DC Green Street Program to Meet Stormwater Goals

CWEA Presentation

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Presenters

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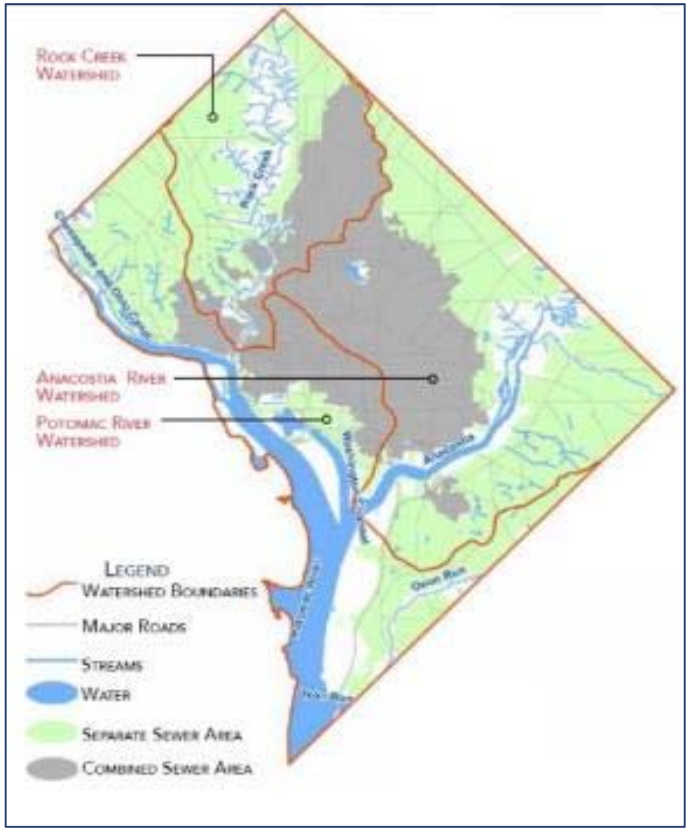
Infrastructure Project Management Division

Green Infrastructure Team

Overview

- District of Columbia
  - 61 square miles
  - 43% of the District's land area is impervious
  - 26% of land is in the Public Right-of-Way



AGENDA

- Regulations and Standards
- Green Infrastructure Design
- Lessons Learned
- End Q/A

Regulations

- DC MS4 Permit
  - EPA Region 3 Issues directly to District
  - Final Issued 2011, New permit will be issued soon
  - Required regulations for 1.2 inch stormwater retention for new development and redevelopment including public ROW
  - DDOT retrofit requirement is 34 acres of impervious cover
  - Incorporates TMDL Requirements

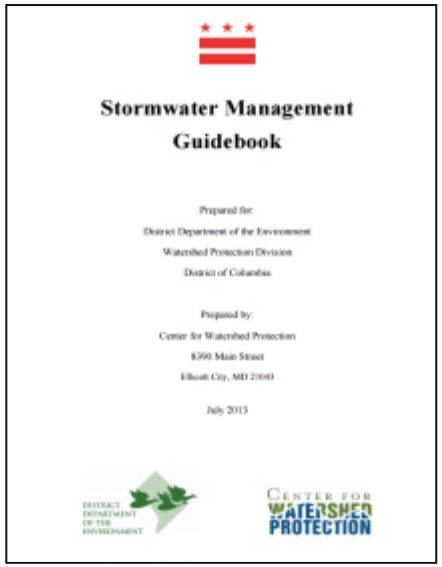
- DOEE facilitates the MS4 Permit between agencies

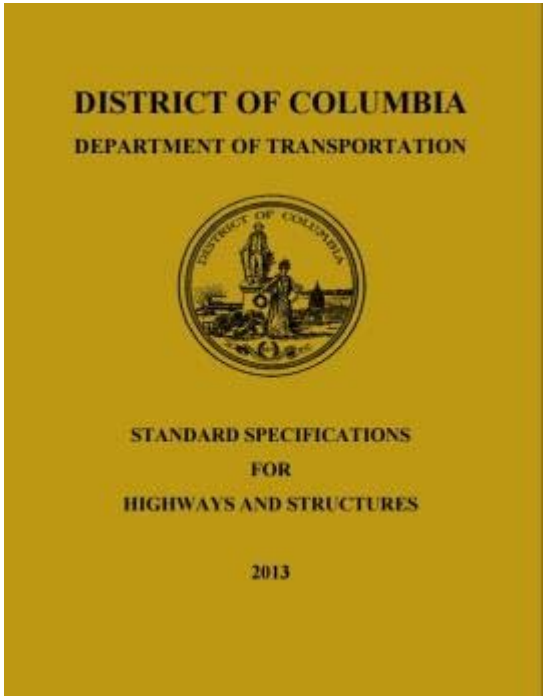
DC Stormwater Regulation

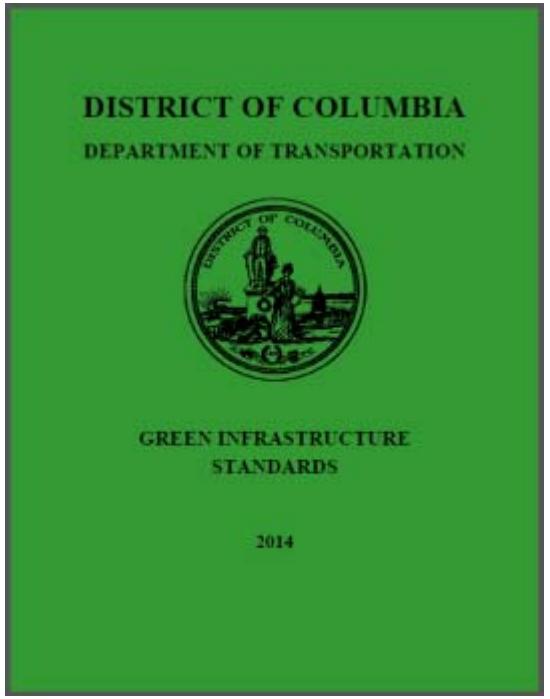
- DOEE regulations for Stormwater Permits – July 22, 2013
  - Retention requirement effective January 15, 2014
- Land Disturbance triggers
  - > 5000 SF, meet requirements
  - Resurfacing, utility trenching exempt
- Options for Existing ROW projects
  - Retain full volume requirement (1.2 inch)
  - Retain volume to the Maximum Extent Practicable (MEP) (No offsite or fee-in-lieu)
- Anacostia Waterfront Development Zone
  - Must treat 1.7 inches of runoff

Standards

- Green Infrastructure Standards (2014)
- DOEE Stormwater Guidebook
- Greening DC Streets







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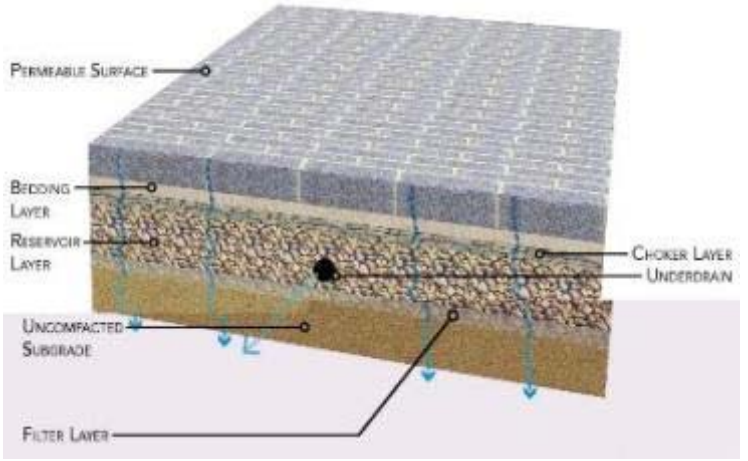
Green Infrastructure Practices

- Practices
  - Bioretention & variations
  - Permeable Pavement
  - Tree Space Design - Soil Volume Requirement

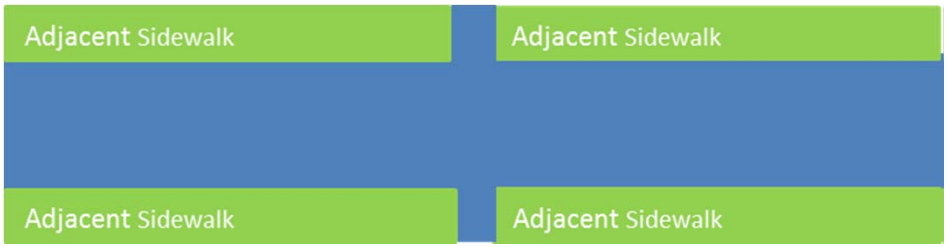


Green Infrastructure Design

- Reconstruction of existing public right-of-way

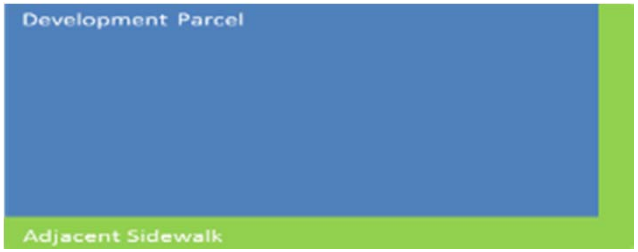
Type 1: federal or municipal construction

  - **Roads, alleys, sidewalks, trails, etc.**



Type 2: Private development

  - Adjacent sidewalks and alleys



- Voluntary Projects – Retrofit

  - Projects done strictly for stormwater retrofit


RiverSmart Washington
33rd St NW
Pervious Concrete Parking Lanes
Complete 2014

Green Infrastructure Design

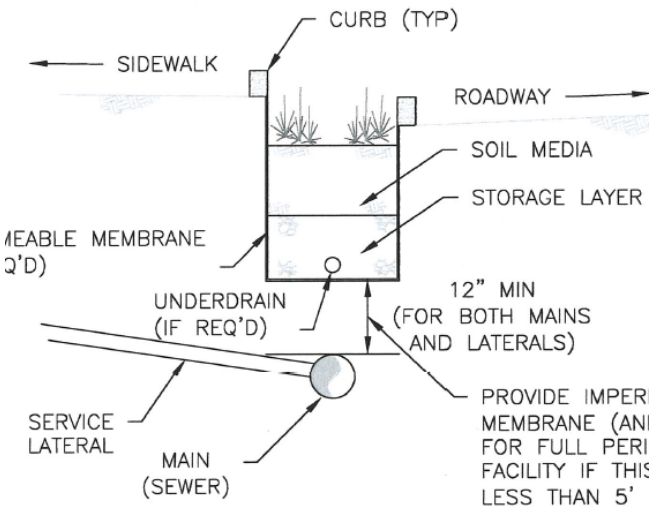
- A valid attempt to use all available space to manage stormwater
  - Tree Space, Parking lanes, public land open space
- Work around accepted conflicts
  - Pedestrian zones, bike lanes, bus shelters, mature trees, sidewalk cafes
  - Utilities, surface & subsurface uses


Golden Triangle BID


Constitution Square

Utility Coordination

- Steps to designing around utilities
  - Avoidance
  - Mitigation
  - Relocation
  - Acceptance
- Coordination with Primary Utilities
  - DC Water, Pepco, Washington Gas, Verizon, Comcast
- Offsets or protection requirements
  - Vertical & horizontal distance for GI near utility lines
  - Some lines can pass through GI

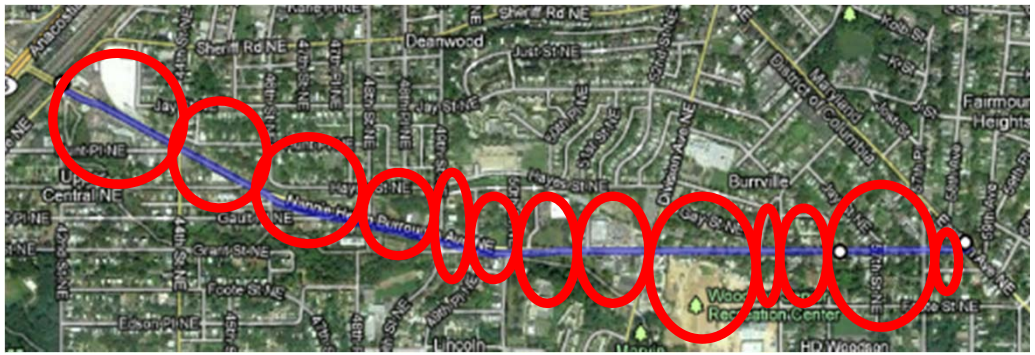


MEP Process

- Complete steps and submit package (plans, table & narrative) to DOEE at each phase
- DOEE provides comments and/or concurrence at each phase
  - If the MEP requirements are met, permit will be issued by DOEE

MEP Initial Design – 30% Submission

- Project survey, grades, utilities
- Establish Plan Layout, set LOD
- Determine drainage areas and required volume retention, within LOD and outside LOD
- Determine BMP layout and areas where BMP's are not possible due to conflict
- # of preserved trees
- Identify Hotspots
- Soil hydrologic class (per NRCS soil map)



MEP Spreadsheet 30%

Project Name: ______________________ *Circle One:* ***MS4 CSO*** *Check if in AWDZ:* ☐ **DDOE Plan Review No.:** ______________________

Summary Data: 30% Design Phase

Disturbance Area (ac.): 0.00
No. of Drainage Areas: ______

Regulated Retention Volume (1.2"): 0 CF
Retention Volume retained: TBD
Deficit: TBD

Instructions
Blocks in the worksheet that are not shaded are data entry fields for the designer.
All shaded blocks are computations internal to the worksheet and should not be edited.

Step 1: Drainage Area and Regulated Volumes — Number and list each drainage area within the project limits of disturbance (LOD). Identify the sq. foot of drainage area contributing runoff from within LOD and from outside LOD. Identify the regulatory SWRv required for each drainage area. Provide corresponding drainage area identifications on SWM.

Step 2: Consider Infiltration — Use the numbered list of drainage areas to record soil type and hotspot concerns within the project limits of disturbance (LOD).

Step 3: Evaluate Existing Infrastructure Constraints — On SWM, depict utility locations and invert/top elevations of ex. conveyance infrastructure to determine opportunities for proposed land conversion and BMP placement. Delineate areas of potential conflict, and areas without conflict, including areas where minimum depths for BMPs can not be met. Delineate trees (size, species, condition).

Step 4: Identify Land Conversion and BMP Placement Opportunities — On SWM identify ex. prop. features (traffic islands, triangle parks, median islands, cul-de-sacs, etc) within each drainage area. Depict if they are chosen, or not, for land conversions or BMP placements. Provide the basis for the decision if these features are not used to improve land obstruction or stormwater retention BMPs. Decisions should use the information established in the previous two steps.

Drainage Area ID	Contributing Area: Paved w-in LOD	Compacted w-in LOD	Natural w-in LOD	Total w-in LOD	Paved outside LOD	Compacted outside LOD	Natural outside LOD	Total outside LOD	SWRv: w-in LOD	outside LOD	Hydro Soil Group	Hot Spot Concern Found? Describe	Preservation of Mature Trees which are in fair or better condition		Land Conversion or BMP Opportunity?	Describe obstacles to Land Conversion or BMP (Attach narrative if necessary)
	SF	SF	SF	SF	SF	SF	SF	SF	CF	CF	A, B, C, D or Urban Land	Y/N	# of trees	Ex. Tree Volume Credit (CF)	Y/N	
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MEP Intermediate Design – 65% Submission

- Geotechnical testing to determine soil infiltration
  - Underdrain needs and location.
  - Utility location to determine vertical conflicts
- Test results influence design of practice
- Update plan and identify any other conflicts
- Calculate volume achieved

MEP Intermediate Design – 90% and Final Submission

- Finalize design and update any changes
- Determine final volume retention
- Final approval by DOEE and permit issued

MEP Spreadsheet 90%

Public Right of Way (PROW) MEP Assessment Worksheet

90% Phase Page 1 of 2

Project Name: ______________________ *Circle One: MS4 CSO* *Check if in AWDZ:* ☐ **DDOE Plan Review No.:** ______________

Summary Data: 90%/Final Design Phase

Disturbance Area (ac.): 0.00

No. of Drainage Areas: ______

Regulated Retention Volume (1.2"): 0 CF

Retention Volume retained: 0 CF

Deficit: 0 CF

Instructions

Blocks in the worksheet that are not shaded are data entry fields for the designer.

All shaded blocks are computations internal to the worksheet and should not be edited.

Step 1: Drainage Area and Regulated Volumes

Update from 65% based on refined or revised design.

Number and list each drainage area within the project limits of disturbance (LOD). Identify the sq. foot of drainage area contributing runoff from within LOD and from outside LOD. Identify the regulatory SWRv required for each drainage area. Provide corresponding drainage area identifications on SWM.

Step 2: Consider Infiltration

Use the numbered list of drainage areas to record water table, bedrock concerns, infiltration rate, and hotspot concerns within the project limits of disturbance (LOD).

Step 3: Evaluate Existing Infrastructure Constraints

On SWM, depict utility and conveyance infrastructure to confirm/adjust opportunities for land conversions and BMPs. Delineate areas of potential conflict, and areas without conflict, including areas where minimum depths for BMPs can not be met. Delineate trees (size, species, condition) and tree protection.

Drainage Area ID	Contributing Area								SWRv		Hydro Soil Group	Water Table OK?	Bedrock elev OK?	Infiltration Rate	Hot Spot Concern Found?	Preservation of Mature Trees which are in fair or better condition	
	Paved w-in LOD	Compacted w-in LOD	Natural w-in LOD	Total w-in LOD	Paved outside LOD	Compacted outside LOD	Natural outside LOD	Total outside LOD	w-in LOD	outside LOD							
	SF	SF	SF	SF	SF	SF	SF	SF	CF	CF	A, B, C, D or Urban Land	Y/N	Y/N	in/hr	Y/N	# of trees	Ex. Tree Volume Credit (CF)
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MEP Spreadsheet 90% Cont'd

Public Right of Way (PROW) MEP Assessment Worksheet

90% Phase Page 2 of 2

Project Name: 0 **DDOE Plan Review No.:** 0

Summary Data: 90%/Final Design Phase

Disturbance Area (ac.): 0.00

No. of Drainage Areas: 0

Regulated Retention Volume (1.2"): - CF

Retention Volume retained: - CF

Deficit: - CF

Step 4: Identify Land Conversion and BMP Placement Opportunities

For land conversion and BMP opportunities already defined at 30%, and for new opportunities added, provide the area measurements below. **Land Conversion and BMP surface areas within the LOD must be reflected in the SWRv computation - update these columns as necessary.** Additional allowable BMP's such as impervious surface disconnect, swales, and infiltration should also be considered. **Describe reason** for eliminated Land Conv./BMP locations

Step 5: Size BMP's and Compute Achieved Retention Volumes

Delineate the drainage area to the BMP locations and compute the ceiling runoff volume reaching them. Aggregate the total maximum possible BMP volume that can be handled by the BMP's at their locations...

Compute and total the total maximum possible BMP capacity based on size of the facilities. Total the number of proposed trees meeting the required soil volume to be considered acceptable for retention volume. Total the maximum retention volume capacity of all facilities, and compare to the regulated volume. If a deficit exists, review BMP placements/sizes to determine if additional volume can be captured.

Drainage Area ID	Land Conversion Area		Bioretention Opportunity Areas		Permeable Pavement Opportunity Areas		BMP Drainage Area (total for all w/in DA - see separate sizing comps)		1.7" (Ceiling) SRC Reaching All Proposed BMPs		Max. Storage Vol. Bioretention Based on Size (Total in DA - See separate sizing comps)	Max Storage Vol. Perm. Pav't Based on Size (Total in DA - See separate sizing comps)	Maximum "Other" Storage Vol. (Total in DA - See separate sizing comps)	No. of prop. trees meeting soil vol req't	Total Sv Practice - Maximum Retention Volume Achievable (BMP's and Trees)	Overage / (Deficit) Volume (as compared to SWRv)
	within	adj	within	adj	within	adj	within	adj (1)	within	adj (1)						
	SF	SF	SF	SF	SF	SF	SF	SF	CF	CF	CF	CF	CF	EA	CF	CF
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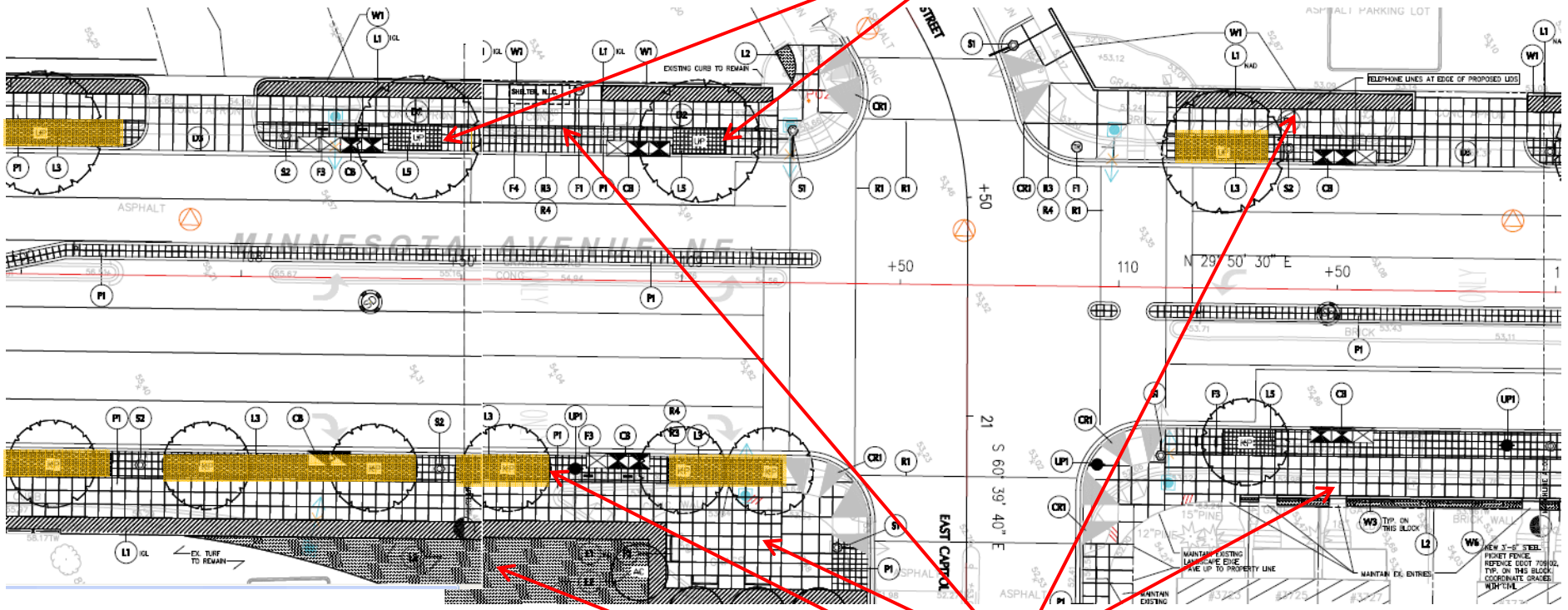
MEP Design Layout



Lessons Learned

- Infiltration testing is not required in soil group D, but areas with poor soils may still be sites for BMPs that are designed with underdrains
- Define the limit of disturbance accurately early in the project to determine if the stormwater regulatory requirement is triggered
- Determine whether any new right of way is being obtained as part of a project, because new right of way is not eligible for MEP

Questions?

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Resources

http://ddot.dc.gov/greeninfrastructure
www.ddoe.dc.gov/stormwaterrule