Workshop Summary and Concept Design Memorandum for Romney, West Virginia

WEST VIRGINIA GREEN INFRASTRUCTURE PLANNING AND IMPLEMENTATION

January 28, 2019

dep

Chesapeake Bay Program
Science. Restoration. Partnership.

TETRA TECH

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INTRODUCTION

In partnership with EPA's Chesapeake Bay Program, West Virginia's Department of Environmental Protection (DEP) Chesapeake Bay Tributary Team is providing stormwater management technical assistance to West Virginia communities within the Chesapeake Bay watershed, with a focus on developing green infrastructure (GI) solutions to improve water quality and provide ancillary community benefits. Communities requested this technical assistance by submitting an expression of interest form and detailing the community needs and stormwater concerns.

The technical assistance is designed to help educate local elected officials and stakeholders about the benefits of GI and move a community through a process of assessment and planning with the ultimate objective of creating a concept design plan for one or more GI opportunities within the community that can be used to seek funding for implementation. The workshop helps a community identify potential challenges, as well as realize opportunities that already exist to make progress. It includes a series of pre-and post-workshop conference calls and an on-site convening of stakeholders to discuss issues, next steps, and actions related to advancing the community's specific goals.

STAGES OF TECHNICAL ASSISTANCE

This memo documents the key outcomes of the technical assistance for Romney, West Virginia and identifies key community issues, prioritized goals, and specific actions to achieve the following goals:

- Engage with the Town of Romney and other stakeholders to identify concerns and priorities related to stormwater;
- Identify opportunities for implementing GI concepts in a context sensitive manner;
- Develop concept designs for the highest priority opportunity areas.

COMMUNITY CONTEXT

Romney is the county seat of Hampshire County and the oldest town in West Virginia, having been settled in 1725 and chartered in 1762[1]. Romney is a small, rural town along the South Branch Potomac River in the Potomac Highlands part of the state with just over 1,800 residents.

Route 50 (Northwestern Pike) runs through Romney and serves as a major throughway connecting I-81 with points to the west. Romney is also home to the West Virginia Schools for the Deaf and Blind, an integral part of the Romney community. The median household income in Romney is just over $27,000, with about a quarter of the population below the poverty level [2]. In comparison, the median household income in West Virginia is over $44,000.

Romney has experienced significant flooding issues along an unnamed tributary to the South Branch of the Potomac that flows between Depot Valley Road and W Sioux Lane in the

[1] http://www.cityofromney.com/
[2] U.S. Census, 2013-2017 American Community Survey 5-Year Estimates, Romney, WV, https://factfinder.census.gov/

northwestern part of town. The stream runs through a town park with a walking path. Recent high flows and flooding events have caused the stream to erode and required the removal of an unstable footbridge along the walking path. The high flows are also undermining Depot Valley Road just downstream of the park. On the opposite side of Depot Valley Road, runoff from a now unused hospital complex is potentially contributing to the erosion problem along Depot Valley Road.

The unnamed tributary originates south of Gravel Lane and flows northward, through an underground conveyance system until it surfaces in a residential lawn just north of Northwestern Pike before being piped again near Goldsborough Avenue. It eventually resurfaces in a stream channel on the northern side of West Birch Lane and remains a surface stream as it passes under West Sioux Lane and along Depot Valley Road. Stormwater runoff collection from the watershed extends well beyond this immediate flow path. Storm sewers from as far east as High Street flow to this tributary. Flow volume increases moving downstream in the stormwater network.

Portion of walking path no longer usable because of excessive stream erosion

View of the runoff from the old hospital located on the terrace above.

General drainage area to the unnamed tributary.

Since Romney is an older town, a significant portion of the stormwater infrastructure was developed 50 – 100 years ago and few records exist to document the exact layout and location of the pipe network. The Romney Maintenance Department has identified the pipe network where it can and has developed a hand-drawn network map. Frequently, information about the pipes and network is not known until a repair is required. Much of the storm drainage system is undersized relative to modern stormwater drainage design criteria and desired level of service. Catch basins and the pipes are insufficiently sized to convey flows from larger storms. The town also has a substantial amount of impervious area and very few catch basins along many of its streets. This causes nuisance street flooding upstream of the unnamed tributary often followed by downstream flooding in the tributary itself.

This project seeks to involve the Romney community and stakeholders in the identification of stormwater concerns and priority action areas; identify significant areas of imperviousness that can be managed with GI practices to help alleviate localized street flooding as well as mitigate the flooding conditions further downstream in the tributary, while improving water quality to help meet the state's Chesapeake Bay TMDL implementation objectives; and developing concept designs for the highest priority opportunity areas.

STAKEHOLDER WORKSHOP

Romney government representatives, West Virginia DEP representatives, community stakeholders, and consultants gathered at Town Hall in Romney for a two-day workshop on July 30 and 31, 2019. The workshop included a background presentation on stormwater management and an introduction to GI practices, a tour focused on potential sites for the design and installation of GI practices and a working session where participants prioritized sites and then provided input into potential GI practices at the highest priority sites.

The workshop also offered an opportunity for the Town to highlight the existing GI practices installed at Town Hall. Tetra Tech was able to provide feedback on management and improvement to the practices, although they appeared to be functioning well.

Bioswale demonstration project at Romney Town Hall.

Pervious pavers and rain garden demonstration project at Romney Town Hall.

During introductions, the attendees were given the opportunity to share with the group why they were participating and what issues they hoped to address through GI. Responses included wanting to learn about GI, addressing stormwater issues, reducing nitrogen and phosphorus, managing properties for multiple benefits, reducing the heat island effect, improving pedestrian safety and walkability and improving aesthetics.

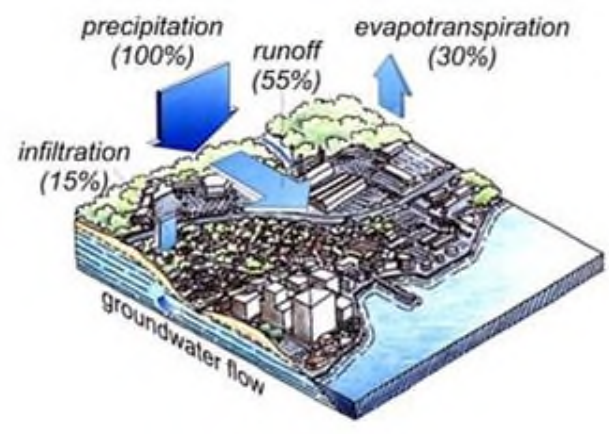
After introductions and a statement from the mayor, Beverly Keadle, the facilitator, Tetra Tech's Jonathan Smith, presented background information on the concept of stormwater management, impacts of stormwater, and the importance of working to restore pre-development hydrology by developing stormwater management systems that function more like forested areas.

Differences in Pre-Development and Post-Development Hydrology

In pre-development conditions, most precipitation infiltrates into the ground or is taken up by vegetation and is lost to evapotranspiration. Only a small amount ends up as runoff. In post-development conditions, infiltration and evapotranspiration are reduced and the majority of precipitation turns into runoff. Typical post-development hydrology alters stream flow, creates flashy runoff with higher peak flows, and more volume is carried down in the stream channel more quickly. Higher flow volumes and velocities can result in stream widening and erosion, decreased channel stability, loss of in-stream pool and riffle structures, lower summer base flows and loss of riparian canopy. Development also results in an increase in pollutants carried from the watershed into receiving streams.

Pre-Development

Post-Development



The facilitator highlighted the guiding principles of GI stormwater management, which include 1) managing stormwater runoff both at the source and at the surface, 2) using plants and soil to slow, filter, cleanse, and infiltrate runoff, and 3) designing facilities that are simple, low-cost,

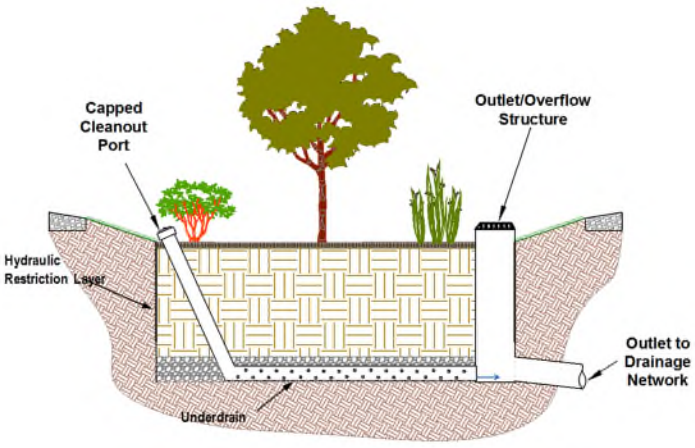
and aesthetically enhance the community. He also provided an overview of appropriate locations for GI and described some of the GI practices. Bioretention, Street Trees and Green Street practices are described in more detail below.

Following the introductory presentation, Richard Kizer, the Public Works Coordinator and Zoning Officer, gave a presentation on stormwater issues in Romney. He highlighted areas of concern and the group discussed potential upstream causes. There was significant discussion about the town park and the associated stream that runs through the area. The stream causes significant flooding to properties along Depot Valley Road during heavy rain events. Mr. Kizer also discussed the stormwater flooding that occurs in the area of N. Marsham Street and W. Rosemary Lane. The flooding appears to be the result of insufficient infrastructure to allow for drainage, as the flooding clears within a short time after rainfall has ended.

The group then participated in a site tour to view some potential project sites. The site tour was conducted earlier in the workshop than initially intended to avoid heavy thunderstorms later in the day.

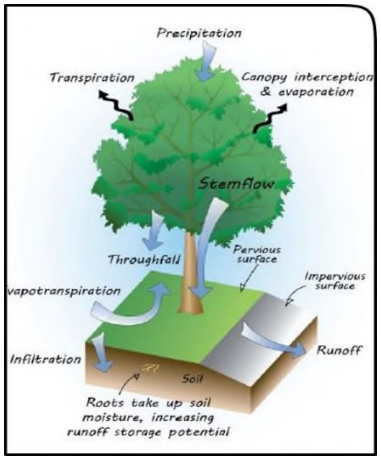
Bioretention

Bioretention BMPs are small-scale, shallow, vegetated, depressed areas with a soil (often engineered soil) media and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes.



Street Trees

Street trees are trees planted within the street right of way to provide a variety of functions such as providing shade, aesthetics, interception of rainfall, or other benefits. Street trees can be planted into vegetated strips or incorporated into green infrastructure practices such as bioretention or tree wells.



Green Streets

A green street is a stormwater management approach that incorporates vegetation (perennials, shrubs, trees), soil, and engineered systems (e.g., permeable pavements) to slow, filter, and cleanse stormwater runoff from impervious surfaces (e.g., streets, sidewalks). Green streets are designed to capture rainwater at its source, where rain falls. Whereas, a traditional street is designed to direct stormwater runoff from impervious surfaces into storm sewer systems (gutters, drains, pipes) that discharge directly into surface waters, rivers, and streams. (source: EPA).

Site Tour

The project team met at the former hospital site located on the terrace above Depot Valley Road to review potential options for stormwater management at the site. The site representative, Eileen Johnson from the Hampshire County Development Authority, noted that redevelopment of the property is planned, and any new user would be required to institute a higher level of stormwater management than is currently on-site. She inquired about temporary GI options that might be viable in the short term.

Participants evaluating the Senior Center parking lot for opportunities. Note the extensive impervious area and lack of trees.

From here, the group moved down to another potential focus area, the corridor from West Birch Lane south to Romney Elementary School from School Street on the western side to approximately Fairfax Street to the east. The large impervious areas at the Romney Elementary School, the Romney Senior Center and the swimming pool were discussed. It was noted that there used to be several trees around the perimeter of the senior center parking lot, but they died and were removed. Participants suggested replacing these trees to add shade to the parking lot in addition to providing some stormwater management benefits. Potential bioretention opportunities were assessed at the senior center and the swimming pool. Several additional options were discussed for the elementary school. Green streets and GI practices have the potential to improve the safety and walkability of the area for school children walking to and from school while also retaining stormwater.

Existing conditions in the Romney Elementary School parking lot.

The group also visited the floodplain area at the northern end of School Street, just before West Sioux Lane. Some in-stream stormwater management practices may be options in this area but would require permits from the Army Corps of Engineers because a preliminary determination from the Corps indicated that the area is jurisdictional stream. The town may further explore the installation of instream structures in this area as a part of future watershed improvements. The group observed a grass swale on the western side of School Street north of West Birch Lane that appears to be functioning as intended and is a good example of low-cost

stormwater management that allows for filtration and infiltration.

Throughout the site visit corridor, the group discussed opportunities for green streets, which include bioretention or bioswales with street trees and sidewalks incorporated to improve pedestrian access and aesthetic appeal. West Birch Lane, West Rosemary Lane, and School Street were all considered as potential opportunity areas. Goldsborough Avenue was also evaluated but since the street was recently repaved and both sides of the street area are heavily used for residential parking, it was eliminated from consideration.

KEY COMMUNITY ISSUES

During the workshop the participants were led through an exercise to evaluate the strengths, challenges, and opportunities specific to Romney as they relate to GI implementation. These provide context when determining appropriate GI solutions.

Strengths

Attendees of stakeholder workshop identified small community size, proximity to the river and its recreational opportunities, Refresh-Restart Romney and The Romney Project as important community strengths. Other important strengths identified by workshop participants included the favorable climate, the historic district, and the presence of the Schools for the Deaf and Blind.

- **Small Community**: While the town is small, and that can bring challenges, it also means that there are fewer bureaucratic obstacles to implementing GI projects and there is a strong network of involved stakeholders and town officials that can reach out to appropriate partners and landowners for collaboration.
- **South Branch Potomac River**: The proximity to the river provides a stronger community connection to the value of improved water quality, and the river itself offers recreational opportunities.
- **Community Organizations** (e.g., Refresh-Restart Romney and The Romney Project): There is a history of local government and community collaboration that has helped implement community revitalization and clean up initiatives and highlight local art and history. This civic engagement can be leveraged for future GI projects.

These strengths can help build support and funding for GI and can provide a tool for the town's vision of community revitalization and flooding reduction.

Challenges

The Town of Romney faces several challenges in implementing GI projects. Some of these challenges stem from a lack of local resources and experience, while others can be traced to the need for stakeholder engagement and support.

- **Limited Funding for Construction and Maintenance**: The Town has limited budgets for stormwater infrastructure, in general, and GI more specifically, including implementation and long-term maintenance, and the efforts of the Maintenance Department are already spread thin.

- **Limited Staff**: The Romney maintenance and administrative staff is a small team. It was specifically mentioned that they lack a tree committee, which could contribute to tree placement and planting throughout the town.
- **Aged Infrastructure**: Most of the stormwater and other utility infrastructure in the town is more than 50 years old, and routinely fails. This places a significant burden on the town's maintenance staff.
- **Lack of Industry and Commercial Operations/Job Opportunities**: The economy in Romney is not growing. People growing up in Romney are often forced to leave the area to find employment. The lack of new or sustained industries in town depresses the median income of the area.
- **Lack of Public Awareness**: The town faces the need to build momentum to educate relevant stakeholders and move past any perceptions that cause resistance to change. The relatively low turnout at the stakeholder meeting meant many important stakeholders and members of the public missed an opportunity to become aware and educated on the benefits of GI, but is also indicative of the need to bring more awareness to these groups to ensure future buy-in.

The roots of many of these challenges are shared by many other similar communities striving to incorporate GI into their portfolio of stormwater management opportunities. The goal of this technical assistance is to help identify key opportunities for GI and fund the initial concept design, which can be used to seek funding for implementation, and can help overcome some of these challenges.

Opportunities

Despite the challenges described above, workshop participants were optimistic about several opportunities to advance GI in Romney. Many felt that there are key organizations and characteristics that can be leveraged to overcome the challenges identified during the workshop.

- **Funding Sources**: Leveraging the partnership with DEP, the Town is well positioned to apply for grants both from state agencies and regional entities, such as the Chesapeake Bay Trust and the Chesapeake Bay Program.
- **Socio-economic Leverage:** The town's lower socio-economic status qualifies it for grant opportunities that may otherwise not be available.
- **High Social Need for Improved Streetscapes:** The Schools for the Deaf and Blind routinely have students walking throughout town. It is important that these students have safe routes, including accessible sidewalks.
- **Available Public Space**: Existing publicly owned parcels can help reduce costs of project implementation. The town can also highlight recent flooding issues to educate the community on the benefits GI can have on water quality and management/flood mitigation with educational signs at any GI practices that are installed.
- **Romney Elementary:** The elementary school contains a significant amount of impervious space that can be addressed in the public right of way and provide additional benefits of green space and shading in a setting that can educate citizens about the many benefits of GI. In addition, the school may be slated for either major renovations or the

school may be moved to another location. Major renovations may provide an opportunity to fund new GI practices as part of the overall project.

Romney has a motivated team that can help build on these opportunities to inspire revitalization and improve flooding conditions through the implementation of GI.

Site Prioritization for Concept Designs

Following the site tour, participants returned to Town Hall. The meeting facilitator gave an informative presentation on principles and benefits of GI elements and green streets designs. The presentation included an explanation of the various elements, issues, and design techniques for different GI applications in various situations and outlined operations, maintenance, and funding issues along with implementation options. The group was able to go outside during a rain storm and observe how the existing GI practices at the Town Hall function during a rain event.

Overall, the presentation was well received, and attendees were excited about how GI concepts might serve to increase green space and general community aesthetics, encourage economic growth and revitalization, and help alleviate flooding issues experienced both along some neighborhood streets as well as downstream along the unnamed tributary.

Following the presentation, workshop participants were presented with a large aerial photograph of the area of interest in Romney. The participants marked up the map to illustrate different issues and features in the town using markers and stickers. Mark ups included areas of flooding, heavy traffic corridors, pedestrian corridors, points of interest, one-way streets, and GI potential opportunity areas. This provides an overall context and setting for the potential GI opportunities as well as helping to identify problem areas and potential infrastructure conflicts and opportunities.

Workshop participants marked up an aerial photograph with potential opportunities, flooding concerns and other features.

Only July 31, the workshop participants reconvened to prioritize sites for further GI design work. The participants that returned for the second day of the workshop included the mayor, the head of city maintenance, local DEP representatives, and a local citizen. The facilitator led the group through an exercise to identify prioritization factors the group wanted to consider when selecting sites. Prioritization factors identified are:

- Funding/grant eligibility
- Acceptance by the public
- Volume reduction function of the practice
- Size of the impact and location of impact

- Alignment with the comprehensive plan (in development)
- Visibility/educational value
- Multi-benefit practices
- Ownership of site property
- Project complexity
- Project feasibility

The participants identified the sites that could be under consideration to move to concept design. The full list included:

- Romney Elementary School
- Changing typology of specific streets
- Watershed-wide tree planting
- Sioux Street in-stream practices
- Residential Parcel at the east end of Rannels Lane
- Romney Children's Shelter
- Former hospital
- Romney Senior Center
- Tabernacle Church parking lot
- Swimming pool parking lot
- End of School Street
- Gravel Lane – one way
- Rosemary Lane green street
- Fairfax Street bioretention

Since not all locations could move forward to concept design, each participant could vote for their top 3 project sites, taking into consideration the prioritization factors identified earlier. Since there were several projects with multiple votes, the top candidates were then further narrowed to the top 3 sites. These were Romney Elementary school, Rosemary Lane green street, and the Romney Senior Center.

Workshop participant considers highest ranked sites to move forward to concept design.

Workshop participants using game pieces to site different green infrastructure practices at the priority sites.

Next, workshop participants engaged in a planning-level design exercise using area maps to identify potential GI opportunities at the selected top priority sites. The participants utilized game pieces representing bioretention and tree plantings to site potential practices through the three priority areas. The participants focused on increased community connection, aesthetics, traffic calming, safe access to local schools, and poor stormwater drainage when siting the BMPs. The facilitator worked with the participants to select appropriate locations based on topography at the sites and potential constraints, such as maintaining pedestrian access, avoiding utility conflicts, and identifying appropriate locations where GI practices could be tied back into the existing stormwater infrastructure. Through this process, attendees revisited the original list of goals in advancing GI identified at the beginning of the workshop, as well as the strengths, weaknesses, and opportunities discussed during the workshop. During the workshop all opportunities identified by the participants were considered. West Birch Lane was also discussed as a good opportunity area for a green street and markups were made to show potential GI opportunities. During the concept design phase, the potential projects are narrowed down based on any additional constraints identified by the design engineer. Constraints can include utility conflicts, insufficient right-of-way space for practices, challenges with neighboring landowners, property ownership limitations, topography, and existing storm water infrastructure.

CONCEPT DESIGNS

The workshop attendees identified the School Street corridor, identified on the General Drainage map, as the highest priority area for development of concept designs. After additional discussion, the concept plan area was expanded to include the Senior Center and West Birch Lane corridor. In situ soils in the project area are predominately clay exhibiting low permeability. As a result, GI practices implemented will need to incorporate underdrain components to ensure proper function.

Concept Design Summary

Using the input provided by the workshop participants a green street concept plan was developed for the project area which is provided in Appendix C.

Along School Street the green street concept focuses on the extension of the existing sub-surface drainage network to the crosswalk just south of the current school bus parking lot. The

extended drainage line provides a connection for proposed street side bioretention areas at the cross-walk and along the existing bus parking lot. These GI practices will manage stormwater runoff from the school parking areas, as well as portions of School Street. The concept design will require some modification of the access and parking configuration for buses, which should be coordinated with school officials, but will provide a better separation between vehicular traffic on School Street and the parking area, which may improve parking lot safety. Additional bioretention areas are recommended along the driveways from the school parking lots to School Street to further manage runoff from these areas before it reaches the existing stormwater conveyance system. Tree plantings throughout the site are also recommended to provide shade and reduce stormwater runoff.

Along Birch Lane the green street concept plan focuses on the installation of street side bioswales on the south side of the street and bioretention adjacent to the Senior Center parking area. Given the longitudinal slope in the portions of Birch Lane east of the senior center the bioretention areas in this area will require check dams or other devices to prevent scour and maintain practice integrity. Tree plantings are also recommended in the grassy areas adjacent to the Senior Center and within the parking lot. Tree boxes in the parking lot can improve shade conditions and reduce heat stress during the warmer months.

Designs

The conceptual designs for the bioretention areas and bioswales were developed using the design guidance provided by the West Virginia Department of Environmental Protection's Stormwater Management and Design Guidance Manual (WVDEP, 2012). This manual provides design criteria for a range of stormwater management practices which provide treatment of stormwater runoff as well as management of runoff volumes and flows. A principle design criterion for bioretention systems is the footprint of the practice which directly relates to the storage available for the capture and treatment of stormwater runoff. At the conceptual stage the commonly used criteria is to size bioretention areas so that the practice footprint is approximately 3% to 6% of the contributing drainage area. Since the design criteria provided in the manual are developed for the purposes of meeting specific regulatory management objectives, when applied to retrofit scenarios such as the Romney GI concept designs some variation from these criteria is acceptable. A summary of bioretention sizing ratios for the concept designs is provided in Table 1. It should be noted that Birch 1(west), Birch 2, and Birch 4 practices include contributing areas which are dominated by pervious areas. As a result, for these practices relatively low sizing ratios may be appropriate. This should be further evaluated as part of future design efforts. A topographic survey that will be conducted as part of a full design will also further clarify the drainage area to each of the proposed BMPs.

Table 1. Summary of BMP drainage areas and estimated sizing.

Bioretention	Drainage Area (ac)	BMP Area (sq ft)	Sizing ratio (%)*
Birch 1 (west)	0.33	209	1
Birch 2	1.23	139	0.2
Birch 3	0.37	1694	10
Birch 4 (east)	1.42	463	0.7
School 1 (south)	0.37	1689	10
School 2	0.33	746	5
School 3	0.23	754	7.5
School 4	0.46	1623	8
School 5	0.13	1040	18
School 6 (north)	0.22	784	8

*sizing ratio represents ratio of BMP footprint to drainage area. WVDEP guidance recommends sizing ratios of 3-6%.

NEXT STEPS

Using the concept designs provided in this report, the Town of Romney can apply for grants that will fund the full design and construction of the projects. Numerous grant opportunities are available to assist with funding these activities.

One of the key grant opportunities highlighted by WV DEP was the Chesapeake Bay Trust Green Streets, Green Jobs, Green Towns (G3) grant program. The grant is funded by U.S. EPA Region 3 and other local partners. Up to $30,000 can be awarded for full engineering designs and up to $100,000 for implementation. Since a match is encouraged but not required, Romney would still be eligible without having to bring significant resources to the project but could provide additional funding or in-kind services to strengthen the application.

APPENDIX A: ADDITIONAL RESOURCES

EPA's Green Infrastructure Website

http://www.epa.gov/green-infrastructure

National Association of City Transportation Officials (NACTO) Urban Street Stormwater Guide

https://nacto.org/publication/urban-street-stormwater-guide/

EPA's Green Infrastructure Funding Sources

https://www.epa.gov/green-infrastructure/green-infrastructure-funding-opportunities

Implementing Stormwater Infiltration Practices at Vacant Parcels & Brownfields

http://www.epa.state.il.us/water/watershed/publications/implementing-stormwater-infiltration-practices.pdf

EPA Reference Documents on Incorporating Green Infrastructure into Brownfields Projects

https://www.epa.gov/sites/production/files/2015-07/documents/green_infrastructure-9-16-14.pdf

http://www.epa.gov/green-infrastructure

West Virginia Stormwater Management and Design Guidance Manual

https://dep.wv.gov/WWE/Programs/stormwater/MS4/Pages/StormwaterManagementDesignandGuidanceManual.aspx

APPENDIX B: WORKSHOP ATTENDEES

Date: July 30, 2019 **Location: Romney, WV** **Green Infrastructure Workshop**

Name	Affiliation/Organization	Telephone	Email Address
Jonathan Smith	Tetra Tech	919-219-1990	jonathan.smith@tetratech.com
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Richard Kizer	Town of Romney	434-210-7909	RKizer@TownofRomney.org
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APPENDIX C: CONCEPT DESIGNS


Depth unknown — assumed 4+ feet
W Birch Lane
School Street
W Rosemary Lane
Fairfax Street
Key
Drainage areas
Landscaped bioretention with underdrain
Grass bioswale with underdrain and checkdams
Catch basin
Curb cut
Existing subsurface infrastructure
Proposed tree planting
N
0
125
250
FEET


Romney
Elementary
School
Rannels Lane
School Street
Northwestern Pike
Key
Project area boundary
Drainage areas
Landscaped bioretention with underdrain
Catch basin
Curb cut
Trench drain
Existing subsurface infrastructure
Proposed subsurface infrastructure
Proposed tree planting
Aboveground storage tanks to be removed
N
0
125
250
FEET