Nursery provides more than 350 species of native plants and seed as well as bioengineering materials and the staff expertise to create customized restoration, mitigation, and native landscape projects.

Cardno has experience retrofitting urban areas with green infrastructure stormwater solutions that reduce water runoff and increase on-site infiltration. Using an integrated design approach, we enhance existing stormwater conveyance systems by retrofitting existing hardscape areas, such as roadway medians, pedestrian paths, and parking lots, with green infrastructure solutions. For each site we study the existing conditions to understand the issues to address and determine the best combination of green infrastructure approaches, to help achieve the desired outcomes. Recent projects include:

- Green infrastructure planning, installation, and maintenance at a corporate headquarters campus in Pewaukee, Wisconsin
- Brownfield redevelopment, waterfront restoration, and green infrastructure planning for the City of Sterling, Illinois
- Metropolitan Water Reclamation District of Greater Chicago project
- Design and construction of green infrastructure for the City of Middleton, Wisconsin including rain gardens, enhanced wetlands, and floodplain connections.

Cardno's hydrologists, ecologists, water resource engineers, planners, landscape architects, and environmental economists integrate a quantitative, science-based approach with a deep understanding of ecological function and the use of native, sustainable landscapes to achieve green infrastructure performance goals. Locally, our staff has Milwaukee area experience in green infrastructure. Heather Schwar, our senior water resource engineer has acted as project manager or technical lead for large MMSD projects including the 30th Street Corridor Green Infrastructure Planning and restoration plans for the Kinnickinnic River. Additionally, senior staff such as Dan Salas and Aaron Steber have overseen construction of stream restoration and floodplain connection projects in the Milwaukee area. Restoration staff led by Andy Sleger have installed, maintained, and monitored natural area restorations, bioswale construction, and other green infrastructure components.

Our green infrastructure services include:

Site Feasibility Studies, Modeling, and Site Assessment

Planning and Design

Economic Impacts and Resource Valuation

Public Education and Involvement

Regulatory Compliance

Installation and Maintenance

Performance Monitoring

Design Standards, Ordinance

Development, and Regulatory-Driven Solutions

Native Plant Nursery

Previous Project Experience

See Appendix A for the Required Form – Attachment A, which contains examples of past project experience in planning, design, construction, and maintenance of green infrastructure projects including native landscaping, constructed wetlands, rain gardens, and bioswales.

Customer Service Approach

As an example of a conflict that arose during the course of a project and how that conflict was resolved, Cardno completed a native landscape design and implementation project for the corporate headquarters of a transmission client with a high level of security. In a typical native landscape project, Cardno specifies plants based on natural features, aesthetic goals, and maintenance. This project had an additional challenge of having to address building security requirements and corporate safety concerns. Specifically, the client did not want native vegetation designed in a way that would aid unauthorized access to the building, resulting in a security threat. The main concern was the location and height of the vegetation after fully grown—which typically occurs three years after initial planting—and the nature of vegetation maintenance. Cardno was challenged with providing a design that was responsive to security issues as well as suited to the natural conditions.

To work through this situation, the Cardno design team met with the security staff, and project team, on numerous occasions to select the appropriate vegetation type and the maintenance goals. Ultimately, final vegetation height was determined based upon the final heights of the buildings, as well as the soil type, slope, and hydrology.

In addition to the design challenges, Cardno also encountered implementation challenges. As is often the case with native landscapes, the selected contractor was not as familiar with maintaining such plantings. To overcome this obstacle, Cardno worked directly with a local landscaper to oversee portions of maintenance work. Cardno:

- Developed a program to train the local contractor on the benefits of native landscaping.
- Provided on-site mentoring for the local contractor.
- Developed a native landscape identification field tutorial for the local contractor to assist with maintenance activities.

For ongoing maintenance, Cardno typically recommends managing native prairie landscapes with prescribed fire, where possible. However, in light of heightened security concerns at this location, Cardno had to consider:

- The affects controlled burning might have on intake to the control center.
- Working with the building maintenance team to develop a burn plan for conducting controlled burns under very narrow parameters, adjusting some aspects of the control center during short durations to minimize smoke intake.
- The potential use of alternative methods of maintenance rather than controlled burns, such as mowing and spot herbicide treatments.

Through planning and coordination with the facilities maintenance team, Cardno was able to address these concerns and implement the site's first prescribed burn in spring of 2015. The facilities team observed the burn implementation and acknowledged the success of the effort.

Project Management Team Qualifications

Cardno will support the Milwaukee Metropolitan Sewerage District (District) with a team of highly qualified professionals who have extensive relevant expertise in a variety of natural resource disciplines, such as native landscaping, green infrastructure, constructed wetlands, planning and facilitation. Our proposed client manager, Heather Schwar, PE, will serve as the primary point of contact for the District. Heather brings a depth of experience managing large, complex projects for the District and elsewhere in Wisconsin. Our proposed technical leads for this contract are senior level consultants who have been recognized for their excellent performance supporting projects directly related to the anticipated projects described in the RFQ. These task leads will be supported by key technical staff who have demonstrated proficiency in all the technical specialties required for these projects. Resumes for Dan and other key professional staff listed in our organization chart below (Figure 1) are located in Appendix B.

In addition to the individuals identified, the entire Cardno staff at each office within the Midwest region is available to assist and address your specific project needs ensuring your project is completed on time and meets expectations. This highly skilled group has diverse technical experience in project management, environmental science, wetland science, aquatic and wildlife biology, botany, ornithology, habitat restoration, water resources engineering, cultural resources, ecological restoration, and native plants.

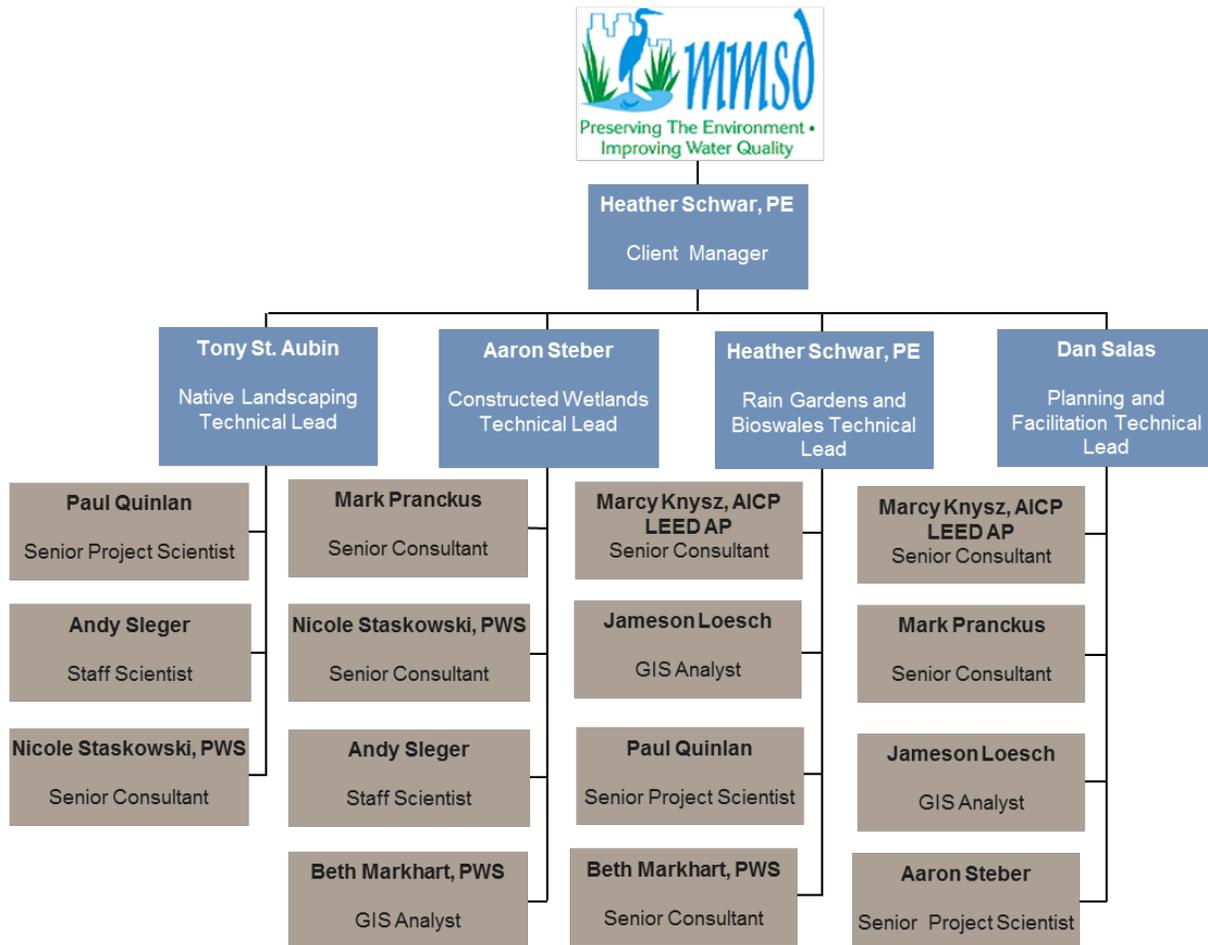


Figure 1. Team Organization Chart

Project References

See Appendix A (Required Form – Attachment A) for a list of project references.

Appendix A

REQUIRED FORM – ATTACHMENT A

**REQUEST FOR QUALIFICATIONS
DISTRICT GREEN INFRASTRUCTURE FUNDING PROGRAMS
GREEN VENDOR PRE-QUALIFICATION LIST
RFQ No. P-2634**

ATTACHMENT A

QUALIFICATIONS WORKSHEET

VENDOR INFORMATION

Vendor Name:

Cardno, Inc.

Address:

5307 S 92nd St Ste 123, Hales Corner, WI 53130

Tax Identification #:

45-2663666

Year Established:

1991

VENDOR'S CONTACT PERSON:

Name:

Anngie Richter

Title:

Regional Manager, Principal

Telephone #:

708-534-3450

Email:

anngie.richter@cardno.com

RESOURCE INFORMATION

Scale of Work *(check all that apply)*

- Commercial / Industrial
- Multifamily
- Residential

Specialties *(check all that apply)*

- | | |
|--|---|
| <input checked="" type="checkbox"/> Design | <input checked="" type="checkbox"/> Landscaping |
| <input type="checkbox"/> Engineering | <input checked="" type="checkbox"/> Maintenance |
| <input checked="" type="checkbox"/> Construction | <input type="checkbox"/> Plumbing |
| <input type="checkbox"/> Downspouts and Gutters | |

GI Type *(check all that apply)*

- | | |
|--|--|
| <input type="checkbox"/> Green Roofs | <input type="checkbox"/> Cisterns |
| <input type="checkbox"/> Stormwater Trees | <input type="checkbox"/> Soil Amendments |
| <input checked="" type="checkbox"/> Native Landscaping | <input checked="" type="checkbox"/> Rain Gardens |
| <input type="checkbox"/> Porous Pavement | <input checked="" type="checkbox"/> Bioswales |
| <input checked="" type="checkbox"/> Constructed Wetlands | |

XOther Planning/Facilitation

SWMBE Certified?

- Yes No

Experience

Project #1: American Transmission Company New Office Building - Landscape Design

Property Owner's: Bill Schwartz, Interstate Partners

Address/City/State/Zip: N16 W23217 Stone Ridge Drive , Suite 120, Waukesha, WI 53188, 262-506-1003

Type of green infrastructure installed (check all that apply):

- | | | |
|--|---|---------------------------------------|
| <input type="checkbox"/> Green roofs | <input type="checkbox"/> Rain Barrels | <input type="checkbox"/> Greenways |
| <input type="checkbox"/> Constructed wetlands | <input type="checkbox"/> Cisterns | <input type="checkbox"/> Rain Gardens |
| <input checked="" type="checkbox"/> Native Landscaping | <input type="checkbox"/> Stormwater Trees | <input type="checkbox"/> Other |
| <input type="checkbox"/> Porous Pavement | <input type="checkbox"/> Bioswales | |

Project #2: Ecological Assessment of Tiedeman Pond Conservancy Area & Harbor Village Northern Pike Spawning Habitat

Property Owner's: Penni Klein, City of Middleton, Wisconsin

Address/City/State/Zip: 7426 Hubbard Ave, Middleton, WI 53562, 608-827-1044

Type of green infrastructure installed (check all that apply):

- | | | |
|--|---|---------------------------------------|
| <input type="checkbox"/> Green roofs | <input type="checkbox"/> Rain Barrels | <input type="checkbox"/> Greenways |
| <input checked="" type="checkbox"/> Constructed wetlands | <input type="checkbox"/> Cisterns | <input type="checkbox"/> Rain Gardens |
| <input type="checkbox"/> Native Landscaping | <input type="checkbox"/> Stormwater Trees | <input type="checkbox"/> Other |
| <input type="checkbox"/> Porous Pavement | <input type="checkbox"/> Bioswales | |

Project #3: Voice of America MetroPark Rain Garden

Property Owner's: Teresa Barnes , Butler County Stormwater District Engineer's Office

Address/City/State/Zip: 1921 Fairgrove Ave (SR 4), Hamilton, OH 45011, 513-785-4142

Type of green infrastructure installed (check all that apply):

- | | | |
|---|---|--|
| <input type="checkbox"/> Green roofs | <input type="checkbox"/> Rain Barrels | <input type="checkbox"/> Greenways |
| <input type="checkbox"/> Constructed wetlands | <input type="checkbox"/> Cisterns | <input checked="" type="checkbox"/> Rain Gardens |
| <input type="checkbox"/> Native Landscaping | <input type="checkbox"/> Stormwater Trees | <input type="checkbox"/> Other |
| <input type="checkbox"/> Porous Pavement | <input type="checkbox"/> Bioswales | |

Project #4: Shor Park Bioretention and Wetland Demonstration Project

Property Owner's: Chris Clingman, Clermont County, Ohio – Parks

Address/City/State/Zip: 2228 Highway 50, Batavia, OH 45103, 513-732-2977

Type of green infrastructure installed (check all that apply):

- | | | |
|--|---|--|
| <input type="checkbox"/> Green roofs | <input type="checkbox"/> Rain Barrels | <input type="checkbox"/> Greenways |
| <input type="checkbox"/> Constructed wetlands | <input type="checkbox"/> Cisterns | <input checked="" type="checkbox"/> Rain Gardens |
| <input checked="" type="checkbox"/> Native Landscaping | <input type="checkbox"/> Stormwater Trees | <input type="checkbox"/> Other |
| <input type="checkbox"/> Porous Pavement | <input checked="" type="checkbox"/> Bioswales | |

Project #5: SSMMA Development of Green Infrastructure Strategic Planning and Training Tools

Property Owner's: Reggie Greenwood, South Suburban Mayors & Managers Association

Address/City/State/Zip: 1904 W 174th St, East Hazel Crest, IL 60429, 708-922-4671

Type of green infrastructure installed (check all that apply):

- | | | |
|---|---|--|
| <input type="checkbox"/> Green roofs | <input type="checkbox"/> Rain Barrels | <input type="checkbox"/> Greenways |
| <input type="checkbox"/> Constructed wetlands | <input type="checkbox"/> Cisterns | <input type="checkbox"/> Rain Gardens |
| <input type="checkbox"/> Native Landscaping | <input type="checkbox"/> Stormwater Trees | <input checked="" type="checkbox"/> Other, Planning & Facilitation |
| <input type="checkbox"/> Porous Pavement | <input type="checkbox"/> Bioswales | |

Type of Green Infrastructure(s): Native Landscaping

Project Information:

Project Name: American Transmission Company New Office Building - Landscape Design
Address/City/State/Zip: Pewaukee, Waukesha County, Wisconsin

Project Owner Information:

Owner's Name: American Transmission Company, Contact: Bill Schwartz, Interstate Partners
Address/City/State/Zip: N234 W2000 Ridgeview Parkway Court, Waukesha, WI 53187
Phone: 262-506-1003
Email: bschwartz@interstatepartners.com

Project Construction Information:

Design and Installation Vendor: Cardno, Inc.

Project Manager Name: Nicole Staskowski

Project Manager's Vendor history: currently employed no longer employed other

Email: nicole.staskowski@cardno.com

Contract information (if applicable): See Project Description

Final Contract Amount (contracted and amended if applicable): \$140,000.00

Construction Start date (contracted): September 2007

Construction Start date (actual): September 2007

Construction End date (contracted): September 2009 (Ongoing maintenance)

Construction End date (actual): September 2009 (Ongoing maintenance)

Was the project completed on-time? Yes No; Explanation:

Was the project completed on-budget? Yes No; Explanation:

Was the project completed to the owner's satisfaction? Yes No; Explanation:

Type of Green Infrastructure(s): Native Landscaping

Project Information:

Project Name: American Transmission Company, Native Plant Seeding
Address/City/State/Zip: Cottage Grove, Dane County, Wisconsin

Project Owner Information:

Owner's Name: American Transmission Company LLC, Contact: Sally Tinberg
Address/City/State/Zip: N234 W2000 Ridgeview Parkway Court, Waukesha, WI 53187
Phone: 608-877-8121
Email: stinberg@atcllc.com

Project Construction Information:

Design and Installation Vendor: Cardno, Inc.
Project Manager Name: Nicole Staskowski
Project Manager's Vendor history: currently employed no longer employed other
Email: nicole.staskowski@cardno.com
Contract information (if applicable): See Project Description
Final Contract Amount (contracted and amended if applicable): \$ 25,000.00

Start date (contracted): May 2009
Start date (actual): May 2009
End date (contracted): 2010 (Ongoing Maintenance)
End date (actual): 2010 (Ongoing Maintenance)

Was the project completed on-time? Yes No; Explanation:
Was the project completed on-budget? Yes No; Explanation:
Was the project completed to the owner's satisfaction? Yes No; Explanation:

Type of Green Infrastructure(s): Native Landscaping

Project Information:

Project Name: American Transmission Company, Superior Coastal Plain Boreal Forest Restoration
Address/City/State/Zip: Douglas County, Wisconsin

Project Owner Information:

Owner's Name: American Transmission Company LLC, Contact: Nayo Parrett
Address/City/State/Zip: N234 W2000 Ridgeview Parkway Court, Waukesha, WI 53187
Phone: 262-506-6700
Email: nparrett@atcllc.com

Project Construction Information:

Installation Vendor: Cardno, Inc.
Project Manager Name: Nicole Staskowski
Project Manager's Vendor history: currently employed no longer employed other
Email: nicole.staskowski@cardno.com
Contract information (if applicable): See attached Project Description.
Final Contract Amount (contracted and amended if applicable): \$1.6M+

Start date (contracted): January 2007
Start date (actual): January 2007
End date (contracted): Ongoing Maintenance
End date (actual): Ongoing Maintenance

Was the project completed on-time? Yes No; Explanation:
Was the project completed on-budget? Yes No; Explanation:
Was the project completed to the owner's satisfaction? Yes No; Explanation:

American Transmission Company New Office Building - Landscape Design



Client:
Interstate Partners LLC

Location:
Pewaukee, Waukesha
County, Wisconsin

Sector:
Environmental

**Start and completion
dates:**
2007- Ongoing Maintenance

**Project Manager or
Principal-in-Charge:**
Nicole Staskowski

Key Services:

- > Conservation Design-LEED
- > Detention Basin
- > Native Landscaping
- > Native Planting and Seeding
- > Prairie
- > Rain Garden

Cardno created a native landscape for a corporate campus that provided both large scale naturalized areas and ornamental plantings for the public realm.

Overview

Cardno was contracted to develop landscape and install plans for ATC's new building in Pewaukee incorporating native plants capable of little to no irrigation, tolerant of drought, and appropriate for soils present on the site. Cardno developed a plan that incorporated native plants within ornamental areas of the site, near building entrances, and along parking and walkways.

Further from built-out areas, native landscaping became more naturalized incorporating pedestrian trails, benches, and educational opportunities throughout a designed prairie. Bio-infiltration was designed along parking stalls and in open space receiving stormwater from overland flow and from pervious surfaces. Native, deep-rooted vegetation (grasses, forbs, shrubs, and trees) were designed for appropriate soils and water regimes throughout the planting areas, including the bio-infiltration areas. ATC and Interstate Partners are pursuing LEED Platinum certification.

Despite the fact that the site is composed mostly of compacted, clayey construction soils, there has been very successful establishment of native plant communities. This has been achieved primarily through proper design and selection of plant species suitable to those conditions. Long-term management of the site has also been crucial to controlling invasive species and allowing for establishment of the native communities on-site.

American Transmission Company, Native Plant Seeding



Client:
American Transmission Company
LLC

Location:
Cottage Grove, Dane
County, Wisconsin

Sector:
Environmental

**Start and completion
dates:**
2009 - Ongoing maintenance

**Project Manager or
Principal-in-Charge:**
Nicole Staskowski

Key Services:

- > Construction
- > Maintenance
- > Native Landscaping
- > Prairie
- > Restoration

Overview

American Transmission Company (ATC) retained Cardno to perform a 1.5-acre turf-to-prairie conversion at its Cottage Grove, Wisconsin facility. To prepare the site for planting, Cardno first applied herbicide on the area to be seeded with prairie plant species. Once the turf was eliminated, Cardno installed a native seed mix using a no-till drill.

Despite the 3:1 slopes on-site, the existing dead turfgrass was utilized as temporary erosion control as the native vegetation emerged. In the first growing season, as expected, the temporary cover crop and annual flowering species began to emerge. One year following installation, the prairie was in full bloom, with numerous native wildflowers, including bee-balm (bergamot), black-eyed Susan, yellow coneflower, pale purple coneflower, and purple coneflower. The prairie continues to be maintained by cutting and mowing annual weeds and through minimal herbicide applications on perennial weeds.

American Transmission Company, Superior Coastal Plain Boreal Forest Restoration



Client:
American Transmission Company
LLC

Location:
Douglas County, Wisconsin

Sector:
Environmental

**Start and completion
dates:**
2007- Ongoing

**Project Manager or
Principal-in-Charge:**
Nicole Staskowski

Key Services:

- > Assessment
- > Botanical Survey
- > Exotic Control
- > Linear Corridor
- > Mitigation
- > Monitoring
- > Native Planting/Seeding
- > Restoration
- > Woodland

Cardno designed and implemented a restoration plan to re-establish a conifer-dominated forested wetland that aligns with the State Wildlife Action Plan.

Overview

American Transmission Company hired Cardno to design and implement a restoration plan for 120 acres of required mitigation in the Superior Coastal Plain in northwestern Wisconsin. This site includes a headwater tributary of the Pokegama River, which ultimately flows into Lake Superior. Cardno worked closely with Wisconsin DNR to align the project plan with the goals of the State Wildlife Action Plan, which emphasizes reestablishment of conifer-dominated forested wetlands historically present throughout the area. The project's intent is to set in place a vegetation succession strategy that, within 10 years, will result in a variety of boreal forest tree species.

The project's initial investigation phase identified existing wetlands and plant communities, some of which included rare plant species. Full botanical inventories were completed for the site's upland forest, sedge meadow, and shrub-scrub community types. As a result, Cardno initiated a three-fold restoration plan that included removing aggressive woody species, planting boreal forest tree species, and conducting ongoing monitoring to assess the conversion's success.

Restoration and monitoring activities began in 2008, and preliminary results indicate a 96% tree survival rate, only 2% invasive species cover, and a positive increase in conifer species. Restoration activities will occur over the first three to four years of the project, while monitoring will continue through year 10 and will include inventory and protection of state-listed plant species on the site.

Type of Green Infrastructure(s): Constructed Wetlands

Project Information:

Project Name: Ecological Assessment of Tiedeman Pond Conservancy Area
Address/City/State/Zip: City of Middleton, Wisconsin

Project Owner Information:

Owner's Name: City of Middleton, Wisconsin, Contact: Penni Klein
Address/City/State/Zip: 7426 Hubbard Ave, Middleton, WI 53562
Phone: 608-827-1044
Email: pklein@ci.middleton.wi.us

Project Construction Information:

Assessment Vendor: Cardno, Inc.
Project Manager Name: Nicole Staskowski
Project Manager's Vendor history: currently employed no longer employed other
Email: nicole.staskowski@cardno.com
Contract information (if applicable): See attached Project Description.
Final Contract Amount (contracted and amended if applicable): \$10,000

Start date (contracted): March 2006
Start date (actual): March 2006
End date (contracted): August 2009
End date (actual): August 2009

Was the project completed on-time? Yes No; Explanation:
Was the project completed on-budget? Yes No; Explanation:
Was the project completed to the owner's satisfaction? Yes No; Explanation:

Type of Green Infrastructure(s): Constructed Wetlands

Project Information:

Project Name: City of Springfield Stormwater Basin Retrofit
Address/City/State/Zip: Springfield, Clark County, Ohio

Project Owner Information:

Owner's Name: City of Springfield, Ohio, Reference: Sky Schelle
Address/City/State/Zip: 76 E High St, Springfield, OH 45502
Phone: 937-324-7739
Email: sschelle@ci.springfield.oh.us

Project Construction Information:

Construction Management Vendor: Cardno, Inc.
Project Manager Name: Joel Thrash
Project Manager's Vendor history: currently employed no longer employed other
Email: joel.thrash@cardno.com
Contract information (if applicable): See attached Project Description.
Final Contract Amount (contracted and amended if applicable): \$23,700.00

Construction Start date (contracted): July 2013
Construction Start date (actual): July 2013
Construction End date (contracted): September 2013
Construction End date (actual): September 2013

Was the project completed on-time? Yes No; Explanation:
Was the project completed on-budget? Yes No; Explanation:
Was the project completed to the owner's satisfaction? Yes No; Explanation:

Type of Green Infrastructure(s): Constructed Wetlands

Project Information:

Project Name: City of Middleton, Wisconsin, Harbor Village Northern Pike Spawning Habitat
Address/City/State/Zip: Dane County, Wisconsin

Project Owner Information:

Owner's Name: City of Middleton, Wisconsin, Contact: Penni Klein
Address/City/State/Zip: 7426 Hubbard Ave, Middleton, WI 53562
Phone: 608-827-1044
Email: pklein@ci.middleton.wi.us

Project Construction Information:

Design Vendor: Cardno, Inc.

Project Manager Name: Jens Jensen

Project Manager's Vendor history: currently employed no longer employed other

Email: Not Available

Contract information (if applicable): See attached Project Description.

Final Contract Amount (contracted and amended if applicable): \$38,400

Start date (contracted): May 2010

Start date (actual): May 2010

End date (contracted): June 2013

End date (actual): June 2013

Was the project completed on-time? Yes No; Explanation:

Was the project completed on-budget? Yes No; Explanation:

Was the project completed to the owner's satisfaction? Yes No; Explanation:

Ecological Assessment of Tiedeman Pond Conservancy Area



Client:
City of Middleton, Wisconsin

Location:
Middleton, Dane County,
Wisconsin

Sector:
Environmental

**Start and completion
dates:**
2006- 2009

**Project Manager or
Principal-in-Charge:**
Nicole Staskowski

Key Services:

- > Assessment
- > Construction
- > Design Services
- > Management Plan
- > Native Planting and Seeding
- > Stormwater

Cardno is providing ongoing environmental services to implement an ecological management plan that reduces stormwater pollution into a pond.

Overview

Cardno provided an ecological assessment report for Tiedeman Pond Conservancy Area, owned by the City of Middleton, Wisconsin. Background material was gathered from the City of Middleton staff, and interviews were conducted with the general public with historical knowledge. To assess the general ecological community, Cardno conducted reconnaissance surveys of vegetation, soil borings, and water chemistry throughout one growing season. The calculated data was analysed and presented within the report. In addition, the report addressed stormwater management issues that pertain to the larger Tiedeman Pond watershed, due to the effects these issues have on the ecological integrity of the pond.

Cardno has been involved with the implementation of the Ecological Management Plan since 2006, including design, construction, and planting of five fore-bays to reduce stormwater pollutants into the pond. Cardno has also conducted native restoration work including invasive plant removal, supplemental native planting, and conversion of turf areas to prairie. Cardno continues to provide ongoing management of Tiedeman Pond.

City of Springfield Stormwater Basin Retrofit



Client:
City of Springfield, Ohio

Location:
Springfield, Clark County,
Ohio

Sector:
Environmental

**Start and completion
dates:**
2013- 2013

**Project Manager or
Principal-in-Charge:**
Joel Thrash
Michael Adams

Key Services:

- > Construction Observation
- > Native Landscaping
- > Stormwater

Cardno designed a model stormwater basin retrofit that incorporated an ecologically functional treatment wetland.

Overview

Cardno was hired to design a retrofit solution for a traditional stormwater detention facility for the City of Springfield, Ohio. The existing detention basin was originally constructed as a peak flood control basin and contained concrete-lined conveyance channels with limited residency time for water quality treatment.

Cardno's design incorporated an ecologically functional stormwater wetland treatment system that meets the Ohio Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Water Quality Volume (WQv) as well as all local municipal separate storm sewer system (MS4) post-construction runoff requirements. Cardno designed retrofit Best Management Practices (BMPs) for the basin and incorporated native vegetation at the City of Springfield Service Center to more appropriately attenuate storm water runoff from the large impervious area owned and operated by the City of Springfield.

The project was funded by the City of Springfield to serve as a model for local stakeholders to demonstrate water quality treatment practices and alternative storm water management solutions.

Cardno also worked closely with Service Center staff and outside contractors to oversee the construction of the retrofit and supervise the BMP installation. Cardno will also coordinate and supervise the planting of native wetland species.

City of Middleton, Wisconsin, Harbor Village Northern Pike Spawning Habitat



Client:
City of Middleton, Wisconsin

Location:
Dane County, Wisconsin

Sector:
Environmental

Start and completion dates:
2010- 2013

Project Manager or Principal-in-Charge:
Dan Salas

Key Services:

- > Erosion-Shoreline
- > Permitting
- > Stream

Cardno designed, permitted, obtained grant funding, performed bid administration and construction oversight to create Northern Pike spawning habitat.

Overview

Cardno assisted the City of Middleton, Wisconsin, with their plan to create Northern Pike spawning habitat within their conservancy park. The goal of the project was to create shallow seasonally flooded spawning habitat in the floodplain of Pheasant Branch Creek, which eventually drains into Lake Mendota. Northern Pike from Lake Mendota will migrate to these spawning areas during the spring to lay eggs. These spawning areas will provide a safe haven for small fry to grow before re-entering the lake. On behalf of the City of Middleton, Cardno wrote and was awarded a Dane County Land and Water Resources grant to help fund the project. Cardno also designed, permitted, performed bid administration and construction oversight for the project.

This project also utilized rootwads as a natural stabilization of Pheasant Branch Creek, just upstream of its confluence with Lake Mendota. The exposed root wads from the reused trees supply quality habitat for aquatic fauna with their many nooks and crevices. Wisconsin DNR and Dane County permits were required for this work.

Type of Green Infrastructure(s): Rain Gardens

Project Information:

Project Name: Orchid Heights Park Rain Garden

Address/City/State/Zip: Middleton, Dane County, Wisconsin

Project Owner Information:

Owner's Name: City of Middleton, Wisconsin, Contact: Penni Klein

Address/City/State/Zip: 7426 Hubbard Ave, Middleton, WI 53562

Phone: 608-827-1044

Email: pklein@ci.middleton.wi.us

Project Construction Information:

Construction Management Vendor: Cardno, Inc.

Project Manager Name: Aaron Steber

Project Manager's Vendor history: currently employed no longer employed other

Email: aaron.steber@cardno.com

Contract information (if applicable): See attached Project Description.

Final Contract Amount (contracted and amended if applicable): \$5,900

Construction Start date (contracted): October 2008

Construction Start date (actual): October 2008

Construction End date (contracted): October 2008

Construction End date (actual): October 2008

Was the project completed on-time? Yes No; Explanation:

Was the project completed on-budget? Yes No; Explanation:

Was the project completed to the owner's satisfaction? Yes No; Explanation:

Type of Green Infrastructure(s): Rain Gardens

Project Information:

Project Name: Kosair Children's Medical Center Stormwater Management
Address/City/State/Zip: 4910 Chamberlain Ln, Louisville, KY 40241

Project Owner Information:

Owner's Name: Norton Healthcare Foundation, Reference: Joseph Mudd, Client, Messer/TMG, LLC
Address/City/State/Zip: PO Box 35070, Louisville, KY 40232
Phone: (502) 426-9000
Email: JMudd@messer.com

Project Construction Information:

Construction Management Vendor: Cardno, Inc.
Project Manager Name: Danielle Thompson and Joel Thrash
Project Manager's Vendor history: currently employed no longer employed other
Email: Danielle.thompson@cardno.com and joel.thrash@cardno.com
Contract information (if applicable): See attached Project Description.
Final Contract Amount (contracted and amended if applicable): \$200,000.00

Construction Start date (contracted): January 2010
Construction Start date (actual): January 2010
Construction End date (contracted): July 2010
Construction End date (actual): July 2010

Was the project completed on-time? Yes No; Explanation:
Was the project completed on-budget? Yes No; Explanation:
Was the project completed to the owner's satisfaction? Yes No; Explanation:

Type of Green Infrastructure(s): Rain Gardens

Project Information:

Project Name: Voice of America MetroPark Rain Garden

Address/City/State/Zip: 7850 VOA Park Dr., West Chester, OH 45069

Project Owner Information:

Owner's Name: Butler County Stormwater District Engineer's Office, Reference: Teresa Barnes

Address/City/State/Zip: 1921 Fairgrove Ave (SR 4), Hamilton, OH 45011

Phone: 513-785-4142

Email: barnest@bceo.org

Project Construction Information:

Construction Management Vendor: Cardno, Inc.

Project Manager Name: Joel Thrash

Project Manager's Vendor history: currently employed no longer employed other

Email: joel.thrash@cardno.com

Contract information (if applicable): See attached Project Description.

Final Contract Amount (contracted and amended if applicable): \$3,743.33

Construction Start date (contracted): November 2008

Construction Start date (actual): November 2008

Construction End date (contracted): April 2009

Construction End date (actual): April 2009

Was the project completed on-time? Yes No; Explanation:

Was the project completed on-budget? Yes No; Explanation:

Was the project completed to the owner's satisfaction? Yes No; Explanation:

Orchid Heights Park Rain Garden



Client:
City of Middleton, Wisconsin

Location:
Middleton, Dane County,
Wisconsin

Sector:
Environmental

**Start and completion
dates:**
2008- 2008

**Project Manager or
Principal-in-Charge:**
Aaron Steber

Key Services:
> Rain Garden

Overview

Stormwater from a neighborhood including several large homes drained overland into an existing large earthen swale alongside the Orchid Heights Park Trail in Middleton, Wisconsin. This stormwater was causing erosion along the existing trail while stagnant water was collecting in low-spots near the trail. A collective group of neighbors approached the City of Middleton to inquire about available options to mitigate the stormwater issues at this site. The City of Middleton hired Cardno to find a solution to accomplish the desired goal. Cardno staff interviewed local landowners and completed a detailed survey of the entire site in order to design and install a 2,000 square foot rain garden. The rain garden was designed with an engineered soil mix and native plants to mitigate erosion and standing water at the site allowing stormwater coming from the neighborhood to slow down and infiltrate on-site. The rain garden is underlain by a 4-inch diameter perforated drainage pipe to route excess infiltrated water underneath the existing trail and into a nearby stormwater pond. The rain garden worked so well, that in 2010 it was expanded by an additional 1,000 square feet. This expansion occurred upstream of the original rain garden footprint and was connected to the original rain garden and planted with a similar mix of native species at the request of local residents.

Kosair Children's Medical Center Stormwater Management



Client:
Messer/TMG, LLC.

Location:
Louisville, Jefferson
County, Kentucky

Sector:
Environmental

**Start and completion
dates:**
2009- 2010

**Project Manager or
Principal-in-Charge:**
Danielle Thompson
Joel Thrash

Key Services:

- >
- > Bioengineering
- > Conservation Design-
LEED
- > Design Services
- > Maintenance
- > Management Plan
- > Native Planting/Seeding
- > Stormwater
- > Waterscaping

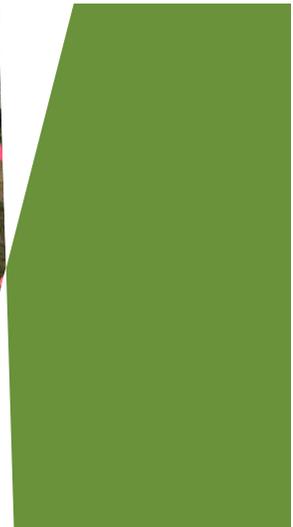
Cardno designed and installed a bioretention treatment train to provide post-construction stormwater management for a new childrens medical center.

Overview

Cardno assisted Land Development and Design (a CE/LA firm) in the stormwater design and planning phase of the LEED-certified Kosair Children's Medical Center project in Louisville, Kentucky. Cardno worked with the project architect, owner, and general contractor to design and install a bioretention 'treatment train,' or directly connected series of bioretention bioswales and bioretention biocells as a part of the post-construction stormwater management plan. These alternative stormwater BMPs were necessary to meet local MSD requirements and to satisfy the post-construction water quantity and water quality aspects of LEED Sustainable Sites credits requirements, thus eliminating and reducing runoff up to the 10-year, 24-hour storm event. Cardno's design support featured an innovative use of the Internal Water Storage concept to meet water quantity storage and water quality treatment goals.

As part of the installation phase, Cardno installed six sequentially tiered bioretention bioswales and bioretention biocells. The project required the use of more than 1,500 tons of engineered and amended soils, 920 linear feet of perforated underdrains, 8 elevated outlet structures, and more than 850 native plants. Additionally, Cardno used its design-build capabilities to design and install a nearly 100-linear-foot recirculating stream with a series of waterfalls and step pools. The waterscape receives stormwater runoff from three of the bioretention feature underdrains, and approximately 0.5 acre of impermeable roof top surface. The waterscape and receiving bioretention features are visible from the third floor of the hospital where recovering children can enjoy a unique viewpoint. Cardno's Native Plant Nursery supplied all native vegetation for the stormwater bioretention features.

Voice of America MetroPark Rain Garden



Client:
Butler County, Ohio

Location:
West Chester Township,
Butler County, Ohio

Sector:
Environmental

**Start and completion
dates:**
2008- 2009

**Project Manager or
Principal-in-Charge:**
Joel Thrash

Key Services:

- > Conservation Design-
LEED
- > Native Landscaping
- > Rain Garden
- > Stormwater

Cardno installed a highly visible and ecologically functional rain garden to capture and treat stormwater at a county park.

Overview

This 435-acre park was originally a part of the Voice of America - Bethany Relay Station. In 2000 it was conveyed to MetroParks through the Federal Lands-to-Parks Program. Much of the park's acreage remains as grassland, leading to the site's designation in 2005 as an "Important Birding Area" by Audubon Ohio. A 256-acre portion of the park originally under the jurisdiction of West Chester Township, was transferred to MetroParks in April 2008. In July 2008 the Board of Park Commissioners approved the Voice of America Park Enhancement Plan.

As part of the Enhancement Plan, Cardno provided installation of a highly visible and ecologically functional stormwater Best Management Practice (BMP) rain garden at the Voice of America MetroPark. Cardno supplied and installed all native plant materials and native landscaping as designed by the Engineers Office and Cardno.

Cardno provided necessary earthwork to establish desired grades, minor topographical adjustments to support plant diversity, construction management, native plant supply and installation, final soil and mulch placement and temporary and permanent erosion control practices. Cardno provided post planting maintenance services that included two to three maintenance trips per growing season. Maintenance trips include spot spraying invasive species, hand pulling exotic or noxious weeds, trimming, irrigation, and supplemental plantings if necessary, to provide continued support of project goals and objectives.

The Stormwater District and MetroParks have used the project to highlight the rain garden project through interpretive signage and educational events at the park. The rain garden is used to educate the public regarding aesthetically pleasing options to reduce stormwater runoff and increase infiltration of stormwater.

Type of Green Infrastructure(s): Bioswales

Project Information:

Project Name: Shor Park Bioretention and Wetland Demonstration Project
Address/City/State/Zip: Milford, Clermont County, Ohio

Project Owner Information:

Owner's Name: Clermont County, Ohio – Parks, Reference: Chris Clingman
Address/City/State/Zip: 2228 Highway 50, Batavia, OH 45103
Phone: 513-732-2977
Email: cclingman@clermontcountyohio.gov

Project Construction Information:

Design/Installation Vendor: Cardno, Inc.
Project Manager Name: Michael Adams
Project Manager's Vendor history: currently employed no longer employed other
Email: michael.adams@cardno.com
Contract information (if applicable): See attached project description.
Final Contract Amount (contracted and amended if applicable): \$84,850.00

Construction Start date (contracted): July 2013
Construction Start date (actual): July 2013
Construction End date (contracted): September 2013
Construction End date (actual): September 2013

Was the project completed on-time? Yes No; Explanation: Ongoing – Project On-Schedule
Was the project completed on-budget? Yes No; Explanation:
Was the project completed to the owner's satisfaction? Yes No; Explanation: Ongoing – Project On-Schedule

Type of Green Infrastructure(s): Bioswales

Project Information:

Project Name: American Red Cross, Design-Build Green Infrastructure Solution
Address/City/State/Zip: 2111 Dana Ave, Cincinnati, OH 45207

Project Owner Information:

Owner's Name: Neyer Properties, Reference: Charlie Pond
Address/City/State/Zip: 2135 Dana Ave, Ste 200, Cincinnati, OH 45207
Phone: (513) 563-7555
Email: CPond@neyer1.com

Project Construction Information:

Design/Installation Vendor: Cardno, Inc.
Project Manager Name: Joel Thrash
Project Manager's Vendor history: currently employed no longer employed other
Email: joel.thrash@cardno.com
Contract information (if applicable): See attached project description.
Final Contract Amount (contracted and amended if applicable): \$94,410.00

Construction Start date (contracted): May 2010
Construction Start date (actual): May 2010
Construction End date (contracted): May 2010
Construction End date (actual): May 2010

Was the project completed on-time? Yes No; Explanation:
Was the project completed on-budget? Yes No; Explanation:
Was the project completed to the owner's satisfaction? Yes No; Explanation:

Type of Green Infrastructure(s): Bioswales

Project Information:

Project Name: Cincinnati State Technical and Community College, Campus-wide LID Stormwater Project
Address/City/State/Zip: 3520 Central Pkwy, Cincinnati, OH 45223

Project Owner Information:

Owner's Name: Cincinnati State Technical and Community College, Reference: Kimberly Vasko
Address/City/State/Zip: 3520 Central Pkwy, Cincinnati, OH 45223
Phone: (513) 569-1560
Email: Kimberly.vasko@cincinnatiastate.edu

Project Construction Information:

Design/Construction Vendor: Cardno, Inc.
Project Manager Name: Scott Dierks
Project Manager's Vendor history: currently employed no longer employed other
Email: Not Available
Contract information (if applicable): See attached project description.
Final Contract Amount (contracted and amended if applicable): \$98,820.00

Construction Start date (contracted): 02/23/2010
Construction Start date (actual): 02/23/2010
Construction End date (contracted): 4/9/2012
Construction End date (actual): 4/9/2012

Was the project completed on-time? Yes No; Explanation:
Was the project completed on-budget? Yes No; Explanation:
Was the project completed to the owner's satisfaction? Yes No; Explanation:

Shor Park Bioretention and Wetland Demonstration Project



Client:
Clermont County, Ohio - Parks

Location:
Milford, Clermont County, Ohio

Sector:
Environmental

Start and completion dates:
2013- 2014

Project Manager or Principal-in-Charge:
Michael Adams

Key Services:

- > Bioswale
- > Botanical Survey
- > Construction
- > Design Services
- > Exotic Control
- > Grants
- > Native Landscaping
- > Rain Garden
- > Restoration
- > Stormwater
- > Woody Control

Cardno assists with securing grant funds and developing bioengineering solutions for a unique habitat restoration and stormwater demonstration project in southwestern Ohio.

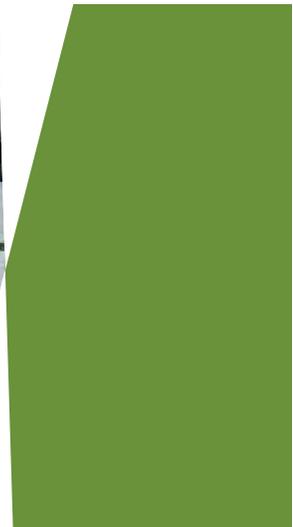
Overview

Cardno was hired to assist with a habitat restoration and stormwater improvement project at Shor Park, a 56-acre parcel of donated park land in southwestern Ohio. Cardno provided design-build stormwater management solutions, construction, native planting, and invasive species management within the context of a Habitat Management -Plan for 15 acres at the site.

Cardno designed and built an interconnected treatment train of stormwater BMPs, including bioswales and a detention basin-to-bioretention cell retrofit to filter runoff from existing parking lots. An existing turfgrass swale located within the parking lot was converted into a bio-infiltration swale that outlets into a large rain garden, designed to manage stormwater runoff from surrounding impervious areas within the Park. The area of the bio-swales and rain garden totals approximately 8,000 square feet and is planted with deep rooted native plants to encourage infiltration and runoff reduction. The project provides extended water quality volume storage within a subwatershed of the Little Miami River.

In addition to the stormwater improvements, Cardno converted approximately 10 acres of old field dominated by invasive species, into wetlands and wet prairie using multiple adaptive management restoration techniques including: invasive species management, surface grading, berm construction, native seeding, and planting. The resulting native plant community features many species of native trees, shrubs, and wildflowers. The restoration work provides a connected conservation corridor with the Cincinnati Nature Center,

American Red Cross, Design-Build Green Infrastructure Solution



Client:
Mark Spaulding Construction

Location:
Cincinnati, Hamilton
County, Ohio

Sector:
Environmental

**Start and completion
dates:**
2010- 2010

**Project Manager or
Principal-in-Charge:**
Joel Thrash

Key Services:

- > Conservation Design-LEED
- > Construction
- > Design Services
- > Engineering
- > Native Landscaping
- > Rain Garden

Cardno designed and installed green infrastructure BMPs to help reduce Combined Sewer Overflows and alleviate stormwater impacts in both the receiving watershed and local sewershed.

Overview

Cardno partnered with Neyer Properties, the American Red Cross and Spaulding Construction to provide design-build green infrastructure solutions on an approximately 2.20 acre redevelopment project in the City of Cincinnati, Ohio. Cardno worked with the Architect and site Civil Engineer to design and construct an approximately 300 linear feet bioretention swale in order to detain, infiltrate and assimilate approximately 0.5 acre-ft (164,000 gallons) of runoff up to the 2-yr, 24-hr storm event. The project was funded through a grant provided by the Metropolitan Sewer District (MSD) of Greater Cincinnati in order to remove stormwater from an overwhelmed combined sewer system and ultimately reduce the duration and extent of combined sewer overflow (CSO) events within the local sewershed.

Cardno's retrofit design necessitated the innovative use of a level spreader, custom built from perforated slotted drainage pipe, to convert concentrated (piped) stormwater flow into sheet flow and re-distribute runoff throughout the approximately 20,000 ft³ bio-retention feature, or bioswale. To complete installation activities, Cardno restoration crews placed more than 1,000 cubic yards of engineered soil, 280 linear feet of underdrains and planted approximately 1,300 native plants in 1-gallon pots, contract grown by the Cardno Native Plant Nursery. The project, equipped with a modular green roof and numerous green technologies, was submitted to the US Green Building Council (USGBC) and received LEED-Gold certification in 2011. The stormwater BMPs designed and installed by Cardno provided 4 synergistic credits in addition to meeting the local post-construction water quality, water quantity and CSO reduction goals.

Cincinnati State Technical and Community College, Campus-wide LID Stormwater Project



Client:
Woolpert Inc.

Location:
Cincinnati, Ohio

Sector:
Environmental

Start and completion dates:
2010- 2012

Project Manager or Principal-in-Charge:
Joel Thrash

Key Services:

- > Design Services
- > Management Plan
- > Stormwater

Cardno designed retrofit using porous paving, bioretention, and bioswales to significantly reduce stormwater runoff.

Overview

Cincinnati State Technical and Community College (CSTCC) needed to find a way to remove an average of 10 million gallons (MG) of stormwater annually from the Metropolitan Sewer District of Greater Cincinnati (MSDGC) combined sewer system. With a MSDGC grant Cardno created a design that retrofitted the entire 45-acre campus to permanently "remove" approximately one third the total average annual volume of runoff generated by the campus.

Cardno's design was driven by CSTCC's goal to remove an annual average of 10MG of runoff from the sewer system. Initial feasibility suggested that up to 2.7MG could be lost in evapotranspiration in an average climate year, and the remainder of the 10MG could be made up with infiltration and re-use opportunities.

Cardno created a detailed model with the freeware USEPA Storm Water Management Model (SWMM v.5.0.018) to model estimates of capture and permanent "loss" of runoff. This information was used to create a design that directed runoff through series of BMPs to maximize rhizosphere and atmospheric availability. The retrofit includes approximately 1.5 acres of porous paving systems, 1.5 acres of bioretention area, almost an acre of bioswales, and several large cisterns with pump systems for landscape irrigation.

Type of Green Infrastructure(s): Planning & Facilitation

Project Information:

Project Name: SSMMA Development of Green Infrastructure Strategic Planning and Training Tools
Address/City/State/Zip: Southern Cook County, Illinois

Project Owner Information:

Owner's Name: South Suburban Mayors & Managers Association, Contact: Reggie Greenwood
Address/City/State/Zip: 1904 W 174th St, East Hazel Crest, IL 60429
Phone: 708-922-4671
Email: reggie.greenwood@ssmma.org

Project Construction Information:

Planning Vendor: Cardno, Inc.
Project Manager Name: Megan Lewis, AICP
Project Manager's Vendor history: currently employed no longer employed other
Email: megan.lewis@cardno.com
Contract information (if applicable): See attached Project Description.
Final Contract Amount (contracted and amended if applicable): \$94,300

Start date (contracted): February 2013
Start date (actual): February 2013
End date (contracted): December 2014
End date (actual): December 2014

Was the project completed on-time? Yes No; Explanation:
Was the project completed on-budget? Yes No; Explanation:
Was the project completed to the owner's satisfaction? Yes No; Explanation:

Type of Green Infrastructure(s): Planning & Facilitation

Project Information:

Project Name: City of South Bend, Indiana Green Infrastructure Consulting
Address/City/State/Zip: South Bend, St. Joseph County, Indiana

Project Owner Information:

Owner's Name: City of South Bend, Indiana, Reference: Gary Gilot
Address/City/State/Zip: 1200 County-City Building, South Bend, IN 46601
Phone: Unknown
Email: ggilot@sbcglobal.net

Project Construction Information:

Planning Vendor: Cardno, Inc.
Project Manager Name: Christine Dittmar
Project Manager's Vendor history: currently employed no longer employed other
Email: Christine.dittmar@cardno.com
Contract information (if applicable): See attached Project Description.
Final Contract Amount (contracted and amended if applicable): \$86,000.00

Start date (contracted): January 2009
Start date (actual): January 2009
End date (contracted): 2012
End date (actual): 2012

Was the project completed on-time? Yes No; Explanation:
Was the project completed on-budget? Yes No; Explanation:
Was the project completed to the owner's satisfaction? Yes No; Explanation:

Type of Green Infrastructure(s): Planning & Facilitation

Project Information:

Project Name: Valparaiso Payment for Ecosystem Services Study
Address/City/State/Zip: Valparaiso, Porter County, Indiana

Project Owner Information:

Owner's Name: City of Valparaiso, Indiana, Contact: Sarah Hines
Address/City/State/Zip: 166 Lincolnway, Valparaiso, IN 46383
Phone: 970-498-1100
Email: shines@fs.fed.us

Project Construction Information:

Planning Vendor: Cardno, Inc.

Project Manager Name: Rod Ginter

Project Manager's Vendor history: currently employed no longer employed other

Email: Unknown

Contract information (if applicable): See attached Project Description.

Final Contract Amount (contracted and amended if applicable): \$364,000.00

Start date (contracted): December 2010

Start date (actual): December 2010

End date (contracted): 2012

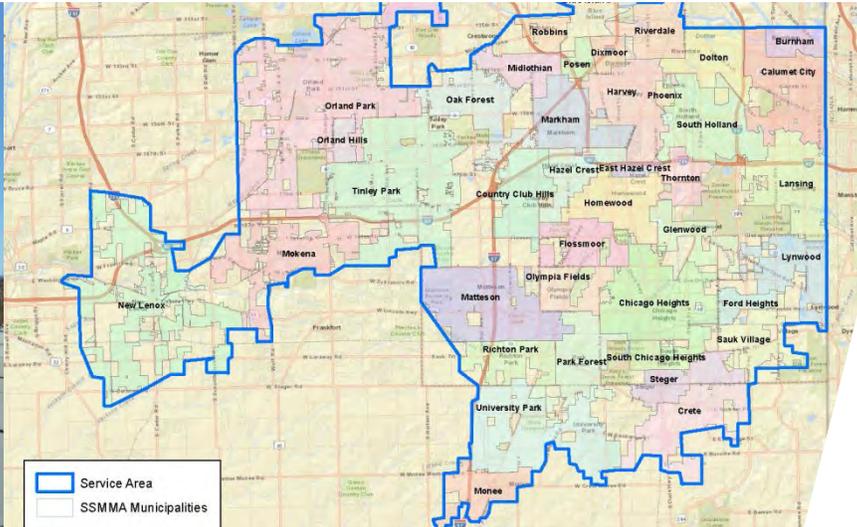
End date (actual): 2012

Was the project completed on-time? Yes No; Explanation:

Was the project completed on-budget? Yes No; Explanation:

Was the project completed to the owner's satisfaction? Yes No; Explanation:

SSMMA Development of Green Infrastructure Strategic Planning and Training Tools



Client:
South Suburban Mayors & Managers Association

Location:
Southern Cook County, Illinois

Sector:
Environmental

Start and completion dates:
2013 - 2014

Project Manager or Principal-in-Charge:
Megan Lewis

- Key Services:**
- > Public Involvement
 - > Training
 - > Economic
 - > Green Infrastructure
 - > Urban Planning
 - > Restoration
 - > Stormwater

Overview

The South Suburban Mayors and Managers Association (SSMMA), which represents 42 communities in southern Cook County, Illinois, retained Cardno to help them create a green infrastructure strategy for their service area, develop a site-specific green infrastructure plan, understand the job creation potential of green infrastructure, and create an online training tool to help encourage implementation of green infrastructure practices throughout the area.

Green Infrastructure Strategy - Working with UrbanGIS, a consulting firm that developed the South Suburban Atlas GIS system, Cardno helped SSMMA identify areas in their service area to target for green infrastructure projects, to help connect green spaces, address stormwater issues, and revitalize economically distressed areas.

Site-specific Green Infrastructure Plans - Cardno JFNew provided SSMMA with a real-world example of how to use green infrastructure for on-site stormwater management. Using the strategy data and additional site-specific data, Cardno created a green infrastructure concept plan that a developers can use to make decisions on how to use green infrastructure to meet Metropolitan Water Reclamation District of Greater Chicago (MWRD) requirements for on-site stormwater management.

Green Jobs - Cardno developed a technical memo that summarized findings that examined job creation associated with green infrastructure. SSMMA has used this memo to support a business plan that OAI Southland, a nonprofit job training and education organization, is developing to create a green infrastructure business enterprise.

Green Infrastructure Training - Cardno created an online training tool that will help disseminate information about green infrastructure and how the Atlas can be used to plan for this approach.

City of South Bend, Indiana Green Infrastructure Consulting



Client:
City of South Bend, Indiana

Location:
South Bend, St. Joseph
County, Indiana

Sector:
Environmental

**Start and completion
dates:**
2009- 2012

**Project Manager or
Principal-in-Charge:**
Christine Dittmar

Key Services:
> Consulting
> Stormwater

A comprehensive approach to green infrastructure from Cardno helped integrate a natural approach to stormwater management throughout the city.

Overview

To satisfy their USEPA Combined Sewer Overflow (CSO) mandate and in conjunction with their signing of the U.S. Conference of Mayors' Climate Protection Agreement, the City of South Bend, Indiana, sought to accelerate their transition to green infrastructure and Low Impact Development (LID). They were intent on successfully implementing infrastructure projects that have reduced environmental impact with equal or better performance than the "standard" projects they replace. The city recognized the benefits of teaming with an ecological expert to smooth the transition and contracted with Cardno to provide a series of consulting services. Cardno provided consultation to both city employees and third party contractors in the following areas:

- 1. Code and Ordinance Review.** Cardno is conducting a review of city codes and ordinances to identify potential concerns for future implementation of LID practices.
- 2. Project Review.** Cardno is reviewing proposed projects to identify specific opportunities for incorporating LID techniques, especially for projects implemented pursuant to the city's long term CSO control plan.
- 3. LID Training.** To help drive cultural change within the city organization structure, Cardno is providing training workshops and created reference materials to increase understanding of design and maintenance best management practices for city officials and third party engineers.
- 4. Best Management Practice Pamphlets.** To educate private landholders, Cardno is preparing a series of six pamphlets on using LID principles. The series will address actions landowners may take with stormwater issues on private land.

Valparaiso Payment for Ecosystem Services Study



Client:
City of Valparaiso, Indiana

Location:
Valparaiso, Porter County,
Indiana

Sector:
Environmental

**Start and completion
dates:**
2010- 2012

**Project Manager or
Principal-in-Charge:**
Ryan Allison

Key Services:

- > Design Services
- > Grants
- > Stormwater
- > Watershed

Overview

Cardno developed a Payment for Ecosystem Services (PES) valuation study for a stormwater green infrastructure auction in Valparaiso, Indiana. We helped the Northwest Indiana Regional Development Authority (RDA) and City of Valparaiso secure a \$325,000 Great Lakes Restoration Initiative (GLRI) grant.

The project was conducted in the Memorial neighborhood, selected as the priority watershed for the study due to on-going issues with basement flooding, sewer backups, and numerous Combined Sewer Overflow (CSO) events that have had adverse effects on water quality in Salt Creek, which drains to Lake Michigan. The neighborhood contains approximately 550 homes and a few small businesses, and the community as a whole is aware of and interested in stormwater issues.

The ongoing Memorial PES study has three main components: conduct a neighborhood stormwater education program and auction, develop decision support system (DSS) software to rank auction bids and manage the auction process, and design and install stormwater best management practices based on the selected bids.

Cardno teamed with RCF Economic & Financial Consulting to develop the auction process and economic valuation, and with Futurity, Inc. to develop the DSS software. The auction resulted in auction bids that were selected for installation based on two factors: the amount property owners were willing to pay and their property's suitability for the selected stormwater infrastructure, based on the amount of runoff to be captured. Cardno completed installation of the rain garden BMPs.

Beyond installing BMPs and improving understanding of the value of green infrastructure in the Memorial neighborhood, the study also intends to develop a replicable, scalable auction and outreach model that can be used throughout the Great Lakes to encourage private property owners to adopt stormwater best management practices.

Appendix B

TEAM RESUMES

Heather Schwar, PE

Current Position

Senior Water
Resources Engineer

Discipline Area

- > Hydrologic and hydraulic modeling
- > Stream Restoration analysis and design
- > Watershed Management
- > Stormwater BMP design

Years' Experience

15

Joined Cardno

2015

Education

- > MS, Civil Engineering (Water Resources), University of Wisconsin-Madison, 2002.
- > BS, Geological Engineering and Geology, University of Wisconsin-Madison, 2000.

Professional Registrations

Professional Engineer, Wisconsin (2006)
Professional Engineer, Washington (2014).

Summary of Experience

As a Senior Water Resources Engineer, Heather leads design and engineering services on watershed management and ecological engineering projects. With 15 years of experience, she focuses on water resources by evaluating and designing various hydrologic and hydraulic (H&H) projects, including stormwater programs with basin, sewer, floodplain, bridge and culvert improvements, scour analyses, stream bank protection, and stream habitat restoration. She also has expertise in numerous hydrologic and hydraulic models including Hydrologic Engineering Centers River Analysis System (HEC-RAS), Geo-River Analysis System (Geo-RAS), Hydrologic Engineering Centers-Hydrologic Modeling System (HEC-HMS), Geo-Hydrologic Modeling System (Geo-HMS), XP-Storm Water Management Model (XP-SWMM), PondPack, Culvert Master and various Geographic Information System (GIS) applications.

Significant Projects

City of Sterling, Illinois, Green Infrastructure Design/Engineering and Construction Oversight, Illinois. The City of Sterling, Illinois, located on the Rock River in western Illinois, is revitalizing its riverfront by transforming a former industrial district along the river into a mixed-use development that includes restored natural areas and open spaces. Cardno developed plans for a stormwater treatment train and upland prairie, successfully obtained grant funds to implement the project, and is serving as construction oversight manager. As the water resources engineer, Heather addresses stormwater, drainage, and green infrastructure issues during construction.

Professional Work History

Project Engineer – 30th Street Corridor Wet Weather Relief Phase 1 Preliminary Engineering and Design, MMSD – Wisconsin

Prior to joining Cardno, Heather provided engineering support for the detention basins and storm sewer design during the design phase of the 30th Street North Corridor Project. The 30th Street North Corridor has been subject to significant flooding impacts due to numerous factors such as limited storm sewer system capacity, and lack of defined and continuous overland flow paths. Hydrologic and hydraulic modeling, alternatives development and analysis, detention basin preliminary design, and stakeholder involvement/public outreach were performed. Heather used the H&H modeling (XP-SWMM) analyses, which were previously developed to investigate regional stormwater drainage problems for the one percent annual probability flood event, to determine a preferred alignment and design of storage and conveyance solutions.

Engineer – Kinnickinnic River Restoration Reach 2 Phase 1 Project, MMSD – Wisconsin

Prior to joining Cardno, Heather was a Project Engineer for this flood management and channel rehabilitation planning analysis for the Kinnickinnic (KK) River watershed. The overall project objectives include reducing flood risk by removing all

Heather Schwar, PE

structures from the 100-year floodplain, improving public safety by reducing drowning risk, providing in-stream aquatic habitat, improving aesthetics of channel and leveraging additional community objectives. For the planning study, Heather was part of the team that used hydrological and hydraulic modeling to evaluate flood management and channel rehabilitation alternatives to develop a recommended KK River Watercourse Management Plan, including a watershed-wide green infrastructure alternative, and evaluate the impacted Milwaukee County Parks.

Western Milwaukee Floodwater Management, MMSD – Wisconsin

Prior to joining Cardno, Heather developed plans and assisted with the specifications for the initial final design and worked on the preliminary plans for a redesign effort currently underway. She completed a grading plan and hydraulic models to determine the design of Schoonmaker Creek and the transition into the Menomonee River in order to reduce the risk of structural flooding in the vicinity of a 1.3-mile reach of the Menomonee River. Phase II required excavating material lying beneath the former Sears property to lower the existing floodplain and to create a riparian corridor and floodplain wetlands for the newly day-lighted Schoonmaker Creek. Project design involved a grading plan to lower more than 40 acres of floodplain and create a new one-acre floodplain wetland along Schoonmacher Creek, development of environmental features, improvement of interior drainage systems, and creating a 75-foot wide riparian corridor for over one mile along the Menomonee River.

Engineer – Wilson Park Creek Stream Rehabilitation Project, MMSD – Wisconsin

Prior to joining Cardno, Heather was a member of the hydraulics engineering for the project to restore approximately one-half mile of stream that has been channelized and contains sections that are lined with concrete. She provided design services to rehabilitate a portion of the Wilson Park Creek and design a new multi-use dry detention basin to manage flooding. The design will ultimately result in improved fish and wildlife habitat, and provide amenities for area residents and visitors.

Continuing Education

- > Managing & Understanding Sediments in Your Watershed, U.S. Army Corps of Engineers, 2010
- > LIS training for the Levee Periodic Inspections, U.S. Army Corps of Engineers, 2009
- > Stream Stability & Scour at Highway Bridges, Federal Highway Administration-National Highway Institute-135046, 2008
- > Fish Passage on Midwestern Streams: Evaluation of Stability & Functionality of Dam Removals, Constructed Fishways & Culvert Crossings, Illinois Institute of Technology, 2007
- > Using Geographic Information Systems, Wisconsin Department of Natural Resources, 2005
- > Succeeding with a Dam Removal Project, University of Wisconsin-Madison, Department of Engineering Professional Development, 2004
- > Habitat Evaluation Procedure, U.S. Geological Survey/ U.S. Army Corps of Engineers, 2004
- > Hydrologic Engineering Applications for GIS, 2002
- > River Analysis with HEC-RAS, 2002

Daniel Salas

Current Position

Senior Consultant

Discipline Area

- > Stream/shoreline restoration design, permitting, and management
- > Wetland delineation, restoration, permitting, and management
- > Geographic Information Systems (GIS) analysis and cartography
- > Erosion control design, installation, and inspection
- > Conservation and natural resource management planning
- > Invasive species control planning and management
- > Application of the Rosgen Natural Channel Classification System and Natural Channel Design
- > Ecological restoration planning, design, installation and management
- > Grant writing and management

Years' Experience

18

Joined Cardno

2006

www.cardno.com

Summary of Experience

Dan manages ecological restoration, stream and shoreline restoration, conservation planning, habitat assessment, endangered and threatened species inventory, and mitigation design and implementation projects. He performs all aspects of project implementation, including design, permitting, construction, and monitoring. He is also experienced in GIS review, analysis, and cartography, geomorphic survey and data analysis, and grant application development and management. Dan has 18 years of experience in ecology and ecological restoration, providing clients with a depth of technical skills and understanding. He works with appropriate agencies to guide clients through the state and federal wetland and waterways permitting processes. Prior to joining Cardno, Dan performed management of natural areas and stream and riparian restoration projects.

Significant Projects

Ecological Assessment of Tiedeman Pond Conservancy Area, Wisconsin. Cardno provided an ecological assessment report for the Tiedeman Pond Conservancy Area, owned by the City of Middleton, Wisconsin. Cardno conducted reconnaissance surveys of vegetation, soils, and water chemistry throughout one season to assess the general ecological community. The report also addressed stormwater management issues that pertain to the larger Tiedeman Pond watershed, due to the effects these issues have on the ecological integrity of the pond. Cardno is responsible for long-term implementation of the plan for the City of Middleton through design and construction of sediment drop out areas, invasive species control, and supplemental emergent and savanna plantings. Dan was an ecologist and provided data analysis, report preparation, and GIS analysis and map development for the report.

Honey Creek Stream Restoration Project, Wisconsin. Cardno assisted in preparation for remedial activities at a Superfund site located in East Troy, Wisconsin. Cardno developed and implemented a stream and wetland restoration plan that focused on restoring ecological health and stability to areas impacted by the remediation. Stream restoration and enhancements involved 300 linear feet of streambed replacement and the construction of constructed riffles, rootwads, and log vanes. As project manager, Dan designed and developed construction specifications and provided construction oversight for this stream restoration project.

Creekwood Crossing Homeowners Association, Pond Restoration, Wisconsin. Cardno was contracted to restore native riparian vegetation around the perimeter of two high-profile stormwater ponds with the intention of providing erosion control and aesthetic and habitat enhancement. Cardno managed the bioengineering design, local permitting, and implementation of natural shoreline stabilization around the two ponds. Dan was the project manager for the bioengineering design and implementation of vegetative shoreline stabilization along two stormwater ponds within a residential community using bank grading, riparian and emergent wetland vegetation installation.

Education

- > BS, Forestry, Ecological Restoration, Purdue University, 2001.

Professional Registrations

- > Certified Senior Ecologist, ESA

Professional Certifications

Riverside Park Bioengineering Demonstration Project Design, Wisconsin. The City of Beloit, Wisconsin, contracted with Cardno for a 300-linear foot shoreline stabilization and enhancement project. Project components included stone toe protection, bank grading without stone, native vegetation seeding and planting, and maintenance guidelines. Dan was the project manager responsible for the project design, permitting coordination and bid document procurement. He was also responsible for the data collection and analysis on this project.

Environmental Management for Transmission Right of Way Vegetation Maintenance, Wisconsin. In an ongoing project the American Transmission Company, has retained Cardno to act on behalf of ATC as an environmental project manager for system-wide vegetation management. Working closely with the company's environmental staff, Cardno staff provides management guidance and assist vegetation management contractors in on-the-ground access planning and environmental compliance. As project manager, Dan is responsible contractor communications and coordination with ATC environmental staff.

U.S. Fish and Wildlife Service, Upper Mississippi River National Wildlife Refuge Habitat Management Planning, Wisconsin. Cardno is assisting in the development of Habitat Management Plans (HMPs) for national wildlife refuges (NWRs) across Region 3 (Midwest). This work includes assisting the Upper Mississippi River National Wildlife and Fish Refuge and its multiple divisions with facilitation and development of their own HMP. Cardno is providing technical assistance, plan review and development, and meeting facilitation services. Dan provides planning oversight, facilitation assistance, and technical support.

U.S. Fish and Wildlife Service, Big Rivers Network of National Wildlife Refuges Habitat Management Planning, Illinois, Missouri. Under an existing contract with USFWS, Cardno is assisting in the development of multiple Habitat Management Plans across Region 3 (Midwest). These sites are located in several states along the Mississippi, Missouri, and Illinois Rivers. Cardno is in the process of developing a Habitat Management Plan (HMP) for the Great River NWR Complex, including Clarence Cannon NWR, in Annada, Missouri. In addition to development of a full HMP, Cardno staff will assist in the development of other habitat plans at other refuges included within the Big Rivers Network. Cardno is conducting technical workshops, facilitating meetings, and providing technical review of plans developed by USFWS staff. Dan was the project manager and technical advisor.

- > Certified Senior Ecologist, Ecological Society of America
- > Certified Endangered Resource Reviewer, WDNR
- > MNDNR Fish Passage and Dam Removal Training
- > Rosgen Level IV: River Restoration and Natural Channel Design
- > Rosgen Level III: River Assessment and Monitoring
- > Rosgen Level II: River Morphology and Applications
- > Rosgen Level I : Applied Fluvial Geomorphology Training
- > OSHA Health and Safety Training
- > OSHA 10 Hr Construction Outreach Program
- > Wildland Firefighter Certified Training: S-130, S-190, I-100

Anthony St. Aubin

Current Position

Regional Manager

Discipline Area

- > Wetland mitigation installation/ management
- > Stream assessment and stabilization design
- > Midwest woodland, wetland, prairie plant identification
- > Bioengineering installation
- > Erosion and sediment control techniques
- > Prescription burning
- > Native seed/ plant installation
- > Ecological restoration and management techniques
- > Tree surveying /inventory methodology
- > Competence with soil penetrometer, laser level, and survey equipment
- > Planning, Site Selection and Hydrology Models for Constructed Wetlands
- > Advanced Tree Identification

Years' Experience

14

Joined Cardno

2003

www.cardno.com

Summary of Experience

Tony provides oversight and project management to ecological restoration projects across the company and serves as Principal-in-Charge for the most complicated and detailed natural resource restoration projects. With more than 15 years of natural resource experience, he is an integral part to the growth and success in developing Cardno's remediation and emergency response services area. His role includes oversight and personnel management, proposal and contract review/generation, project estimating, planning, and management, and is responsible for profitability, performance, safety, and client satisfaction. He has served on several professional organizations and has given numerous presentations and workshops on the use of native vegetation in the landscape, habitat restoration, and restoration design/planning. He has a BS in Biological Research with an emphasis in Ecology from the Loras College. Before joining Cardno, Tony worked as a forestry technician for Superior National Forest in Ely, Minnesota.

Significant Projects

Metropolitan Water Reclamation District of Greater Chicago Natural Prairie Landscape, Illinois. The project included assessing and maintaining natural prairie landscapes in order to increase the vegetative quality and density. The contract was a multi-year agreement and began in 2009. Tony was the project manager supervised the installation and stewardship of nine facilities throughout Cook County, Illinois.

Hudson River Restoration, New York. Cardno was retained to provide habitat restoration services associated with dredging in the Hudson River. Work activities included the installation and maintenance of over 100,000 locally-sourced native wetland plants and the installation of over 17 acres of native seeding. Tony served as the project assistant on the project that was successfully completed in December of 2014.

Tinley Creek Wetland Restoration, Illinois. Cardno was retained by Openlands, a Chicago area nonprofit conservation organization, to install approximately 200,000 plants on an estimated 440-acre wetland restoration site. Cardno coordinated the plant deliveries with the contract grower and Tinley Creek Woods and provided quality control. Cardno installed the plants over a six-week period. When combined with the adjacent Bartel Grassland habitat, this restoration effort will result in more than 860 acres of grassland and wetland habitat. Tony was the project manager.

WE Power - Southeast Seep Wetland Mitigation, Wisconsin. Cardno was contracted for implementation of a wetland mitigation project for WE Energies adjacent to Lake Michigan in Milwaukee County, Wisconsin. The project, known as the Southeast Seep Site, involved 3 acres of wetland restoration, 1 acre of wetland enhancement, and 16 acres of prairie and forested upland buffer plantings. Our team completed tile removal, scraping, native seed and plant installation, and dormant season mowing of woody invasive species. Tony was the project assistant responsible for this 3.3 acre wetland mitigation installation project. Installation also included 11 acres of upland prairie, and 4.5 acres of wood removal for WE Energies.

Education

- > BS, Biological Research, Loras College, 1999.

Butler Lake, Illinois. Cardno was awarded a federal contract to install 8 acres of native prairie seed, 2 acres of wetland seed, and 7,040 wetland plants as part of a USACE dredging and ecosystem restoration project. This USEPA/Chicago Wilderness award-winning project was initiated in 2006, and Cardno continues to manage the site under a contract with the Village of Libertyville. Tony was the project manager for 11.0 acres of shoreline restoration as part of an U.S. Army Corp of Engineers funded lake dredging project. The project also included the installation of 7,500 wetland plant, and 2.0 acres of wetland enhancement which involved a custom seed mix and erosion and sediment control.

Greater Chicago Auto Auction, Illinois. Cardno worked with the general contractor to design BMPs for on-site treatment of the stormwater generated on the more than 200-acre site. Following design, Cardno was awarded the contract to provide and plant wetland plugs in the wetland areas. A spillway was also constructed with bioengineering materials and native plants to fortify the stormwater wetland. Tony was the field crew supervisor responsible for crew supervision on a mitigation planting project installing 25,000 wetland plant plugs and drill seeding 26 acres.

Midewin Tallgrass Prairie, Illinois. Cardno assisted the USFS with the restoration of native prairies at the only federally-owned property managed solely for the preservation and restoration of a tall-grass prairie community. Cardno cleaned, processed, and stored the native seed collected from the site, provided ecological consulting services to control woody resprouts, and provided natural wastewater treatment design services for the site's administration facilities. Tony was the field crew supervisor responsible for crew supervision on a large scale invasive species removal project from bid preparation and submittal to successful execution and billing.

Frankfort Prairie Park, Illinois. Cardno designed and constructed the innovative landscape plan for the approximately 13-acre Frankfort Prairie Park in Frankfort, Illinois. Cardno provided design and implementation of native landscaping and restoration management on the project in 2001-2002 and continues to be involved with maintenance and monitoring services for the site. The final design included restoration and creation of nine acres of native tall grass prairie, three acres of wet prairie, and a fishing pond with native emergent vegetation lining the shorelines. Tony was the project manager responsible for the natural areas of the prairie park which was installed by Cardno in the summer of 2001. He works annually with the Village of Frankfort to prioritize and implement natural resource management objectives and goals.

Professional Certifications

- > OSHA 10-hour Safety and Health Training
- > Licensed Pesticide Applicator, Illinois, Indiana, and Wisconsin
- > Wildland Firefighter Certified Training: S-130, S-190, S290
- > Illinois Certified Burn Boss
- > Certified in CPR and First Aid
- > Registered United States Department of Agriculture (USDA) Technical Service Provider (TSP)
- > U.S. Army Corp of Engineers Certified Construction Quality Management

Aaron Steber

Current Position

Senior Project Scientist

Discipline Area

- > Stream/Shoreline Restoration Design and Project Management
- > Stream Survey/Assessment
- > Road Streams Crossings
- > Watershed Assessment and Planning
- > ERSRI ArcGIS, EPA SWMM, WinSLAMM, RiverMorph
- > Application of the Rosgen Natural Channel Classification System and Natural Channel Design
- > Permit and Grant writing/management
- > Erosion control design and management
- > Habitat restoration planning, design, installation and management
- > Geographic Information Systems (GIS) analysis and cartography
- > Riparian PFC Assessments

Years' Experience

16

Joined Cardno

2008

www.cardno.com

Summary of Experience

Aaron is a stream restoration specialist managing streambank/shoreline stabilization and habitat enhancement projects including project planning, design, grant administration, permitting, and construction oversight. He has more than 16 years of experience working with streams in: Wisconsin, Minnesota, Illinois, Iowa, Michigan, Ohio, Colorado, Montana and Idaho as well as in Finland and Costa Rica. Aaron conducts geomorphic surveys to review channel morphology/stability, and works with computer modeling software to assess the most effective methods of managing available water resources in designated areas. Aaron also provides design and construction oversight for aquatic organism passage, stormwater and water quality improvement projects as well as wetland, watershed and lake studies.

Prior to joining Cardno Aaron was the state forest hydrologist for the Idaho Department of Lands (IDL). While working for IDL, Aaron provided technical solutions to a variety of water resource issues including: stream crossings, stream restoration, erosion control, wetlands, forest-practices, mining, landslides, groundwater availability and endangered species for more than 800,000 acres of actively managed forests.

Significant Projects

Lakeview Park Rain Garden, Wisconsin. Stormwater from a parking lot and tennis courts was redirected into an approximately 1,500-square foot vegetated rain garden, which was planted with more than 500 native plant plugs and seeded with native seed suitable for the wet conditions found at the site. Aaron was the project manager responsible for providing design and construction oversight on all aspects of this project.

Orchid Heights Park Rain Garden, Wisconsin. Stormwater from several homes drained over land into an existing large earthen swale alongside Orchid Heights Park in Middleton, Wisconsin. A collective group of neighbors approached Cardno to determine available options to mitigate the standing water that collected in low spots of the main swale. To accomplish the desired goal, Cardno designed and installed a 2,000 square foot rain garden to mitigate standing water at the site. Aaron was the project manager responsible for the design, construction and construction oversight.

Fairfield Ravine Streambank Stabilization, Illinois. Cardno provided Civiltech with design and construction services on a streambank/ ravine stabilization project for the Lake County Forest Preserve in Wauconda, Illinois. The project site was approximately 500 linear feet of eroding stream channel in a ravine with eroding slopes. The channel connects to a newly constructed stormwater basin at the top of the reach and flows into a wetland. Cardno designed and provided construction oversight for stabilization of the ravine. The design included cross vane grade control structures and regrading the slopes and developing a new channel configuration to stabilize the project area. Wetland habitat structures were constructed at the bottom of the reach.

Education

- > MS, Hydrology and Watershed Management, University of Minnesota, 2005.
- > BS, Water and Soil Resources, University of Minnesota, 2002.

Professional Certifications

Lakeview Park Stormwater Detention Basin, Wisconsin. Cardno, in conjunction with Nahn & Associates, designed and installed an one-acre stormwater detention basin with enhanced habitat in Lakeview Park in the City of Middleton, Wisconsin. This project was designed to improve the water quality of stormwater flowing into Lake Mendota by trapping suspended sediments and phosphorus. An innovative approach was used to enhance the habitat using sections of large trees that had been removed from the site as part of a nearby streambank stabilization project for the City of Middleton. As project manager, Aaron oversaw the design and construction of the project.

- > Rosgen Level IV: River Restoration and Natural Channel Design
- > Rosgen Level III: River Assessment and Monitoring
- > Rosgen Level II: River Morphology and Applications
- > Rosgen Level I : Applied Fluvial Geomorphology
- > Wal-Mart Certified Stormwater Professional, 2008, 2009, 2010, 2011
- > Idaho Panhandle Certified Stormwater and Erosion Control Professional
- > Wildland Firefighter Training: Type 2: I-100; S-130; S-190; L-180; RT-130
- > OSHA 40-Hour Hazwoper certification
- > OSHA 10-Hour Construction Outreach certification
- > OSHA General Industry Certification
- > Certified in CPR and First Aid

Andrew Sleger

Current Position

Field Technician

Discipline Area

- > Supervising field crews
- > Exotic & invasive species control
- > GIS/GPS
- > Wetland delineation
- > Prescribed burn field crew
- > Gypsy Moth monitoring & implementation of control measures
- > Trail design & planning
- > Construction oversight
- > Pre-bid site survey
- > Machinery operation

Years' Experience

5

Joined Cardno

2010

Education

- > BS, Conservation & Environmental Studies, University of Wisconsin, Madison, 2010.

Summary of Experience

Andy assists in the management and field implementation of many different restoration and maintenance projects. Currently based in the Madison, Wisconsin office, he has 5 years' experience in natural resource management and ecological restoration mostly in prairie and oak savanna settings. Andy implements techniques in restoration ecology including invasive species control and native seed and plant installation. He also assists with execution of day-to-day operations of field crews and equipment maintenance.

Significant Projects

American Transmission Company, Native Plant Seeding, Wisconsin. Cardno was contracted to design and install a turf-to-prairie conversion on transmission company property in eastern Dane County, Wisconsin. Our team designed a species mix that emphasized showy plants throughout the year. Site preparation and installation of the seed mix was facilitated by proactive education of employees and ownership in the project. As a field technician, Andy executed field maintenance and plantings of the prairie restoration.

American Transmission Company, Superior Coastal Plain Boreal Forest Restoration, Wisconsin. Cardno completed mitigation design for a 140-acre site designed to compensate for impacts to a new transmission line corridor. The project is consistent with the State Wildlife Action Plan and includes restoration of historical boreal forest wetland communities and associated uplands within the Pokegama-Carnegie State Natural Area. The project's intent is to set in place a vegetation succession strategy that, within 10 years, will result in a positive trajectory of boreal forest tree species on the site. Restoration activities occurred the first 4 years of the project, while monitoring will continue through year 10. Andy was a field crew supervisor for day laborers and assisted with site restoration. This work has included tree planting and invasive control throughout the site.

Wisconsin Department of Transportation Invasive Species Control, Wisconsin. As part of a master contract, Cardno performed invasive species control on Wisconsin DOT properties. The sites included highway rights-of-way and mitigation sites. As a project field supervisor, Andy was responsible for performing invasive species control and prescribed burns on numerous sites across the state.

Village of Mukwonago, Vegetation Monitoring, Wisconsin. A wetland mitigation site in Waukesha County, Wisconsin, required monitoring services to determine whether the bank was in compliance with Wisconsin DNR permits. Cardno created a monitoring protocol based on criteria outlined in the permits and conducted a floristic quality assessment (FQA) of the site. Andy assisted with project management, design of seed mixes, and field supervision pertaining to invasive species management, planting and subsequent maintenance.

Infiltration Basin Repair, Wisconsin. The Wisconsin Department of Military Affairs retained Cardno to design and install a native forb and grass landscape to re-vegetate the failed bioswale plantings at Camp Williams, a military facility at Camp

Professional History

Douglas, Wisconsin. To help ensure the site achieves long-term success, Cardno is providing on-going maintenance activities to suppress invasive species so that the native vegetation can become established. As a field supervisor, Andy conducted installation and maintenance of native forbs and grass plugs.

University of Wisconsin-Madison Arboretum – Madison, Wisconsin

As a student (2006-2009) and volunteer (2007-present), Andy has provided implementation of restoration directives using volunteer labor in the field. Restoration projects included the planting and maintenance of tallgrass prairie, oak savanna, Native American Effigy Mounds, and native forest communities. The primary objective of these projects is education of volunteers in ecological restoration in a hands-on, low-impact setting. Only hand tools are ever used with volunteers. Andy was also involved in many special projects at the Arboretum including Gypsy Moth monitoring and control, trail inventory and improvement construction, interviewing student rangers, recording phenology, weather measurements, apprehension of visitors violating policies, application of herbicide, conducting controlled burns, general office and receptionist duties, equipment and vehicle maintenance.

Professional Certifications

- > Licensed Pesticide Operator, Forestry and Wetland Categories, Wisconsin
- > Wildland Firefighter Training: S130/S190/L180
- > OSHA 40-Hour HAZWOPER certification
- > Certified in CPR and First Aid

Continuing Education

- > Introductory Prescribed Fire Course, Aldo Leopold Foundation

Paul Quinlan

Current Position

Senior Project Scientist

Discipline Area

- > Erosion and sediment control techniques
- > Invasive species control
- > Native seed/ plant installation
- > Natural areas restoration
- > Plant identification
- > Prescription burning
- > Project budgeting and planning
- > Project management
- > Restoration planning and management techniques
- > Wetland mitigation installation/ management

Years' Experience

16

Joined Cardno

2014

Education

- > M.S., Environmental and Forest Biology, State University of New York – College of Environmental Science and Forestry, 1996.
- > B.S., Biology, Clarkson University, 1994.

Summary of Experience

Paul coordinates the operations of restoration teams based in the Madison, Wisconsin office, and brings his experience in ecological restoration and program management to improve efficiency and assist with business development. His responsibilities include proposal and contract generation, and project estimating, planning, and management. He designs, implements and manages ecological restoration projects that involve invasive species control, native plant establishment, wetland mitigation, and project monitoring. Paul collaborates with the Madison office and other offices to plan both short and long-term resource management activities, including crew and equipment delegation and material procurement.

Before joining Cardno, Paul worked for 11 years at Shirley Heinze Land Trust, a conservation organization in northwest Indiana, where he served as Stewardship Program Manager, then Stewardship Director.

Professional Work History

Stewardship Director – Shirley Heinze Land Trust – Valparaiso, Indiana

Prior to joining Cardno, Paul managed the Land Trust's Land Stewardship Program, and was responsible for the planning, coordination and implementation of ecological restoration activities on the Land Trust's 30 nature preserves. He helped establish and grow support from a wide range of partners and funders to increase the organization's visibility and effectiveness. He also advised the Board of Directors regarding conservation values and project selection, and assisted with the organization's accreditation process with Land Trust Alliance.

In addition to grant writing and reporting, Paul managed permanent and seasonal field staff to control invasive plants, conduct controlled burns, and establish native plant communities in a range of habitats including dune, prairie, savanna, forest, and wetland. Some of Paul's major projects there included:

- > A 65-acre savanna restoration project at Bur Oak Woods Preserve. This five-year, multi-phase effort leveraged funding sources and partnerships to remove excess trees and shrubs, re-establish the native plant community, and re-introduce prescribed burning to a fire-suppressed savanna remnant.
- > A 30-acre prairie restoration project at Gordon and Faith Greiner Nature Preserve. This project converted fallow agricultural land, formerly used for row-crop production, to a diverse, wet-mesic prairie that is now maintained with prescribed burns.
- > A 50-acre wetland restoration in the Great Marsh in Beverly Shores, Indiana. This multi-year project controlled invasive plant species including hybrid cattail, reed canary grass and common reed, with herbicide applications. This was followed by the installation of more than 20,000 plugs and several pounds of seed of various native herbaceous wetland species.
- > A 30-acre Karner Blue Butterfly (KBB) habitat restoration at Ivanhoe South Nature Preserve. Paul initiated the management of this fire-suppressed dune-and swale

remnant with the removal of a dense understory of black cherry and white mulberry from the black oak savanna. This was followed by the re-introduction of prescribed fire, reduction of the overstory canopy, control of invasive herbaceous wetland plants, and establishment of wild lupine and species used as nectar sources by KBB adults.

Environmental Technologist – Kentucky Dept. for Surface Mining Reclamation and Enforcement – Frankfort, Kentucky

Prior to joining Cardno, Paul performed environmental reviews of coal mining permit applications, which involved assessing the hydrologic, geologic and biological impacts of proposed mining operations. He reviewed applications for regulatory compliance, interpreted maps and diagrams of mining operations, and advised and corresponded with industry representatives and consultants.

Nature Preserves Stewardship Assistant – Kentucky State Nature Preserves Commission – Frankfort, Kentucky

Prior to joining Cardno, Paul wrote and revised management plans for nature preserves and natural areas, developed and compiled maps using GPS and GIS, and conducted ecological management activities on preserves, including prescribed burns.

**Professional
Certifications**

- > Wilderness First Responder, SOLO Wilderness Emergency Medicine, (2012)
- > Certified in CPR and First Aid: *CPR, AED, and First Aid for Children, Infants and Adults*, MEDIC First Aid (2013)
- > Wildland Firefighter Certification Training: S-130, S-190, I-100 (1999 and 2008)
- > Certified Pesticide Applicator, Indiana, Category 6: Right-of-Way (2011)

Continuing Education

- > Human Factors on the Fireline (L-180), National Wildfire Coordinating Group, 2008
- > Followership to Leadership (L-280), National Wildfire Coordinating Group, 2008
- > Fire Operations in the Wildland–Urban Interface (S-215), National Wildfire Coordinating Group, 2007
- > Prescribed Fire Management, Indiana Department of Natural Resources, 2003
- > Soil Erosion and Sediment Control Course, U.S. Dept. of the Interior, Office of Surface Mining, 2002
- > Subsidence Course, U.S. Dept. of the Interior, Office of Surface Mining, 2002
- > Intermediate Wildland Fire Behavior (S-290), National Wildfire Coordinating Group, 2001
- > Introduction to ArcView, Environmental Science Research Institute [ESRI] course, 2000

Mark Pranckus

Current Position

Senior Consultant

Discipline Area

- > Design and construction of agricultural and urban stormwater management techniques and Best Management Practices
- > Design and construction of streambank and shoreline stabilization projects and stream restoration projects
- > Physical and biological stream surveying and evaluation
- > Fish and invertebrate sampling and identification
- > Regulatory permitting, local, state and federal
- > Native plant identification
- > Restoration methods including exotic/invasive species control, native plant installation, erosion control and prescribed burn management

Years' Experience

14

Joined Cardno

2004

www.cardno.com

Summary of Experience

Mark leads engineering feasibility studies and manages construction of water quality improvement projects including stream restoration and watershed BMP projects. He conducts physical and biological stream surveys, aquatic habitat assessments, and fish and invertebrate sampling and identification. He also leads and conducts macroinvertebrate, fishery, habitat, and water quality surveys; develops habitat and fisheries management plans, and leads with federal, state, and local permitting for stream and water-resource related projects. He assists in the development of watershed management plans and lake diagnostic studies.

Significant Projects

Radio Tower Bay Wetland Restoration, Minnesota. Radio Tower Bay, a shallow, sheltered bay in the St. Louis River estuary was impacted in the late 1800s by two historical milling operations that deposited wood waste into the bay, reducing water depth and altering habitat. As part of the effort to de-list the St. Louis River Area of Concern (AOC), Cardno completed a feasibility study investigating opportunities to remove the wood waste and restore the bay for Minnesota Land Trust, a non-profit partner in the estuary. Additionally, Cardno completed an Environmental Assessment Worksheet (EAW) to facilitate the regulatory process and developed a construction plan set and bid documentation to remove and dewater approximately 115,000 cubic yards of material from the bay using hydraulic dredging and geotextile tubes. As project manager, Mark was responsible for leading the design and environmental assessment of the project.

St. Louis River Estuary Wild Rice Restoration Implementation Plan, Minnesota. Wild rice was once abundant in the St. Louis River estuary, providing both cultural harvest opportunities and fish and wildlife habitat. As part of the effort to restore wild rice to the estuary, Cardno was contracted by the Minnesota Department of Natural Resources to develop an estuary-wide restoration plan. Through the planning process, Cardno built a geospatial model based using existing data sets and information collected by Cardno to classify and prioritize sites for wild rice restoration within the approximate 12,000 acre estuary. The plan will be used by both Minnesota and Wisconsin and other partners over the next 10 years to restore at least 275 acres of wild rice in the St. Louis River estuary. As project manager, Mark was responsible for completing field work, facilitating the meetings among state, tribal, and non-profits partners, and developing the plan.

Save the Dunes Conservation Fund, Dunes Creek Watershed Implementation Plan, Indiana. Cardno designed and constructed multiple water quality and stormwater management improvement projects for Save the Dunes Conservation Fund (SDCF) as part of their Dunes Creek watershed management implementation project. Projects included rain gardens, bioswales, and wetland creations on private property, approximately 610 feet of bioswale and re-vegetation of a detention basin on a commercial facility, and a demonstration swale at a county-operated visitor's center. Project funding was provided by a grant received by SDCF from Indiana DEM Section 319 program funds and from matching funds provided by project partners. Mark was the project manager responsible for the design and construction

Mark Pranckus

Education:

- > MS, Biology, University of Minnesota-Duluth, 2004.
- > BS, Biology, Indiana University, 1996.

Professional Certifications:

Professional Memberships:

Continuing Education

oversight of a series of water quality improvement projects on private landowners' property, a commercial facility, and a county-operated visitor's center.

AU.S. Fish and Wildlife Service, Upper Mississippi River NWFR Habitat Management Planning, Minnesota, Illinois, Iowa, and Wisconsin. Cardno is assisting in the development of Habitat Management Plans (HMPs) for national wildlife refuges (NWRs) across Region 3 (Midwest). This work includes assisting the Upper Mississippi River National Wildlife and Fish Refuge and its multiple divisions with facilitation and development of their own HMP. Cardno is providing technical assistance, plan review and development, and meeting facilitation services. Mark is responsible for leading the Cardno planning team on this project. His duties include coordinating with USFWS staff on project progress and tasks, providing technical expertise in the selection of Resources of Concern and HMP development, and facilitating project partner meetings and workshops.

Save the Dunes – The Village at Burns Harbor Raingarden Project, Indiana. Cardno was contracted to design and construct a large rain garden at the National Association of Home Builder's National Green Building Program certified residential development in Burns Harbor, Indiana. A series of cells that capture and treat stormwater from five houses, the rain garden was designed to be integrated into the existing landscaping of each house and the overall landscaping of the development. As project manager, Mark was responsible for the design and construction of a large raingarden.

Marquette Park Ecological Restoration, Indiana. Cardno worked on a multi-faceted restoration plan for Marquette Park in Gary, Indiana. To address sedimentation issues, the team stabilized an eroding sand filter designed to filter stormwater from a parking lot. Cardno also mapped sediment depths and locations within a lagoon and provided a sediment assessment report. In addition, the team assessed the lagoon fishery and combined the historic information into a management report, and implemented a fish habitat restoration project. Cardno also provided a vegetation assessment and management recommendations to protect any endangered, threatened, or rare plant species, and naturalized a section of lagoon shoreline with native wetland vegetation. As project manager, Mark coordinated Cardno resources and reviewing project deliverables.

- > Professional Certificate of Watershed Management, Indiana Watershed Leadership Academy
- > Stream Assessment and Monitoring Training, Minnesota DNR
- > Fluvial Geomorphology and Stream Classification Training, Minnesota DNR
- > Certified in CPR and First Aid

- > American Fisheries Society
- > Indiana Chapter of AFS – Secretary/Treasurer 2008-2010
- > Indiana Lakes Management Society
- > Refuge Comprehensive Conservation Planning, National Conservation Training Center

Nicole Staskowski, PWS

Current Position

Senior Consultant

Discipline Area

- > Ecological restoration planning, design and management
- > Wetland delineation, restoration, permitting, mitigation design and management
- > Botanical inventories
- > Invasive species planning and management
- > Grant writing and administration
- > Plant taxonomy and ecological assessments
- > Prescribed burn planning and management

Years' Experience

22

Joined Cardno

1994

Education

- > BS, Botany, concentration in Environmental Science, Miami (Ohio) University, 1994.

Summary of Experience

Nicole is a Senior Consultant for Cardno in Wisconsin, providing technical and project management oversight to Cardno's ecological and regulatory projects. She has more than 20 years of wetlands and natural resource experience throughout the Midwest, primarily in Wisconsin, Minnesota, Illinois, and Indiana. Nicole assists with ecological restoration projects, natural area habitat assessments, botanical and rare species inventories, wetland delineations, mitigation design and implementation, grant coordination, and sustainable development master planning. She manages complex natural resource mitigation and restoration design and implementation projects. Nicole works with various state, federal, and local agencies to guide clients through the state and federal wetland and waterways permitting processes. She designs and implements wetland mitigation bank projects in the Midwest. Her expertise in the restoration and integration of native plant communities includes plant taxonomy and natural areas classification. Nicole has used her botanical and plant ecology skills to develop and implement vegetation community monitoring protocols for numerous projects.

Significant Projects

Ecological Assessment of Tiedeman Pond Conservancy Area, Wisconsin.

Cardno provided an ecological assessment report for the Tiedeman Pond Conservancy Area, owned by the City of Middleton, Wisconsin. Cardno conducted reconnaissance surveys of vegetation, soils, and water chemistry throughout one season to assess the general ecological community. The report also addressed stormwater management issues that pertain to the larger Tiedeman Pond watershed, due to the effects these issues have on the ecological integrity of the pond. Cardno is responsible for long-term implementation of the plan for the City of Middleton through design and construction of sediment drop out areas, invasive species control, and supplemental emergent and savanna plantings. As Project Manager, Nicole responsible for developing the ecological assessment and stormwater plan and implementation of the plan.

American Transmission Company New Office Building - Landscape Design, Wisconsin.

Cardno was contracted to develop landscape plans for ATC's new LEED registered building in Pewaukee, incorporating native plants capable of little to no irrigation, tolerant of drought, and appropriate for soils present on the site. Cardno developed a plan that incorporated native plants within ornamental areas of the site, near building entrances, along parking and walkways and installed a five-acre prairie with native vegetation. Nicole was the Project Manager responsible for all aspects of the project.

American Transmission Company, Native Plant Seeding, Wisconsin.

Cardno was contracted to design and install a turf-to-prairie conversion on transmission company property in eastern Dane County, Wisconsin. Our team designed a species mix that emphasized showy plants throughout the year. Site preparation and installation of the seed mix was facilitated by proactive education of employees and ownership in the project. As Project Manager, Nicole was responsible for design and oversight of installation.

American Transmission Company, Superior Coastal Plain Boreal Forest Restoration, Wisconsin. Cardno completed mitigation design for a 140-acre site designed to compensate for impacts to a new transmission line corridor. The project is consistent with the State Wildlife Action Plan and includes restoration of historical boreal forest wetland communities and associated uplands within the Pokegama-Carnegie State Natural Area. The project's intent is to set in place a vegetation succession strategy that, within 10 years, will result in a positive trajectory of boreal forest tree species on the site. Restoration activities occurred the first 4 years of the project, while monitoring will continue through year 10. Nicole was the Project Manager for agency coordination, mitigation design, construction, maintenance, and monitoring.

Master Plan for Graber Pond Conservancy Area, Wisconsin. Cardno was contracted to work with the City of Middleton and a landscape architecture firm to develop an ecological assessment master plan for Graber Pond, a unique kettle pond in an undeveloped portion of the city limits. The team completed field work including characterizing the existing ecological communities on site and the surrounding watershed, identifying opportunities for restoration, and creating a phased plan for implementation of restoration. Cardno is responsible for long-term implementation of the plan for the city, which includes invasive species control and supplemental emergent and savanna plantings. As Project Manager, Nicole was responsible for development of ecological components and collaboration with landscape architect firm to create Master Plan.

Coffee Creek Center, Indiana. Cardno conducted a detailed floristic inventory and assessment of this 640-acre site in Porter County, Indiana. This development highlights environmental restoration as an integral part of a 640-acre mixed use community based on innovative sustainability concepts. Cardno was integrally involved with all ecological issues on the site and was a key member of the site planning as well as the development of a non-profit organization that is responsible for long-term ecological management. Restoration design included seep springs, bottomland hardwood, emergent and wet prairie, salmonid stream, and tallgrass prairie restoration. Cardno developed and implemented restoration plans for a salmonid stream and a bottomland forest by installing bioengineering materials, native plants and seed mixes to stabilize the streambank. The Cardno Native Plant Nursery provided and installed custom-grown native wetland and prairie plants throughout the site. Cardno's experienced maintenance crew conducted prescribed burns for ecological restoration and targeted invasive species control. In addition, the Cardno-designed pavilion restroom is treated with subsurface flow constructed wetlands planted with native species selected for their effluent treatment and evapotranspiration capabilities. As Project Manager, Nicole led efforts for design, planning and implementation of ecological restoration efforts of this conservation design community that was identified by Urban Land Institute and Smithsonian Institute as an excellent example of conservation design.

- > Professional Wetland Scientist, Society of Wetland Scientists
- > WDNR Certified Endangered Resource Reviewer, August 2012

Marcy Knysz, AICP LEED AP

Current Position

Senior Consultant

Discipline Areas

- > Project Management
- > Habitat Conservation Planning
- > NPDES Compliance
- > Watershed Planning
- > NEPA & ESA Compliance
- > Wetland Permitting and Mitigation Design
- > Storm Water BMP Design
- > Grant Writing and Administration

Years' Experience

14

Joined Cardno

2013

Education

- > MS, Biology, Northern Illinois University, 1998
- > BS, Cell & Structure Biology, University of Illinois Urbana, 1996

Professional History

Summary of Experience

Marcy has over 14 years of experience in environmental resources in both the private and public sectors. Her experience encompasses project management, transportation planning, environmental consultation and coordination with federal, state and local agencies. Marcy is proficient in Clean Water Act issues and environmental regulations. She is an expert on NPDES regulations and regularly assists clients with permitting and compliance. Marcy writes technical reports and specifications, prepares NEPA documents, wetland permit applications, incidental take permit applications, Habitat Conservation Plans and consultations per the Endangered Species Act and the Illinois Endangered Species Protection Act.

Marcy specializes in green infrastructure and natural area design elements such as rain gardens, bio-infiltration basins, bio-swales, naturalized detention basins, natural area restoration and streambank stabilization. She currently serves as Watershed Coordinator for Buffalo Creek Clean Water Partnership and is in the process of writing a Watershed-Based Plan for Buffalo Creek.

Significant Projects

Village of Mount Prospect NPDES Permit Program Compliance, Illinois. Cardno was hired by the Village of Mount Prospect, Illinois, to prepare the Village's Storm Water Management Program, Public Work's Storm Water Pollution Prevention Plan, and annual reports for submittal to the Illinois Environmental Protection Agency (IEPA) for compliance with NPDES Municipal Separate Storm Sewer System (MS4) permit requirements. Cardno designed best management practices with measurable goals; provided educational materials and resources; conducted employee training; performed water quality sampling, outfall and detention basin inventories; designed an illicit discharge, detection and elimination screening and tracing program; and represented the client during IEPA audits for compliance with NPDES MS4 permit requirements. We also prepared the Pollution Prevention Plan; Operational and Maintenance Plan; Capacity, Management, Operations, and Maintenance Plan; and conducted site inspections for compliance with NPDES Combined Sewer Overflow (CSO) permit requirements. As project manager, Marcy oversaw all aspects of the project.

Village of Deerfield NPDES Permit Program Compliance, Illinois. Cardno was hired by the Village of Deerfield, Illinois, to prepare the Village's Storm Water Management Program, Public Work's Storm Water Pollution Prevention Plan and annual reports for submittal to the Illinois Environmental Protection Agency (IEPA) for compliance with NPDES Municipal Separate Storm Sewer System (MS4) permit requirements. We designed best management practices with measurable goals; provided educational materials and resources; conducted employee training; performed water quality sampling, outfall, detention basin and streambank inventories; designed an illicit discharge, detection, and elimination screening and tracing program; and represented client during IEPA audits for compliance with NPDES MS4 permit requirements. As project manager, Marcy oversaw all aspects of the project.

Environmental Consultant – Willow Park, Northfield Park District – Illinois

Prior to joining Cardno, Marcy served as the Environmental Consultant for the project, which included a new 40' x 80' storage building, pedestrian pathway, educational signs, river overlook area, soccer fields, baseball diamonds and bocce ball courts. The project

was designed to improve river water quality and enhance the natural environment through wetland restoration, native bio-swales, permeable pavers and 160 linear feet of vegetative bank stabilization on the River. Marcy worked with Lake County Stormwater Management Commission to secure funding for the project through the IEPA 319 Grant Program.

Environmental Consultant – Bannockburn Village Hall BMP Project

Prior to joining Cardno, Marcy served as the Environmental Consultant on the project team, which assisted the Village in designing plans for and receiving an IEPA 319 Grant in the amount of \$52,000. The project included a variety of Best Management Practices to improve water quality and reduce the volume and rate of storm water discharging off the Village Hall property. Improvements consisted of stabilization of 500 linear feet of existing unvegetated drainage swales, constructing permanent rock check dams to slow flow in the swales, wetland restoration in areas with bare soil and creation of two rain gardens. The addition of rain gardens, wetlands, bioswales and check dams were designed to reduce flood damage by reducing the quantity and velocity of storm water leaving the site. Elements of design included specifications for site preparation, construction, drainage, planting, maintenance, and monitoring.

Environmental Consultant – Our Lady of Perpetual Help Parish, – Glenview, Illinois

Prior to joining Cardno, Marcy served as the Environmental Consultant on the project team, which designed ten rain gardens and three acres native prairie restoration. Elements of design included specifications for site preparation, construction, drainage, planting, maintenance, and monitoring. Marcy assisted with securing funding for the project through the Illinois Department of Natural Resources Conservation 2000 Grant Program.

Environmental Consultant – Waukegan Sports Park – Waukegan, Illinois

Prior to joining Cardno, Marcy was the Environmental Consultant for a new community sports park on an existing 140-acre golf course in Waukegan, Illinois. Site design included 16.5 acres of native plantings, bioswales and rain gardens to provide additional beauty and water quality treatment. Due to the presence of regulated wetlands and regulatory floodplains, the storm water detention facilities were designed to meet the special regulations by ACOE, the IDNR, and Lake County Stormwater Management Commission. Furthermore, due to the proximity of the Waukegan Regional Airport, the detention facilities were designed within specific drawdown time. This project received the Lake County Stormwater Management Commission's 2011 Best Management Project/Development Project of the Year Award.

Certifications

- > AICP Certified Planner, American Institute of Certified Planners, 2006
- > LEED Accredited Professional; U.S. Green Building Council, 2002
- > Envision Sustainability Professional, Institute for Sustainable Infrastructure, 2014
- > Certified Professional in Erosion and Sediment Control; International Erosion Control Association, 2007
- > Certified Wetland Specialist #CWS 003; Lake County Stormwater Management Commission, 2002
- > Designated Erosion Control Inspector; Lake County Stormwater Management Commission, 2007

Elizabeth Markhart, PWS

Current Position

Senior Consultant

Discipline Area

- > Project Management
- > Watershed Planning Section 401 & 404 Permitting
- > Threatened and Endangered Species Surveys
- > Wetland and Stream Delineations
- > Wetland Permitting and Mitigation Design
- > NEPA & ESA Compliance
- > Stormwater/Green Infrastructure
- > Grant Writing and Administration

Years' Experience

24

Joined Cardno

2014

Education

- > M.S., Plant Physiology, University of Minnesota, St. Paul, 1986
- > B.A., Environmental, Population, Organismic Biology, University of Colorado, Boulder, 1979

Summary of Experience

Beth is a Senior Consultant with more than 20 years of environmental consulting experience centered in the Upper Midwest. She leads and assists with wetland delineations, habitat surveys, permit applications, mitigation projects, environmental monitoring, endangered species reviews, and all associated report writing duties. Beth is experienced in NEPA writing for several federal agencies, and plans and specification writing for wetland restoration. Her experience with a wide variety of public and private clients has addressed their project goals for ecological restoration and management, park and natural resource planning, water quality and quantity management, agricultural sustainability, compliance with numerous federal, state, and local regulations, and gaining stakeholder support through the use of Systematic Development of Informed Consent. Beth's positions have ranged from staff biologist to project manager to program supervisor, with responsibility for small, short-term to complex projects with public review and project needs from pre-planning through design, construction, and monitoring. Beth has worked extensively with engineers, planners, and contractors, and through appointments, election, and invitations to regional, state, and national level organizations for wetlands, water quality, and native plant science and education, has developed a reputation with government program staff. Based in the Twin Cities of Minneapolis/St. Paul, Beth is focusing on project development in the northern Midwest and western Great Lakes region and alliances across the Cardno team.

Professional History

Project Manager – Glacial Ridge Prairie/Wetland Restoration Monitoring – The Nature Conservancy, Minnesota

Prior to joining Cardno, Beth managed and conducted field work to pilot test the key ecological attribute methods to be used on a 5-year rotation basis for monitoring restoration progress at the largest (24,000+ acres) prairie/wetland restoration in the U.S. The test unit was 2,400 acres of dune and swale prairie wetland that was in the first five years of restoration. Inclusions of minimally disturbed seepage fen served as wetland condition reference.

Project Manager – MN and WI pipeline corridor wetland and natural community surveys – Private Client

Prior to joining Cardno, Beth managed surveys for a proposed route extending from northwest Minnesota to southeast Wisconsin (roughly 1,000 miles). Methods proposed for screening natural communities and potential listed species were proposed and accepted by state agencies, and routine wetland delineations were conducted. Multiple field crews were mobilized with responsibility for discrete corridor segments.

Wetland Scientist – Resource Management Plans – Rice Creek Watershed District, Minnesota

Prior to joining Cardno, Beth coauthored three resource management plans and drafted a Special Area Management Plan (SAMP) for use by state and federal wetland regulators in a 30,000-acre watershed area tributary to the Upper Mississippi River. The plans included completing district wide natural resources

Professional Registrations

Professional Wetland Scientist (#260), Society of Wetland Scientists, 1995

inventory, and serve as blueprints for National Pollutant Discharge Elimination System (NPDES) green infrastructure, Total Maximum Daily Loads (TMDL) implementation, and watershed-based federal and state wetland mitigation projects. Additionally, the plans meet the alternatives analysis requirements for ditch repair in accordance with Minnesota law.

Restorationist – Bruce Vento Nature Sanctuary – City of St. Paul, Minnesota

Prior to joining Cardno, Beth served to develop plans and specifications for Mississippi River floodplain terrace and bluff restoration as part of a large post-industrial clean-up and park development project. The award-winning park showcases restoration of bluff prairie, a groundwater seepage wetland system, and oak woodland and prairie. Project implementation integrated volunteer buckthorn bashing groups, respect for early Native American sacred sites, and a regional trail.

BMP Specialist – Minnesota Stormwater Manual – Minnesota Pollution Control Agency

Prior to joining Cardno, Beth served on an interdisciplinary team to prepare Minnesota's award-winning stormwater manual. Incorporating leading practices for developing green infrastructure projects, Beth prepared Appendix E to address vegetated Best Management Practices (BMPs) and the needs for issues such as salt tolerance and applications for green roofs.

Professional Certifications

- > Professional Wetland Scientist (#260), Society of Wetland Scientists, 1995
- > Certified Wetland Delineator, State of Minnesota, 2008

Jameson Loesch

Current Position

Staff Scientist

Discipline Area

- > Geographic Information Systems (GIS)
- > Spatial data analysis and management
- > GIS modeling and custom tool development
- > Mobile mapping
- > Cartographic design and map creation
- > Air photo/satellite imagery interpretation
- > Wetland delineations
- > Plant identification and surveys
- > Vegetation monitoring
- > Endangered species surveys

Years' Experience

7

Joined Cardno

2011

Education

- > MS, Geography/ Biogeography, Northern Illinois University, DeKalb, IL 2010.
- > BS, Geography, GIS emphasis, University of Wisconsin, LaCrosse, 2008.

Summary of Experience

Jameson maintains a leading role as a GIS analyst, while also providing technical support for field work. He is responsible for the acquisition/creation, management and analysis of large datasets for both small and large multi-year projects, as well as the creation of maps and figures for many of Cardno's GIS projects. With six years of experience in spatial data analysis, Jameson often works with project managers and clients to develop custom GIS tools, which help to standardize analysis and increase efficiency. Jameson also assists in field botany efforts for wetland delineations, endangered species surveys, wetland mitigation bank monitoring, botanical inventories, as well as aid in the preparation of reports.

Significant Projects

Environmental Project Management for American Transmission Company's Special Work Assignment Team, Wisconsin and Illinois. ATC hired Cardno as their sole Environmental Project Manager (EPM) for their Special Work Assignment Team (SWAT) which is focused on updating transmission lines that do not meet the new internal Study Based Ratings Methodology (SBRM) guidelines. Cardno staff is involved in projects from initial design to project closeout, including continual coordination and communication with the SWAT project team. Cardno conducts environmental reviews, completes wetland delineations, habitat assessments, endangered species surveys, cultural resource reviews, and prepares permit applications. In addition, Cardno develops and implements various ATC-required environmental plans, provide project-specific environmental training, monitoring and construction observation based on site and permit requirements. Through this continuing contract, Cardno will be involved in over 35 rebuild and maintenance projects on more than 300 miles of transmission line throughout ATC's footprint in Wisconsin and Illinois. Jameson manages all of the spatial data and is in charge of the creation and management of Environmental Access Plans for each project. His tasks include: acquisition of existing data, initial GPS unit set-up for field data collection, editing maps based on design scope changes, updating access plans and submitting final datasets to the client. Jameson also assists with field work when needed.

Vegetation Maintenance Environmental Screenings, Wisconsin. This American Transmission Company project consisted of screening of potential environmental impacts associated with right-of-way maintenance and developed a series of environmental access maps for contractors. The review of more than 9,000 miles of transmission line also consisted of endangered and threatened species impact reviews and has allowed Cardno to provide management guidance and assist contractors in on-the-ground access and planning. As a field technician, Jameson conducted environmental screenings, including endangered, threatened and rare impact review and management guidance. He created several custom GIS tools to automate the process of line set up, environmental screening, and generation of property owner lists. He also assisted the project manager in coordinating project members, QA/QC, and delivery of completed maps and data to the client. Jameson was also responsible for the management of all data used in this project.

NVCS Habitat Mapping, Ohio River Islands National Wildlife Refuge – West Virginia and Ohio. Cardno worked collaboratively with refuge staff to conduct National Vegetation Classification Standard (NVCS) habitat mapping for 23 islands within the Ohio River Islands National Wildlife Refuge. Jameson obtained multi-band NAIP imagery for use in a supervised image classification. A preliminary analysis was conducted for each island in order to break up the vegetation into distinct polygons based on spectral signature and general patterns in the vegetation. This analysis was coupled with a review of historic habitat maps for the refuge to further define the boundaries of each unique habitat polygon. Jameson also created field maps and set up GPS units for utilization in the field for conducting NVCS classifications on site. This information was used to determine specific species compositions and define a community type for each polygon. All spatial data was combined into a final dataset based on standards provided by the client, and metadata was written.

Sunkhaze Meadows National Wildlife Refuge Comprehensive Conservation Plan/Environmental Assessment (CCP/EA), Maine. Cardno is facilitating the development of the 1,300-acre refuge's Comprehensive Conservation Plan and Environmental Assessment (CCP/EA) in order to meet the Service's mandate to complete CCP's for all refuges. This plan will address issues related to habitat management, public use, and compatible uses on the refuge. The plan scope of work includes all aspects of CCP development from the beginning and continuing through to completion of the final CCP/EA for final public review and Service approval. Jameson was a project assistant for analysis of habitat type and area for management and planning purposes. He also produced maps for use in the CCP.

Presquile National Wildlife Refuge Comprehensive Conservation Plan/Environmental Assessment (CCP/EA), Virginia. Cardno is facilitating the development of the 1,300-acre refuge's Comprehensive Conservation Plan and Environmental Assessment (CCP/EA) in order to meet the U.S. Fish and Wildlife Service's mandate to complete CCPs for all refuges. The plan will address issues related to site access, public use, habitat management, and erosion control. The plan scope of work includes all aspects of CCP development from the beginning and continuing through to completion of the final CCP/EA for final public review and Service approval. Jameson was a project assistant for analysis of habitat type and area for management and planning purposes. He acquired historic aerial imagery, georeferenced data, and carried out study of erosion losses and also produced maps for use in the CCP.

John Heinz National Wildlife Refuge, Comprehensive Conservation Plan / Environmental Assessment (CCP/EA), Pennsylvania. Cardno facilitated the development of the 1,100-acre refuge's Comprehensive Conservation Plan and Environmental Assessment (CCP/EA) in order to meet the U.S. Fish and Wildlife Service's mandate to complete CCPs for all refuges. The plan scope of work included all aspects of CCP development from the beginning and continuing through to completion of the Draft CCP/EA for final public review. Jameson conducted data analysis for habitat type and area. He also produced maps for use in the CCP.

Continuing Education

- > NHI Screening and Methodology, WDNR Certified
- > Basic Wetland Delineation, WDNR
- > Feature Analyst, ESRI

About Cardno

Founded in 1945, Cardno partners with public and private clients to solve engineering, environmental, human health and social challenges. With over 300 offices worldwide, Cardno provides clients with access to over 8,000 professionals focused on delivering customized consulting solutions to plan, design and construct social and physical infrastructure.

Cardno's Americas Region encompasses operations across Canada, the United States and Latin America. Integrated services are provided through four operating lines: Natural Resources Management & Health Sciences, Engineering and Environmental Services, Government Services and Latin American Services. The region has over 4,600 professionals in over 230 offices to provide clients with locally responsive service.

Cardno currently ranks 27th on Engineering News-Record's (ENR's) 2014 Top 500 Design Firms and 30th on ENR's Top 200 Environmental Firms. Visit www.cardno.com to learn more.

Cardno is listed on the Australian Securities Exchange [ASX: CDD].