Institute for Environmental Solutions

IES 2015 Sheridan Quincy Tree Project
Fort Logan Northgate 3-8 School

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THE TREE PROJECT
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IES 2015 Sheridan Quincy Tree Project
Fort Logan Northgate 3-8 School
Final Report

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2. Executive Summary

This report documents the 2014-2016 *IES Sheridan Quincy Tree Project*. The program took place near the Sheridan Quincy Trail on school property just north of the Quincy Trail in Sheridan, Colorado. The Institute for Environmental Solutions (IES), in collaboration with the City of Sheridan, Sheridan School District No. 2, and South Suburban Parks and Recreation District developed the project to improve a well-used path section in the Sheridan community with green infrastructure. However, due to planting restrictions, the planting was moved on to school property just north of the Quincy Trail.

This report describes the project's origins, planning, implementation, and outcomes. The report and the attached appendices document the project's organizations, goals, objectives, and the stakeholders and contributions. The project's replicable design is described in detail so it can be used as a model for future community planting programs.

IES has completed many successful tree planting projects that have been the basis of the *Sheridan Quincy Tree Project*. IES completed its first planting project, *Trees for Healthy Kids and Community*, in Golden in 2011. The Tree Project followed up this project with the *Trees for a Healthy Community and Economy* in Broomfield in 2012. Since then, IES has completed four successful projects in the Wheat Ridge Greenbelt: *Revive the Greenbelt* (2012-2013), *Preserve the Greenbelt Elementary Education Program* (2013-2014), *Growing the Greenbelt Education and Ecological Health Program* (2014-2015), and the *Greenbelt Restoration and Environmental Education Network* (2015-2016). These four projects focused on improving the Greenbelt's ecological balance by increasing canopy and biological diversity, and slowing storm water runoff and erosion.

The *Sheridan Quincy Tree Project* was developed to give middle school students in Fort Logan Northgate 3-8 School's (FLN) Leadership Class the opportunity to receive real-world, hands-on lessons in community event planning and tree science, while providing much needed environmental improvement to school property. Students participated in three hands-on classroom workshops, a planting day, two site preparation events, and watering events. The program was planned by IES, with the help of UCD Master of Urban and Regional Planning student Greg Colucci and the landscape architecture and design team from DesignWorkshop. IES collaborated with the City of Sheridan, Sheridan School District No. 2 (SSDN2), and South Suburban Parks and Recreation District (SSPRD) in organizing the project. Under IES direction, students from the FLN Leadership Class planted 60 native trees on school property just north of the Quincy Trail.

The trees were cared for during spring of 2016 by FLN students, who visited the site to mulch paths and water trees. The IES Tree Project team cared for the plants during the summer of 2016, watering twice a week to ensure high survival rates on site. The current survival rate is over 90% thanks to the dedication of IES Tree Stewards.

IES encourages comments and questions. Please contact IES at solutions@i4es.org or visit our website at www.i4es.org.

3. Introduction and Overview

This Report: *Sheridan Quincy Tree Project* Final Report

This report describes the 2014-2015 IES *Sheridan Quincy Tree Project* (SQT) in Sheridan, Colorado. The Institute for Environmental Solutions (IES) created this program as a part of the Tree Project.

This report documents the development, planning, implementation, and outcomes for the *Sheridan Quincy Tree Project*, evaluates the success of the program, and makes suggestions for future environmental health and education projects. The report and attached appendices provide comprehensive details about the program's planning process, educational workshops and planting day. SQT was designed to introduce students from FLN's Leadership Class to the tenets of environmental stewardship, focusing on proper tree planting, care, and maintenance skills, while improving a vital community space in need of green infrastructure development. The program also helped develop leadership skills by guiding students in creating their own management plans to care for their planting site. This project and report aim to provide a replicable model for future environmental education programs and planting events in Sheridan and throughout the Colorado Front Range.

Institute for Environmental Solutions

The Institute for Environmental Solutions is a Denver-based independent non-profit organization that delivers scientific solutions to improve our health and environment.

The IES science and stakeholder approach to environmental improvement is objective, practical and cost-effective. IES confronts multi-faceted environmental issues such as community health, climate change, air pollution, and water pollutants that others may find too complicated or difficult to address. By maintaining a commitment to science and collaboration with people of different backgrounds, perspectives, and interests, IES provides lasting solutions for Colorado's most pressing environmental problems. Through innovative and groundbreaking projects to tackle these challenges, IES provides Colorado communities with the opportunity to make measurable improvements to the environment.

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The IES Tree Project

The Tree Project, one of IES's major ongoing programs, is dedicated to improving Colorado's cities using tree science. Through collaborative, multi-disciplinary partnerships and programs, we restore natural systems and urban green infrastructure, educate children and adults to become environmental stewards, rehabilitate, improve and maintain critical urban natural resources, and improve community health and economy.

The Tree Project facilitates collaboration among communities, businesses, and individuals to achieve environmental improvement in air and water quality, carbon sequestration, energy conservation, and storm water management with trees. Proper tree selection, planting, and maintenance improve community health and the local economy. The Tree Project assesses planting practices and vegetation benefits under various scenarios to establish optimal urban tree selection, planting, and maintenance guidelines for practical and cost effective environmental, social, and economic improvement.

IES Revive the Greenbelt planting day, April 2013

In 2010-2011, IES collaborated with Mitchell Elementary School and the City of Golden on the *Trees for Healthy Kids and Community Project* to plant 40 trees to improve the school environment, reduce air pollution and noise from the adjacent highway, control storm water, and mitigate wind. After three years, City of Golden Forester Dave Hugh described the project as "a big success," with the majority of trees still thriving.
IES partnered with the City and County of Broomfield on the *Trees for a Healthy Community and Economy Project* in 2011-2012, developing and implementing a plan to protect the environment while improving the local economy in Broomfield's emerging civic center.

In 2012-2013, the IES *Revive the Greenbelt!* program initiated a successful partnership between IES and the City of Wheat Ridge. During the program, over 200 volunteers planted more than 200 trees, removed noxious and invasive species, replaced canopy gaps, implemented strategies to improve the long-term health of the riparian ecosystem, and increased the local community's awareness of urban forestry in the Wheat Ridge Greenbelt.

In 2013-2014, IES implemented its pilot education program, the *Preserve the Greenbelt Elementary Education Program*. The program combined innovative hands-on classroom workshops, educational planting days, and volunteer tree stewardship to engage students, educators, and families from Kullerstrand Elementary, Mountain Phoenix Community School, and Wheat Ridge High School. More than 120 students participated in the workshops and the planting day, resulting in over 200 native trees and shrubs planted in the Greenbelt. The survival rate of these new trees is currently over 85%. The Colorado Alliance for Environmental Education awarded the *Preserve the Greenbelt Elementary Education Program* with its 2014 Environmental Education Award for Excellence.

In 2014-2015, IES returned to the Greenbelt and extended its collaboration with the City of Wheat Ridge to carry out the *Growing the Greenbelt Education and Environmental Health Project*. Through interactive, hands-on classroom workshops and a planting day, this program taught students from Wheat Ridge High School's Career Exploration Class about local ecology and careers in science. *Growing the Greenbelt* also united community members to remove noxious invasive vegetation and to plant over 150 new trees, shrubs, grasses, and forbs in the Greenbelt.

Students and teacher at GREEN planting day, April 2016

In the spring of 2016 IES completed the *Greenbelt Restoration and Environmental Education Network* (GREEN). GREEN gave special need students from Kullerstrand Elementary School the opportunity to complete hands-on science lessons and to have socialization outside of their classroom. The project resulted in 120 native trees, shrubs, grasses, and flowers being planted along a new trail corridor in the Wheat Ridge Greenbelt.

Based on these experiences, IES has determined that five critical factors go into successful tree planting and survival:

- Collaboration with the full range of interested stakeholders
- Careful planning of the education and planting program
- Careful selection of the planting sites and plant species to optimize survival
- Good instruction and proper planting with well-organized volunteer participation
- Appropriate maintenance plants and implementation

In 2015, IES set out to develop a new urban planting and education program. After working with the City of Sheridan to identify an area in need of ecological restoration, the Sheridan Quincy

Trail, IES designed the Sheridan Quincy Tree Project to engage local students and community members to improve the degraded space. IES received grant support from Xcel Energy, the Colorado Garden Foundation, and Patagonia Denver as well as in-kind contributions from the City of Sheridan, SSDN2, FLN, SSPRD, and DesignWorkshop. IES designed and implemented the *Sheridan Quincy Tree Project* to teach students from FLN about tree planting practices and environmental stewardship, while working to revegetate a bare and erosion-prone portion of the school district's property. The IES Tree Project will continue to build on the successes of this and other projects, working to improve the Colorado front range urban environment using tree science.

4. IES Sheridan Quincy Tree Project

After four years of successful tree plantings in Colorado's front-range communities, IES sought to become involved with a new community in need of sound scientific planning and environmental improvement through tree planting. IES partnered with the City of Sheridan to help the city improve the Sheridan Quincy Trail. Soon after, IES partnered with SSDN2 and FLN to involve local students and further community outreach to involve all interested community partners in the Sheridan community. IES also partnered with SSPRD to ensure all project planning was approved and site specific. The DesignWorkshop Foundation donated professional landscape design services to produce the project plan and design the water storage cube. The project was initially designed to improve the Quincy Trail, but because of planting restrictions (see below), the project was moved to school property.

FLN students at planting day, October 2015

The *Sheridan Quincy Tree Project* (SQT) was based on previous successful IES education and environmental education projects in the Wheat Ridge Greenbelt, including the award winning *Preserve the Greenbelt Elementary Education Program*. SQT included four classroom and on-site workshops and an educational planting day. It was designed to teach students from FLN's Leadership Class lessons in science, community project design, and community leadership. Students actively participated in lessons where they helped design key elements of the project, including planning the planting day, planning a stewardship program, and helping name the project. Thanks to the flexibility and support of project stakeholders, the students were able to see their plan come to life. Students planted 60 native trees on a neglected part of the Sheridan Athletic Complex in October 2015.

Project goals

The goals of the *Sheridan Quincy Tree Project* were to:

- Improve the water quality of storm water runoff, reduce erosion, and enhance the overall aesthetic appeal of the Sheridan Quincy Trail corridor.
- Engage public school students in learning about local ecology, horticultural practices, and how to improve and care for their community and urban environment.
- Foster a connection among FLN, SSDN2, the City of Sheridan, and SSPRD.
- Collaborate with local residents, nonprofit organizations, and Sheridan businesses.
- Support city initiatives to improve the Sheridan Quincy Trail.

Project objectives

The *Sheridan Quincy Tree Project* objectives were:

1. Engage stakeholders, including businesses, nonprofits, schools, and community members, to form a Stakeholder Project Advisory Committee.

The Stakeholder Project Advisory Committee consisted of all project partners and sponsors, and regularly met throughout the planning and implementation of SQT. The advice and expertise provided by the Committee during project planning and the planting day were essential to the project's success.

FLN students and volunteers at planting day, October 2015

2. Plan and develop an education program in Sheridan public schools.
3. Implement an educational planting program that includes long-term plant care and tree maintenance. Recruit and organize local volunteers. Obtain trees, shrubs, plant materials, supplies, and equipment.

The second and third objectives were designed to engage public school students in learning about ecology, horticultural practices, and how to improve and care for their community and urban environment. IES designed four classroom and on-site workshops, and a planting day with hand-on activities that taught science and leadership lessons. The students of Fort Logan Northgate 3-8's Leadership Class were hard working and passionate about the program. Their participation in the planning and the ongoing care of the trees will continue to provide them with valuable leadership lessons.

4. Review the master plan for community-wide trail improvement, analyze the needs of the project location, establish priorities for remediation, and design the pilot trail planting plan and plan for long-term maintenance and sustainability.
5. Plan and implement a planting program that improved the Sheridan Quincy Trail.

Objectives 4 and 5 were designed to achieve environmental improvement and IES's Tree Project mission of improving local communities through tree science. IES worked diligently with all project partners to explore every option for the design and implementation of a planting plan that would help reduce erosion and improve storm water management, while increasing the aesthetic appeal of the trail.

6. Evaluate the program and produce a final report.

The final objective was created to make SQT into a pilot program that could be used to help plan

and implement future planting projects in the Sheridan community. Evaluation of the program is a key aspect to providing quality and innovative programs. This report completes the final objective of the project.

Fort Logan Northgate 3-8 School's Leadership Class

FLN's Leadership Class gives students the opportunity to learn leadership skills and to actively participate in projects that better their school and community. The class is an elective class for 6th through 8th grades at the school, and students must apply to participate. Teacher Sharena Del Brocco selects students based on their initiative and passion for leadership.

Twenty-six students participated in four workshops and a planting day. Students gave feedback to IES during the third workshop in the form of a class brainstorm of what they learned. The brainstorm content is in Appendix W. The students were great to work with. Their passion, enthusiasm, and desire to improve their community inspired IES throughout the planning and implementation of SQT. IES considers the partnership with the Leadership Class to be a great success and looks forward to continued work with these students during site maintenance and future planting programs.

The SQT planting plan

Greg Colucci, MURP student, and the discovery of planting restrictions

IES was contacted in September 2014 about providing an internship for a University of Colorado-Denver, Master of Urban and Regional Planning (MURP) student. IES submitted a proposal for a student to research the ownership and regulations for the Sheridan Quincy Trail, and help IES with a planting design. Master's student Greg Colucci agreed to tackle the project. Through his research, he discovered that there are significant planting restrictions along the Quincy Trail. Restrictions include an 80-foot easement that restricts the planting of any deep rooting plants or installation of any permanent structures along the trail. His MURP Capstone Project analyzed site restrictions and the latest green infrastructure practices to give IES recommendations for a multi-year project to improve the Quincy Trail. The full report is in Appendix E.

SQT planting site prior to planting

Due to Greg's research and report, IES had to adapt the planting program so it could include tree planting and still work towards improving the Quincy Trail. IES worked diligently with all project partners to find a new site. Thanks to the cooperation of Cyndi Wright and SSDN2, IES moved the planting site off the trail and onto adjacent school property where there were no planting restrictions. The planting site is located just north of the western end of the Quincy Trail

on the Sheridan School Athletic Complex. This area needed revegetation and aesthetic improvement. Its proximity to the trail still addresses the initial goal of improving storm water runoff and reducing erosion on the Quincy Trail.

The Project Planting Plan was designed by DesignWorshop. The Planting Plan includes 60 trees of three species: catalpa, big-tooth maple, and common hackberry. The plan had all 60 trees placed in a spiral direction starting in the center of the planting site. Trees were placed 5 to 7 feet apart from each other to ensure high survival rates. Catalpa were set in the middle of the spiral and continued out until 20 were placed. Once the catalpas were used up, the plan continued with common hackberry species. The spiral completes two circles around the center point of the site before we ran out of room to place trees. The final trees were placed in lines coinciding with the last edge of the spiral. The final two three lines of trees have the end of the hackberry trees and all the big-tooth maple trees.

Fall planting

SQT marked the first time IES planted during the fall. The original plan was to plant in the spring of 2015, but site restrictions, changing the planting site, and a funding delay forced IES to delay planting. The program was delayed further by the presence of over 60 tons of dirt unexpectedly being stored on the planting site that hindered any planting.

Catalpa trees ready for planting, October 2015

Landscape architectural firm DesignWorkshop volunteered to develop the new site planting plan. DesignWorkshop professionals designed a spiraled tree layout, called The Learning Forest, including 60 native Colorado trees. The Learning Forest is a visual representation of the number of trees that could have been included on the Quincy Trail had there been no planting restrictions. Since IES had never planted in the fall, we had trouble finding the correct trees for the project late in the 2015 planting season. IES was fortunate to partner with the Colorado State Forest Service Nursery in Fort Collins to obtain all the trees with minor modifications.

The planting day occurred on October 9. Twenty-six students and 25 volunteers from IES, the City of Sheridan, SSPRD, and DesignWorkshop planted all 60 trees in a three-hour time span. IES would like to thank the volunteers for their hard work to ensure the planting was completed on schedule. Because of the residual dirt left over from storage, the topsoil was extremely tough to dig through. Volunteers from the City of Sheridan and SSPRD continually watered the ground and used pickaxes to soften the soil for the students. All planting day plans, volunteer lists, and agendas are in Appendices Z through FF. The planting day was a great success!

Site maintenance plan

The site will continue to be cared for throughout the next three years by the Leadership Class and IES volunteers. Students will water, mulch, and care for the trees. They created a maintenance plan during their third classroom workshop and have been provided with IES Tree Stewards Manuals to reference during their trips to the planting site. Students will be supervised on site by IES Tree Steward Coordinator Don Mangus and IES Tree Project team members, who will help students complete the watering and care necessary for the trees' survival.

IES and DesignWorkshop created and installed a water tank structure onsite that the students will use for watering. This structure, called the cube, is a protective structure that houses a 275-gallon plastic water storage tote tank. The cube has illustrations and infographics to teach the students and the Sheridan community about the planting project, the water cycle, and trees in Colorado. It also gives students a space to reach out to their community by posting information about their class' activity in the Learning Forest on a built-in corkboard that only the class has access to. Design plans for the cube are in Appendix Y.

Students watering during spring, 2016

Project partners and donors

IES started new partnerships with the City of Sheridan, SSDN2, FLN, and SSPRD with this project. IES developed a Memorandum of Understanding (MOU) that was signed by Sheridan Mayor Dallas Hall, and received expert advice from City Manager Devin Granbery, City Planner Jennifer Henninger and Public Works Superintendent/Stormwater Coordinator Randy Mourning. IES also signed an MOU with FLN Vice Principal Amy Kolquist and Leadership Class teacher Sharena Del Brocco. IES relied heavily on the partnership with Cyndi Wright, Director of Facilities and Transportation for SSDN2, to find a new planting site and help IES develop and implement the planting day. IES received helpful instruction and contact information from Polly Plancarte, Executive Secretary to the Superintendent at SSDN2. IES partnered with and received expert advice from Shawn Wissel, Trails and Natural Open Space Supervisor, and Greg Howe, Forestry and Horticulture Supervisor, at SSPRD. These partners were active participants in the Stakeholder Project Advisory Committee.

IES continued its partnership with the Denver office of the international landscape architectural firm DesignWorkshop, which volunteered to design both the planting plan and cube. DesignWorkshop worked with Greg Colucci to plan the spiral planting design, and worked with IES to develop content for and construct the cube.

IES received grant funding from Xcel Energy, Colorado Garden Foundation, and Patagonia Denver. Funds were used to plan and implement the program; including developing and purchasing education materials, purchasing planting supplies, and researching and developing the planting plan for the planting site.

5. Project Organization

Partnership between IES and City of Sheridan

The Sheridan Quincy Tree Project began with a new partnership between IES and the City of Sheridan. The City of Sheridan was looking for help restoring and improving vital trail sections throughout the community. IES Executive Director Carol Lyons and City Planner Jennifer Henninger both sat on a community board and began discussing relevant issues in Sheridan, including community spaces that could not be improved due to a lack of City resources. Both agreed that IES could provide outside support for the City in its goal to revitalize trail spaces through the planting of native trees species.

Shortly after, IES began writing grant applications to support a pilot project in the Sheridan community. IES grant applications were written to support the goals of the City of Sheridan to provide non-motorized transportation options for all students to get to school and adults to work. After IES successfully received a grant from Xcel Energy, the partnership was solidified and the Sheridan Quincy Tree Project was born.

Sheridan Quincy Trail

Stakeholder involvement and the Tree Project Steering Committee

IES met with project partners throughout the planning and implementation of SQT to ensure that project information was available and project partners could contribute their expertise and help plan the project. The major project partners were the City of Sheridan, SSDN2, Fort Logan Northgate 3-8 School, SSPRD, and DesignWorkshop. The City of Sheridan provided expert advice on site preparation and Sheridan planting and storm water codes, as well as planting materials for volunteers on the planting day. SSDN2 allowed IES to plant on its property, provided expert planning advice, stored all trees prior to planting, and watered the trees during the fall of 2015. FLN allowed IES to work with its students and provided collaboration on the development of all education materials. SSPRD provided planning advice, and planting day materials including water, shovels, benches, and volunteers. DesignWorkshop provided the planting and water storage cube plans, constructed the cube, and had 8 volunteers at the planting day.

The Project Stakeholder Advisor Committee meetings occurred every two to three months throughout the planning process and ensured the IES Sheridan Quincy Tree Project supported all project goals and improved the Sheridan Quincy Trail and school property. The meeting agendas are in Appendix A. During project planning stages, IES also drew from the expertise of the IES Tree Project Steering Committee, which consists of professionals in related fields and meets

every three months. At these meetings, IES Associates and graduate interns worked with the Steering Committee to develop the project's mission, goals, and objectives. Agendas for these meetings are in Appendix B.

Collaborative funding model

IES explored many avenues of possible funding for the program and prepared numerous grant applications for the project. SQT received grant funding from Xcel Energy, the Colorado Garden Foundation, and Patagonia Denver. These major funders made the project possible and were recognized through IES press releases, project materials, and on the cube.

IES explored community partnerships through a business outreach plan. IES planned and implemented business outreach in the Sheridan community, which included face-to-face, email, and phone contact. While this outreach did not result in any direct donations from Sheridan businesses, it yielded some valuable contact information and publicity that should help future IES projects in Sheridan. IES met Neil Lillard of Lillard & Clark Construction Company, Inc. in Sheridan, on planting day, as he happened to walk along the path adjacent to the site. Mr. Lillard is a big supporter of SSDN2, and made a generous contribution to the IES program. Further explanation and discussion about the business outreach is in the Community Collaboration section of this report (Chapter 9).

IES staff members, graduate interns, and Institute Associates contributed hundreds of volunteer hours to project planning, implementation, research, evaluation, public relations, business outreach, and project promotion.

Sponsors were acknowledged in the IES quarterly e-newsletter, IES social media pages, the Sheridan Community Newsletter, press releases, and on the cube. More information about the dissemination of project information and public outreach is in Chapter 9.

South Suburban Parks and Recreation Department providing mulch, October 2015

Project plan

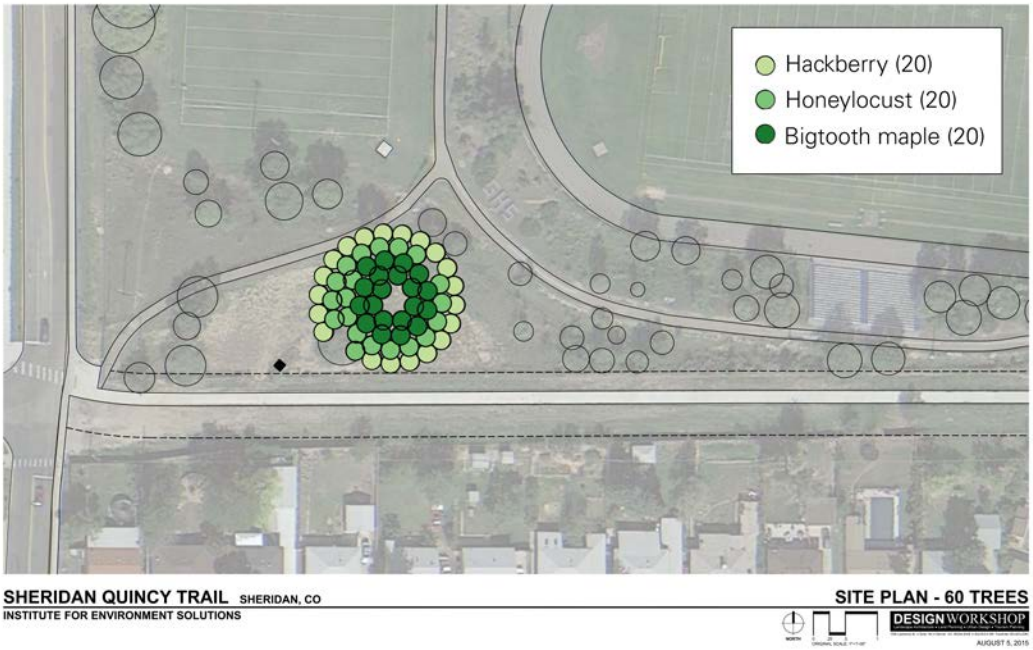
The IES Sheridan Quincy Tree Project Plan, found in Appendix C, presents the outline of the project from planning to the implementation of the final workshop. The Project Plan was prepared for the planting site and used by the IES team and our partners during the project. When planning for a project of this size, it was important to be realistic with time and resources available for each task. The plan was based on previously successful IES project models. The project had ten major components:

- Project Organization
- Project Planning

- Funding: Sponsor Recruitment
- Education Program Organization
- Site Evaluation and Preparation
- Planting Planning
- Planting Organization and Implementation
- Plan Long-term Maintenance
- PR/Communications
- Project Documentation

The project timeline is available in the Project Plan. Planning for the project began with the initial partnership between IES and the City of Sheridan in 2014. IES met with City officials to determine the area that needed the most attention from a tree planting and signed a Memorandum of Understanding with the City of Sheridan Mayor Dallas Hall on January 26, 2015. IES then began contacting other potential stakeholders and partnered with SSDN2, FLN, and SSPRD. IES met regularly with these stakeholders through the spring and summer of 2015 to discuss project plans and receive advice and comments. Once IES explored the planting restrictions on the Quincy Trail and decided to move the planting to school property, the date for a fall planting was set. IES finalized its partnership with FLN with a Memorandum of Understanding signed on September 18, 2015.

IES planned and implemented four classroom workshops and an educational planting day. The workshops were based on previous successful IES educational activities. The first two workshops took place prior to the planting day on October 9, and focused on preparing students for the planting and teaching them about leadership in project planning and implementation. The final two workshops took place after the planting and focused on educating students about tree care and helping them plan a maintenance program to care for the trees. More information about the workshops and planting day is in Chapter 10: Project Design and Events.



SQT Planting Plan

6. Community Collaboration

Many community members and organizations worked with IES to ensure that the SQT project was successful. Project collaborators provided valuable time, effort, experience and knowledge for the project. The City of Sheridan provided project planning, equipment, planting day labor and equipment, and project materials. IES's partnership with FLN resulted in strong collaboration on educational materials, workshop planning, and planting implementation. SSPRD provided project planning and advice, project supplies and materials, and planting day labor and equipment. SSDN2 provided expertise on maintenance programs, site planning and planting plans, and provided transport and care for the trees. DesignWorkshop developed the planting plan, helped prepare the site, and designed and built the cube to protect the water tank and help communicate project information to the Sheridan community.

Business outreach

FLN students on planting day, October 2015

IES planned Business Outreach in Sheridan that was completed in two phases from June 29 to July 11, 2015, by Tree Project team members Sean Mangus, John Kelly, Leiloni Shine, and Melissa Smith. The outreach was designed to build support, financially and in volunteer participation, for the SQT Project. Sheridan businesses have an interest in IES's work because we strive to create healthy communities and thriving natural environments. Involving local businesses helps to share the IES story and mission, create a buzz in the community about our programs and events, and build support for future endeavors. IES went to 21 local businesses to have direct contact with possible partners. IES dropped off project prospectus materials and talked to either a manager or receptionist at ten of the locations; ten of the remaining businesses were closed, and one did not accept solicitors. After this direct contact, IES sent out initial outreach emails to the businesses which could not be contacted in person. Of the businesses IES spoke to, many seemed excited about the project, but there were no significant donations to the project that resulted from the business outreach. The business plan and business scripts are in Appendices GG and HH.

The full-color prospectus materials included information about the project, a graph of the tiered donation system, photographs and maps of the site, and a list of project partners and partner logos. This tiered system of incentivized acknowledgment to businesses spoke directly to the designed purpose of the business outreach – to generate program support through direct donations. The prospectus materials and initial outreach emails are included in Appendix D.

IES has not yet figured out a way to successfully involve the local business community in our projects. We may need to spend more time and effort to meet and work with community leaders and selected officials. Advice on this issue would be welcome.

Video

IES planned a project video that would present the Sheridan Quincy Tree Project in visual form. We arranged for both video and still photographs to be taken at each of the workshops and the planting day. Jesse Johnson of IOTK Media was commissioned to record all project events. Mr. Johnson was present at the third and fourth workshops and the planting day, and two student videographers from Warren Tech, Daniel Baca and Michael Policarpio, filmed the second workshop and planting day in collaboration with Mr. Johnson. Volunteers and participants were interviewed about the program, workshops, planting day, and the project's future effects. To ensure the video accurately described the project, IES worked closely with Mr. Johnson while planning the video. IES prepared video outlines with suggested content, which are in Appendix II. Drafts of the video were carefully reviewed by IES staff, associates, and project partners.

IES chose to develop two project videos. There is a shorter, three-minute project video and a longer, ten-minute project video to convey the project message most effectively. IES believed that many people would be more likely to watch a three-minute video about the project than a ten-minute video, and so created two options to encourage viewer interest and closer exploration of the project. Both videos are accessible on the IES website and YouTube page.

Jesse Johnson of IOTK Media recording an IES workshop

Importance of partnership between IES and FLN

The partnership between IES and SSDN2 has been a key element to project success. The partnership with FLN resulted in a strong collaboration with multiple staff members, including Vice Principal Amy Kolquist and Leadership Class teacher Sharena Del Brocco, to implement curriculum enhancing, hands-on science and leadership education classes.

The FLN school administration and teachers evidently set a high standard for FLN student behavior and performance, which they monitor closely. IES team members were received with courtesy and enthusiasm by FLN students and staff members. This collaborative atmosphere makes a big positive difference in the success and effectiveness of this project. It also makes our work a lot more fun.

The students were wonderful and responded to all activities with enthusiasm and hard work. On the October 9, 2015 planting day, IES, 26 students and 15 volunteers planted 60 native tree saplings on the planting site. The tree species planted on site were common hackberry, bigtooth maple, and catalpa. Students completed four workshops that introduced them to tree ecology, project leadership, and watering and tree care techniques. Students planned a stewardship program for the rest of the school year, where they will visit the site two to three times a month

to water and care for trees. The student passion to learn about tree science and to work on community improvement projects inspired IES to improve the program for future years.

Without the enthusiasm and support provided by the administrators, teachers and students at FLN, the SQT Project would not have been successful. Sheridan students realized they have the power to positively change their community. IES believes that this collaboration will continue to bring positive impacts for the Sheridan community.

Importance of SSPRD and City of Sheridan's input and volunteers for planting day success

SSPRD and the City of Sheridan provided valuable support for the project. The City of Sheridan provided planning expertise throughout the project, and also provided planting supplies and volunteers who helped students dig and water the trees on the planting day. SSPRD was particularly helpful on the planting day, providing shovels, digging tools, top soil, and mulch. The planting site was covered in densely packed earth that was difficult to break. Volunteers from SSPRD came to the site on the planting day and broke up the ground with pick axes, helping student volunteers dig holes and water the newly planted trees.

SSPRD employee breaking soil on planting day, October 2015

Partnership with DesignWorkshop

IES's partnership with international landscape architecture firm DesignWorkshop was an important part of project planning and implementation. DesignWorkshop designed the Learning Forest planting plan for the planting site after it was moved to school property. DesignWorkshop associates Josh Brooks and Kathleen King met with IES to discuss project plans and met with IES associates to stake and prepare the site the week before the planting day. Josh Brooks, Kathleen King, and Drew LaBarge developed and built the cube, which protects the water tank from vandalism and presents the SQT project with the Sheridan community. Kathleen King and five DesignWorkshop associates volunteered at the planting day, helping students plant, mulch and water the trees.

FLN student and Kathleen King of DesignWorkshop on planting day, October 2015

Effect of community collaboration

The effective collaboration among IES and these community members and organizations made the project a success. Because of this collaboration, the students at FLN received hands-on science and leadership education, SSD2 school property received much

needed green infrastructure improvement, and the community of Sheridan was strengthened through the partnership of multiple municipal entities. This stakeholder involvement and excitement about the project ensures future commitment to IES projects in Sheridan.

7. Project Design and Events

The SQT project design includes information about initial planning and site changes, planting plan design, the design and execution of the FLN workshops and planting day, and the planning for the Tree Stewardship program.

Initial planning and easements

The project was originally designed to improve the Sheridan Quincy Trail space, which is a paved walking path from Federal Boulevard to South Irving Street that connects to West Quincy Avenue. During the planning process, IES was forced to adapt to a number of restrictions on and around the Quincy Trail, which changed the location of the planting. IES learned of planting restrictions thanks to a project conducted by Greg Colucci, a Masters of Urban and Regional Planning student from The University of Colorado Denver. Greg located and evaluated the easements in place on the trail, due of the presence of two large Denver Water conduits directly beneath the Quincy Trail corridor. The conduits are 72 inches and 42 inches diameter with a combined 80-foot wide surface easement that restricts any permanent structures including trees within the easement. Planting within the easement can only be low-rooting shrubs and grasses. This easement drastically altered planting ability in the Quincy Trail corridor, and ultimately led to a change in the planting site.

Aerial photo of Quincy Trail. Tree planting site in blue box

Site change and planning

After this information was presented to stakeholders, IES and SSDN2 decided to move the planting site off the Sheridan Quincy Trail and onto school property just north of the trail. The site was chosen because it was under stress due to erosion and flooding. IES shifted the priorities of the project to improve the site on the school's property through green infrastructure, but planned the project to still have a positive impact on the Sheridan Quincy Trail. Planting native trees helped the site and trail with storm water runoff and erosion issues. IES did not have to remove invasive species from the site because the site was free of vegetation prior to the planting, reducing the amount of work students needed to accomplish on the planting day.

One of the greatest problems that IES faced during this project was an unexpected dirt pile on the planting site. The dirt was left over from the demolition of the old Sheridan Elementary School. The dirt was going to be used by Habitat for Humanity at a house building site in Sheridan, but needed to be stored until the City and Habitat for Humanity could sign a legal agreement about the new homes. The planting site was chosen for storing the dirt without the knowledge of IES. It took IES over two months to get the dirt removed and to finalize planting plans with FLN. This delayed the planting until October.

Planting design: collaboration with DesignWorkshop

IES worked with project partner DesignWorkshop to complete a planting plan suited for the new planting site called the Learning Forest. The design included 60 native trees in a tight spiral design for two purposes: to improve the site with green infrastructure and to give a visual representation to the Sheridan community about the number of trees that could be planted along the Quincy Trail had planting restrictions not been in place. The tree species chosen for the planting day were common hackberry, bigtooth maple, and catalpa. The planting design is in Appendix X.

DesignWorkshop originally specified honey locust trees as one of the three species to be planted. However, when IES was purchasing the trees, we couldn't source any honey locust for the project. So, after a discussion with the DesignWorkshop team, IES decided to change the planting plan to include catalpa instead of honey locust.

When staking the site, DesignWorkshop associates Josh Brooks and Kathleen King and IES Program Coordinators John Kelly and Olivia Tracy had to slightly modify the spiral design to adapt to a sharp slope that did not exist before new dirt had been brought onto the site. However, 60 trees were still staked and ultimately planted, fulfilling the original design objectives.

DesignWorkshop Team Planning Spiral Design

Environmental education and leadership workshops

IES planned and designed four workshops and one planting day for the FLN Leadership Class. The workshops and planting day were designed to not only teach students about ecology, tree planting and care, but also to support their leadership curriculum, providing real-world activities and applications for the leadership skills they continue to build.

Workshop 1 design

The first workshop took place on June 2, 2015 from 2:20 to 3:15 pm, during the leadership class period. The workshop introduced students to the planting site, the program and their role in the program, taught the students about ecology and tree needs, and began the conversation about

project planning and stewardship. Classroom activities were a combination of lecture, small group discussions, and class-wide brainstorms. The content outline for workshop 1 is in Appendix G.

IES Associates during Workshop 1, June 2015

Workshop 1 event

IES Tree Project Manager, Sean Mangus, provided brief background information on the SQT trail space and program. The introduction provided the students with more detailed information about what people and activities are involved in planning a program like SQT. IES provided FLN students with their role in this planning, including planting and stewardship responsibilities. IES Program Coordinator John Kelly and Graduate Intern Emily Alvarez led a discussion with students to determine what stewardship was and what it means for the students, and had students brainstorm a stewardship contract and discuss what their roles would be in the coming months for the site. Students agreed to visit the site during summer months to check on site conditions (although they did not follow through on this commitment). The workshop PowerPoint and brainstorm flipcharts are in Appendices H though K. Students added to the development of the program by brainstorming what they believed the project should be called and voted to have the official name be The Sheridan Quincy Tree Project.

Workshop 2 design

The second SQT workshop took place on September 15, 2015, from 2:20 to 3:15 pm. IES focused on introducing students to the concept of the planting day, discussing the ecology of trees, and having students work to develop an agenda for the planting day that took tree needs, time constraints, and student abilities into consideration. The workshop was designed to prepare students for the planting day and to help students understand the variety of considerations involved in planning restoration and conservation events. IES used a tree needs activity that has been successfully used to teach these concepts in other IES workshops. For discussions, IES used both class-wide discussions and small group work. The content outline for Workshop 2 is in Appendix N.

Workshop 2 event

After briefly introducing workshop content, John Kelly introduced the planting and staking plans that IES and DesignWorkshop had developed and the importance of a staking day in project design. After this, IES associate Olivia Tracy led the students in an activity to help discover the needs of trees. Students were all given a card which had either a part of a tree (canopy, trunk, or roots) or a tree need (water, sun, soil/nutrients, and air). Students then "built" the trees with guidance from IES by gathering into groups where all tree parts and needs were combined. IES asked students who were "roots" to stand up and to space themselves far enough apart from the other "roots" so that they could grow (modeling the tree need for space). Then students with trunks and canopies were, in turn, asked to find a root system to build a tree. Once this was completed, trees were asked to collect one each of all four nutrients to build a healthy tree. After a tree was healthy, students opened an umbrella, signifying that their tree was growing. Some of the cards were then redistributed or removed to show students how different conditions can have different effects on trees. This led into a group conversation about the needs of trees and why it is important to monitor all of these needs.

FLN students and teacher learn about tree needs

Once students understood some of the needs of project design and tree needs, IES had students work in small groups to develop agendas for the planting day. After a large-group discussion combining many of these suggestions, IES told students that we would work to develop an agenda in part based on student suggestions. After answering final questions and providing final information about what students needed to bring to the planting day, students signed a Stewardship Agreement and concluded the workshop. The PowerPoint and brainstorm flipcharts are in Appendices O through R.

Workshop 3 design

Workshop 3 took place after the planting day on November 11, 2015. The workshop was originally designed to take place outside at the tree site; however, on the day of the workshop, it was cold and snowy in the morning, so IES and Sharena Del Brocco agreed it would be best to have the workshop in the classroom. For this workshop, IES focused on watering and tree care techniques, preparing students to be stewards for the trees they planted on October 9 and brainstorming a stewardship and maintenance program for the rest of the school year. IES also included time to receive student feedback on the project and discuss what their major takeaways

were from the project. The content outline for Workshop 3 is in Appendix S.

Workshop 3 event

After Carol Lyons, IES Executive Director, introduced the workshop, John Kelly and Tree Steward Coordinator Don Mangus presented and demonstrated proper tree watering and care techniques to the students. Since the workshop did not take place on site, IES used pictures projected on the Smart Board to demonstrate the size of mulch rings and provide visual assistance. Students came to the board to draw one of their trees, with all of the tree parts, and then to draw a mulch ring around that tree to help demonstrate the need for mulch. They discussed the role of the cube and how students will access water from inside the cube. Students were given a handout that had all the information about tree watering and care techniques so they had a reference when visiting the site in the spring to care for their trees. The PowerPoint and mulch activity flipchart are in Appendices T and U.

FLN students and teacher discuss tree care

After discussing these needs, Olivia Tracy led students in a stewardship scheduling discussion. Students were split into small groups at their tables and were asked to answer four questions, including how often they should come to the site, what they should accomplish in each site visit, how they should distribute their time on-site, and how much time they will have on-site during their visit. After working in small groups, students came back into a large-group discussion where IES recorded ideas on a flipchart. IES said they would develop a schedule based in part off of these student ideas. The stewardship activity flipchart is in Appendix V.

Finally, IES Graduate Intern Ross Calhoun led a classroom discussion on program feedback. When asking students what they learned from the project, students reported that the most important aspect of the program was the importance of teamwork and developing individual tasks during this type of project. Students reported that they very much enjoyed the planting day and enjoyed the teamwork that they engaged in during that day, much of which they developed themselves as they worked in small groups on the day. The feedback activity brainstorm is in Appendix W.

Tree planting event

FLN students and teacher at the Planting Day

IES worked with DesignWorkshop to develop the planting design and species selection. The spiral of the Learning Forest was designed to not only provide students with visual and kinetic interactions with three types of trees, but also to help them experience the feeling of a forested space in an area where there are few instances of urban forestry. The tree species were selected because they are native Colorado species that would improve the environmental quality of the planting site, and because of their visual appeal and the differences in their leaves and fall colors, which would provide beauty and interest to the spot for the wider community.

FLN students planting with the help of city of Sheridan employee Nick Nelson

The site was, for an extended period, covered in a large amount of fill dirt, which was removed a few weeks before the site staking. However, the property had been graded with a large amount of dirt remaining on the land, which changed the topography of the site. IES associates and DesignWorkshop associates who were staking on October 6 found that the spiral design, if followed exactly, would run off the edge of the flat portion of the site as it stood then. Therefore, all agreed that the spiral shape would be slightly altered, expanding the planting out in circles on the east and west sides of the site and eliminating some of the arcs along the north side of the site. The resulting planting still retained the spiral model of the original plan and allowed for all 60 trees to be planted.

The planting day took place the morning of Friday, October 9, from 8:30 to 11:45 am. After a fifteen-minute demonstration of tree planting techniques in a large group, students were split into groups of three,

supervised by an adult volunteer from IES, DesignWorkshop, or the City of Sheridan. Nine groups were each assigned to plant trees in a certain order to cut down on congestion during planting. Students in groups 1-3 planted catalpa, hackberry, and maple, in that order. Students in groups 4-6 planted hackberry, maple, and catalpa, in that order. Students in groups 7-9 planted maple, catalpa, and hackberry, in that order. The planting day student agenda and volunteer group assignments are in Appendices DD and EE.

FLN students planting a catalpa

The soil was very packed and hard. Volunteers from the City of Sheridan and SSPRD worked with pickaxes to loosen the soil at each staked location and dig holes for the students to plant the trees. The students took a snack break about halfway through planting. Although IES brought one snack and drink per student, the students were middle-school age and working hard. In the future, IES will supply more snacks for the students. In addition, the site did not have easily accessible bathroom facilities, and IES forgot to plan for a portable restroom, something that will be considered for future planting days.

Supplies and planting gear were provided by IES and by multiple project partners, including the City of Sheridan and SSPRD. SSPRD provided the shovels, top soil, mulch, and water for the planting day, as well as many volunteers. The City of Sheridan provided volunteers and gloves for the planting day. The planting day volunteer list, agenda, and materials list are in Appendices BB, CC, and FF.

FLN student mulching tree rings to prepare for summer

Spring tree stewardship events

During the spring 2016 months, students participated in two preparation stewardship events at the planting site on February 18 and May 4. The two events were planned by IES to help the students learn about hands-on tree care techniques and to help the trees get ready for the warmer summer months. Students helped to re-mulch the trees, set up protective cages, and mulch new pathways across the site. The mulch paths were placed along the design of the planting spiral to ensure that students or IES Associates could still work on site when there had been a heavy rainfall, and would protect new grass seed in the future.

The cube: continued collaboration with DesignWorkshop, installation, and student watering event

DesignWorkshop Associates Josh Brooks and Kathleen King, and Tree Project Manager John Kelly constructing the cube

To solve the problem of having no irrigation at the planting site, IES and DesignWorkshop decided to put a 275-gallon tote tank on the planting. However, IES and the project stakeholders were worried about potential vandalism at the site. So IES and DesignWorkshop designed a special shed structure that would house the tote tank and the tools needed for site watering and maintenance. The resulted structure was called the cube. The cube's design specifications are in Appendix HH.

The cube gave IES and DesignWorkshop the opportunity to present the project to the Sheridan community. DesignWorkshop added Drew LaBarge to its team to design the illustration for the cube. IES drafted content for all four sides which included the story of the project and the Learning Forest, the importance of trees, the story of water to Colorado, and a thank you panel for all project partners. The illustration was designed with infographics that helped cement the lessons that were being taught in the text on the cube. The illustrations were completed by DesignWorkshop and printed by Harmonic Media. The cube's illustration is in Appendix II.

Cube panels during construction

IES and DesignWorkshop installed the cube in two parts. On April 3, 2016, the construction of the base and skeleton of the cube were completed. On May 21, the illustrated panels and door were added to complete the structure. Tree Project Manager John Kelly and the DesignWorkshop team consisting of Josh Brooks, Drew LaBarge, and Kathleen King participated in both install dates. IES Tree Project Intern Patti Venneman assisted during the second construction date.

After the cube was installed, IES held the final workshop for the Fort Logan Northgate students on May 23, 2016. John Kelly and Patti Venneman conducted the workshop with an introduction to the cube, a reminder of how to properly water trees, and an activity where students watered all trees on site. Students were excited to finally get to water their trees and participate in the final workshop of the project. Starting in the spring, the cube was filled twice a week by staff members from the Sheridan School District No. 2, who purchased a water tank and pump as part of their contribution to the project and maintenance program.

Summer watering schedule

The students from FLN planned a summer watering schedule for two days a week during the summer. However, no students signed up to participate in the summer watering program, even though both IES and Sharena Del Brocco tried multiple times to reach students and get them to sign up. So, the IES designed and implemented a community outreach program for summer watering. IES produced a schedule to have two Associates on site both Wednesday and Saturday mornings to water the site, and handed out fliers for this program at the Sheridan Library and Recreation Center. Unfortunately, IES did not receive interest from the community to water during the summer, and IES Associates cared for the site.

Site vandalism and response

The planting site was vandalized between 10 am, July 9 and 9 am, July 13, 2016. The damage was discovered the morning of July 13 by the IES Tree Project Team. Fourteen trees were pulled out of the ground and 11 them stolen from the planting site. All trees that were stolen were either hackberry or maple. At least 20 tree cages were pulled out of the ground and strewn about the site. We found a pair of gloves at one of the plant holes, trash underneath the cube, and the equipment inside the cube in disorder. IES Associates replanted three hackberries that were left at the site. However, because of the shock to the trees, they did not survive.

FLN students and teacher at spring watering event, May 2016

IES filed a police report at the request of the City of Sheridan. The Tree Project Team installed chicken wire around the bottom of the cube to deter anyone from climbing under and into the cube and is planning to replant the disturbed or missing trees this fall as part of the 2017 *Sheridan Quincy Trail Project*.

8. Sheridan Quincy Tree Project Evaluation

Project outcomes

The IES Sheridan Quincy Tree Project was a successful program, in spite of considerable logistical problems during the planning and implementation of the Planting Plan. The main goals of the project were to improve the Sheridan Quincy Trail with green infrastructure techniques while fostering new partnerships with community members and organizations, and to train the next generation of environmental stewards in the Sheridan community. IES was able to meet its environmental and educational goals through careful planning, adapting to site restrictions, and working diligently with project partners.

IES set forth six objectives for this project. The first objective was to engage stakeholders, including businesses, nonprofits, schools, and community members to form a Stakeholder Project Advisory Committee. IES achieved this objective through multiple meetings with interested potential stakeholders. Once IES had verbal agreements from key project partners, the City of Sheridan and FLN, IES created Memorandums of Understanding to explain each stakeholder's role in the project. The Stakeholder Project Advisory Committee met once every three months throughout the planning of the project. We were not successful in involving the local business community, as noted in Section 6.

The second objective was to plan and develop an education program in Sheridan public schools. IES planned four classroom workshops and a planting day in conjunction with Sheridan educators Amy Kolquist and Sharena Del Brocco. The classroom workshops were designed to teach students lessons in ecology, planting practices, and leadership. Twenty-six students participated in the program and helped IES plan the project, providing input on the planting day agenda, 3-year maintenance program, and information on the water storage cube.

The third objective was to implement an educational planting program that included long-term plant care and tree maintenance, recruit and organize local volunteers, and obtain trees, shrubs, plant materials, supplies, and equipment. IES successfully completed this objective through a multitude of project activities. IES planned the planting program with the help of Sheridan educators, DesignWorkshop, the City of Sheridan, and SSPRD. All stakeholders played a key role in ensuring the planting day was successful by supplying materials, volunteer labor, and volunteer leadership at the planting day. Students received hands-on training in tree planting and tree care during their planting day and designed their own maintenance program during a classroom workshop. IES Tree Stewards Coordinator Don Mangus will monitor the site during student visits. Engaging students to care for their trees during summer break was not successful. IES needs to do more work on this challenge.

The fourth objective was to review the master plan for community-wide trail improvement, analyze the project location, establish priorities for remediation, and design a pilot trail planting plan. IES succeeded in this objective because of Greg Colucci's efforts and subsequent report. The report addressed the complexities of the plans to improve trails in Sheridan and the specific site restrictions on the Sheridan Quincy Trail. Greg's recommendations for improvement projects along the Quincy Trail for the next three years gave IES the necessary information to plan the SQT planting day and develop ideas for projects that will continue to improve the trail in upcoming years.

The fifth objective was to plan and implement a planting program that improved the Sheridan Quincy Trail. DesignWorkshop used the suggestions from Greg Colucci to plan the Learning Forest. The number of trees and design allowed for green infrastructure improvements to the school property just to the north of the west end of the Sheridan Quincy Trail. Planting trees at this site will help the Quincy Trail by reducing storm water runoff at the west end of the trail. IES implemented the planting plan by preparing the site with the help of DesignWorkshop Associates Josh Brooks and Kathleen King, and implementing the planting day on October 9, 2016. Over 25 community members participated in the planting program, learning proper techniques for tree planting and care.

The final objective was to evaluate the program and produce a final report. IES Tree Project team members evaluated the program through student and educator feedback, responses from stakeholders, and internal review. The results of the evaluation are discussed below.

FLN students mulching new tree rings, March 2016

Project successes

The Sheridan Quincy Tree Project was a successful program that implemented green infrastructure improvement for a vital trail section, while providing the opportunity for Sheridan students to learn important lessons in science and leadership. IES had six key areas of success:

1. All trees were planted.
2. SQT was the first successful fall planting for IES.
3. Students and volunteers enjoyed the program, learning about tree science, proper tree planting techniques, and that they can positively impact their open spaces.
4. Community partnerships were established and strengthened. Key organizations participated throughout the entire project, culminating in planting day volunteers and materials from both SSPRD and City of Sheridan.
5. IES was resilient in the face of planning, site, and planting challenges.
6. Stakeholders have agreed to a continued partnership for a 2016 project.

These successes mark important milestones for IES in the Sheridan community and for the Tree Project. All trees in the planting design were planted. This was the first time that IES undertook a fall planting, which brought up new issues that IES has not dealt with in previous projects. IES

showed resilience by adapting to planting restrictions and on-site challenges to have a successful fall planting day. IES also successfully developed SQT as a pilot program that received positive feedback from stakeholders and the community. FLN was impressed by the classroom activities and believed that this project gave its students a unique opportunity to help their community.

A large success of the program was the positive response from stakeholders in the Sheridan community. Stakeholders were impressed that IES could manage such a large and diverse project. IES is excited that all stakeholders are signed on and ready to participate in another environmental improvement and educational project in 2016.

Program challenges

FLN Students Plant a Hackberry

There were many challenges presented to IES during the planning and implementation of the Sheridan Quincy Tree Project. The first was building initial stakeholder partnerships in Sheridan. As with any pilot project in a new community, the first and most difficult step is to bring all interested stakeholders into the project. For example, there was initially some resistance from SSPRD to the project because it believed that this project could add a burden on its limited resources to care for new trees on the trail. There were similar concerns with other stakeholders. Sheridan is a small community with limited resources. However, IES is an organization interested in building collaborative community projects. IES alleviated concerns by managing the majority of the project and lessening the amount of time and materials that each stakeholder would need to commit to the project.

The second challenge was obtaining support from businesses in the Sheridan community. IES projects attempt to include local businesses to spread information about the project to the entire community. IES organized and implemented a comprehensive business outreach plan in Sheridan, but was unsuccessful in receiving outside support from the business community except

for the fortuitous meeting with Neil Lillard followed by a generous donation.

There are many planting restrictions on the Sheridan Quincy Trail. Restrictions included regulations that prohibit deep rooting plants and permanent structures along the trail section. The IES Tree Project mission is to improve spaces with tree plantings, so this development was a significant hurdle. With discussion with project stakeholders and through research, IES and SSDN2's Director of Facilities and Transportation, Cyndi Wright, agreed that trees could be planted on school property northwest of the trail. This problem threatened to derail the project, but thanks to the adaptability and commitment of Cyndi Wright and her staff, the issue was addressed.

IES continually pushed back the planting date due to a large fill dirt pile located on the planting site. The fill dirt originated from the old FLN. After construction of the new school building, the district had no immediate storage locations. The intention was to sell the fill dirt to Habitat for Humanity for a building site in Sheridan; however, Habitat for Humanity had difficulty obtaining permission to move the fill dirt to its sites. IES contacted all stakeholders repeatedly in an effort to break the gridlock. Finally, in September, Habitat for Humanity moved the dirt with the help of the City of Sheridan. Without the pile being moved, the planting would not have happened in October.

Planting Site with Staking Flags

The dirt pile was removed from the planting site by October, but it left residual problems for the IES team during the final planning stages and on the planting day. The final step in planning was to prepare the site for planting. IES and DesignWorkshop flagged the site to identify planting locations to make sure the trees would be planted in the correct spiral formation. However, when IES and DesignWorkshop prepared the site, there was a line of fencing that was intended to hold the dirt pile which cut off 25 to 30% of the original planting site. IES and DesignWorkshop had to change the planting plan on the spot to make sure the trees were properly planted with enough space. The resulting plan was not a full spiral, as had been originally envisioned by DesignWorkshop, but included a small spiral with arms that fanned out not connected to the inner spiral.

The last effect from the dirt pile was a layer of packed dirt covering the planting site. The dirt was moved using large trucks and was packed down instead of being taken off site. This resulted in a hard upper layer of dirt that the students and volunteers had to dig through on the planting day. Thanks to the hard work of volunteers from the City of Sheridan and SSPRD, who watered the site and broke up the dirt with pickaxes, the planting was successfully completed.

FLN students at spring watering event

IES had a few mishaps on the planting day due to poor planning. The first was that there was no bathroom on site. IES should have had a portable restroom on site for students and volunteers. IES underestimated the amount of refreshments needed for the students. IES promised granola bars and water for the students, and asked students to bring their own water for the planting day. However, many students did not bring water and IES's supplies soon dwindled. The granola bars were eaten very quickly. Fortunately, IES had purchased bagels for community volunteers which were offered to the students.

There were significant problems implementing a watering program with the students. The site lacks water lines or irrigation. IES needed to ensure water would be onsite for students to use for tree care. IES decided that a tote tank onsite would be the easiest way to provide water access for the students. This brought up issues including filling the tank, concerns of vandalism, and school restrictions about ground clearance of on-site structures. DesignWorkshop suggested the idea for the cube to protect the tote tank. IES and DesignWorkshop worked through multiple design drafts to ensure it met all the standards for the School District for both the structure and content of the cube. Cyndi Wright developed a plan with IES to ensure the tank will be kept full for student use.

IES had to determine how to best connect with students and teach them valuable leadership lessons. This was the first time IES had worked with a class whose focus was leadership. IES had to adapt science and ecology based activities and create activities that focused primarily on leadership. The resulting activities, developed with the help of teacher Sharena Del Brocco, used small group and class-wide discussions to guide students to plan key aspects of the program. The activities were well received by educators at FLN.

IES had difficulties bringing the watering plan to fruition during the summer of 2016. Students had produced a plan to water twice a week, but there were no volunteers to implement the plan. IES and Sharena Del Brocco tried multiple times during the beginning of the summer to contact students and get volunteers to sign up for watering, but there were no responses from students. Instead, IES had to implement a summer watering schedule that consisted of watering on Wednesday and Saturday mornings. Site care and watering was completed by Don Mangus, John Kelly, Patti Venneman, Lindsay Nerad, and Elizabeth Morgan.

The final challenge to the program was vandalism in July 2016. Sometime between watering on July 9 and July 13, an individual or group of individuals forcibly removed 15 trees from the ground at the planting site and broke into the cube. IES Associates were able to locate four trees that were pulled and replanted them, but their status, as of August 2016, is not good. IES informed all stakeholders and filed a police report with the Sheridan Police Department. Replanting of the species is needed and IES is planning to accomplish replanting as part of the 2016 *Sheridan Quincy Trail Project*.

Recommendations for next steps

IES has seven recommendations to improve future projects in Sheridan. These recommendations will allow IES to improve future projects in Sheridan and in communities throughout the Front Range, and will help advance our mission to improve communities with education and ecological health improvement programs.

The first recommendation is to continue to work with stakeholders to improve future plantings. SQT taught IES that working with small communities includes multiple stakeholders that disagree about how projects should proceed. The most important way to ensure that projects are successful is to bring all stakeholders together and actively discuss all aspects of the project. IES needs to continue to make stakeholder involvement and participation a key aspect of all planting programs.

The second recommendation is to continue to work with DesignWorkshop to plan projects along the Sheridan Quincy Trail for the next two or more years. IES is an excellent position to continue its work near and along the Sheridan Quincy Trail. The partnership with DesignWorkshop was very successful for this project and would be a great help in future projects. The full trail section gives IES and DesignWorkshop the opportunity to implement a multi-year improvement program that will improve the trail and make the space more inviting for community members.

FLN Students at planting day

The third recommendation is to ensure that the planting site is monitored and maintained carefully for the next three years. One of the guiding principles of successful IES Tree Project initiatives is to have an appropriate maintenance plan that is effectively implemented. The

planting site is highly susceptible to erosion due to a lack of vegetation. It may need more monitoring and direct work than any site IES has previously worked with. The residual effects of the dirt pile, including the lack of other vegetation and the possibility for higher erosion, and the work of the students, should all be considerable focus points for the Tree Project during the monitoring of the site.

The fourth recommendation is to support Don Mangus as the site supervisor. Don has taken over as the IES Tree Stewards Coordinator in Wheat Ridge and will be supervising the Sheridan planting site. IES needs to provide Don the support he needs to both monitor the site and the students on the watering visits. His success in helping the Leadership Class students care for the site will ease the amount of time Tree Project members need to spend monitoring and caring for the site. His involvement gives the students a direct person of contact and a recognizable figure that they can go to with care questions.

The fifth recommendation is to replant the disturbed species at the planting site during the IES Sheridan project in 2016. The first priority needs to be trees that were removed during the vandalism in July 2016. The site also needs grass and shrub planting to help stabilize soil at the site. Both of these issues should be included in the plans for the next project in Sheridan and should be discussed with project stakeholders in the planning process.

The sixth recommendation is to improve the education materials for 2016's program. While this year's activities were well received, there are new materials to include and room for improvement. IES needs to make sure that 2016's classroom workshops include an update to the maintenance and stewardship program for the 2015 site, as well as new maintenance and stewardship plans for the 2016 site. IES should improve classroom activities that focus on leadership. At times students were confused about directions or scope of certain activities, especially the planting day agenda and stewardship plan activities. Students had to ask IES Associates multiple questions to understand the entirety of what they needed to accomplish with the planting day agenda and stewardship plan. To solve this problem, IES should revise and expand its explanatory lead-ins to class activities. We should use workshop time to demonstrate planting, using actual tools and plants. Students should be involved in the demonstrations.

The last recommendation is to start business outreach earlier in the project. IES should begin business outreach in the spring for a fall planting. This gives IES the opportunity to attempt contact with businesses multiple times if initial contact attempts are unsuccessful. It also gives businesses the opportunity to schedule a donation in advance. Sheridan is a small community that has many locally-owned, family businesses. These businesses might be willing to donate to a local program if they have adequate time to plan a donation. Direct involvement from City of Sheridan staff members and elected officials might also improve local business involvement.

Conclusion

IES's Sheridan Quincy Tree Project was successful. The project was made possible due to major grant funding from Xcel Energy, the Colorado Garden Foundation, and Patagonia Denver, as well as involvement from all project stakeholders. The project would not have been completed without the hard work and dedication from the staff of the City of Sheridan, SSDN2, FLN, and SSPRD. IES is honored to work in Sheridan, a community that has dedicated civil servants and community members who care about improving their trail sections, school properties, and open

spaces. IES looks forward to successful continued partnerships with the Sheridan community.

The mission of the IES Tree Project is to improve Colorado cities using tree science. Through collaborative multi-disciplinary partnerships and programs, we restore natural systems and urban green infrastructure, educate children and adults to become environmental stewards, rehabilitate, improve, and maintain critical urban natural resources, and improve community health and economy.

Based on this experience in Sheridan, IES confirmed that five critical factors go into successful tree planting and survival:

- Collaboration with the full range of interested stakeholders
- Careful planning of the education and planting program
- Careful selection of the planting sites and plant species to optimize survival rates
- Good instruction and proper planting with well-organized volunteer participation
- Appropriate maintenance plans and implementation

IES looks forward to building on this experience and continuing to work in the Sheridan community to improve the Quincy Trail. IES also looks forward to continuing to train the next generation of tree stewards. We welcome comments, feedback, and volunteers. Please contact us at Solutions@i4es.org.

FLN students at planting day

Plans for printing, binding and distributing this report

This report will be available electronically via the IES website, www.i4es.org. A limited number of printed and bound copies will be distributed to project stakeholders. If you would like a printed copy of the report, please email Solutions@i4es.org.