Section II-6 Training

TRAINING

The diverse experience and expertise brought by the Cahill Team is an asset in creating a training program that provides participants with the knowledge to implement new stormwater management and land development strategies. CA is a national leader in innovative stormwater management design and environmental planning; our expertise has been sought after for educational training workshops and seminars throughout the Commonwealth and even nationwide. The Cahill Team is highly experienced in educating and training a wide variety of groups - from state and local agencies to engineers and other professionals to watershed advocacy groups. We bring this experience of what works and what doesn't work to the "training table" and are confident that it will enable us to develop an effective training program with our specialists at PEC.

The Pennsylvania Environmental Council (PEC) will lead this effort for the Team. PEC brings their extensive experience in outreach and education related to stormwater and other watershed protection issues. As a statewide leader in environmental education, PEC has worked closely with county agencies, municipal governments, academic institutions, businesses, nonprofit and grassroots organizations throughout the Commonwealth. PEC has worked state wide to promote the establishment of new municipal Environmental Advisory Councils (EAC) and assists and educates existing EAC's. In the face of increasing demands on Pennsylvania municipalities to make critical decisions impacting land and water resources, PEC has engaged in developing and delivering Municipal Environmental Education Programs to keep municipal officials abreast of current and future environmental issues. The Cahill Team, with the leadership of PEC, will use its experience to deliver a training program that satisfies the requirements of the Oversight Committee for the effective training of PADEP staff, as well as state and local groups and organizations.

The approach of the Cahill Team is one that is multifaceted and which starts with non-structural techniques to reduce development impacts and ends with a final design that respects and often "mimics" the natural system through the use of a wide variety of mitigation techniques. The implementation of recent changes in State regulatory requirements will certainly raise challenges for designers and state and local agencies, as in many cases it will require significant modifications to current mitigation methods and strategies. Therefore, it is extremely important that the Training Program address these challenges and provide participants with the tools to effectively use the BMP Manual on a site by site basis.

The BMP Manual should be just one of the tools utilized by participants in the evaluation, design and construction of development projects and their associated stormwater BMPs. Users of the manual must be equipped to ask the right questions about a development site in order to effectively propose and design BMPs that will provide the maximum water quality and quantity benefits. It is the Team's intent to create a BMP manual and training program that provides a Procedure that can be used by regulators and designers alike to evaluate different design approaches and to make more valuable decisions.

This procedural approach has been recently put to use by PEC and CA for a Stormwater Training Program that was designed to educate county and municipal officials in evaluating local

development proposals. The program focuses on providing overall environmental education pertaining to land development and stormwater management, while providing a comprehensive evaluation procedure (Attachment II-6) to guide the sight planning and design process. The BMP Manual Training Program could benefit from a similar approach based on the Stormwater Planning and Design Procedure (Figure 1-1) and tailored to meet the requirements of the PADEP Oversight Committee. Real world examples should be used to demonstrate the ideas and design strategies and participants should play an active role in the discussions. The workshop should include a break-out session in which participants evaluate case studies and determine design solutions that include land development alternatives and possible stormwater mitigation measures. In accordance with the requirements, these workshops will be scheduled and completed within 182 days of the publication of the Final Manual.

CHECKLIST SUMMARY FOR COMPREHENSIVE STORMWATER MANAGEMENT
(Use with Site Planning and Design Procedure)

SITE ANALYSIS

1. Background Site Factors

Describe the hydrologic and natural elements

- Chapter 93 stream use designation?
  - Special Protection waters (EV, HQ)?
  - Fishery / Aquatic Life Use (WWF, CWF, TSF)?
- Any Chapter 303d/impaired stream listing classifications?
- Aquatic biota sampling?
- Existing water quality sensitivities downstream (water supply source?)?
- Location of any known downstream flooding?

2. Site Factors Inventory

Describe the size and shape of the site

- Special constraints/opportunities?
- Special site border conditions?

Describe the existing developed features of the site, if any?

- Existing structures/improvements, structures to be preserved?
- Existing cover/uses?
- Existing impervious areas?
- Existing pervious maintained areas?
- Existing public sewer and water?
- Existing storm drainage system?
- Existing wastewater system?

Describe important natural features of site

- Existing hydrology (drainage swales, intermittent, perennial)?
- Existing topography, contours, subbasins?
- Soil series found on site and their Hydrologic Soil Group ratings?
- Areas of vegetation (trees, scrub, shrub)?
- Special Value Areas?
  - Wetlands?
  - Floodplains?
  - High quality woodlands, other woodlands and vegetation?
  - Riparian buffers?
  - Naturally vegetated swales/drainageways?
- Sensitive Areas?
  - Steep slopes?
  - Special geologic conditions (limestone?)?
  - Shallow bedrock?
  - High water table?
- PNDI areas or species?

3. Site Factors Analysis

Characterize the constraint-zones at site

- Avoid development on or near special and sensitive natural features

Characterize the opportunity-zones at site

- Location of well-draining soils
- Location and quality of existing vegetation

BACKGROUND SITE CONSIDERATIONS

BUILDING PROGRAM

Township Comprehensive Plan and Zoning guidance?
- Guidance in Comprehensive Plan?
- Existing Zoning District?
  - Total number of units
  - Type of units
  - Density of units
- Any allowable options?

Township SLDO guidance and options?
- Performance standards for neo-traditional, village, hamlet planning?
- Reduce building setbacks?
- Curbs required?
- Street width, parking requirements, other impervious requirements?
- Cut requirements?
- Grading requirements?

Township SLDO/stormwater requirements?
- Peak rate and design storms?
- Total runoff volume?
- Water quality provisions?
- Methodological requirements?
- Maintenance requirements?

Tailor building program to fit the constraints and opportunities of the natural features?

Is applicant submission complete or fully responsive to municipal zoning/SLDO requirements?

Are municipal zoning/SLDO requirements themselves inadequate?

Is useful interaction at sketch plan or even pre-sketch plan phases occurring?

BACKGROUND SITE CONSIDERATIONS

SITE DESIGN

1. Lot Configuration and Clustering

Reduce individual lot size?

Concentrate/cluster uses and lots?

Configure lots to avoid critical natural areas ?

Configure lots to take advantage of effective mitigative stormwater practices?

Orient built structures to fit natural topography?

Minimize site disturbance (excavation / grading) at site?

Minimize site disturbance (excavation / grading) for each lot?

2. Impervious Coverage

Reduce road width?

Utilize cul-de-sacs and turnarounds at reduced road width?

Reduce driveway length and width?

Reduce parking ratios?

Reduce parking sizes?

Examine potential for shared parking?

Utilize porous surfaces for applicable parking features (overflow)?

Design sidewalks for single-side street movement?

Disconnect stormwater flows from roofleaders?

Utilize rainbarrels and/or cisterns for lot irrigation?

3. Minimum Disturbance/Maintenance

Define disturbance zones for site?
- Protect maximum total site area from development disturbance

DESIGN PHASE 1: PREVENTATIVE

Protect naturally sensitive and special areas from disturbance

Minimize total site compaction?

Maximize zones of open space and greenways?

Consider re-forestation and re-vegetation opportunities?

4. Preliminary Calculations for SW Management for Mitigation

Address management objectives of applicant?

runoff volume
recharge volume
runoff rate
non-point source pollutant loading

VEGETATED/NON-STRUCTURAL BMPs

Use of vegetative BMPs for stormwater management

Swales?
Filter Strips?
Raingardens/Recharge Gardens/Bioretention Beds?
Berms, Level Spreaders, other grading techniques?

Consider short- and long-term maintenance

STRUCTURAL BMPs

Use structural, infiltration BMP's

Infiltration Basin?
Infiltration Trench?
Porous pavement with recharge bed?

Where infiltration is infeasible, use pollution control practices

Water quality devices?
Wet pond/retention basin?
Constructed wetland?
Extended detention pond?
Multi-chamber catch basin and inlets?
Sand and sand-peat filter?

Where infiltration is infeasible, use other volume control practices

Roof garden or vegetated roof?

Consider short- and long-term maintenance

DESIGN PHASE 2: MITIGATIVE

STORMWATER METHODOLOGY AND CALCULATIONS

1. Iterative process occurring throughout planning and design processes

Soil Cover Complex Method (TR-55) is industry standard for calculations

2. Strive to achieve two basic goals

Minimize the pre to post development increase for Curve Numbers
Maximize predevelopment Time of Concentration
Assume "conservative" pre-development conditions
Respect natural sub-areas in the design and engineering calculations

3. Strive to achieve 4 standards of Comprehensive Stormwater Management

No increase in total volume of runoff from pre to post development, for up to the 2-yr storm
No reduction in total volume of recharge, for up to the 2-yr storm
No increase in peak rate of runoff
No increase in pollutant loading

STORMWATER CALCULATIONS

STORMWATER PLAN