LID ELEMENT #19: PRE AND DURING CONSTRUCTION INSPECTIONS

OBJECTIVE

To ensure proper installation and function of low impact development (LID) elements through inspection prior to, during and after construction activities.

RELATED ELEMENTS

Element 20 Maintenance Standards and Inspections

CURRENT APPROACH TO CONSTRUCTION INSPECTIONS

Inspectors follow established procedures for inspecting and documenting work being completed under a public works contract or City-issued permit. During the pre-construction conference (pre-con) for the project, special emphasis is usually placed on the installation and maintenance of erosion and sediment control best management practices, and other requirements of the site's construction Stormwater Pollution Prevention Plan (SWPPP) or Erosion and Sediment Control Plan. If the project has federal funding, an additional checklist is used that reviews environmental and adjacent property consideration. Inspection requirements for LID techniques are not specifically called out from other issues; if they are part of the project they are typically addressed in the section of the Pre-Con called "Other Items".

"Protecting native soil and vegetation, minimizing soil compaction, and retaining hydrologic function during the site preparation and construction phases presents some of the most significant challenges within the development process."

Low Impact Development Technical Guidance Manual for Puget Sound, Puget Soun (2012)

For erosion and sediment control (ESC) inspections, inspection and enforcement procedures are outlined in the Erosion and Sediment Control and Inspection and Enforcement Policy. The Phase II Municipal Stormwater Permit requires that the City perform inspections and provide enforcement for infractions.

CODES AND STANDARDS REVIEWED

Engineering Design and Development Standards (EDDS) Chapter 3
Washington State Department of Transportation (WSDOT) Standard Specifications
City of Olympia Stormwater Erosion and Sediment Control Inspection and Enforcement Policy
City of Olympia Construction Inspector Training Manual (Public Projects Only)

BENEFITS OF INSPECTION

In order for LID techniques to be effective, they must be installed correctly. Infiltration facilities need to be protected from compaction and sedimentation. Permeable pavements must be protected from soil,

landscaping materials, and other construction material during all phases of construction. Compost amended soils need to be installed with the correct mix of materials and to the proper depth. Areas designated for preservation of natural vegetation need to be protected from disturbance including removal of soil and/or vegetation. While the contractor has the responsibility for properly installing and protecting LID BMP's during construction, the site inspector helps ensure correct methods are observed and proper installation, protection, and maintenance occurs for the duration of the project.

OLYMPIA CODE AND POLICY ANALYSIS

The requirement for inspections is incorporated into several city codes, including the City of Olympia Engineering Design and Development Standards (EDDS), the Olympia Municipal Code (OMC) and the WSDOT Standard Specifications (adopted into the OMC by reference). These codes typically indicate when inspections are required and for what project types. Inspection procedures are specified within the City of Olympia Stormwater Erosion and Sediment Control Inspection and Enforcement Policy and City of Olympia Construction Inspector Training Manual.

The Construction Inspector Training Manual focuses on inspection procedures and processes. The Stormwater Erosion and Sediment Control and Inspection Policy is similarly focused on procedure, but includes enforcement as well. Specific requirements for inspections of particular types of facilities are not identified in these documents. Inspectors are trained as Certified Erosion Sediment Control Leads.

Access to private properties for inspections is granted by the project permit. Once construction is complete, an operation and maintenance agreement must be signed and recorded between the City and the owner for stormwater facilities. This agreement grants access to the City for inspections to ensure on-going mainenance occurs and stormwater facilities are functioning properly. It also gives the City authority to have maintenance activities performed and then charge the owner for these services if the owner does not perform this work after notification.

Increasing the use of low impact development techniques could result in the increased need for inspection to ensure proper protective measures are observed.

HURDLES TO LID SPECIFIC INSPECTION

This element presents the following challenges:

Increased Frequency and Duration of Inspection – Currently ESC best management practices (BMPs) require inspections prior to construction, during construction and upon completion of construction. It is anticipated that increased use of LID BMPs/ techniques will add a number of additional items to inspection lists, increase the number of required inspections, and make the

inspections longer to conduct. To ensure proper installation of LID facilities, multiple inspections might be needed for the same element to verify correct installation. Ultimately, the number of inspections for sites incorporating LID elements is expected to be higher than a site using standard stormwater practices. This increase in the number of inspections will require additional City and private resources to accommodate. Over time, as LID construction becomes more common and contractors are familiar with the requirements of LID construction, the need for more inspections could diminish.

Increased Need for Enforcement – Enforcement is required when a contractor is not following required procedures. Enforcement, therefore, occurs after improper procedures have occurred, using either a corrective action notice or a stop work notice. Many LID elements are not as effective if improper installation or other enforceable action has occurred. For instance, if an area that is supposed to be preserved as natural vegetation is cleared, that natural area and its associated infiltration benefits cannot be recovered to its original condition. The area can be replanted and compost amended soils placed but this will not provide the same infiltration benefit as a natural, undisturbed area. Also, protecting pervious concrete driveways from becoming storage areas for landscaping materials such as compost or bark can be a challenge. In addition, areas proposed for infiltration may not be suitable for such if compaction of the soil occurs during construction. Mitigation procedures can be implemented but design infiltration rates might not be recoverable. Therefore, in order to protect future LID facility installations, stringent enforcement is needed before damage occurs. Post-infraction enforcement will be more rigorous than currently exercised.

Development of LID Specific Protocols – Given LID features sensitivity to improper installation and maintenance, LID specific protocols for inspection will be required. DOE provides information on both design and maintenance of LID facilities but does not provide guidance on inspection requirements. In order to ensure proper installation of LID BMP's, the City needs to develop inspection protocols including both frequency of inspections as well as features to inspect.

OPTIONS CONSIDERED

The following options were considered for this element:

- Option 1: Continue to use current inspection manuals and procedures without change.
- Option 2: Revise the current inspection manuals and procedures to recognize specific components related to LID elements of a project. Requirements specified for LID inspection should cover pre-construction inspections and inspections during construction.

ANALYSIS

Proper installation of LID elements is essential to their proper function. Therefore, inspection of these facilities is essential to successful implementation of LID.

Option 1 (no change) would maintain the status quo. As with any new concept, it takes time for designers, contractors and inspectors to fully understand proper design and installation. Current manuals do not highlight LID practices, and therefore any use of these techniques would be up to the individual inspector to review as part of other construction inspections. This could result in inconsistent inspection, enforcement and increased liability.

Implementation of Option 2 (update current manuals to include specific information for LID elements) will require updates to the current inspection manuals, Stormwater Erosion and Sediment Control Inspection and Enforcement Policy and Construction Inspector Training Manual, to include specific language regarding inspection procedures for LID techniques. By highlighting the LID elements of a project and the unique inspection needs of those elements, special attention would be paid during their inspection and could also provide better consistency in inspection and enforcement.

Highlighting the LID elements of a project and the inspection needs of those elements, before and during construction should be a top priority of implementing LID.

Development of LID BMP inspection protocols will be needed including pre-construction inspection requirements and inspection requirements during construction. Protocols will also be needed for post installation protection of LID BMP's as construction continues around facilities that are installed in early construction phases.

RECOMMENDATION

Staff recommends Option 2. Option 2 will ensure that inspection procedures and protocols are updated for LID specific requirements. Option 1 would not provide LID specificity for inspections.