



DESIGN PROCEDURE FOR A SENSITIVE LOW IMPACT PROJECT (SLIP)

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BACKGROUND

Today it is critical that development projects be soft-on-the-environment. There are many factors that lessen its impacts. Architects take care of building factors, landscape architects help greatly, and mechanical engineers are critical. Until recently, the efforts of civil engineers to bring environmental benefit to a project were not adequately addressed. This procedure works to change that.

SLIP PROCEDURE

1. Site Reconnaissance
 - 1.1. General Project Parameters
 - Using information from the owner/developer, document the desired yield from the project. This can be usable pad area, leasable floor area, or other goals for the project.
 - 1.1.1. Define and list all
 - 1.1.2. Designate the importance of each to the project
 - 1.2. Opportunities & Constraints of the Site
 - 1.2.1. List the specific opportunities of the site.
 - 1.2.1.1. List each one, do not use general statements that cannot be itemized
 - 1.2.1.2. Each one should be specific to this site.
 - 1.2.2. List the specific constraints of the site.
 - 1.2.2.1. List and be site specific.
 - 1.2.2.2. Prioritize the importance of each constraint.
 - 1.3. Obtain Regulatory Requirements
 - 1.3.1. Federal Regulations
 - 1.3.2. State Regulations (Energy and Pollution Prevention)
 - 1.3.3. City/County Building Regulations
 - 1.3.4. Community regulations (or anticipated regulations from stakeholders)
 - 1.4. Site Physical Inputs
 - 1.4.1. Site geotechnical factors
 - 1.4.1.1. Instability/faulting
 - 1.4.1.2. Infiltration of stormwater
 - 1.4.2. Natural areas defined
 - 1.4.2.1. Importance of maintaining each area (political or jurisdictional)
 - 1.4.2.2. Is the area an asset or a constraint?
 - 1.4.2.3. Hydrologic circumstances
 - 1.5. Documentation of this project effort (Many agencies require documentation of this procedure for a permit approval. The requirement may come from a federal, state or local jurisdiction.

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2. Preliminary Design (Design #1)
 - 2.1. Perform grading analysis
 - 2.1.1. Determine pad sizes, road network, open-space/landscaping, etc.
 - 2.2. Perform preliminary SLIP analysis
 - 2.2.1. Determine general requirements for stormwater pollution control (biofiltration)
 - 2.2.2. Determine general requirements for flow control (hydromodification)
 - 2.2.3. Determine likely locations for permanent BMPs
 - 2.3. Document Site Design (LID) circumstances per requirements of agencies.
3. Revised Preliminary Design (Design #2)

Prepared to integrate requirements from all design input areas.

 - 3.1. Review and evaluate by design-team
 - 3.2. If appropriate, estimate development costs.
 - 3.3. Evaluate processing complexities. Are USACE permits required, are temporary use permits required, what state and local regulatory pollution permitting is likely.
 - 3.4. Determine if design is ready to proceed to final.
 - 3.5. Document Sources of onsite pollution that are likely, per local agency requirements.
4. Final Design (Design #3)
 - 4.1. Perform hydrologic analysis of site (only on-site conditions)
 - 4.2. Perform drainage area analysis (site and surrounding areas)
 - 4.3. Perform jurisdictional stormwater calculations (use local requirements for determination of volume treatment and flow control treatment that is needed).
 - 4.4. Calculate pollutant removal BMP size(s) and location(s).
 - 4.5. Calculate the detention, flow treatment, and flow discharge values to meet the project's jurisdictional requirements. (Hydromodification and flood routing)
 - 4.6. Transmit these requirements to the designer of the site grading to confirm that the project can integrate these solutions.
 - 4.7. Document all calculations and designs as necessary to satisfy federal, state and local requirements. This usually results in a lengthy Water Quality Report. The report has many local identifications including Storm Water Master Plans (SWMPs), Storm Water Management Plans (SWQMPs), etc.
 - 4.8. Design engineer for grading plan will integrate these designs and details into the plans.

Notes:

- a. Requirements for this procedure will be revised to meet the needs of Federal Regulations present at each specific site. These can include permits relating to Waters of the US (WOTUS), Federal Emergency Management (FEMA), and US Army Corps of Engineers (USACE).
- b. Requirements for the above procedures can be impacted by State requirements for Waters of the State, and Water Resource Control Boards.
- c. The procedure must be adapted to account for local jurisdictional requirements such as local habitat maintenance regulations, grading limitations, and maximum velocity of discharge stipulations.

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