



# Washington State Low Impact Development Training Plan

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Prepared for the **Washington State Department of Ecology**

Washington Stormwater Center | Veda Environmental | Cascadia Consulting Group |  
Washington State University Social and Economic Sciences Research Center



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# Table of Contents

- I. Executive Summary..... 11**
- II. Introduction..... 17**
- III. Training Plan Structure..... 24**
  - Overview ..... 25**
    - Component #1: Training Schedules ..... 26
    - Component #2: Work Plans ..... 30
    - Component #3: Potential Providers..... 31
- IV. Summary of Training Schedules and Work Plans ..... 32**
- V. LID Training Plan for Western Washington..... 34**
  - Training Plan Strategies ..... 34**
    - Strategy 1: Build Capacity (including Train-the-Trainer)..... 34
    - Strategy 2: Curriculum Building ..... 35
    - Strategy 3: Deliver Online Trainings ..... 35
    - Overview of Detailed Plan ..... 35
  - Western Washington Training Schedule..... 36**
  - Western Washington Work Plan – Detailed Year 1 Actions ..... 39**
    - Administration and Coordination ..... 40
    - Capacity Building..... 41
    - Curriculum ..... 44
    - Evaluation and Adaptive Management ..... 45
  - Western Washington – Potential Providers..... 48**
- VI. LID Training Plan for Eastern Washington ..... 50**
  - Training Plan Strategies ..... 50**
    - Strategy 1: Build Capacity (including Train-the-Trainer)..... 50
    - Strategy 2: Develop Eastern Washington Specific Curriculum ..... 51
    - Strategy 3: Deliver In-person and Online Trainings ..... 51
    - Overview of Detailed Plan ..... 51
  - Eastern Washington Training Schedule ..... 52**
  - Eastern Washington Work Plan – Detailed Year 1 Actions ..... 54**
    - Administration and Coordination ..... 55
    - Capacity Building..... 56
    - Curriculum ..... 58
    - Evaluation and Adaptive Management ..... 59

Eastern Washington – Potential Providers ..... 62

VII. Conclusion ..... 64

VIII. Appendices ..... 67

    Appendix A. Washington State Low Impact Development Training: Needs Assessment Report  
    Executive Summary ..... 68

    Appendix B. LID Steering Committee Members..... 77

    Appendix C. LID Expert Panel ..... 78

    Appendix D. Methodology ..... 79

    Appendix E. Audience-Specific Training Schedules ..... 85

    Appendix F. Guide to Western and Eastern Washington Training Schedules ..... 99

    Appendix G. Current Service Providers of LID Training in Washington ..... 106

    Appendix H. Professional Associations..... 107

    Appendix I. LID Topic Experts ..... 109

**Tables and Figures**

Figure 1. Development of Training Plan ..... 12

Figure 2. Overall Process for Development of the LID Training Plan..... 20

Table 1. Course Levels..... 27

Figure 3. Year 1 Priority Actions Cost Estimates - Statewide..... 31

Figure 4. Year 1 Priority Actions Cost Estimates – Regional ..... 31

Table 2. Summary of Western and Eastern Washington Training Schedules and Work Plans ..... 33

Table 3. Western Washington Training Schedule ..... 37

Table 4. Potential LID Training Providers in Western Washington..... 48

Table 5. Eastern Washington Training Schedule..... 53

Table 6. Potential LID Training Providers in Eastern Washington ..... 62

Figure 5. Attributes Assessed to Develop Audience-Specific Schedules ..... 80

Table 7. Example Table of LID Topic Priority by Audience..... 82

Table 8. Example Table of Training Levels ..... 83

Table 9. Example Table of Audience-Specific Training Schedule..... 84

Table 10. Priority Topics Identified for Design/Engineering Professionals..... 85

Table 11. Levels of Knowledge and Training for Design/Engineering professionals ..... 86

Table 12. Training Schedule for Design/Engineering Professionals..... 87

Table 13. Priority Topics Identified for Operations/Maintenance Professionals ..... 88

Table 14. Levels of Knowledge and Training for Operations/Maintenance Professionals ..... 89

Table 15. Training Schedule for Operations/Maintenance Professionals ..... 89

Table 16. Priority Topics Identified for Inspection/Enforcement Professionals ..... 90

Table 17. Levels of Knowledge and Training Inspection/Enforcement Professionals ..... 91

Table 18. Training Schedule for Inspection/Enforcement Professionals ..... 91

Table 19. Priority Topics Identified for Permitting/Planning Professionals ..... 92

Table 20. Levels of Knowledge and Training for Permitting/Planning Professionals ..... 93

Table 21. Training Schedule for Permitting/Planning Professionals ..... 93

Table 22. Priority Topics Identified for Construction/Land Development Professionals ..... 94

Table 23. Levels of Knowledge and Training for Construction/Land Development Professionals ..... 95

Table 24. Training Schedule for Construction/Land Development Professionals ..... 96

Table 25. Priority Topics Identified for Elected Officials/Managers/Public Works Professionals ..... 97

Table 26. Levels of Knowledge and Training for Elected Officials/Managers/Public Works Professionals ..... 97

Table 27. Training Schedule for Elected Officials/Managers/Public Works Professionals ..... 98

Figure 6. Process for Developing Western and Eastern Washington Training Schedules ..... 99

Table 28. Summary Table of Audience-Specific Schedules ..... 100

Table 29. Summary Table Identifying Trends and Overlaps among Audiences and Topics ..... 103

Table 30. Current Service Providers of LID Training in Washington ..... 106

Table 31. Professional Associations ..... 107

Table 32. LID Topic Experts ..... 109

# Glossary

Key Words	Definition
<b>Audiences</b>	The LID Steering Committee selected six priority audiences.
<b>1 Design/engineering professionals</b>	Individuals that design and/or review specifications for engineered and non-engineered buildings or site plans, stormwater pollution prevention plans (erosion and sediment control, industrial, construction), small and large on-site septic systems, water design systems, temporary erosion and sediment control plans, construction cost estimating, certified erosion and sediment control lead inspections, and project management/engineer inspections.
<b>2 Operations/maintenance professionals</b>	Personnel as well as contractors that are hired to conduct operations and maintenance activities, including parks, facilities, landscape, utility, and system maintenance staff, as well as ferries and airports, roads and asset management. Those who operate and maintain LID facilities within public and private sector properties.
<b>3 Inspection/enforcement professionals</b>	All individuals that work in code enforcement and inspection. Also included are building and land development code enforcement, and inspection and enforcement in construction, building, utility, stormwater management, plumbing, electrical, and fire marshals.
<b>4 Permitting/planning professionals</b>	Individuals that review permits for buildings, site plans, and erosion and sediment control or construction stormwater pollution prevention plans. In addition, code writing or development, zoning, land use, and long and short-term jurisdictional planning, stormwater and watershed management planning.
<b>5 Construction/land development professionals</b>	All individuals involved in the installation of LID facilities. This category refers to all individuals that clear land, prep sites, and operate equipment. Also included are building, remodeling, and landscaping professionals, including landscape architects.
<b>6 Elected officials/managers/public works professionals</b>	Refers to elected officials, city and county managers, public works directors, or other city/countywide program managers. Also included are facilities managers, planning commissioners, attorneys, legal counsel, and Washington State House and Senate members.
<b>Bioretention Areas</b>	Systems utilizing special soil mixes and plants that are engineered to treat and infiltrate a specific amount of stormwater. They have exact design criteria to ensure they function according to the design intent. These facilities have operation, maintenance, and inspection requirements since they are part of a stormwater treatment and flow control system. Bioretention facilities are commonly found on commercial properties or in a public right-of-way.
<b>Curriculum Review Committee</b>	A group of curriculum experts recommended by the LID Training Plan to provide third party oversight and review of LID training curriculum as it is developed and implemented.

Key Words	Definition
<b>LID (Low Impact Development)</b>	LID is a stormwater and land development strategy applied at the parcel and subdivision scale that emphasizes conservation and use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely mimic pre-development hydrologic functions. LID mimics pre-disturbance hydrologic processes of infiltration, storage, evaporation, and transpiration to control flow, address water quality treatment, and protect receiving waters.
<b>LID Expert Panel</b>	Panel of LID experts convened to address specific technical questions as related to LID Training Plan. See Appendix C.
<b>LID Service Provider</b>	An entity (public, private, or nonprofit) that provides LID training. LID service providers design and implement LID training programs, often inviting in LID topic experts to provide lectures on specific topics. Current LID service providers are listed in Appendix G.
<b>LID Steering Committee</b>	A multi-stakeholder committee that has provided guidance and oversight throughout the development of the LID Training Plan and will continue to serve in this role as the Training Plan is implemented. See Appendix B.
<b>LID Topic Expert</b>	An individual with specific expertise in a particular LID topic(s) that is often tapped to provide that expertise at LID training forums. See Appendix I for a preliminary list of LID topic experts in Washington.
<b>LID Training Facilitator</b>	Individuals and/or entities that provide training to build capacity among LID service providers.
<b>LID Training Plan</b>	Refers to this document. The goal of the LID Training Plan is to provide Ecology and the State Legislature with clear guidance on the most efficient and cost effective path forward for developing and delivering LID training throughout Washington State for each of the next four years.
<b>LID Training Program</b>	Refers to the implementation phase of the LID Training Plan.
<b>LID Training Topics</b>	Refers to the 12 training topics commonly provided in Washington as selected by the LID Steering Committee (listed below).
1 Overall understanding of purpose of LID	Refers to an introductory training topic that provides basic information as to the goals and objectives of LID.
2 Bioretention areas	See definition above
3 Rain gardens	See definition below
4 Permeable paving	A stormwater management strategy and alternative to impervious surfaces in which permeable paving options all require a base of rock or gravel to hold rainwater until it infiltrates into the soil. Also referred to as porous or pervious.
5 Vegetated/green roofs	A vegetated roof system used in place of a conventional roof.

Key Words	Definition
<b>6 Rainwater collection systems</b>	These systems collect and store rainfall for later use. When designed appropriately, rainwater collection systems slow and reduce runoff, and provide a source of water.
<b>7 Site assessment</b>	Process that evaluates the hydrology, topography, soils, vegetation, and water features of a site in order to identify how stormwater moves through the site prior to development.
<b>8 Site planning/layout</b>	Incorporating information gathered from the site assessment phase of a project into site planning and layout, including tree credits.
<b>9 LID resources</b>	Trainings on content of a suite of resources available to assist permittees and others in designing and implementing LID. Resources include LID Technical Guidance Manual (W WA, E WA), SWMMWW (W WA), SWMMEW (E WA), local code integration, etc.
<b>10 Hydrologic modeling</b>	Use of mathematical equations to estimate runoff based on weather patterns, land use, soil, and topography.
<b>11 Compost-amended soils</b>	Adding compost and mulch to soil provides needed food to the many life forms that soil contains. These life forms help create structure and pore space that allows rainwater to more easily soak into the soil.
<b>12 Regulatory/code integration related to LID</b>	Refers to trainings on new regulations as written in municipal stormwater permits and efforts to assist permittees on their integration into codes.
<b>Needs Assessment Report</b>	Report that combines findings from two surveys <sup>1</sup> that aimed to better understand the capacity of current LID service providers to meet increased demand for training, the level of interest of potential providers to fill training gaps, and the type and level of training needed by stormwater professionals throughout the state. See Appendix A for the Executive Summary from the Needs Assessment Report.
<b>Rain garden</b>	Typically, smaller systems than bioretention facilities that do not need to be engineered. Rain gardens do not require operation, maintenance, and inspection requirements nor do they require complex modeling.
<b>Train-the-Trainer</b>	A training class for individuals that will ultimately deliver LID training.

<sup>1</sup> Statewide LID Training Needs Assessment Survey conducted by Washington State University Social and Economic Sciences Research Center and Current and Potential LID Service Provider Survey conducted by Veda Environmental and Cascadia Consulting Group.

## Commonly Used Acronyms

Acronym	Definition
<b>LID</b>	Low Impact Development
<b>NPDES</b>	National Pollutant Discharge Elimination System
<b>RFP</b>	Request for Proposals
<b>SWMMEW</b>	Stormwater Management Manual for Eastern Washington
<b>SWMMWW</b>	Stormwater Management Manual for Western Washington
<b>WSC</b>	Washington Stormwater Center

# I. Executive Summary

Low Impact Development (LID) practices are increasingly being used in Washington State to address a variety of water quality and quantity issues related to stormwater runoff. New National Pollutant Discharge Elimination System (NPDES) municipal stormwater permits issued by the Washington State Department of Ecology (Ecology) now require each permitted jurisdiction to review and revise development codes to make LID the preferred and commonly used approach for site development. Public and private sector professionals throughout Washington will need additional training to ensure relevant skills and expertise are widespread. This LID Training Plan (Training Plan) was developed to provide a framework for Ecology to meet these training needs.

The Training Plan was developed under contract to the Washington Stormwater Center (WSC), and supports the long-term requirements of the NPDES permit. The Training Plan was also designed to support the vision of both Ecology and the LID Steering Committee, a multi-stakeholder group convened to provide oversight to the state as it moves to implement LID permit requirements (see Appendix B). The Steering Committee provided direction and guidance throughout the process of developing the Training Plan and will continue to serve in this role as the Training Plan is implemented. **The goal of the LID Training Plan is to provide Ecology and the State Legislature with clear guidance on the most efficient and cost effective path forward for developing and delivering LID training throughout Washington State for each of the next four years.** The Training Plan provides a blueprint for Ecology to help NPDES permittees and other key stakeholders prepare for upcoming LID requirements, leverage LID training investments made in 2013, and maximize the beneficial use of state funding.

*The LID Steering Committee provided direction and guidance throughout the process of developing the Training Plan and will continue to serve in this role as the Training Plan is implemented.*

The Training Plan was designed to:

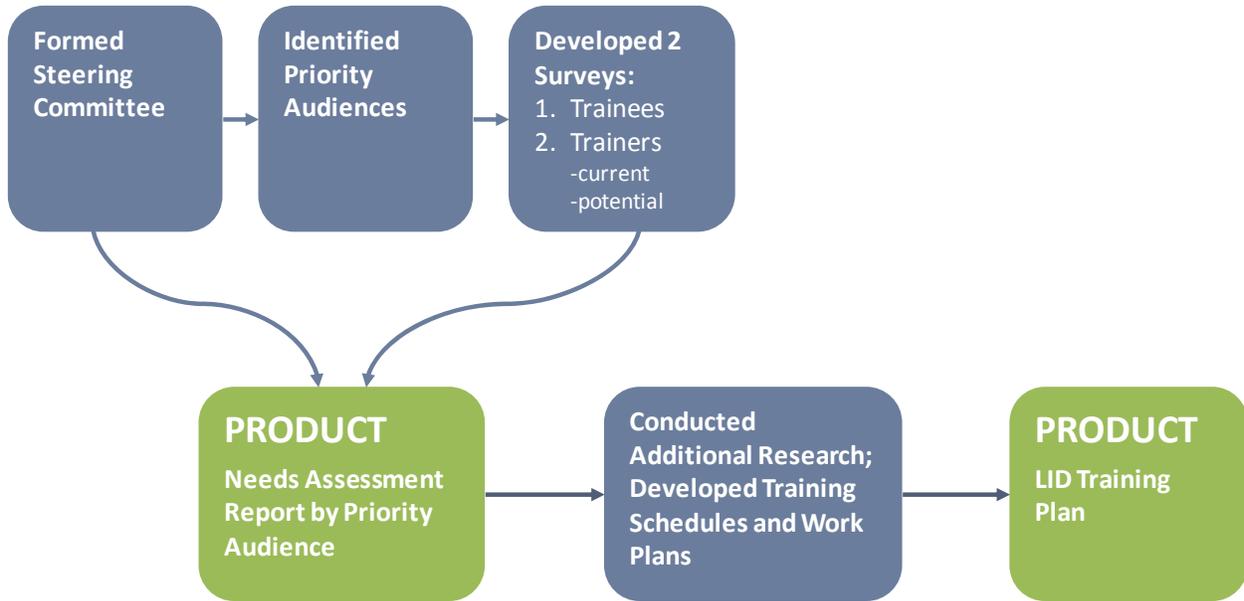
- Determine the level of training needed and priority of LID training topics across six different audiences, including: design/engineering; operations/maintenance; inspection/enforcement; permitting/planning; construction/land development; and elected officials/managers/public works professionals.
- Identify key aspects of a sustainable and viable long-term LID training program in Washington in terms of content, resource needs, and capacity.
- Outline a comprehensive and efficient pathway to incorporate necessary updates and LID innovations in a timely fashion.
- Establish protocols and recommendations for evaluation of LID training programs.

## Approach

The Training Plan is based on findings from a needs assessment that identified LID training needs among professionals across the state and determined the capacity of current and potential LID service providers to meet increased demand for training. Key findings from the Needs Assessment were summarized in the Washington State Low Impact Training: Needs Assessment Report (see Appendix A for Needs Assessment Report Executive Summary) and were augmented with additional research, including input from an LID Expert Panel (see Appendix C) and internal Ecology reviewers. The overall process for developing the LID Training Plan is shown in the diagram below and a more detailed description of the approach and methodology can be found in the Introduction to the Training Plan (see page 17).

*The Training Plan is based on findings from the Washington State LID Training: Needs Assessment Report (Needs Assessment) available at: <http://www.wastormwatercenter.org/news/?id=273>. The Needs Assessment identified LID training needs among professionals across the state and determined the capacity of current and potential LID service providers to meet increased demand for training.*

Figure 1. Development of Training Plan



As depicted below, the Training Plan is divided geographically into two regions: Western and Eastern Washington. This organizational structure is the result of differences between the two regions, including geographic conditions, types and level of training needed, and applicable permit conditions that dictate timing of training. For each region, the Training Plan consists of three core components: 1) a **training schedule** that outlines the trainings to be conducted each year over the next four years; 2) a **work plan** that details actions needed to execute the training schedule, and 3) a list of **potential providers** that could assist with additional training capacity.

## Components of the Training Plan

### Western Washington



#### Western Washington Training Schedule

The Western Washington training schedule presents a phased timeline for delivering topical training to priority audiences according to urgency, priority, and need.



#### Western Washington Work Plan

The Western Washington work plan presents a recommended plan for recruiting LID training providers and topic experts, reaching priority audiences, designing courses and curriculum, streamlining administration and program coordination, and integrating effective program evaluation and adaptive management strategies.



#### Western Washington Potential Providers

The Western Washington potential providers section overviews potential providers of LID training and, where possible, information on their specific interests and training levels.

### Eastern Washington



#### Eastern Washington Training Schedule

The Eastern Washington training schedule presents a phased timeline for delivering topical training to priority audiences according to urgency, priority, and need.



#### Eastern Washington Work Plan

The Eastern Washington work plan presents a recommended plan for recruiting LID training providers and topic experts, reaching priority audiences, designing courses and curriculum, streamlining administration and program coordination, and integrating effective program evaluation and adaptive management strategies.



#### Eastern Washington Potential Providers

The Eastern Washington potential providers section overviews potential providers of LID training and, where possible, information on their specific interests and training levels.

## Highlights

### Training Schedules

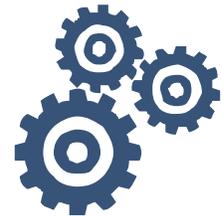
Two detailed **training schedules** (one for Western and Eastern Washington) were developed for a four-year time period. Western and Eastern Washington are differentiated throughout the Training Plan to reflect different geographic conditions, types and level of training needed, and applicable permit conditions that dictate timing of training. These two schedules list specific training needs for each of the six priority audiences and reflect efficiencies that were identified across audiences and LID training topics (see Table 3 and Table 4). For example, operations/maintenance and inspection/enforcement audiences share similar training requirements so the schedules show that these two audiences are targeted to receive the same training. Efficiencies are also achieved by combining LID training topics where appropriate (e.g., permeable pavement combined with site assessment).



*The LID Training Plan focuses on six priority audiences; however, these are not the only audiences that will need training on LID during the next four years and beyond.*

### Work Plans

Two detailed **work plans** (one for Western and Eastern Washington) provide blueprints for implementing the training schedules. Specific actions in four categories are identified: 1) Administration and Coordination; 2) Capacity Building; 3) Curriculum; and 4) Evaluation and Adaptive Management. Only priority actions are included in the work plans. Cost estimates are also included for Year 1 actions.



**Examples of high priority actions in Year 1 include:**

- **Fill gaps in existing curriculum**, specifically, develop a step-by-step overview of how to integrate LID requirements into existing codes and plans. This is one of the highest priorities for curriculum.
- **Develop and launch online LID training courses based on WSU and UW LID programs** to ensure that training opportunities are immediately available across the state.
- **Develop training capacity** at selected community and technical colleges and professional associations in priority geographic areas (especially Eastern and SW Washington, but also the Puget Sound Region).
- **Leverage and augment existing trainings, Requests for Proposals (RFPs), existing training venues, and other efforts** already underway that are targeting priority audiences or advancing priority topics (for example, working with permittees to update codes to reflect new permit requirements).

- **Fund WSU LID Training Program** to ensure that it is accessible and cost effective to meet the needs of priority audiences.
- Establish a **curriculum review committee** to provide third party review of new and existing curriculum to meet academic standards and compatibility with permit requirements. Washington Department of Ecology will have final approval of all curriculum.

*Western and Eastern Washington are differentiated throughout the Training Plan to reflect different geographic conditions, types and level of training needed, and applicable permit conditions that dictate timing of training.*

## Potential Providers

Potential providers of LID training are included in each of the two regional sections. Where possible, information is included regarding the potential providers' specific interest in providing LID training (e.g., topics of interest and level of training they are able to provide).



## Performance Targets

**Performance targets** are an important component to adaptively managing the Training Plan. Examples of quantitative and qualitative metrics that could be used to help ensure that training targets include:

- Quantitative metrics
  - Increase number of people trained (within priority audiences).
  - Increase number of avenues for making LID information available (e.g., online, in-person, in-the-field, etc.).
  - Increase the amount and accessibility of audience-specific LID content and materials.
  - Develop and consistently increase Train-the-Trainer programs for all audiences.
  - Increase training opportunities specifically outside of Puget Sound, (i.e., SW Washington and E Washington).

- Qualitative metrics
  - Increase in knowledge of people trained.
  - Increase in acceptance, by priority audience, of LID as a best management practice (BMP).<sup>2</sup>
  - LID becomes the preferred approach for stormwater management.
  - Increase in general public’s perception around LID as a BMP.
  - Long-term impact on improvement in water quality (recommend including as a long-term metric).
  - Increase in overall quality of LID projects installed (recommend including as a long-term metric).

## Key Assumptions

**Key assumptions** identified and deemed critical to the successful implementation of the Training Plan include:

- Funding remains consistent for the next four years.
- Effective collaboration and partnering occurs among key state agencies, (including Ecology, the Washington Stormwater Center, and the Puget Sound Partnership), and partners, (including the LID Steering Committee).
- Ecology will provide leadership in ensuring the implementation of the Training Plan, including ensuring that the plan is adaptively managed to reflect changes (e.g., in permit language, etc.).
- The LID Steering Committee will provide ongoing oversight and direction as the LID Training Plan is implemented.

In summary, the LID Training Plan is intended to provide Ecology with clear direction over the next four years of anticipated funding for LID training to priority audiences throughout Washington. The Training Plan provides the framework for the LID education and training needs of priority audiences.

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<sup>2</sup> The data to measure this could come from permit applications – number of LID projects permitted and number constructed. It could also reflect the percentage of LID projects permitted at the local government permit counter versus conventional projects permitted.

# II. Introduction

Low Impact Development (LID) practices are increasingly being used in Washington State to address a variety of water quality and quantity issues related to stormwater runoff. Also known as Green Stormwater Infrastructure (GSI), LID is a stormwater and land development strategy applied at the parcel and subdivision scale that emphasizes conservation and use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely mimic pre-development hydrologic functions.<sup>3</sup> LID mimics pre-disturbance hydrologic processes of infiltration, storage, evaporation, and transpiration to control flow, address water quality treatment, and protect receiving waters. Examples of LID practices include bioretention facilities, permeable pavements, rainwater collection systems, and green roofs.

New National Pollutant Discharge Elimination System (NPDES) municipal stormwater permits<sup>4</sup> issued by the Washington State Department of Ecology (Ecology) require jurisdictions to review and revise development codes to make LID the preferred and commonly used approach for site development. Public and private sector professionals across Washington will need training to implement the LID requirements.

Although numerous LID training programs currently exist, the new requirements are expected to result in an increase in training demand that will exceed current Puget training provider capacity. In addition, most non-state funded LID training programs operate in the Puget Sound region and are unlikely to be sufficient to meet the specific needs of many Eastern and Southwestern Washington jurisdictions covered by the municipal stormwater permits.

Consequently, Ecology, with funding from the Washington State Legislature, engaged the Washington Stormwater Center, Veda Environmental, Cascadia Consulting Group, and the Washington State University Social and Economic Sciences Research Center (WSU-SESRC) (the Project Team) to develop a comprehensive LID Training Plan (Training Plan) to ensure adequate training is available throughout Washington State on LID techniques. The development of the Training Plan was directed and guided by the LID Steering Committee, a multi-stakeholder group convened to provide oversight to the state as it moves to implement LID permit requirements (see Appendix B). The Steering Committee will continue to serve in this role as the Training Plan is implemented.

## Background

The first step in developing the Training Plan was to conduct a comprehensive Needs Assessment in order to obtain baseline information about the status of both LID expertise among professionals and stormwater practitioners, as well as current training in the state. The Needs Assessment consisted of

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<sup>3</sup> As defined in the Department of Ecology municipal stormwater permit.

<sup>4</sup> These permits cover discharges from municipal separate storm sewer systems, also referred to as MS4s. For the purposes of this document, these permits will be referred to as “municipal stormwater permits.”

results from two surveys: the *Statewide LID Training Needs Assessment Survey* and the *Current and Potential LID Service Provider Survey*. Findings from these surveys provided a better understanding of the type and level of training needed by stormwater professionals throughout the state, the capacity of current LID service providers to meet increased demand for training, and the level of interest of potential providers to fill training gaps. Specifically, it helped lay the foundation for the development of the Training Plan as it identified priorities for training in various LID topic areas by addressing the following five areas:

- **Audiences for LID Training.** Who are the target audiences and are they being reached by current LID training programs?
- **Topics addressed and level of training needed.** Are the topics being covered in LID training programs meeting the specific needs of target audiences? What are those needs based on each audience’s current knowledge of LID topics?
- **Potential to increase training capacity.** Do current LID training programs have the capacity to meet increased demand in all geographic locations, on all LID topics, and for all audiences? What, if any, additional “potential” providers exist and what resources might they need to help increase training capacity?
- **Assistance and resources needed.** What additional resources are needed to expand capacity?
- **Preferences regarding training format, length, and travel distance.** How should trainings be delivered and where should they be held?

The resulting report was published in May 2013 and is entitled *Washington State Low Impact Development Training: Statewide Needs Assessment Report (Needs Assessment Report)*. The executive summary from this report is included in Appendix A, and the entire report is available at: <http://www.wastormwatercenter.org/news/?id=273>.

The Needs Assessment Report focused on **six priority audiences** and **12 LID training topics** (for a definition of each audience and LID topic area, please see the Glossary starting on page 7). The priority audiences and the LID training topics were selected by the LID Steering Committee with input from an LID Expert Panel (see Appendix C). These six audiences and 12 priority topics subsequently became the focus of the LID Training Plan.

The **six priority audiences** include:

1. Design/engineering professionals
2. Operations/maintenance professionals
3. Inspection/enforcement professionals
4. Permitting/planning professionals
5. Construction/land development professionals
6. Elected officials/managers/public works professionals

The **12 LID training topics** include:

1. Overall understanding of the purpose of LID
2. Bioretention areas
3. Rain gardens<sup>5</sup>
4. Permeable paving
5. Vegetated/green roofs
6. Rainwater collection systems
7. Site assessment
8. Site planning/layout
9. LID resources (e.g., LID Technical Guidance Manual, Stormwater Management Manual for Western Washington, etc.)
10. Hydrologic modeling
11. Compost-amended soils
12. Regulatory/code integration related to LID

To develop the Training Plan, key findings from the Needs Assessment Report on each of these six priority audiences was augmented with additional research, including gathering extensive input from an LID Expert Panel and Ecology staff. The Training Plan identifies what LID topics and level of training is needed (introductory, mid-level, and advanced) for each of these six priority audiences, and where training is needed. The Training Plan includes training schedules and work plans for Western and Eastern Washington that are intended to serve as a roadmap for the successful implementation of LID training throughout the state over the next four years. These training schedules and work plans were designed to maximize efficiencies and minimize expenditures.

In addition to informing the LID Training Plan, the preliminary findings from the Needs Assessment resulted in the development and deployment in 2013 of four introductory LID 101 outreach programs, including: 1) Building Industry Association of Washington (BIAW) members; 2) elected officials, public works professionals, and other high-level municipal managers; 3) commercial compost providers, nurseries, landscapers; and 4) real estate professionals. Also, four existing grants funded by Ecology were augmented to add LID training elements, including: LID Operations and Maintenance; Western Washington Hydrology Model (WWHM), and the Eastern Washington LID Guidance Manual. Finally, Ecology hosted ten workshops on the 2012 Stormwater Management Manual for Western Washington (SWMMWW).

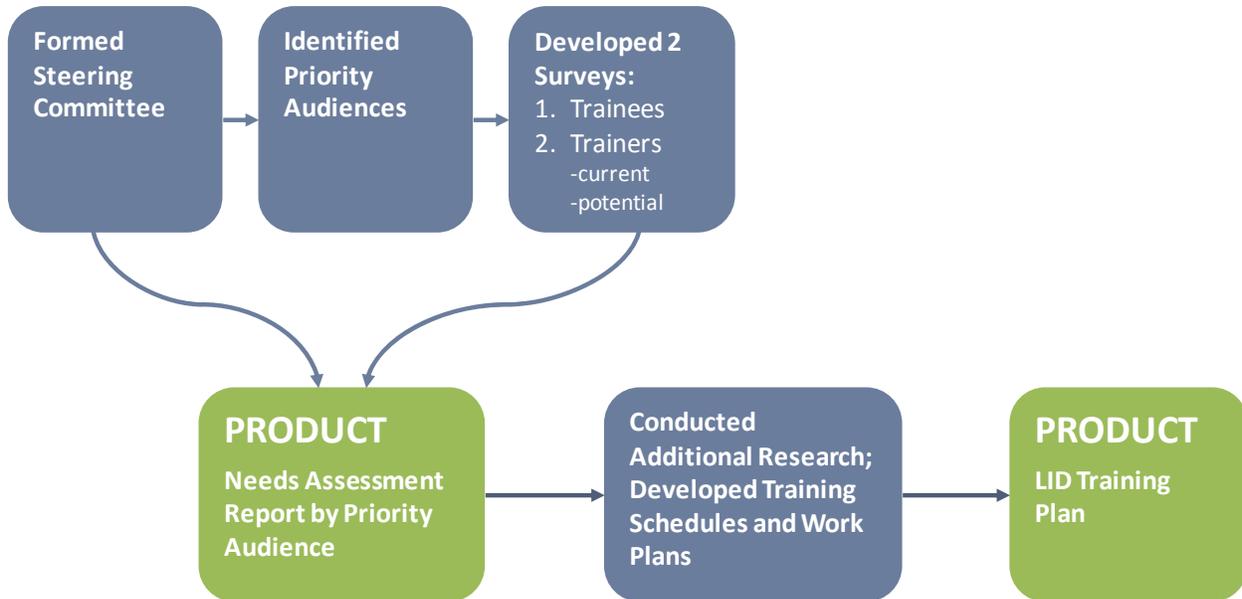
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<sup>5</sup> The terms “bioretention” and “rain gardens” are often used interchangeably. While rain gardens are a type of bioretention practice, and look and behave similarly to other bioretention practices, they are non-engineered systems that can (and often are) designed and installed by homeowners with little to no training. Other bioretention facilities, such as biofiltration swales, are engineered facilities whose design and installation require much more extensive technical training. Therefore, the LID Steering Committee, at the suggestion of LID technical experts, opted to address bioretention practices and rain gardens separately for the purposes of the LID Training Plan.

## Approach

As mentioned previously, the LID Training Plan builds on the findings from the Needs Assessment Report. The Training Plan analyzed the results from the Needs Assessment Report, conducted additional research where needed, convened an LID Expert Panel, and developed a methodology that combined the data with the additional research (see Figure 2 below).

**Figure 2. Overall Process for Development of the LID Training Plan**



To build the Training Plan, the Project Team undertook the following activities:

- Analyzed Needs Assessment results.
- Filled data gap in construction/land development audience from Needs Assessment Report (received few responses from this audience and filled in gaps through consulting with LID experts and BIAW).
- Contacted potential service providers in Southwestern and Eastern Washington by email and via phone to determine their level of interest in providing or hosting LID trainings. This additional research was conducted because these entities were not accessed through the Current and Potential Service Provider Survey.
- Convened an LID Expert Panel of key current providers to “ground-truth” findings regarding training needed for specific audiences, to better determine their capacity to expand trainings in different formats (e.g., online, in-person, Train-the-Trainer, etc.), and to clarify definitions of “levels” of training and what they entail.
- Developed a methodology for each priority audience to better determine specific training needs (see Appendix D).

- Applied methodology to develop audience-specific training schedules (see Appendix E) that were then used to develop four-year training schedules for Western and Eastern WA (see Table 3 and Table 5).
- Developed four-year work plans for Western and Eastern Washington (see Table 2) and a list of prioritized actions for Year 1.
- Developed two lists of potential service providers (Western and Eastern WA) to build LID training capacity (see Table 4 and Table 6).

*Cost estimates are included for high priority Year 1 actions only. The Training Plan is designed to be adaptively managed based on Year 1 outcomes. Prioritized actions and their associated cost estimates will need to be developed for each subsequent year based on these outcomes.*

This Training Plan is intended to provide Ecology and the State Legislature with recommendations on the most efficient and cost effective path forward for developing and delivering LID training throughout Washington State for each of the next four years. The Training Plan is designed specifically to:

- Provide a blueprint for Ecology to develop and deliver LID trainings to support NPDES jurisdictions throughout Washington prepare for upcoming code revisions/LID requirements in the new municipal stormwater permits.
- Leverage and build on the investments made in 2013 to introduce “LID 101” programs to selected audiences.
- Guide the use of LID training funds Ecology is currently requesting from the State Legislature and help prioritize projects and needs.
- Guide the development of RFPs, contracts, and grant programs to more efficiently and effectively develop and deliver audience-specific LID training in the right locations and at the right times to help the state prepare for the upcoming LID requirements.

*Western and Eastern Washington are differentiated throughout the Training Plan to reflect different geographic conditions, types and level of training needed, and applicable permit conditions that dictate timing of training.*

## Intended Audience

The primary audiences for this LID Training Plan are Ecology and the State Legislature. Ecology will be adaptively implementing and adaptively managing the plan should the Legislature allocate additional funding for LID training for future years.

The Training Plan will be available for others to use and reference as needed. Secondary audiences could include current and potential LID service providers and training programs. These secondary audiences could benefit from the Plan by: 1) understanding more clearly what the specific needs for LID training are throughout the state, and 2) identifying opportunities for collaboration and enhancing and/or developing training programs.

## Objectives

To achieve the overall purpose of the Training Plan, the following objectives were identified:

- Identify the key components of a sustainable and viable long-term LID training program in Washington.
- For each priority audience, determine:
  - What training is needed, at what level, in what format, and when.
  - Where efficiencies can be achieved (i.e., where training needs overlap between audiences).
- Establish protocols and recommendations for evaluation of LID training programs.
- Outline a comprehensive and efficient pathway to incorporate necessary updates and LID innovations in a timely fashion.

## Expected Outcomes

- A statewide, ongoing training program that recognizes differences in regional conditions to:
  - Establish the basic institutional framework for ongoing training programs across the state, including options for certification and degrees of LID specialists in relevant fields.
  - Implement Western and Eastern training schedules that effectively address the training needs for each audience.
  - Build and implement a Train-the-Trainer program (with LID training facilitators and LID topic experts) that meets growing demand by expanding capacity for current and potential providers and topic experts as well as online training resources to reach more members of each priority audiences.
  - Develop tools, such as databases and websites, that are designed to make pertinent information related to LID and permit compliance easily accessible to municipal stormwater permittees and assist with coordination efforts.
- A training program that uses materials and delivery formats that have been tested and refined, (e.g., the WSU LID Technical Training Workshops), including training modules that meet professional standards and reflect current LID knowledge levels.
- A training program that is managed adaptively to ensure that the program continues to meet the needs of its audiences while simultaneously keeping up with LID innovations.
- Partnerships among practitioners, professional associations, colleges and universities, municipal stormwater permittees, the business community, the building industry, and other stakeholders to deliver and promote trainings that support the transition to the new LID requirements.

*Note that “training program” refers to the implementation of this document, the LID Training Plan.*

## Notes on Training Plan

- The LID Training Plan looks at priority topics as indicated through surveys and review by the LID Expert Panel and others. However, its authors recognize that prioritization of topics may need to be altered, based on new science or effectiveness studies, and that these listed topics may be augmented in the future.
- The LID Training Plan focuses on six priority audiences; however, its authors recognize that these are not the only audiences that will need training on LID during the next four years and beyond. Other audiences, such as realtors, are also high priorities for LID training, and in fact have already been targeted for training by Ecology. This targeted training has occurred concurrently with the development of this Training Plan, as have a number of other targeted trainings aimed at elected officials, compost manufacturers and retailers, landscapers and nurseries, building industry professionals, and operations and maintenance crew leads. Due to the timing, it was not possible to integrate all of the information that resulted from these targeted trainings, such as presentations, materials, and evaluation summaries, into the LID Training Plan. **A priority action for Year 1 is therefore to integrate this information and make appropriate, adaptively managed steps.**
- Each of the six priority audiences contains numerous “sub” audiences, many of which will require their own specialized training. This is particularly true for the construction/land development audience, which is comprised of a highly diverse and nuanced group of professionals ranging from concrete pourers to equipment operators, landscape professionals and arborists. However, it is also true for other audiences, such as operations/maintenance, which includes both permittees, as well as contractors, each of which has different training requirements. Budget and time limitations prevented this level of detail to be incorporated into this Training Plan. The authors, however, recognize that individualized training can and should be developed for specific audiences within each of the broad audience classes. “Drilling down” into each of these sub-audiences requires time and resources that go well beyond the scope of this LID Training Plan. However, it is a critical element moving forward. **A priority action for Year 1 is to identify additional audiences and take steps to address gaps in delivering training to them.**
- The LID landscape in Washington is extremely complex and nuanced, with hundreds of current and potential providers of LID trainings (and more coming on board every day), multiple LID training topics, numerous priority audiences for training (see paragraph above), and significant geographic differences between Eastern and Western Washington requiring customized approaches. This Training Plan is a first step towards mapping this landscape. **A priority action for Year 1 is to conduct additional work to further flush out priority audiences and sub-audiences (see paragraph above); potential providers of LID training; etc.**

*The LID landscape in Washington is extremely complex and nuanced, with hundreds of current and potential providers of LID trainings, multiple LID training topics, numerous priority audiences for training, and geographic differences between Western and Eastern Washington requiring customized approaches. This Training Plan is a first step towards better understanding these complexities and mapping a path forward.*

# III. Training Plan Structure



Training Schedules

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Work Plans

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Potential Providers Lists

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## Overview

The Training Plan is divided into two geographically based sections: Western Washington and Eastern Washington. For each section, the plan has three core components: 1) a training schedule; 2) a work plan, and 3) a potential provider list. A summary of recommendations for the four-year LID Training Plan for Western and Eastern Washington are provided in Table 2. See below for the organizational structure of the Western and Eastern Washington sections.

## Western Washington



### Western Washington Training Schedule

The Western Washington training schedule presents a phased timeline for delivering topical training to priority audiences according to urgency, priority, and need.



### Western Washington Work Plan

The Western Washington work plan presents a recommended plan for recruiting LID training providers and topic experts, reaching priority audiences, designing courses and curriculum, streamlining administration and program coordination, and integrating effective program evaluation and adaptive management strategies.



### Western Washington Potential Providers

The Western Washington potential providers section overviews potential providers of LID training and, where possible, information on their specific interests and training levels.

## Eastern Washington



### Eastern Washington Training Schedule

The Eastern Washington training schedule presents a phased timeline for delivering topical training to priority audiences according to urgency, priority, and need.



### Eastern Washington Work Plan

The Eastern Washington work plan presents a recommended plan for recruiting LID training providers and topic experts, reaching priority audiences, designing courses and curriculum, streamlining administration and program coordination, and integrating effective program evaluation and adaptive management strategies.



### Eastern Washington Potential Providers

The Eastern Washington potential providers section overviews potential providers of LID training and, where possible, information on their specific interests and training levels.

## Component #1: Training Schedules



The training schedules provide a *timetable for the trainings* and include information on courses that will be offered, level of course (introductory, mid-level, advanced), course progression and repetition, and course offerings by audience(s). These schedules reflect what ideally should be offered to meet the training needs for each priority audience.

### Courses offered

The trainings will consist of nine courses. Each course is designed for a specific audience group. The topics covered in the course, as well as the level at which they are taught, are reflective of the unique needs and abilities of the course target audience group:

1. **LID Briefings.** These are non-technical trainings designed for elected officials. They cover all topics and are conducted both online and in-person.
2. **All Topics Overview.** This is a more intensive overview training designed to quickly and efficiently introduce LID to technical audiences. It is designed to be taught both in-person and online to Eastern Washington audiences (except elected officials).
3. **High Priority Topics – Introductory.** This course, designed for Western Washington construction/land development, inspection/enforcement, and operations/maintenance audiences, provides an introduction to topics that were identified as high priority. It is taught both in-person and online and includes topics such as permeable paving, site assessment, and regulatory/code integration.
4. **High Priority Topics – Mid-level.** This course is a more advanced version of the *High Priority Topics – Introductory* course, and is offered both online and in-person to all audiences statewide (except elected officials).
5. **Low Priority Topics.** This course, designed for all audiences statewide (except elected officials), covers topics that were identified as lower priority and many audiences are currently unfamiliar with. It includes hydrologic modeling, rainwater collection systems, green roofs, and rain gardens, and is offered both online and in-person.
6. **Permeable Paving and Bioretention.** This is an in-person, advanced-level course designed for design/engineering audiences.
7. **Hydrologic Modeling.** This is an in-person, advanced-level course designed for design/engineering audiences.
8. **Site Assessment and Site Planning/Layout.** This is an in-person, advanced-level course designed for the design/engineering and planning/permitting audiences.
9. **Rainwater Collection Systems and Compost-Amended Soils.** This is an in-person, advanced-level course designed for the design/engineering audience.

## Level of course

Table 1 below describes the differences among the three course levels: introductory, mid-level, and advanced categories.

**Table 1. Course Levels**

	INTRODUCTORY	MID-LEVEL	ADVANCED
<b>EXAMPLE / STATUS</b>	Introduction to Rain Gardens (multiple providers)	WSU and UW LID programs	Curriculum needs to be developed
<b>DESCRIPTION</b>	An introduction to all LID techniques and concepts. Classroom only.	A more detailed overview of LID techniques and concepts; includes some hands-on activities and/or in the field demonstrations.	An in-depth course in which specific LID techniques are taught, demonstrated, and practiced.
<b>LENGTH</b>	Half-day or shorter	One to two days (two days if multiple topics are combined).	Two or more days per topic
<b>LEARNING OBJECTIVES</b>	<b>Foundational Understanding</b> Participants gain a foundational understanding of LID techniques and concepts. Participants will learn the following: regulatory requirements requiring stormwater management and LID; introduction to LID BMPs; LID as a cost effective method; LID as a regulatory requirement and its relationship to codes/ordinances, and LID maintenance issues.	<b>Practical Applications</b> Participants gain an in-depth understanding of LID techniques and concepts that can be applied to stormwater management projects. Participants will learn the following: design process for employing various LID techniques; how to evaluate feasibility across LID techniques; LID maintenance issues; and strategies for collaborating as an interdisciplinary team.	<b>LID Implementation</b> Participants gain expert level knowledge and understanding that enables them to begin designing and/or building LID techniques. Participants will learn the following: how to design, implement, or maintain LID projects and/or how to monitor/measure the effectiveness of the LID BMP.
<b>SUITABLE LID TOPICS</b>	All topics except Hydrologic Modeling	All topics	Bioretention Permeable Paving Site Planning and Layout Hydrologic Modeling Site Assessment Collection Vegetated Roofs

## Course Progression and Repetition

The training schedules have the following progression and repetition:

- **Two trainings per year per audience (except elected officials).** To ensure that the training plan can sufficiently cover all courses within the four-year time period, various tools, methods, and programs outlined in this LID Training Plan can be employed by Ecology to ensure that all audiences from both Western and Eastern WA (except elected officials) are offered two trainings or training connections (via on-line, webinar, forum, etc.) per year.
- **Repeated at least once every two years.** The schedules repeat courses on an approximate one-to-two-year cycle, depending on the audience. This allows for audiences who missed the first year of trainings to catch up in later years. Two exceptions are design/engineering and

permitting/planning professionals, who receive advanced level trainings on new topics until Year 3, with repeated advanced trainings in Year 4.

- **Online courses throughout then emphasized in last year.** In the second half of Year 1 and in Years 2-3, online and in-person trainings are available for all introductory and mid-level online courses (except for Eastern Washington—see *Training Plan for Eastern Washington* section beginning on page 50). This allows for all audiences of diverse locations and capacities to attend the trainings. The first half of Year 1 is reserved for development of these online courses. Because most audiences will have likely attended their needed courses by Year 3, introductory and mid-level courses in Year 4 are only available online.
- **All in-person advanced courses.** Because advanced topics are most effectively taught in-person, all advanced courses for design/engineering professionals are taught in-person (not online).
- **Four-six topics per technical course.** To allow for technical trainings to go into more depth on each topic area, courses with technical content are limited to four-six topics per course (except for Eastern Washington—see *Training Plan for Eastern Washington* section beginning on page 50).

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## Course offerings by audience

### 1) Design/engineering professionals

The training schedule for design/engineering professionals is a blend of introductory/mid-level training courses and a customized series of advanced level courses. It includes the following elements:

- Mid-level training on high-priority topics and introductory level training on low-priority topics.
- Advanced level trainings that reflect overall topic priorities and topic clumps identified by the LID Expert Panel.

### 2) Operations/maintenance and inspection/enforcement professionals

The inspection/enforcement and operations/maintenance professionals were grouped together in the training schedules because of their similar training needs. Below are additional elements of their trainings:

- A mix of introductory and mid-level training on high priority topics are provided in Year 1.
- Inspection/enforcement and operations/maintenance audiences do not require advanced level training on any LID training topics.

### 3) Permitting/planning and design/engineering professionals

The permitting/planning audience is grouped with the design/engineering audience for introductory and mid-level courses due to similar needs for each audience for introductory level training on low priority LID training topics and mid-level training on high priority LID training topics. Below are additional elements of their training schedule:

- Because permitting/planning and design/engineering professionals generally begin the training with a deeper knowledge of LID topics, their trainings begin in Year 1 at the mid-level.
- Introductory level trainings are offered in Year 2 on less familiar, lower priority topics.

This audience is offered advanced level training on site assessment and site planning/layout to accommodate their more advanced training needs for these topics. Permitting/planning did not identify the need for advanced training in any topic area by the survey; however, additional research and information gathered from the LID Expert Panel noted that it is important for this audience to understand the fundamentals of how LID site planning and layout occurs.

### 5) Construction/land development professionals

To optimize efficiency within the training schedules, construction/land development professionals share the majority of their trainings with the inspection/enforcement and operations/maintenance professionals. Below are additional elements of their trainings:

- Permeable paving and bioretention areas were added to the introductory high priority topics course to accommodate this audience, which is currently less familiar with these topics than other audiences.
- This audience was not identified as requiring high-level training on rainwater collection systems, vegetated/green roofs, or hydrologic modeling. Therefore, the mid-level low priority topics course does not include these topics.
- This audience does not require advanced level of training on any LID training topics.

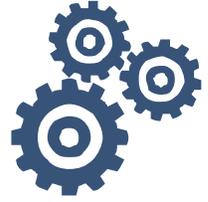
### 6) Elected officials/managers/public works professionals

The training schedules provide for non-technical, introductory-level briefings once a year to elected officials/managers professionals. Unique elements of their trainings include the following:

- Trainings will be limited to once per year based on that audience's input.
- Because elected officials/managers/public works professionals are the only non-technical priority audience identified, their courses are separate from the other trainings.
- To make the trainings more accessible and convenient to this audience, they will be offered in-person trainings that occur during already-scheduled meetings and on-demand online trainings for those not available to attend in-person meetings.

## Component #2: Work Plans

The work plans provide a *blueprint for Ecology to implement the training schedules*, including specific actions around capacity building and curriculum and course development. Specific actions in four categories are identified. The work plans reflect prioritized actions that fall within Year 1 funding allocations.



### Categories of Action

- **#1: Administration and Coordination:** Actions that involve the coordination and oversight of LID Training Plan Implementation.
- **#2: Capacity Building:** Actions needed to expand capacity and covers issues such as Train-the-Trainer and the issuance of certifications and degrees as well as actions needed to expand capacity among current providers, potential providers, and LID topic experts.
- **#3: Curriculum:** Actions related to curriculum development, expansion, and evaluation.
- **#4: Evaluation and Adaptive Management:** Actions related to establishing effective evaluation and adaptive management techniques for LID trainings. This will be critical to the successful implementation of this Training Plan. The Training Plan will need to be evaluated on multiple levels—from the accuracy of curricula and availability of trainings to the effectiveness of individual courses and participant learning—to identify remaining needs for the program as a whole. Table 2 below includes year-by-year actions needed to adaptively manage the LID Training Plan.

Actions are prioritized across the four years of the Training Plan, with highest priority actions occurring in Year 1. For Year 1 actions, cost estimates are included (see Western Washington Work Plan on 39 and Eastern Washington Work Plan on page 54). The Training Plan is designed to be adaptively managed based on Year 1 outcomes and, therefore, prioritized actions and their associated cost estimates will need to be developed for each subsequent year. Figure 3 reflects cost estimates for Year 1 priority actions statewide and Figure 4 reflects cost estimates for Year 1 priority actions by region. Total cost estimates range from \$1,047,000 to \$1,262,000; Figure 3 and Figure 4 represent the low end of the range.

Figure 3. Year 1 Priority Actions Cost Estimates - Statewide

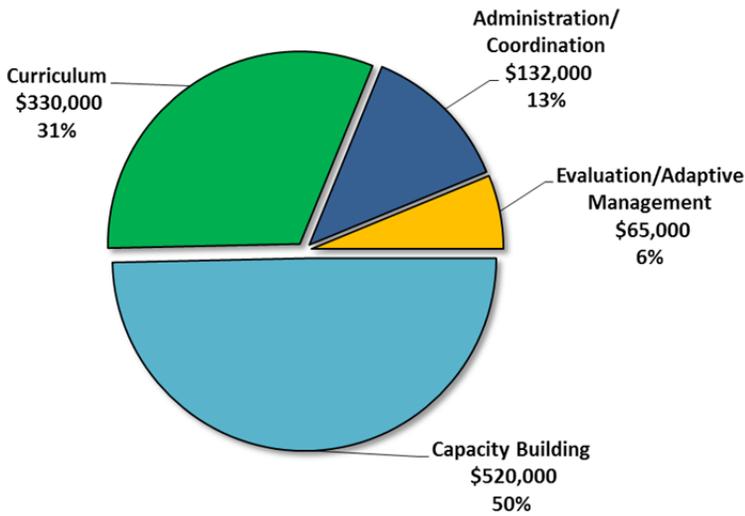
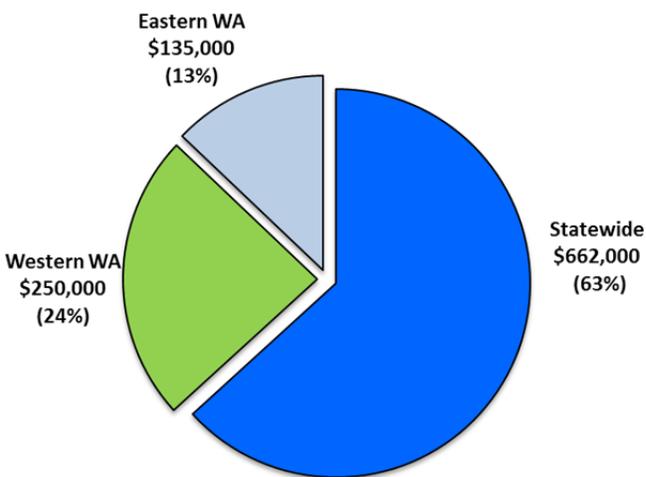


Figure 4. Year 1 Priority Actions Cost Estimates – Regional



**Component #3: Potential Providers**



The potential provider lists offers *potential service providers for LID trainings* to help build capacity across the state.

# IV. Summary of Training Schedules and Work Plans

Table 2 provides a summary of the four-year LID Training Plan for Western and Eastern Washington. It provides an overview of training courses to be offered each year and key actions to be taken by Ecology to successfully provide those courses. The summary also discusses recommended actions in the following four categories: administration and coordination; capacity building; curriculum; and evaluation and adaptive management. For more details on the individual aspects of the plan, consult the geographically-specific sections that follow.

Table 2. Summary of Western and Eastern Washington Training Schedules and Work Plans

		YEAR 1	YEAR 2	YEAR 3	YEAR 4
WESTERN WA TRAINING SCHEDULE		LID Briefings	+  LID Briefings (R)	+  LID Briefings (R)	+  LID Briefings (R)
		Introductory High Priority Topics	+  Introductory Low Priority Topics	+  Introductory High Priority Topics (R)	+  Introductory Low Priority Topics (R)
		Mid-Level High Priority Topics	+  Mid-Level Low Priority Topics	+  Mid-Level High Priority Topics (R)	+  Mid-Level Low Priority Topics (R)
			Permeable Paving & Bioretention areas	Site Assessment & Planning/Layout	Permeable Paving & Bioretention Areas (R)
			Hydrologic Modeling	Rainwater Collect. & Compost Amend. Soils	Site Assess/Plan/Layout & Hydro Modeling
WESTERN WA WORK PLAN	Administration & Coordination	A. Establish LID Training Coordinator position B. Create LID database and clearinghouse of information C. Enhance Ecology website to include all training information	A. Review LID Training Coordinator roles and responsibilities and adaptively manage, as appropriate. B. Build, refine, update, and augment LID database and clearinghouse C. Maintain website; incorporate interactive elements	A. Adaptively manage Training Plan B. Continue to build, adapt and refine LID database C. Continue to build and maintain website	A. Adaptively manage Training Plan B. Continue to build, adapt and refine LID database C. Continue to build and maintain website
	Capacity Building	A. Develop training capacity at priority community/technical colleges B. Leverage existing (and issue new) RFPs C. Continue existing trainings (W WA Hydrology Model, LID O & M) D. Design and implement a Train-the-Trainer certification program E. Fund WSU's LID Training Course	A. Continue to build training capacity at community/technical colleges B. Continue RFPs (if warranted) C. Continue trainings (if warranted) D. Continue and refine Train-the-Trainer E. Continue WSU funding (if warranted)	A. Continue to build training capacity at community/technical colleges B. Continue RFPs (if warranted) C. Continue trainings (if warranted) D. Continue and refine Train-the-Trainer E. Continue WSU funding (if warranted)	A. Finalize capacity building with intention of reducing state support after Year 4 B. Continue RFPs (if warranted) C. Continue trainings (if warranted) D. Continue and refine Train-the-Trainer E. Continue WSU funding (if warranted)
	Curriculum	A. Establish third party curriculum review committee (CRC) B. Leverage existing work on SWMMWW and regulatory/code integration C. Develop curriculum for advanced level trainings in priority topic areas D. Develop online curriculum and courses based on WSU and UW LID courses E. Create and post "LID How To" YouTube videos	A. CRC continues work, including prioritizing new training topics B. Continue SWMMWW and code integration C. Adaptively manage advanced level training curriculum, as needed D. Continue to offer WSU/UW live, online courses E. Continue refining "how to" videos (if warranted)	A. CRC continues work, including prioritizing new training topics B. Adaptively manage SWMMWW and code integration work C. Adaptively manage advanced level training curriculum, as needed D. Continue WSU/UW live, online courses and expand topic areas covered E. Continue refining "how to" videos (if warranted)	A. CRC continues work, including prioritizing new training topics B. Adaptively manage SWMMWW and code integration work C. Adaptively manage advanced level training curriculum, as needed D. Continue WSU/UW live, online courses and expand topic areas covered E. Continue refining "how to" videos (if warranted)
	Evaluation & Adaptive Management	A. Evaluate availability of approved curricula B. Evaluate and adaptively manage availability of training opportunities and qualified trainers C. Evaluate and adaptively manage quality and effectiveness of trainings	A. Evaluate availability of approved curricula B. Evaluate and adaptively manage availability of training opportunities and qualified trainers C. Evaluate and adaptively manage quality and effectiveness of trainings	A. Evaluate and adaptively manage availability of training opportunities and qualified trainers B. Evaluate and adaptively manage quality and effectiveness of trainings C. Evaluate long-term indicators of program impact and assess remaining gaps	A. Evaluate and adaptively manage availability of training opportunities and qualified trainers B. Evaluate and adaptively manage quality and effectiveness of trainings
EASTERN WA TRAINING SCHEDULE		<i>Curriculum &amp; Capacity Building Existing In-Person Trainings Development of Online Modules</i>			
		+  LID Briefings	+  All Topics Overview	+  LID Briefings (R)	+  LID Briefings (R)
		+  Mid-Level High Priority Topics	+  Mid-Level Low Priority Topics	+  All Topics Overview (R)	+  Mid-Level High Priority Topics (R)
			Permeable Paving & Bioretention Areas	Site Assessment & Planning/Layout	Mid-Level Low Priority Topics (R)
			Hydrologic Modeling	Rainwater Collect. & Compost Amend. Soils	Site Assessment & Planning/Layout
EASTERN WA WORK PLAN	Administration & Coordination	A. Establish LID Training Coordinator position B. Create LID database and clearinghouse of information C. Enhance Ecology website to include all training information	A. Review LID Training Coordinator roles and responsibilities and adaptively manage Training Plan, as appropriate. B. Build, refine, update, and augment LID database and clearinghouse C. Maintain website; incorporate interactive elements	A. Training Coordinator to adaptively manage Training Plan B. Continue to build, adapt and refine LID database C. Continue to build and maintain website	A. Training Coordinator to adaptively manage Training Plan B. Continue to build, adapt and refine LID database C. Continue to build and maintain website
	Capacity Building	A. Develop training capacity at priority community/technical colleges B. Leverage existing (and issue new) RFPs targeting priority audiences C. Continue and/or customize existing trainings (LID O & M, LID Technical Guidance Manual for E WA, W WA Hydrology Model) D. Develop and implement a Train-the-Trainer certification program	A. Continue to build training capacity at community/technical colleges B. Continue RFPs (if warranted) C. Continue and expand trainings( if warranted) D. Continue and refine Train-the-Trainer	A. Continue to build training capacity at community/technical colleges B. Continue RFPs (if warranted) C. Continue and expand trainings( if warranted) D. Continue and refine Train-the-Trainer	A. Continue to build training capacity at community/technical colleges B. Continue RFPs (if warranted) C. Continue and expand trainings( if warranted) D. Continue and refine Train-the-Trainer
	Curriculum	A. Establish third party curriculum review committee (CRC) B. Customize existing curriculum on appropriate LID topics C. Utilize SWMMWW and code integration training templates and customize for Eastern Washington (SWMMEW) D. Develop online curriculum and courses based on WSU and UW LID courses E. Create and post "LID How To" YouTube videos specific to E WA	A. CRC continues work, including prioritizing new training topics B. Expand/refine E WA curriculum, as needed C. Continue training permittees on SWMMEW and code integration D. Continue developing/refining live, online courses tailored to E WA E. Expand/refine "LID How To" YouTube videos specific to E WA	A. CRC continues work to prioritize new LID training topics B. Continue to expand/refine E WA curriculum, as needed C. Continue training permittees on SWMMEW and code integration D. Continue developing/refining live, online courses tailored to E WA E. Expand/refine "LID How To" YouTube videos specific to E WA	A. CRC continues work to prioritize new LID training topics B. Continue to expand/refine E WA curriculum, as needed C. Continue training permittees on SWMMEW and code integration D. Continue developing/refining live, online courses tailored to E WA E. Expand/refine "LID How To" YouTube videos specific to E WA
	Evaluation & Adaptive Management	A. Evaluate availability of approved curricula B. Evaluate and adaptively manage availability of training opportunities and qualified trainers C. Evaluate and adaptively manage quality and effectiveness of trainings	A. Evaluate availability of approved curricula B. Evaluate and adaptively manage availability of training opportunities and qualified trainers C. Evaluate and adaptively manage quality and effectiveness of trainings	A. Evaluate and adaptively manage availability of training opportunities and qualified trainers B. Evaluate and adaptively manage quality and effectiveness of trainings C. Evaluate long-term indicators of program impact and assess remaining gaps	A. Evaluate and adaptively manage availability of training opportunities and qualified trainers B. Evaluate and adaptively manage quality and effectiveness of trainings

KEY: = in-person course offered    = online training offered    INTRO LEVEL    MID LEVEL    ADVANCED LEVEL    (R) = Refresher course

# V. LID Training Plan for Western Washington

## Training Plan Strategies

The Needs Assessment Report confirmed what LID practitioners already suspected – that the majority of LID training currently taking place in Washington State is located in Western Washington—specifically, the Puget Sound region. Not surprisingly, Western Washington survey responders reported higher average levels of current knowledge about LID topics than responders from Eastern Washington. This was true for the majority of LID topic areas.



Despite the fact that the majority of current LID trainings and LID topic experts occur in or reside in the Puget Sound area, demand for training is strongest in that region and it is expected to grow significantly. Therefore, building capacity in the Puget Sound area is critical in advancing LID in Washington State.

In Southwest Washington, there are currently no providers of LID training that have been identified through the surveys and research. However, potential providers of training exist in this sub-region and it will be important moving forward to build capacity here. Additionally, significant LID expertise exists in Portland, Oregon, and one strategy moving forward will be to better identify and leverage these cross-state potential opportunities.

There are three key strategies to advancing LID as the preferred stormwater management strategy in Western Washington. These three strategies correspond to the action categories described above. More details for each of these strategies, including the specific, detailed actions needed to advance them, are contained in the sections that follow.

### Strategy 1: Build Capacity (including Train-the-Trainer)

Demand for LID training throughout Western Washington is strong and exceeds current capacity across all levels (introductory, mid-level, and advanced). Therefore, additional LID trainings will need to be offered, with particular focus on mid-level and advanced level courses. Those entities with topic expertise in priority Western Washington topics (permeable paving, bioretention areas, site assessment, and site planning/layout) should **develop a two to three day Train-the-Trainer curriculum** (Capacity Building Action D) for these specific topics to deliver to individuals and entities who have expressed interest in becoming service providers, such as Centralia College, Edmonds Community College, and

Clover Park Community College. For a comprehensive list of potential service providers in Western Washington, please see Table 4 below.

## Strategy 2: Curriculum Building

Potential training participants identified seven high priority topic areas in the Needs Assessment Report. Current providers indicated that they offer trainings on five of the seven priority topics – permeable paving, bioretention areas, site assessment, site planning/layout, and hydrologic modeling at an introductory or mid-level. However, current providers do not offer curricula that cover the remaining two priority topics: LID resources (e.g., Low Impact Development Technical Guidance Manual for Western Washington), and regulatory/code integration. **Classes and curricula for these two topic areas will need to be fully developed or expanded to meet these additional high priority-training needs.** In addition, advanced level training on all of the seven priority topics will need to be developed.

The two topics most frequently covered by current providers – overall understanding of purpose of LID and rain gardens – were not identified as priority topics by potential training participants. In fact, rain gardens were identified as the lowest priority topic. This is likely a reflection of the fact that most current providers produce trainings for interested citizens and rain gardens are a frequent topic covered for that audience.

Finally, significant efforts to expand LID training into related curriculum, such as the Certified Erosion and Sediment Control Lead (CESCL) training and the Growth Management Act (GMA) workshops and conferences, are necessary.

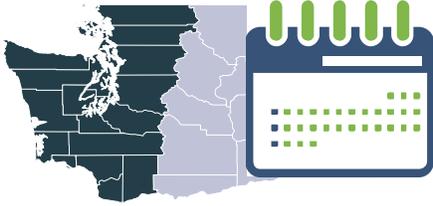
## Strategy 3: Deliver Online Trainings

There is significant need to deliver online trainings to enable all target audiences, regardless of their location and proximity to existing training locations, access to training on high priority LID topic areas (for appropriate topics). **The WSU and UW LID courses should be adapted for online content, preferably as “Massive Online Open Courses” that are accessible statewide.** This will help expand the reach and frequency of those trainings beyond Puyallup and Seattle as well as increase certifications across the state.

## Overview of Detailed Plan

The following three sections present detailed information that should enable Ecology to advance these strategies for Western Washington. The three sections include: the **Western Washington training schedule**, which is a compilation of audience-specific training needs; the **Western Washington work plan**, which include all priority, recommended actions for the first year of the Training Plan; and the **Western Washington potential service providers list** which includes information about potential LID training providers in or close to high priority locations (as identified in the Needs Assessment Report).

## Western Washington Training Schedule



The Western Washington training schedule details the trainings that will be provided each year for Western Washington audiences. It was compiled by synthesizing information from six audience-specific schedules and consulting with the LID Expert Panel. Actions that Ecology should take to develop, execute, and manage the Western Washington trainings are detailed in the

Western Washington work plan that follows.



## Western Washington Training Schedule

Table 3. Western Washington Training Schedule

Audiences		YEAR 1		YEAR 2		YEAR 3		YEAR 4	
		2013 Q3-Q4	2014 Q1-Q2	2014 Q3-Q4	2015 Q1-Q2	2015 Q3-Q4	2016 Q1-Q2	2017 Q3-Q4	2018 Q1-Q2
A	Elected Officials	INTRO TRAINING ALL TOPICS OVERVIEW 👤 in-person (online development)		REFRESHER: ALL TOPICS OVERVIEW 📺 👤		REFRESHER: ALL TOPICS OVERVIEW 📺 👤		REFRESHER: ALL TOPICS OVERVIEW 📺 online only	
	Construction & Land Development	INTRO TRAINING 🔗 HP TOPICS INCLUDE: • Regulatory/code integration • Site assessment • Site planning/layout • LID resources • Purpose of LID • Permeable paving • Bioretention areas 👤 in-person only (online development)		🔗 LP TOPICS INCLUDE: • Rainwater collection systems • Green roofs • Compost-amended soils • Rain gardens 📺 👤		REFRESHER: 🔗 HP TOPICS INCLUDE: • Regulatory/code integration • Site assessment • Site planning/layout • LID resources • Purpose of LID • Permeable paving • Bioretention areas 📺 👤		REFRESHER: 🔗 LP TOPICS INCLUDE: • Rainwater collection systems • Green roofs • Compost-amended soils • Rain gardens 📺 Online only	
			🔗 HP TOPICS INCLUDE: • Permeable paving • Bioretention areas • Site assessment • Site planning/layout 📺 👤		🔗 LP TOPICS INCLUDE: DAY 1: • Compost-amended soils • Rain gardens 📺 👤		REFRESHER: 🔗 HP TOPICS INCLUDE: • Permeable paving • Bioretention areas • Site assessment • Site planning/layout 📺 👤		REFRESHER: 🔗 LP TOPICS INCLUDE: DAY 1: • Compost-amended soils • Rain gardens 📺 Online only
C	Inspection & Enforcement	INTRO TRAINING 🔗 HP TOPICS INCLUDE: • Regulatory/code integration • Site assessment • Site planning/layout • LID resources • Purpose of LID • Permeable paving • Bioretention areas 👤 in-person only (online development)		🔗 LP TOPICS INCLUDE: • Rainwater collection systems • Green roofs • Compost-amended soils • Rain gardens 📺 👤		REFRESHER: 🔗 HP TOPICS INCLUDE: • Regulatory/code integration • Site assessment • Site planning/layout • LID resources • Purpose of LID • Permeable paving • Bioretention areas 📺 👤		REFRESHER: 🔗 LP TOPICS INCLUDE: • Rainwater collection systems • Green roofs • Compost-amended soils • Rain gardens 📺 Online only	
	Operations & Maintenance		🔗 HP TOPICS INCLUDE: • Permeable paving • Bioretention areas • Site assessment • Site planning/layout 📺 👤		🔗 LP TOPICS INCLUDE: DAY 1: • Compost-amended soils • Rain gardens DAY 2: • Rainwater collection systems • Green roofs • Hydrologic modeling 📺 👤		REFRESHER: 🔗 HP TOPICS INCLUDE: • Permeable paving • Bioretention areas • Site assessment • Site planning/layout 📺 👤		REFRESHER: 🔗 LP TOPICS INCLUDE: DAY 1: • Compost-amended soils • Rain gardens DAY 2: • Rainwater collection systems • Green roofs • Hydrologic modeling 📺 Online only

HP = High Priority LP = Low Priority 🔗 = focused on technical content 📺 = online training offered 👤 = in-person course offered  
(continued on next page)

Table 3. Western Washington Training Schedule (Cont'd)

Audiences, Cont'd.		YEAR 1		YEAR 2		YEAR 3		YEAR 4	
		2013 Q3-Q4	2014 Q1-Q2	2014 Q3-Q4	2015 Q1-Q2	2015 Q3-Q4	2016 Q1-Q2	2017 Q3-Q4	2018 Q1-Q2
D	Planners & Permitters			✖ LP TOPICS INCLUDE: • Rainwater collection systems • Green roofs • Compost-amended soils • Rain gardens ☰				REFRESHER: ✖ LP TOPICS INCLUDE: • Rainwater collection systems • Green roofs • Compost-amended soils • Rain gardens ☰ Online only	
	Designers & Engineers		✖ HP TOPICS INCLUDE: • Permeable paving • Bioretention areas • Site assessment • Site planning/layout • Regulatory/code integration ☰		✖ LP TOPICS INCLUDE: DAY 1: • Compost-amended soils • Rain gardens DAY 2: • Hydrologic modeling • Rainwater collection systems • Green roofs ☰		REFRESHER: ✖ HP TOPICS INCLUDE: • Permeable paving • Bioretention areas • Site assessment • Site planning/layout • Regulatory/code integration ☰		REFRESHER: ✖ LP TOPICS INCLUDE: DAY 1: • Compost-amended soils • Rain gardens DAY 2: • Rainwater collection systems • Green roofs • Hydrologic modeling ☰ Online only
E	Designers & Engineers			✖ TOPICS INCLUDE: • Permeable Paving • Bioretention Areas ☰ in-person only	✖ TOPICS INCLUDE: • Hydrologic Modeling ☰ in-person only	✖ TOPICS INCLUDE: • Site Assessment • Site Planning and Layout ☰ in-person only	✖ TOPICS INCLUDE: • Compost-amended Soils • Rainwater Collection Systems ☰ in-person only	REFRESHER: ✖ TOPICS INCLUDE: • Permeable Paving • Bioretention Areas ☰ in-person only	REFRESHER: ✖ TOPICS INCLUDE: • Hydrologic Modeling • Site Assessment • Site Planning and Layout ☰ in-person only
F	Planners & Permitters			✖ TOPICS INCLUDE: • Site Assessment • Site Planning and Layout ☰ in-person only		REFRESHER: ✖ TOPICS INCLUDE: • Site Assessment • Site Planning and Layout ☰ in-person only			REFRESHER: ✖ TOPICS INCLUDE: • Site Assessment • Site Planning and Layout ☰ in-person only

“All Topics Overview” is a summary-level course focused on providing a general overview of the High and Medium Priority Topics identified in the Needs Assessment. It is not a comprehensive course.

HP = High Priority LP = Low Priority ✖ = focused on technical content ☰ = online training offered ☰ = in-person course offered

## Western Washington Work Plan – Detailed Year 1 Actions

The Western Washington work plan included below identifies specific, detailed actions for Year 1 that are recommended to successfully implement the training schedule (above).



The actions are prioritized and the information included is intended to provide Ecology with a step-by-step approach to efficiently and effectively move forward with delivering LID training in Western Washington over the next four years. It is recommended that the work plan be adaptively managed so that each year reflects both the lessons learned from the prior year and the identified gaps in service. **Please note that actions identified in the work plan are intended for implementation by Ecology.**

As noted previously, four categories of actions are included in the work plan:

1. Administration and Coordination
2. Capacity Building
3. Curriculum
4. Evaluation and Adaptive Management

The highest priority recommended actions are included in the work plan.

**Note:** All cost estimates included below are provided by the Washington Stormwater Center unless otherwise noted. Statewide actions benefit both Western and Eastern Washington; actions specific to Western Washington are highlighted in light blue.

**Administration and Coordination**

**Total cost = \$132-\$142K**

**Statewide actions = \$132-\$142K**

**Western WA specific actions = Not applicable**

**Eastern WA specific actions = Not applicable**

**Administration and Coordination Actions**

**Estimate**

<p><b>A Establish LID Training Coordinator position to oversee implementation of LID Training Plan.</b> This individual should serve as a liaison between the various permitted jurisdictions, helping them identify and share resources, experiences, etc., in order to improve collaboration and achieve cost savings and efficiencies. High priority tasks for year one include:</p> <ul style="list-style-type: none"> <li>■ Continue refining the list of current providers of LID trainings and LID topic experts.</li> <li>■ Develop partnerships with key entities, particularly associations (see Appendix H) who can help design and deliver targeted training to other audiences within the construction industry, such as dirt moving contractors and others in need of very specific, peer-delivered training related to LID implementation.</li> <li>■ Work with the Department of Commerce to incorporate relevant LID topics and subjects into existing GMA and CESCL workshops and conferences. Work with other established training venues currently used by targeted audiences such as association meetings, city council meetings, public works training sites, etc.</li> <li>■ Coordinate and facilitate Curriculum Review Committee. It is recommended that this committee have a third-party facilitator, if budget allows.</li> <li>■ Evaluate and adaptively manage availability of training opportunities and qualified trainers (description included in Evaluation and Adaptive Management Action B).</li> <li>■ Find opportunities to encourage regional coordination among LID service providers to help ensure consistency and efficiency of approaches (webinars, coordination workshops, etc.).</li> </ul>	<p><b>= \$112K</b> (cost estimate provided by Ecology) <b>STATEWIDE ACTION</b></p>
<p><b>B Create a clearinghouse of LID information for Washington State.</b> This clearinghouse should be hosted on one succinct website and should serve as a one-stop resource and information center that provides designers, engineers, permittees, educators, planners and others with easy access to information on sustainable development practices in the Puget Sound region and beyond. The clearinghouse would include a variety of interactive features, many of which have been used successfully in similar web-based applications such as Seattle Public Utilities Resource Venture program (<a href="http://www.resourceventure.org">www.resourceventure.org</a>) and the Climate Adaptation Knowledge Exchange (CAKE) (<a href="http://www.cakex.org/">www.cakex.org/</a>).</p>	<p><b>= \$10-\$20K</b> <b>STATEWIDE ACTION</b></p>

**Administration and Coordination Actions**

**Estimate**

**C Enhance Ecology’s website** so that all information related to LID training is easily accessible to all audiences and represents the most up-to-date information.

**= \$10K**  
**STATEWIDE ACTION**

**Capacity Building**

**Total cost = \$520-\$600K**

**Statewide actions = \$260K**

**Western WA specific actions = \$175-\$255K**

**Eastern WA specific actions = \$85K**

**Capacity Building Actions**

**Estimate**

**A Develop training capacity at community and technical colleges.** Cost estimate was developed with the following assumptions:

- 3 Puget Sound area institutions
- 1 Peninsula institution
- 1 SW institution

**= \$75K**  
(or \$15K per institution)  
**WESTERN WA ACTION**

Four priority training locations were identified in the Needs Assessment: #1) Seattle #2) Tacoma, #3) Everett and, #4) Olympia. Strong potential exists in two of the four locations (Seattle and Everett) due to the high number of potential providers there. Potential also exists in lower priority locations (Bellingham, Mount Vernon) and other locations (Port Angeles, Aberdeen, and Port Townsend). The following entities should receive direct support in Year 1 to build training capacity in Western Washington. See the Potential Providers list (Table 4) for more detailed information about each entity and their specific area of interest.

- **Seattle (area):** Lake Washington Institute of Technology (Kirkland) and Bellevue College (Bellevue)
- **Everett (area):** Cascadia Community College (Bothell) and Edmonds Community College (Edmonds)
- **Northwest:** Bellingham Technical College (Bellingham), Skagit Valley College (Mount Vernon)
- **Peninsula:** Peninsula College (Port Angeles), Grays Harbor Community College (Aberdeen), WSU Extension Jefferson County (Port Townsend)
- **Southwest:** Centralia Community College (near Portland)

Capacity Building Actions	Estimate
<p><b>B Leverage existing (and issue new) RFPs targeting priority audiences.</b> Current efforts, such as the LID 101 trainings, have laid the foundation for reaching certain priority audiences (e.g., elected officials, real estate professionals, nurseries and landscapers, composters, and members of the BIAW). These initiatives should be continued, expanded, and adaptively managed to ensure that lessons learned are incorporated moving forward. Additional trainings for the following priority audiences identified in this plan - inspection/enforcement, operations/maintenance, permitting/planning, and design/engineering - should receive trainings as outlined in the Western Washington training schedule. <i>(Cost estimate is based on five previous LID 101 grant appropriations at estimated \$90K each with assumption that curriculum developed from these appropriations can be built upon).</i></p>	<p><b>= \$200K</b> STATEWIDE ACTION</p>
<p><b>C Continue existing trainings such as LID Operations and Maintenance and the Western Washington Hydrology Model.</b> Trainings should be modeled after 2012-2013 training models. <i>(Cost estimate is based on two previous grants at estimated \$45K each, assuming that curriculum developed from existing work can be built up.)</i></p>	<p><b>= \$60K</b> STATEWIDE ACTION</p>

Capacity Building Actions		Estimate
<p><b>D Design and implement a Train-the-Trainer certification program.</b> This statewide program will help expand the number of LID service providers and increase the number of LID topic experts to meet increased demands for training by priority audiences. The Train-the-Trainer program should consist of two components: 1) <b>LID Service Provider trainings</b> that expand the number of LID service providers, and 2) <b>LID content expert trainings</b> that expand number of LID content experts.</p> <ul style="list-style-type: none"> <li>■ <b>2 LID Service Provider trainings in W WA (preferably in Seattle and Everett) @ approximately \$13K</b> <ul style="list-style-type: none"> <li>— Two one-day trainings for entities interested in becoming LID service providers. Program content will include the following: 1) suggested course curriculum and associated LID topic experts by topic area and target audience; 2) marketing strategies for participant recruitment; 3) funding strategies for course implementation; and 4) course evaluation and adaptive management strategies. Participants will be provided with LID topic basics but will not be expected to become LID topic experts. Participants will receive a certificate for their participation and will become an official “LID Service Provider.” The Service Provider training should be offered in the highest priority locations identified in the Needs Assessment (Seattle and Everett).</li> </ul> </li> <li>■ <b>1 LID Topic Expert training in W WA @ approximately \$13K each</b> <ul style="list-style-type: none"> <li>— These trainings will enable experienced LID topic experts to teach in-depth courses on their area(s) of LID expertise. These training are intended to increase the number of LID topic experts in Washington and would entail inviting experienced LID topic experts to train less-experienced professionals in how to become instructors. These courses will be modeled after best practices from the WSU Extension and UW LID courses. The training objective is to build a pool of competent LID topic experts who can then be available to LID service providers. Participants will receive a certificate for their participation and will become an official “LID Topic Expert.” Prerequisite recommended: certificate from either WSU or UW LID trainings.</li> </ul> </li> </ul>	<p><b>= \$40K</b> WESTERN WA ACTION</p>	
<p><b>E Fund WSU’s LID Training Course</b> This training course provides the latest design guidelines, science, construction details, and practical experience necessary to properly design, build, and maintain LID practices.</p>	<p><b>= \$60-\$140K</b> WESTERN WA ACTION</p>	

**Curriculum**

**Total Cost = \$330-\$455K**

**Statewide actions = \$205-\$330K**

**Western WA specific actions = \$75K**

**Eastern WA specific actions = \$50K**

Curriculum Actions	Estimate
<p><b>A Establish curriculum review committee (CRC)</b> to 1) provide third party review of new and existing curriculum to meet academic standards and compatibility with new permit requirements, and 2) identify and prioritize new curriculum needed to address priority training needs identified in the Western Washington training schedule (e.g., code integration guidance). It is crucial that independent, well-qualified, third party experts review the various issues surrounding LID training and provide direction for curriculum in areas where opinions of stakeholders may differ. The CRC should be tasked with ensuring that curriculum is based on the best science and engineering/technical information available. The CRC can also provide independent review of the trainings to make sure that they accomplish the goals of the program.</p>	<p><b>= \$0K</b>                      (costs included in Admin. and Coord. Action A)  <b>STATEWIDE ACTION</b></p>
<p><b>B Leverage existing work to train permittees on SWMMWW and code integration.</b> This would include a step-by-step overview of how to integrate LID requirements into existing codes and plans. <b>This is one of the highest priorities for curriculum development in Western Washington and can be built on the foundation of existing code integration efforts underway via contracts by Ecology.</b> Ideas include: 1) hold regional workshops where local government staff bring portions of their code and regulations, and workshop staff review and provide recommendations for how to revise and/or insert new language to fully, and successfully, integrate LID into the local government’s codes; 2) A group of professionals with significant experience developing LID code language is hired to visit various local governments, review their regulations, and provide specific recommendations for revising and developing new language for codes and standards. Those local governments receiving this assistance would then share their revised language with other cities within their county at a subsequent work session. <i>(Cost estimate based on past Puget Sound Partnership code workshops).</i></p>	<p><b>= \$80K</b>  <b>STATEWIDE ACTION</b></p>
<p><b>C Develop curriculum for advanced level trainings in four high priority topic areas for design/engineering and permitting/planning professionals.</b> (See Western Washington training schedule in Table 3). These four topics areas include: permeable paving; bioretention areas; site assessment; site planning/layout.</p>	<p><b>= \$75K</b>  <b>WESTERN WA ACTION</b></p>

Curriculum Actions	Estimate
<p><b>D Develop online curriculum and courses based on WSU and UW LID courses.</b> One critical component of this strategy in Year 1 is making WSU and/or UW LID courses either “MOOCs” (massive online open courses) or static online courses. MOOCs are much preferred as they are more interactive and students engage directly with a “live” teacher rather than a pre-recorded course. This field has evolved significantly in recent years and involves sophisticated and simple-to-implement elements, such as small-group-interaction via the web, testing via the web, one-on-one interaction with professions/instructors over the web, etc. Creating a “MOOC” of WSU and/or UW’s LID training will significantly expand the reach of those trainings beyond Puyallup and Seattle and increase certifications.</p>	<p><b>= \$100K</b> STATEWIDE ACTION</p>
<p><b>E Create and post “LID How To” YouTube videos</b> on LID installations and other appropriate topics. This is particularly important for highly specialized contractors who need quick and easy-to-access, step-by-step tutorials on very specific LID issues, such as protecting root zones during the construction phase, how to mix bioretention soils, etc.</p>	<p><b>= \$25K</b> STATEWIDE ACTION</p>

**Evaluation and Adaptive Management**

- Total cost = \$65K**
- Statewide actions = \$65K**
- Western WA specific actions = Not applicable**
- Eastern WA specific actions = Not applicable**

According to the Kellogg Foundation’s Evaluation Handbook, evaluations generally cost 5-7% of a project’s total budget.

Evaluation and Adaptive Management Actions	Estimate
<p><b>A Evaluate availability of approved curricula.</b> Assessing curricula includes three activities. <i>(The cost estimate applies to the following work plan actions.)</i></p> <ul style="list-style-type: none"> <li>■ Assess curricula created by the LID Training program and by others against established learning criteria.</li> <li>■ Track approved curricula against identified needs and priorities for trainings by audience, topic, level of training needed, and location.</li> <li>■ Incorporate evaluation results in the annual program report.</li> </ul>	<p><b>= \$20K</b> STATEWIDE ACTION</p>

**Evaluation and Adaptive Management Actions**

**Estimate**

**B Evaluate and adaptively manage availability of training opportunities and qualified trainers.** This will be accomplished by four main tasks: 1) developing and maintaining a database of providers (LID service providers and LID topic experts); 2) assessing whether the supply of trainings meets the level of demand; 3) evaluating the “Train-the-Trainer” course; and 4) incorporating evaluation results in annual program report and storing survey data in central database. *(The cost estimate applies to all work plan actions listed above.)*

**= \$0K**  
 (costs included in  
 Admin. and  
 Coord. Action A)  
**STATEWIDE  
 ACTION**

- **Develop and maintain a central program database of providers (LID service providers and LID topic experts) and trainings provided.** Develop central program database and data collection protocols; collect data on:
  - Train-the-Trainer program participants, including training capabilities by audience, topic, technical level, and location.
  - Providers that use approved curricula, including training capabilities by audience, topic, technical level, and location.
  - Number of trainings provided, hours of instruction provided, and training participants reached using approved curricula, by audience, topic, technical level, and location. If applicable, also track number of certificates issued.
- **Assess quality and distribution of trainings:**
  - Survey training providers annually regarding their perception of demand for their trainings, such as whether they have wait-lists or difficulty filling trainings. Develop and administer survey; summarize results.
- **Evaluate the “Train-the-Trainer” course**
  - Develop course evaluation methodology and survey (i.e., track the number of individuals who complete the course, survey participants at the end of each course to assess course effectiveness, identify potential improvements, and summarize results.)
- **Incorporate evaluation results in annual program report and store survey data in central program database**
  - Develop annual report template including desired content.
- **Adaptive management actions include:**
  - As evaluation efforts identify significant gaps in the availability of training providers and trainings, take steps to recruit additional providers or train additional LID topic experts.
  - As evaluation efforts identify overlaps in trainings provided, encourage providers to coordinate or diversify the audiences, topics, and technical levels they target to increase efficiency.
  - Summarize survey lessons learned and share with all participating training providers. (Annually)
  - Conduct additional evaluation and modify the “Train-the-Trainer” course as participant surveys identify significant opportunities to improve.

**Evaluation and Adaptive Management Actions**

**Estimate**

- C Evaluate and adaptively manage quality and effectiveness of trainings.** Through a post-training questionnaire administered by training providers to a sample of training participants, measure participant assessment of self-reported learning and key workshop aspects. To the extent possible, develop questionnaires for each curriculum using standardized questions to reduce survey costs and allow comparison across providers and trainings. *(The cost estimate applies to work plan actions: Capacity A-D and Curriculum C and D.)*
- Develop post-training questionnaire and administration and analysis protocols.
    - Participant knowledge: self-reported change in knowledge of the topic covered.
    - Training format: length, timing location, and facilities (including webinar technology).
    - Teaching methods: presenter skills, course materials, assignments, and hands-on activities, case study examples.
    - Topics covered: relevance, technical level, and additional desired topics.
    - Promotional methods: where participants learned about training, typical sources for information.
    - Other topics: training cost, availability of certification or credits, participant suggestions for improvements.
  - Administer surveys, analyze results, and incorporate into annual program report.
  - Incorporate evaluation results in annual program report and store survey data in central program database.
  - Adaptive management actions include:
    - As participant questionnaires identify significant needs or opportunities to improve, conduct additional evaluation and modify curricula, recommended training formats, teaching methods, topics covered, and promotional methods.
  - As needed, improve and increase trainings in locations or topics associated with continued low compliance with LID requirements.

**= \$45K  
STATEWIDE  
ACTION**

## Western Washington – Potential Providers



Table 4 below includes a list of potential providers of LID training in Western Washington, sorted alphabetically by region. These potential providers were identified in order to build capacity in Western Washington. They were identified through two separate efforts. First, numerous potential providers responded to the *Current and Potential LID Service Providers Survey*. These potential providers responded to specific questions in the survey that helped the project team understand their experience with trainings/LID, audiences they would prefer to train, and topics they would like to train on. In some cases, follow-up phone calls were made to get additional information.

Second, technical and community colleges throughout the region were contacted to assess level of interest in providing LID trainings. Those entities that had strong interest and are well positioned to deliver trainings, (i.e., they already have stormwater or related programs within their institutions), are included below. Note that those entities contacted through this second approach do not include the same level of detail as those identified through the survey due to time restrictions.

Finally, additional potential providers will very likely be identified as the Training Plan is implemented.

### Key to Audiences

- A. Construction/land development
- B. Design/engineering
- C. Permitting/planning
- D. Inspection/enforcement
- E. Elected officials/managers/public works
- F. Operations/maintenance
- G. Realtors
- H. Citizens

### Key to Topics

- A. Overall understanding of purpose of LID
- B. Bioretention areas
- C. Rain gardens
- D. Permeable paving
- E. Vegetated/green roofs
- F. Rainwater collection systems
- G. Site assessment
- H. Site planning/layout
- I. LID resources
- J. Hydrologic modeling
- K. Compost-amended soils
- L. Regulatory/code integration

**Table 4. Potential LID Training Providers in Western Washington**

Entity name	Location	Region	Experience	Audiences	Topics	Notes and/or Contact Info (if available)
Bellevue College	Bellevue	Puget Sound	High/Low	All	None listed	Keiko Matter <a href="mailto:keiko.matter@bellevuecollege.edu">keiko.matter@bellevuecollege.edu</a> 425.564.2892
Bellingham Technical College	Bellingham	Puget Sound	Low to moderate			
Cascadia Community College	Bothell	Puget Sound	Moderate			
City of Bellevue	Bellevue	Puget Sound				Indicated interest in providing training but no other info.

V. LID Training Plan for Western Washington

Entity name	Location	Region	Experience	Audiences	Topics	Notes and/or Contact Info (if available)
City of Olympia	Olympia	Puget Sound	Some/Some	A-F, H	A,B,C,D, G,H I, J, K	Eric Christensen <a href="mailto:echriste@ci.olympia.wa.us">echriste@ci.olympia.wa.us</a>
Clover Park Community College	Lakewood & campus near Puyallup	Puget Sound	Moderate/High			
Edmonds Community College*	Edmonds	Puget Sound	Moderate to high			
Grays Harbor College	Aberdeen	Puget Sound				
Green River Community College	Auburn	Puget Sound	Moderate	F		
Highline Community College	Des Moines	Puget Sound	Moderate			
Lake Washington Institute of Technology	Kirkland	Puget Sound	Low			
Muckleshoot Indian Tribe- Fisheries Division	Auburn	Puget Sound	Low/Some	C	B,C,H,J,K ,L	Karen Walter <a href="mailto:karen.walter@muckleshoot.sn.us">karen.walter@muckleshoot.sn.us</a> 253.876.3116
Pierce Co Public Works and Utilities	Tacoma	Puget Sound	Low/Some	A,B,C,E,F	A,B,C,D, G,H,I,L	Dawn Anderson <a href="mailto:danders@co.pierce.wa.us">danders@co.pierce.wa.us</a> 253.798.4671
Renton Technical College	Renton	Puget Sound				
Skagit Valley College	Mount Vernon	Puget Sound	Some			Claus Svendsen <a href="mailto:Claus.svendsen@skagit.edu">Claus.svendsen@skagit.edu</a> Offer a certified CESCL training
Thurston Co. Public Works	Olympia	Puget Sound				Dale Rancour <a href="mailto:rancoud@co.thurston.wa.us">rancoud@co.thurston.wa.us</a> 360.867.2328 Need event planning assistance, technology, topic experts, curriculum, printing
WA Association of Landscape Professionals		Puget Sound	High/Some	B	C,D,E,F,K	Patty Anderson <a href="mailto:patty@walp.org">patty@walp.org</a> 425.967.0729
WSU - Jefferson County Extension	Port Townsend	Puget Sound	Moderate			
Centralia College	Centralia	SW WA	Moderate to high			
City of Centralia	Centralia	SW WA	Moderate			
City of Kelso	Kelso	SW WA	Low			
Clark County		SW WA				
Lewis County		SW WA	Some/Low			
Peninsula College	Port Angeles	Western WA				

# VI. LID Training Plan for Eastern Washington

## Training Plan Strategies

The Needs Assessment confirmed what many LID practitioners already suspected – that most LID training in Washington State is focused in Western Washington. Indeed, fewer than 5% of current providers said the main location for their work was in Eastern Washington, and most trainees in Eastern Washington travel to the west side of the state for general LID programs or to Seattle and Puyallup to participate in the UW or WSU programs.



Eastern Washington responders to the Needs Assessment indicated that they had less experience with LID practices compared to responders in Western Washington. This result is not surprising, as LID permit requirements have already come online in Phase I Western Washington jurisdictions, whereas the Eastern Washington Phase II permit becomes effective on August 1, 2014. Several Eastern Washington jurisdictions have shown early leadership in designing and implementing LID practices, including the cities of Spokane and Wenatchee, and Yakima County. Eastern Washington responders expressed strong interest in receiving LID training.

There are three key strategies to advancing LID as the preferred stormwater management strategy in Eastern Washington. These three strategies correspond to the action categories described above. More details for each of these strategies, including the specific, detailed actions needed to advance them, are contained in the sections that follow.

### Strategy 1: Build Capacity (including Train-the-Trainer)

Building training capacity in priority Eastern Washington locations is critical in Year 1. The Needs Assessment identified several Eastern Washington entities that were interested in providing LID training; however, additional research revealed that their interests were to “host” trainings by providing training space, and not actually to develop training capacity. Therefore, research was conducted to identify more entities that are suited to conduct LID trainings in this region, particularly technical and community colleges. This research focused on entities located in or near the priority training locations identified in the Needs Assessment —namely, Spokane, Yakima and the Tri-Cities (Richland, Kennewick and Pasco). Between the entities that responded to the *Statewide LID Training Needs Assessment Survey* and the additional entities contacted through the supplemental research outlined above, a total of nine Eastern Washington entities have expressed interest in delivering or hosting trainings. Three entities – Columbia

Basin College, Walla Walla Community College, and Spokane Community College – have since been identified as priorities for building capacity due to the fact that they are in (or near) priority locations for training.

The vast majority of current LID topic experts in Washington State are located in Western Washington (see Appendix I). Training Eastern Washington personnel to deliver LID training – in a Train-the-Trainer capacity – is a critical element in moving LID training forward in this part of the state. Those entities and individuals with topic expertise in priority E WA topics (permeable paving; bioretention areas, site assessment, and site planning/layout) should be contracted to develop a two to three Train-the-Trainer curriculum for these specific topics which can then be delivered in person in Eastern Washington to individuals and entities who have expressed interested in becoming topic experts and service providers.

### Strategy 2: Develop Eastern Washington Specific Curriculum

LID curriculum in Washington has been primarily developed to address specific permit and geographic conditions in Western Washington. Therefore, an LID Expert Panel was convened in part to address the need for new curriculum in Eastern Washington. This panel confirmed that, indeed, there are specific conditions and needs for Eastern Washington that need to be reflected in geographically appropriate curriculum. The panel pointed specifically to the following LID topics as needing new curriculum built: bioretention areas; hydrologic modeling, and all topics that involve plants (e.g., site planning/layout and compost-amended soils).

### Strategy 3: Deliver In-person and Online Trainings

The ultimate goal is to deliver in-person and online trainings for appropriate topics in Eastern Washington. To a very limited degree, in-person trainings are already happening, primarily in the form of the Washington Stormwater Center delivering trainings on the Eastern Washington Low Impact Development Guidance Manual; Ecology delivering trainings on the permit; and some limited outreach to elected officials and other priority audiences by Ecology contractors. However, there is significant need to increase the delivery of in-person and online trainings in Eastern Washington. Strategies 1 and 2 are intended to address this issue; however, there is still need for both types of training in Year 1 in Eastern Washington given the timing of the permit.

### Overview of Detailed Plan

The following three sections present detailed information that should enable Ecology to advance these strategies for Eastern Washington. Specifically, the Eastern Washington training schedule, which is a compilation of audience-specific training needs; the Year One Detailed Actions, which include all priority, recommended actions for the first year of the Training Plan; and the Eastern Washington potential service providers list, which includes information about potential LID training providers in or close to high priority locations (as identified in the Needs Assessment Report).

## Eastern Washington Training Schedule

The Eastern Washington training schedule details the trainings that will be provided each year for Eastern Washington audiences. It was compiled by synthesizing information from six audience-specific schedules and consulting with the LID Expert Panel. The resulting training schedule for Eastern Washington reflects the differences in current levels of knowledge among stormwater practitioners in Eastern Washington as compared to Western Washington by offering introductory levels of training across all LID training topics and target audiences. The schedule also provides an opportunity to build capacity between both current and potential service providers and to develop curriculum to reflect geographic differences within LID training content. Additional elements of Eastern Washington’s training schedule are listed below:



- No new trainings are offered in the first half of the first year (i.e., Q3/Q4 for 2013 and Q1/Q2 for 2014) to allow for capacity building. During this time, online modules will be developed and Eastern Washington audiences will have access to existing in-person trainings. Later, in the second half of the first year, Eastern Washington audiences will have access to both existing in-person trainings and new online trainings. In Year 2, Eastern Washington audiences will have access to new in-person training courses on all topics.
- The schedule for Eastern Washington elected officials/managers/public works professionals parallels that of Western Washington, as this audience is already beginning at an introductory level.
- Trainings for inspection/enforcement, operations/maintenance, permitting/planning and design/engineering all begin at an introductory level.
- As compared to Western Washington, Eastern Washington audiences will have access to a more intensive, front-loaded training schedule. The schedule provides a technical overview of all topics in Q1/Q2 of Year 2, as opposed to the four-six topic courses that are provided for Western Washington audiences. This condensed training approach will assist Eastern Washington in quickly boosting skills across work categories and LID training topics.

Eastern Washington Training Schedule



Table 5. Eastern Washington Training Schedule

Audiences		YEAR 1		YEAR 2		YEAR 3		YEAR 4		
		2013 Q3-Q4	2014 Q1-Q2	2014 Q3-Q4	2015 Q1-Q2	2015 Q3-Q4	2016 Q1-Q2	2017 Q3-Q4	2018 Q1-Q2	
A Elected Officials	INTRO TRAINING	CURRICULUM & CAPACITY BUILDING**  EXISTING IN-PERSON TRAININGS  DEVELOPMENT OF ONLINE MODULES	CURRICULUM & CAPACITY BUILDING**  EXISTING IN-PERSON TRAININGS  ONLINE MODULES, AS AVAILABLE	ALL TOPICS OVERVIEW		REFRESHER: ALL TOPICS OVERVIEW		REFRESHER: ALL TOPICS OVERVIEW <small>online only</small>		
	Construction & Land Development Inspection & Enforcement Operations & Maintenance Planners & Permitters Designers & Engineers			MID-LEVEL TRAINING	✘ ALL TOPICS OVERVIEW	✘ HP TOPICS INCLUDE: • Permeable paving • Bioretention areas • Site assessment • Site planning/layout • Regulatory/code integration	✘ LP TOPICS INCLUDE: DAY 1: • Compost-amended soils • Rain gardens DAY 2*: • Rainwater collection systems • Green roofs • Hydrologic modeling	REFRESHER: ✘ ALL TOPICS OVERVIEW	REFRESHER: ✘ HP TOPICS INCLUDE: • Permeable paving • Bioretention areas • Site assessment • Site planning/layout • Regulatory/code integration	REFRESHER: ✘ LP TOPICS INCLUDE: DAY 1: • Compost-amended soils • Rain gardens DAY 2*: • Rainwater collection systems • Green roofs • Hydrologic modeling
					✘ TOPICS INCLUDE: • Permeable Paving • Bioretention Areas <small>in-person only</small>	✘ TOPICS INCLUDE: • Hydrologic Modeling <small>in-person only</small>	✘ TOPICS INCLUDE: • Site Assessment • Site Planning and Layout <small>in-person only</small>	✘ TOPICS INCLUDE: • Compost-amended Soils • Rainwater Collection Systems <small>in-person only</small>	✘ TOPICS INCLUDE: • Permeable Paving • Bioretention Areas <small>in-person only</small>	✘ TOPICS INCLUDE: • Hydrologic Modeling <small>in-person only</small>
					✘ TOPICS INCLUDE: • Site Assessment • Site Planning and Layout <small>in-person only</small>		REFRESHER: ✘ TOPICS INCLUDE: • Site Assessment • Site Planning and Layout <small>in-person only</small>		✘ TOPICS INCLUDE: • Site Assessment • Site Planning and Layout <small>in-person only</small>	

\*Construction and Land Development do not require mid-level training on Day 2 mid-level topics

\*\* Includes LID O & M, LID Technical Guidance Manual for E WA, and W WA Hydrology Model

HP = High Priority LP = Low Priority ✘ = focused on technical content 📖 = online training offered 🗣️ = in-person course offered

## Eastern Washington Work Plan – Detailed Year 1 Actions

The Eastern Washington work plan included below identifies specific, detailed actions for Year 1 that are recommended to successfully implement the Eastern Washington training schedule (above).



The actions are prioritized and the information included is intended to provide Ecology with a step-by-step approach to efficiently and effectively move forward with delivering LID training in Eastern Washington over the next four years. It is recommended that the work plan be adaptively managed so that each year reflects both the lessons learned from the prior year and identified gaps in service. **Please note that actions identified in the work plan are intended for implementation by Ecology.**

As noted previously, four categories of actions are included in the work plan:

1. Administration and Coordination
2. Capacity Building
3. Curriculum
4. Evaluation and Adaptive Management

The highest priority recommended actions are included in the work plan.

**Note:** All cost estimates included below are provided by the Washington Stormwater Center unless otherwise noted. Statewide actions benefit both Eastern and Western Washington; actions specific to Eastern Washington are highlighted in light blue.

**Administration and Coordination**

**Total cost = \$132-\$142K**

**Statewide actions = \$132-\$142K**

**Western WA specific actions = Not applicable**

**Eastern WA specific actions = Not applicable**

**Administration and Coordination Actions**

**Estimate**

<p><b>A Establish LID Training Coordinator position to oversee implementation of LID Training Plan.</b> This individual should serve as a liaison between the various permitted jurisdictions, helping them identify and share resources, experiences, etc., in order to improve collaboration and achieve cost savings and efficiencies. High priority tasks for year one include:</p> <ul style="list-style-type: none"> <li>■ Continue refining the list of current providers of LID trainings and LID topic experts.</li> <li>■ Develop partnerships with key entities, particularly associations (see Appendix H) who can help design and deliver targeted training to other audiences within the construction/land development industry, such as dirt moving contractors and others in need of very specific, peer-delivered training related to LID implementation.</li> <li>■ Work with the Department of Commerce to incorporate relevant LID topics and subjects into existing GMA and CESCL workshops and conferences. Work with other established training venues currently used by targeted audiences such as association meetings, city council meetings, public works training sites, etc.</li> <li>■ Coordinate and facilitate Curriculum Review Committee. It is recommended that this committee have a third-party facilitator, if budget allows.</li> <li>■ Evaluate and adaptively manage availability of training opportunities and qualified trainers (description included in Evaluation and Adaptive Management Action B).</li> </ul>	<p><b>= \$112K</b> (cost estimate provided by Ecology) <b>STATEWIDE ACTION</b></p>
<p><b>B Create a clearinghouse of LID information for Washington State.</b> This clearinghouse should be hosted on one succinct website and should serve as a one-stop resource and information center that provides designers, engineers, permittees, educators, planners and others with easy access to information on sustainable development practices in the Puget Sound region and beyond. The clearinghouse would include a variety of interactive features, many of which have been used successfully in similar web-based applications such as Seattle Public Utilities Resource Venture program (<a href="http://www.resourceventure.org">www.resourceventure.org</a>) and the Climate Adaptation Knowledge Exchange (CAKE) (<a href="http://www.cakex.org/">www.cakex.org/</a>).</p>	<p><b>\$10-\$20K</b> <b>STATEWIDE ACTION</b></p>
<p><b>C Enhance Ecology website</b> so that all information related to LID training is easily accessible to all audiences and represents the most up-to-date information.</p>	<p><b>\$10K</b> <b>STATEWIDE ACTION</b></p>

**Capacity Building**

**Total cost = \$520-\$600K**

**Statewide actions = \$260K**

**Western WA specific actions = \$175-\$255K**

**Eastern WA specific actions = \$85K**

Capacity Building Actions	Estimate
<p><b>A Develop training capacity at community and technical colleges in three priority Eastern WA locations.</b> Three priority training locations identified in the Needs Assessment include, in order: Spokane, Yakima, and the Tri-Cities. Strong potential exists in two of the three locations (Spokane and the Tri-Cities), and additional potential exists in a location that was not identified as a priority in the Needs Assessment (Walla Walla). <u>The following entities should receive direct support in Year 1 to build training capacity in Eastern Washington.</u> See Table 6 for more detailed information about each entity and their specific area of interest.</p> <ul style="list-style-type: none"> <li>■ Spokane: Spokane Falls Community College</li> <li>■ Tri-cities: Columbia Basin College (Pasco)</li> <li>■ Walla Walla: Walla Walla Community College</li> </ul>	<p><b>= \$45K</b> (or \$15K per institution) <b>EASTERN WA ACTION</b></p>
<p><b>B Leverage existing and issue new RFPs targeting priority audiences.</b> Current efforts, such as the LID 101 trainings, have laid the foundation for reaching certain priority audiences (e.g., elected officials, real estate professionals, nurseries and landscapers, composters, and members of the BIAW). These initiatives should be continued, expanded, and adaptively managed to ensure that lessons learned are incorporated moving forward. Additional trainings for the following priority audiences identified in this plan - inspection/enforcement, operations/maintenance, permitting/planning, and design/engineering - should receive trainings as outlined in the Eastern Washington training schedule. <i>(Cost estimate is based on five previous LID 101 grant appropriations at estimated \$90k with assumption that curriculum developed from these appropriations can be built upon).</i></p>	<p><b>= \$200,000K</b> <b>STATEWIDE ACTION</b></p>
<p><b>C Continue and/or customize existing trainings such as the LID Operations and Maintenance, LID Technical Guidance Manual for Eastern Washington, and the Western Washington Hydrology Model.</b> Trainings should be modeled after 2012-2013 trainings. Curriculum should be customized for Eastern Washington, as needed. <i>(Cost estimate is based on two previous grants at estimated \$45K each, assuming existing work can be built upon.)</i></p>	<p><b>= \$60K</b> <b>STATEWIDE ACTION</b></p>

## Capacity Building Actions

## Estimate

<p><b>D Design and implement a Train-the-Trainer certification program.</b> This statewide program will help expand the number of LID service providers and increase the number of LID topic experts to meet increased demands for training by priority audiences. The Train-the-Trainer program should consist of two components: 1) <b>LID Service Provider trainings</b> that expand the number of LID service providers; and 2) <b>LID content expert trainings</b> that expand number of LID content experts.</p> <ul style="list-style-type: none"> <li>■ <b>2 LID Service Provider training in E WA (preferably in Spokane) @ \$13K</b> <ul style="list-style-type: none"> <li>— A one-day training for entities interested in becoming LID service providers. Program content will include the following: 1) suggested course curriculum and associated LID topic experts by topic area and target audience; 2) marketing strategies for participant recruitment; 3) funding strategies for course implementation; and 4) course evaluation and adaptive management strategies. Participants will be provided with LID topic basics but will not be expected to become LID topic experts. Participants will receive a certificate for their participation and will become an official “LID Service Provider.” The service provider training should be offered in the highest priority location identified in the Needs Assessment (Spokane).</li> </ul> </li> <li>■ <b>1 LID Topic Expert training in E WA @ 13K each</b> <ul style="list-style-type: none"> <li>— These trainings will enable experienced LID topic experts to teach in-depth courses on their area(s) of LID expertise. These training are intended to increase the number of LID topic experts in Washington and would entail inviting experienced LID topic experts to train less-experienced professionals in how to become instructors. These courses will be modeled after best practices from the WSU Extension and UW LID courses. The training objective is to build a pool of competent LID topic experts who can then be available to LID service providers. Participants will receive a certificate for their participation and will become an official “LID Topic Expert.” Prerequisite recommended: certificate from either WSU or UW LID trainings.</li> </ul> </li> </ul>	<p><b>= \$40K</b>  <b>EASTERN WA</b>  <b>ACTION</b></p>
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**Curriculum**

**Total Cost = \$330-\$455K**

**Statewide actions = \$205-\$330K**

**Western WA specific actions = \$75K**

**Eastern WA specific actions = \$50K**

<b>Curriculum Actions</b>	<b>Estimate</b>
<p><b>A Establish curriculum review committee (CRC)</b> to 1) provide third party review of new and existing curriculum to meet academic standards and compatibility with new permit requirements; and 2) identify and prioritize new curriculum needed to address priority training needs identified in the Eastern Washington Training Schedule, (e.g., code integration guidance). It is crucial that independent, well-qualified, third party experts review the various issues surround LID training and provide direction for curriculum in areas where opinions of stakeholders may differ. The CRC should be tasked with ensuring that curriculum is based on the best science and engineering/technical information available. The CRC can also provide independent review of the trainings to make sure that they accomplish the goals of the program.</p>	<p><b>= \$0K</b>                      (costs included in Admin. and Coord. Action A)  <b>STATEWIDE ACTION</b></p>
<p><b>B Customize existing curriculum on appropriate LID topics for Eastern Washington.</b> Priority topics include permeable paving, bioretention areas, site assessment, site planning/layout, and regulatory/code integration, as identified in the Eastern Washington training schedule (Table 5).</p>	<p><b>= \$50K</b>  <b>EASTERN WA ACTION</b></p>
<p><b>C Utilize SWMMWW and code integration training templates and customize for Eastern Washington (SWMMEW).</b> Ideas include: 1) hold regional workshops where local government staff bring portions of their code and regulations, and workshop staff review and provide recommendations for how to revise and/or insert new language to fully, and successfully, integrate LID into the local government’s codes; and 2) a group of professionals with significant experience developing LID code language is hired to visit various local governments, review their regulations, and provide specific recommendations for revising and developing new language for codes and standards. Those local governments receiving this assistance would then share their revised language with other cities within their county at a subsequent work session.</p>	<p><b>= \$80K</b>                      based on past Puget Sound Partnership (PSP) code workshops  <b>STATEWIDE ACTION</b></p>

Curriculum Actions	Estimate
<p><b>D Develop online curriculum and courses for appropriate topics based on WSU and UW LID courses.</b> One critical component of this in Year 1 is making WSU and UW LID courses either “MOOCs” (massive online open courses) or static online courses. MOOCs are recommended as they are more interactive and students engage directly with a “live” teacher rather than a pre-recorded course. This field has evolved significantly in recent years and involves sophisticated and simple-to-implement elements, such as small group interaction via the web, testing via the web, one-on-one interaction with professions/instructors over the web, etc. Creating a “MOOC” of WSU and/or UW’s LID training will significantly expand the reach and frequency of those trainings throughout Eastern Washington and increase certifications. It will also help address the issue of the need to provide only one in-person class per year by WSU.</p>	<p><b>= \$100K</b> STATEWIDE ACTION</p>
<p><b>E Create and post “LID How To” YouTube videos</b> on LID installations and other appropriate topics. This is particularly important for highly specialized contractors who need quick and easy-to-access, step-by-step tutorials on specific LID issues, such as protecting root zones during the construction phase, how to mix bioretention soils, etc.</p>	<p><b>= \$25K</b> STATEWIDE ACTION</p>

**Evaluation and Adaptive Management**

- Total cost = \$65K**
- Statewide actions = \$65K**
- Western WA specific actions = Not applicable**
- Eastern WA specific actions = Not applicable**

According to the Kellogg Foundation’s Evaluation Handbook, evaluations generally cost 5-7% of a project’s total budget.

Evaluation and Adaptive Management Actions	Estimate
<p><b>A Evaluate availability of approved curricula.</b> Assessing curricula includes three activities. <i>(The cost estimate applies to the following work plan actions.)</i></p> <ul style="list-style-type: none"> <li>■ Assess curricula created by the LID Training program and by others against established learning criteria.</li> <li>■ Track approved curricula against identified needs and priorities for trainings by audience, topic, level of training needed, and location.</li> <li>■ Incorporate evaluation results in the annual program report.</li> </ul>	<p><b>= \$20K</b> STATEWIDE ACTION</p>

**Evaluation and Adaptive Management Actions**

**Estimate**

**B Evaluate and adaptively manage availability of training opportunities and qualified trainers.** This will be accomplished by four main tasks: 1) developing and maintaining a database of providers (LID service providers and LID topic experts); 2) assessing whether the supply of trainings meets the level of demand; 3) evaluating the “Train-the-Trainer” course; and 4) incorporating evaluation results in annual program report and storing survey data in central database. *(The cost estimate applies to all work plan actions listed above.)*

**= \$0K**  
 (costs included in  
 Admin. and  
 Coord. Action A)  
**STATEWIDE  
 ACTION**

- **Develop and maintain a central program database of providers (LID service providers and LID topic experts) and trainings provided.** Develop central program database and data collection protocols; collect data on:
  - Train-the-Trainer program participants, including training capabilities by audience, topic, technical level, and location.
  - Providers that use approved curricula, including training capabilities by audience, topic, technical level, and location.
  - Number of trainings provided, hours of instruction provided, and training participants reached using approved curricula, by audience, topic, technical level, and location. If applicable, also track number of certificates issued.
- **Assess quality and distribution of trainings:**
  - Survey training providers annually regarding their perception of demand for their trainings, such as whether they have wait-lists or difficulty filling trainings. Develop and administer survey; summarize results.
- **Evaluate the “Train-the-Trainer” course**
  - Develop course evaluation methodology and survey (i.e., track the number of individuals who complete the course, survey participants at the end of each course to assess course effectiveness, identify potential improvements, and summarize results.)
- **Incorporate evaluation results in annual program report and store survey data in central program database**
  - Develop annual report template including desired content.
- **Adaptive management actions include:**
  - As evaluation efforts identify significant gaps in the availability of training providers and trainings, take steps to recruit additional providers or train additional LID topic experts.
  - As evaluation efforts identify overlaps in trainings provided, encourage providers to coordinate or diversify the audiences, topics, and technical levels they target to increase efficiency.
  - Summarize survey lessons learned and share with all participating training providers. (Annually)
  - Conduct additional evaluation and modify the “Train-the-Trainer” course as participant surveys identify significant opportunities to improve.

## Evaluation and Adaptive Management Actions

## Estimate

- C Evaluate and adaptively manage quality and effectiveness of trainings.** Through a post-training questionnaire administered by training providers to a sample of training participants, measure participant assessment of self-reported learning and key workshop aspects. To the extent possible, develop questionnaires for each curriculum using standardized questions to reduce survey costs and allow comparison across providers and trainings. *(The cost estimate applies to work plan actions: Capacity A-D and Curriculum C and D.)*
- Develop post-training questionnaire and administration and analysis protocols.
    - Participant knowledge: self-reported change in knowledge of the topic covered.
    - Training format: length, timing location, and facilities (including webinar technology).
    - Teaching methods: presenter skills, course materials, assignments, and hands-on activities, case study examples.
    - Topics covered: relevance, technical level, and additional desired topics.
    - Promotional methods: where participants learned about training, typical sources for information.
    - Other topics: training cost, availability of certification or credits, participant suggestions for improvements.
  - Administer surveys, analyze results, and incorporate into annual program report.
  - Incorporate evaluation results in annual program report and store survey data in central program database.
  - Adaptive management actions include:
    - As participant questionnaires identify significant needs or opportunities to improve, conduct additional evaluation and modify curricula, recommended training formats, teaching methods, topics covered, and promotional methods.
  - As needed, improve and increase trainings in locations or topics associated with continued low compliance with LID requirements.

= \$45K  
STATEWIDE  
ACTION

## Eastern Washington – Potential Providers



Table 6 below includes a list of potential providers of LID training in Eastern Washington. These potential providers were identified in order to build capacity in Eastern Washington. They were identified through two separate efforts. First, numerous potential providers responded to the *Current and Potential LID Service Providers Survey*. These potential providers responded to specific questions in the survey that helped the project team understand their experience with trainings/LID, audiences they would prefer to train, and topics they would like to train on. In some cases, follow-up phone calls were made to get additional information.

Second, technical and community colleges throughout the region were contacted to assess level of interest in providing LID trainings. Those entities that had strong interest and are well positioned to deliver trainings, (i.e., they already have stormwater or related programs within their institutions), are included below. Note that those entities contacted through this second approach do not include the same level of detail as those identified through the survey due to time restrictions.

Finally, additional potential providers will very likely be identified as the Training Plan is implemented.

Key to Audiences		Key to Topics	
<b>A.</b>	Construction/land development	<b>A.</b>	Overall understanding of purpose of LID
<b>B.</b>	Design/engineering	<b>B.</b>	Bioretention areas
<b>C.</b>	Permitting/planning	<b>C.</b>	Rain gardens
<b>D.</b>	Inspection/enforcement	<b>D.</b>	Permeable paving
<b>E.</b>	Elected officials/managers/public works	<b>E.</b>	Vegetated/green roofs
<b>F.</b>	Operations/maintenance	<b>F.</b>	Rainwater collection systems
<b>G.</b>	Realtors	<b>G.</b>	Site assessment
<b>H.</b>	Citizens	<b>H.</b>	Site planning/layout
		<b>I.</b>	LID resources
		<b>J.</b>	Hydrologic modeling
		<b>K.</b>	Compost-amended soils
		<b>L.</b>	Regulatory/code integration

**Table 6. Potential LID Training Providers in Eastern Washington**

Entity name	Location	Region	Host or Training Provider	Experience	Audiences	Topics	Notes or Contact Info
City of Pullman	Pullman	E WA		Some / Low	A,B,C,E	A,B,D,F, H,I,J,K, L	Rob Buchert <a href="mailto:rob.buchert@pullman-wa.gov">rob.buchert@pullman-wa.gov</a> 509-338-3314
City of Spokane	Spokane	E WA	Host				

VI. LID Training Plan for Eastern Washington

Entity name	Location	Region	Host or Training Provider	Experience	Audiences	Topics	Notes or Contact Info
Spokane Community College	Spokane	Eastern	Training provider				Strong interest in serving in leadership role, including outreach into rural areas. Have adequate expertise to begin incorporating LID coursework into existing Water Resources degree program, offer online modules with a field training component, offer for-credit stand-alone trainings, and serve as a Train-the-Trainer provider to build capacity.
City of Walla Walla	Walla Walla	E WA	Training provider	Low/Low	A, B, C	A, B, C, D, E, F	Brad Daly <a href="mailto:bdaly@ci.walla-walla.wa.us">bdaly@ci.walla-walla.wa.us</a> 509.524.4669
Columbia Basin College	Pasco	E WA	Training Provider				
Walla Walla Community College	Walla Walla	E WA	Training Provider				

*\*as reported in the Current and Potential Providers Survey and updated with additional research*

# VII. Conclusion

## Summary

New National Pollutant Discharge Elimination System (NPDES) municipal stormwater permits issued by the Washington State Department of Ecology (Ecology) now require each permitted jurisdiction to review and revise development codes to make LID the preferred and commonly used approach for site development. Results from the *Washington State Low Impact Development Training: Needs Assessment Report* demonstrated that additional training was needed for public and private sector professionals to ensure relevant skills and expertise are prevalent across sectors. This Training Plan was developed to address this need by providing a framework for Ecology and the State Legislature to build capacity among service providers and deliver audience-specific trainings across LID topic areas and levels of training throughout the state. The Training Plan provides a blueprint for Ecology to help NPDES permittees and other key stakeholders prepare for upcoming LID requirements, leverage LID training investments made in 2013, and maximize the beneficial use of state funding.

The Training Plan was developed under contract to the Washington Stormwater Center (WSC). It supports the long-term requirements of the NPDES permit and the vision of both Ecology and the LID Steering Committee, a multi-stakeholder group convened to provide oversight to the state as it moves to implement LID permit requirements. The Training Plan was developed under the direction and guidance of the LID Steering Committee. This Steering Committee will continue to serve in this role as the Training Plan is implemented.

## Creating a Sustainable and Viable Washington State LID Training Program for the Future

The Training Plan is divided geographically into two regions: Western and Eastern Washington. This is due to differences between the regions geographic conditions, types and level of training needed, and applicable permit conditions that dictate timing of training. For each of the two geographic regions, the Training Plan contains three core components: 1) a training schedule, 2) a work plan containing detailed Year One actions (with cost estimates) needed to implement the training schedule, and 3) a list of potential providers who, along with current providers, can help deliver the trainings.

Two key elements of the Training Plan include:

- **Detailed Year One actions for both Western and Eastern Washington (with cost estimates).** The synchronized implementation of these Year One actions will help ensure an efficient and cost effective path forward for developing and delivering LID training throughout Washington State for each of the next four years. The prioritized actions are designed to:
  - Build capacity to meet future training demands through the implementation of Train-the-Trainer program which is designed to increase the number of LID topic experts and the number of entities that offer LID trainings across the state. Future fee-based trainings will help guarantee their offerings by providing a sustainable funding mechanism.
  - Develop curriculum across LID topics and presented in multiple formats (in-person, online, in-the-field) to meet the needs of a variety of audiences over time.
  - Establish protocols and recommendations for the evaluation of key LID training elements to help ensure relevance of future training efforts. These protocols are intended to be built into all future LID trainings and, thus, their execution and integration are the responsibility of each entity offering LID trainings.
  - Create a clearinghouse of LID information for the state and enhance the Ecology LID website to facilitate the accessibility of LID information. It is recommended that Ecology continue to make pertinent updates, as needed, to ensure that these resources remain relevant into the future.
- **Evaluation and Adaptive Management.**
  - Adaptive management provides an opportunity to incorporate LID innovations and allows for the incorporation of lessons learned through recommended Year One evaluation actions such as identifying gaps in curricula and availability of service providers and topic experts, effectiveness of training formats and teaching methods, and relevance of topics covered. **These lessons learned will inform the prioritized actions in Year Two – Year Four and assist with laying the foundation for a sustainable and viable LID Training Program beyond the four year mark. Adaptively managing the prioritized actions described in the Training Plan over the next four years is the cornerstone to creating a sustainable and viable Washington State LID Training Program for the future.**

## Additional Recommended Actions for Consideration

The Training Plan includes cost estimates for priority Year 1 actions for Western and Eastern Washington based on a budget of approximately \$1 million. The following actions are offered for additional consideration, if budget allows:

- **Ensure that language for Municipal Stormwater Capacity grants is updated annually to reflect LID Training Plan needs.** The language should, at a minimum, require recipients to build in-field training elements to their LID projects (make “learning moments” of any projects underway, inviting in participants to observe and ask questions as the project progresses).

- **Begin building relationships and partnerships with associations and others to partner on delivering targeted training in the correct format.**
- **Begin targeted grants to associations** and other entities positioned to deliver training to priority construction industry sub-audiences.
- **Build a continuing education credits (CEUs) and other professional development credits program as needed.**
- **Build in language to RFPs and develop grants to Associations** and other entities positioned to deliver training to priority construction-industry sub-audiences.
- **Organize existing case studies and identify gaps;** build regionally relevant case studies where gaps exist.
- **Build E WA-specific continuing education credits (CEU)** and other professional development accreditation program as needed.
- **Develop more in-the-field training opportunities.**
- **Send observers to trainings** by providers that receive especially high or low ratings to identify keys to success and areas for improvement.

Demand for LID training throughout Washington State is strong and expected to grow stronger. Implementation of this Training Plan demonstrates the state’s commitment to meeting this demand while simultaneously ensuring that demand will continue to be met well beyond the four years outlined in this Plan. As the LID Training Plan moves towards the implementation phase, the LID Steering Committee should continue to serve in the leadership role that it has played thus far – providing oversight and guidance to Ecology and its key partners.

# VIII. Appendices

**Appendix A** – Needs Assessment Report – Executive Summary

**Appendix B** – LID Steering Committee members

**Appendix C** – LID Expert Panel members

**Appendix D** – Methodology

**Appendix E** – Audience-Specific Training Schedules

**Appendix F** – Guide to Western and Eastern Washington Training Schedules

**Appendix G** –Current Providers of LID Training

**Appendix H**– Professional Associations

**Appendix I** –LID Topic Experts

# Appendix A. Washington State Low Impact Development Training: Needs Assessment Report Executive Summary<sup>6</sup>



## Overview

Low Impact Development (LID) practices are increasingly being used in Washington State to address a variety of water quality and quantity issues related to stormwater runoff. New municipal stormwater permits issued by the Washington State Department of Ecology (Ecology) now require jurisdictions to use LID for new developments and redevelopment unless site conditions are prohibitive.

Public and private sector stormwater professionals working in a variety of fields related to development will need additional training to meet Ecology's new LID requirements. Although numerous LID training programs exist in Washington, the new requirements are expected to result in an increase in training demand that will likely exceed current training provider capacity.

The Washington Stormwater Center (WSC), Veda Environmental, Cascadia Consulting Group, and the Washington State University Social and Economic Sciences Research Center (WSU-SESRC) (Project Team) conducted two separate statewide surveys aimed at better understanding the capacity of current LID service providers to meet increased demand for training, the level of interest of potential providers to fill training gaps, and the type and level of training needed by stormwater professionals throughout the state.

Both of the surveys were web-based and were conducted from November 2012 to early January 2013. The first survey, entitled *Statewide LID Training Needs Assessment Survey*, targeted potential trainees

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<sup>6</sup> Please note, the Executive Summary has been adapted for inclusion in the LID Training Plan. For the complete Needs Assessment Report, please visit <http://www.wastormwatercenter.org/news/?id=273>.

and received 388 responses. The second survey, entitled *Current and Potential LID Service Providers Survey*, targeted current and potential providers of LID training and received 87 responses.

The results of the two surveys provide important information to the Project Team as it works to complete a comprehensive LID Training Plan for Washington State (Training Plan).

This Needs Assessment Report is a preliminary step towards developing the LID Training Plan. Initial findings have already resulted in the development of an introductory LID 101 education program to priority audiences, including: building industry members, elected officials, public works directors and other high-level jurisdictional managers, commercial compost providers, nurseries, landscapers, and realtors. Additionally, three existing grants funded through Ecology were augmented to add one-time training elements to the grantees' existing work plan: LID operations /maintenance professionals; Western Washington Hydrology Manual (WWHM), and the Eastern Washington LID Guidance Manual.

## Summary of Gaps and Needs for LID Training

The surveys revealed a large number of gaps and needs for LID training in Washington. These gaps and needs fall primarily into five categories, including:

- **Audiences for LID training**  
Who are the target audiences, and are current LID training programs reaching them?
- **Topics addressed and level of training needed**  
Are the topics that LID training programs cover meeting the specific needs of target audiences? Based on current knowledge, what are those needs?
- **Potential to increase training capacity**  
Do current LID training programs have the capacity to meet increased demand in all geographic locations, on all LID topics, and for all audiences? What (if any) additional "potential" providers exist and what resources might they need to help increase training capacity?
- **Assistance and resources needed**  
What additional resources are needed to expand capacity?
- **Training preferences**  
Training format or preferred method of delivery, length, and distance willing to travel.

A brief summary of key gaps and needs for each of these categories appears below. A full description of each of these categories appears in Section 3 of the full report.

## Audiences for LID Training

Current LID training providers are, for the most part, designing their trainings to reach the target audiences in need of technical training. These target audiences include the following professionals:

- Design/engineering
- Operations/maintenance
- Inspection/enforcement
- Planning/permitting
- Construction/land development
- Elected officials/managers/public works

**The majority of current providers (56%) also train interested citizens on non-technical LID topics, particularly rain gardens.** Although this audience is not a focus for technical training, it could be helpful to assess demand for these trainings. This could help assess residential acceptance of such landscaping features and future opportunities for outreach to a residential audience to increase understanding, acceptance, and use of LID.

**Eastern Washington is underserved by existing programs.** The survey results revealed that most LID trainings are concentrated in Western Washington, specifically the Puget Sound region. Fewer than 5% of current LID training providers work primarily in Eastern Washington. **Although more potential providers work in Western Washington compared to Eastern Washington, there were several potential providers from Eastern Washington who expressed strong interest in providing training.** Because this area is underrepresented by current training programs, and responders indicated significant need for training of all professional categories and most topic areas, it will be very important to begin working with potential providers in Eastern Washington immediately.

## Topics Addressed

**Potential training participants identified seven high priority topic areas.**

Current providers have trainings on four of the seven priority topics - permeable paving, bioretention, site assessment, and site planning and layout. However, **current providers do not offer curricula that cover the remaining three priority topics -LID resources, regulatory/code integration, and hydrologic modeling.** Classes and curricula for these three topic areas will need to be fully developed or expanded to meet the priority needs of potential training participants.<sup>7</sup>

*All seven priority topic areas are potentially important for Eastern Washington responders.*

<sup>7</sup> It should be noted that in addition to this Needs Assessment and the Washington State Low Impact Development Training Plan, Ecology has begun to fund, design, and provide specific LID trainings that target both priority topics and priority audiences identified in this Report. This includes trainings on the Western Washington Hydrology Model (WWHM), LID operations and maintenance, and introductory trainings to elected officials, realtors, and

**The two topics most frequently covered by current providers – overall purpose of LID and rain gardens – were not identified as priority topics by potential training participants.** In fact, rain gardens were identified as the lowest priority topic. In developing the LID Training Plan, a chief focus will be on providing trainings on high priority topics that aide and educate stormwater permitholders on new and essential components required in their permits.

**Eastern and Western Washington responders noted very different priorities regarding LID topics.**

- Eastern Washington responders did not identify a single topic area as a priority.
- Western Washington responders noted four priority topics: bioretention, permeable paving, site assessment, and LID resources.

This discrepancy is likely the result of the limited level of knowledge of LID topics expressed by Eastern Washington compared to Western Washington responders (see Level of Training Needed on page 72). Therefore, all seven priority topic areas are potentially important for Eastern Washington responders.

**Two priority topics identified by Western Washington responders—hydrologic modeling and LID resources—are not topics that current providers frequently cover.** Current providers should expand their programming to include these two topics to ensure adequate coverage for potential training participants. Given the highly technical nature of hydrologic modeling, providers should develop classes that focus solely on this topic rather than developing broader classes that only include a discussion of hydrological modeling.

**Priorities for training differed considerably across various work categories.**

- Design/engineering professionals:—a high priority audience—identified significantly more topics as priorities than responders from other work categories.
- Operations/maintenance professionals: although rating topics slightly lower overall, this group identified bioretention, LID resources, and regulatory issues as their highest training priorities.
- Inspection/enforcement professionals: named permeable paving and bioretention as their top two desired training topics.
- Elected Officials/managers/public works professionals: identified technical LID concepts and regulatory/code integration as their top two priorities.

Two priority topics these audiences identified – LID resources and regulatory issues – are not being adequately covered by current training programs.

**More than two-thirds (70%) of responders were “very” or “extremely” interested in learning more about the new LID regulations.** This particular topic is very appropriate for webinars and should be explored further.

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members of the Building Industry Association. The LID Training Plan will include more details on these efforts as well as recommendations for them going forward.

## Level of Training Needed

**Introductory level training is needed for all priority topic areas, with hydrologic modeling the highest priority for introductory curricula development and training.** Only about one-third of responders noted introductory level of knowledge for each of the topic identified in Table 15, page 44 of the full report (*Washington State Low Impact Development Training: Needs Assessment Report*).

**Significant additional advanced training will be needed on permeable paving and bioretention.** There is strong demand for advanced training on both of these topics, which were the two highest priority topics identified in Table 15, page 44. The majority of current providers offer primarily introductory or mid-level training on these topics. Only about one-third of current providers stated they provided advanced trainings on permeable paving and bioretention.

**In Eastern Washington, introductory and mid-level courses on all seven priority topics are needed.** Responders from Western Washington reported higher levels of current knowledge than responders from Eastern Washington in all topic areas, which is expected since the majority of current providers are focused mostly in the Puget Sound region.

**Mid and advanced level curriculum development and trainings are needed for design/engineering professionals on all topic areas.** Expectedly, they reported higher levels of current knowledge than responders in most other work categories for all topic areas—with the exception of green roofs and rainwater collection. Notably, they also reported that they needed the most advanced training in all topic areas.

**More mid-level training is needed for the following professionals:**

- Permitting/planning: site planning and layout and site assessment.
- Inspection/enforcement: permeable paving and bioretention.

**Introductory training is needed for elected officials/managers/public works professionals and real estate professionals.** Some indicated they needed no training.

**Introductory-level courses on priority topics will be particularly important in Eastern Washington Phase II jurisdictions.** These responders reported substantially lower average levels of current knowledge across all LID topics.

*Funding mechanisms should be designed to encourage collaboration—not only among providers, but also within and across regions, to reduce duplicative efforts and streamline the development and delivery of systematic statewide Low Impact Development trainings.*

## Potential to Increase Training Capacity

**Regional coordination will be essential to ensure an efficient use of limited state resources.**

Developing regional capacity to meet the training needs for the topics identified as the highest priority and the least available will be necessary moving forward. Current providers indicated a strong interest in

expanding their trainings and numerous potential providers also expressed strong interest in developing training programs. Coordinating with current providers and bringing in new providers, particularly in Eastern Washington, are efficient ways to move LID training forward and reach target audiences.

## Assistance and Resources Needed

**Program support is essential through funding and assistance with marketing and curriculum development.** Responders most commonly described needs for additional staff and funding. When asked what specific assistance they would need to expand their trainings, current providers commonly mentioned:

- Marketing and promotion (72%)
- Development of curriculum and training materials (63%)
- Printing of training materials (50%)
- Topic experts to serve as trainers (44%)

In terms of resources needed to expand capacity, both current and potential providers expressed strong interest in getting help in curriculum development and training materials. More than half of current providers said they would be willing to modify their existing curriculum if funding were available for trainings that met new curriculum standards.

## Preferences Regarding Training Format, Length, and Travel Distance

**There is a willingness to accept trainings in several different locations for various lengths of time through classroom, field studies, and web-based curriculum.**

- **Most programs currently offered are classroom/lecture based.** However, 16% are web-based, a higher percentage than expected. Most overall responders (82%) appear willing to participate in web-based training, and some priority topics, such as regulatory/code integration and LID resources, are well suited for web-based training.
- **Length and timing of trainings.** Most responders are willing to attend half day and full day classes, and over a third are willing to attend a two-day class. Evening classes and week-long classes were very unpopular, with most responders saying they would not attend an evening class. However, it is important to remember that the survey did not reach the building industry—an audience most likely to need evening and weekend classes because their work schedules typically do not allow for time away from work for trainings.
- **Location of trainings.** All responders expressed a fairly strong willingness to travel up to 60 miles for training. The top three locations for Western Washington trainings are: Seattle, Tacoma, and Everett. For Eastern Washington trainings, they are: Spokane, Yakima, and Tri-Cities.
- **Timing of delivering trainings.** LID training programs will need to be developed quickly since almost two-thirds of responders or their employees indicated that they need training “immediately”, or before their jurisdictions adopt LID requirements.

## Next Steps and Issues in Developing LID Training Plan

The Project Team will use the results of the Needs Assessment Report to develop a comprehensive LID Training Plan for Washington State.

**Immediate next steps that the Project Team will undertake in order to develop this plan include:**

- **Convene a Project Team** meeting to develop a detailed outline and timeline (including deliverables) for developing the LID Training Plan.
  - **Detailed outline** to include: critical/immediate training needs; training goals, objectives, performance measures, and outcomes; resource needs to implement training plan; training delivery; and schedule for training plan implementation.
  - **LID Training Plan** to include: four-year vision, goals, and objectives.

### Key Issues to be addressed in Developing LID Training Plan

A number of key issues that should be addressed and/or considered in developing an LID Training Plan were identified in the process of developing this report. Where feasible<sup>8</sup>, the Project Team will address the following key issues as it moves towards completing the LID Training Plan:

- **Coordinating with initial work now underway through the Ecology LID 101 program being done by the Washington Homebuilders Association.** This key audience was underrepresented in the Needs Assessment survey despite extensive efforts to engage them, and their input will be critical in moving towards the development and implementation of a comprehensive LID Training Plan.
- **Follow-up with interested responders from the current and potential provider survey** to help build partnerships and increase training capacity. Numerous current and potential providers expressed strong interest in expanding or developing training programs on LID.
- **Prioritize reaching out to Eastern Washington potential providers.** While more potential providers work in Western versus Eastern Washington, there were several from Eastern Washington that expressed strong interest in providing training.
- **Conduct additional research on technical and community colleges**, especially in Eastern Washington, to determine their interest/ability to be LID training providers. Despite efforts to reach this audience, very few technical or community colleges responded to the survey, yet they are well positioned to help deliver LID trainings.

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<sup>8</sup> Budget and time permitting.

- **Conduct additional research of current providers to review and assess participant evaluations.** Utilizing existing information from training participants will be very helpful in completing a training plan to further determine participants' preferences for level and type of training, and how current programs meet current needs. Part of this research should include a focus group or individual interviews with key current service providers such as WSU Research and Extension Center and the University of Washington.
- **Explore options for providing training on priority topics on-line.** For example, more than two-thirds (70%) of responders were "very" or "extremely" interested in learning more about the new LID regulations. This particular topic is very appropriate for webinars and should be explored further.

## Key Issues to be Addressed in Advancing LID in Washington State

A number of key issues were identified as a result of this Needs Assessment that the Project Team feels would be helpful in advancing LID in Washington State. Two of these issues are beyond the scope of the LID Training Plan, but are included below for consideration.

- **Develop regionally relevant case studies** that present costs and methods of maintenance, cost of complying with new regulations, and other issues. Responders expressed a lot of concern with a variety of issues related to LID, with cost of maintenance and operations/maintenance topping the list. Developing regionally relevant case studies on specific topics of concern could help directly address these issues and build overall support for and understanding of LID.
- **Develop guidance on communicating LID concepts with members of the public.** Public perception rated among the lowest concerns by survey responders; however, the experience of actual practitioners in Seattle, Bellingham, and elsewhere does not reflect this general lack of concern. Succinctly addressing real public concerns and perceptions with key messages and comprehensive community engagement practices will be crucial to the overall success of LID implementation in Washington.

## Conclusion

Demand for LID training throughout Washington State is strong. Priorities for training in terms of specific LID topics, as well as level of training (introductory, mid-level, and advanced) differ considerably between Eastern and Western Washington, between professional work categories (design/engineering versus permitting/planning and operations/maintenance, etc.), and between types of regulated entities (Phase I governments versus Western Washington and Eastern Washington Phase II). Current training programs are meeting some of the growing demand, but they tend to focus their efforts in the Puget Sound region and are limited in terms of both the LID topics they cover, as well as the level of training provided. Therefore, additional training programs will need to be developed, particularly in Eastern

Washington. These programs should be targeted not only geographically, but also to specific audiences in terms of topic, content, and level.

The LID Training Plan will build on the gaps and needs identified in this Needs Assessment Report and identify exactly what training is needed, where, for whom, and at what level.

## Appendix B. LID Steering Committee Members

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<b>CLINGMAN, TOM</b>	Ecology	<a href="mailto:tom.clingman@ecy.wa.gov">tom.clingman@ecy.wa.gov</a>
<b>CONNOLE, RUSS</b>	Spokane County	<a href="mailto:rconnole@spokanecounty.org">rconnole@spokanecounty.org</a>
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<b>MOORE, BILL</b>	Ecology	<a href="mailto:bill.moore@ecy.wa.gov">bill.moore@ecy.wa.gov</a>
<b>MULLER, GRETCHEN</b>	Cascadia Consulting	<a href="mailto:gretchen@cascadiaconsulting.com">gretchen@cascadiaconsulting.com</a>
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<b>SCHROEDER, CARL</b>	Association of WA Cities	<a href="mailto:carls@awcnet.org">carls@awcnet.org</a>
<b>STARK, JOHN</b>	WSU-Puyallup Research/Ext Center	<a href="mailto:starkj@wsu.edu">starkj@wsu.edu</a>
<b>TACKETT, TRACY</b>	Seattle Public Utilities	<a href="mailto:tracy.tackett@seattle.gov">tracy.tackett@seattle.gov</a>
<b>TROHIMOVICH, MERIAT</b>	City of Tacoma	<a href="mailto:MPollard@ci.tacoma.wa.us">MPollard@ci.tacoma.wa.us</a>
<b>WEISS, JOSH</b>	WA State Association of Counties	<a href="mailto:jweiss@wacounties.org">jweiss@wacounties.org</a>
<b>WILKINSON, HILARY</b>	Veda Environmental	<a href="mailto:Hilary@vedaenv.com">Hilary@vedaenv.com</a>
<b>WISHART, BRUCE</b>	People for Puget Sound	<a href="mailto:wishart.bruce@comcast.net">wishart.bruce@comcast.net</a>
<b>WULKAN, BRUCE</b>	Puget Sound Partnership	<a href="mailto:bruce.wulkan@psp.wa.gov">bruce.wulkan@psp.wa.gov</a>

## Appendix C. LID Expert Panel

Individuals with extensive experience providing LID training in Washington were invited to participate in the LID Expert Panel. This list reflects experts that participated in the panel; not everyone who was invited was able to participate.

<b>ATCHISON, DUSTIN</b>	CH2MHill
<b>CARLSON, WAYNE</b>	AHBL
<b>DUGOPOLSKI, REBECCA</b>	Herrera Environmental Consultants
<b>ERWIN, TANYALEE</b>	WSU Research and Extension Center and Washington Stormwater Center
<b>GIRALDO, GREG</b>	SvR Design Company
<b>HINMAN, CURTIS</b>	WSU Research and Extension Center
<b>HUTCHINSON, GRETA</b>	Cascadia Consulting Group (note taker)
<b>JONES, JOCELYN</b>	Department of Ecology
<b>KIRSCHBAUM, ROBIN</b>	HDR
<b>LENTH, JOHN</b>	Herrera Environmental Consultants
<b>MULLER, GRETCHEN</b>	Cascadia Consulting Group (Co-facilitator)
<b>PASZTOR, ZSOFIA</b>	Edmonds Community College
<b>WEBB, CHRIS</b>	Maul Foster & Alongi, Inc.
<b>WILKINSON, HILARY</b>	Veda Environmental (Co-facilitator)

## Appendix D. Methodology

### Introduction

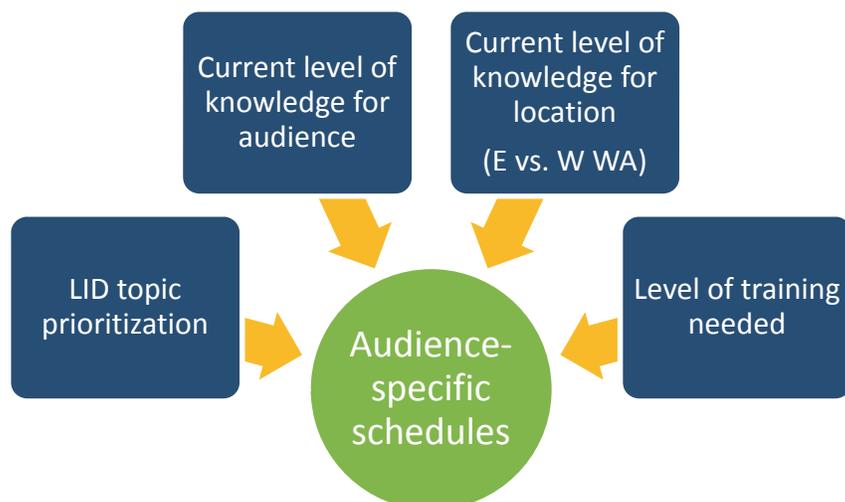
This LID Training Plan is intentionally organized around the specific training needs of the six priority audiences previously identified. Implementing an LID project, from the design and engineering phase to permitting and planning to construction and land development to inspection and enforcement to operations and maintenance, requires the expertise of a variety of professionals. The six priority audiences that are the focus of this Training Plan include those professionals currently thought to be critical early adopters to ensure the successful implementation of LID in Washington State. However, additional audiences will also need training, and this LID Training Plan includes recommendations for how best to begin the process to identify and train additional audiences (see Western Washington Work Plan on page 39 and Eastern Washington Work Plan on page 54 in the Training Plan).

It is important that each of the six audiences that are the focus of this Training Plan receive training specific to their role in LID implementation. However, it is equally important that the training address the highly integrated nature of LID. Each professional group will need to understand how their work fits into the broader framework of LID projects. In other words, how their work integrates with, is affected by, and/or impacts the work of other professionals. Only with an integrated approach to training can the various professionals involved in LID implementation ensure that LID projects function as planned over the lifetime of the LID facilities.

In order to address the distinct role in LID implementation that each professional group plays in successful LID integration and implementation, audience-specific training schedules were developed. These individual training schedules serve as guides for the development of the comprehensive training schedules for Western and Eastern Washington, ensuring that all audience needs are addressed in the schedules.

Audience-specific schedules were developed using a step-by-step approach that aligns with the overarching training goals and assumptions (listed below). The schedules were developed using four key attributes listed in Figure 5 below: 1) prioritization of LID topics; 2) current level of knowledge for the audience; 3) current level of knowledge for the location; and 4) level of knowledge/training needed. The data used for each of these attributes was drawn from the Needs Assessment Report. The sections below describe the goals, assumptions, and methodology for using these attributes to developing audience-specific schedules.

Figure 5. Attributes Assessed to Develop Audience-Specific Schedules



## Audience-Specific Training Goals

The overarching goal of the trainings is to equip audiences from a variety of sectors across Washington with the knowledge and skills they need to effectively and efficiently comply with new LID requirements and to properly design, install, operate, and maintain LID facilities.

To satisfy this goal, training schedules were developed that are:

- **Timely.** Audiences will be trained on topics in advance of when regulatory requirements go into effect.
- **Efficient.** To respect the time and resources of the audience and trainers, the level of training will match the current level of understanding. Introductory training will not be provided for topics that are well understood by each audience.
- **Relevant to the audience.** The training will focus on those topics most important to the audience’s ability to adopt and implement new LID requirements.
- **Location-specific.** The training will be tailored to accommodate potential differences between Western and Eastern Washington audiences.
- **Personal.** The training will be conducted in a format that resonates with the learning preferences, limitations, and needs of the audience.

For each audience, specific objectives have been developed to meet the above goal. These specific objectives are contained within Appendix E.

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## Audience-Specific Assumptions

The audience-specific schedules make the following assumptions, which are addressed later in development of Western and Eastern Washington training schedules:

- **Assumption 1: Progression from one training level to the next (introductory, mid-level, advanced).** It was assumed that all audiences should progress to the level of training appropriate for each particular target audience, as determined by the LID Expert Panel.
- **Assumption 2: Western and Eastern Washington.** Because Eastern Washington responders from the Needs Assessment Report indicated lower levels of knowledge across all LID training topics, it was assumed that all trainings for Eastern Washington audiences should begin at a more basic level than those for Western Washington.
- **Assumption 3: Repetition.** For development of the audience-specific schedules it was assumed that audiences attend all trainings and do not need to “repeat” trainings across years. However, because individuals may miss trainings on any given year, it is imperative that trainings be repeated each year or every other year.
- **Assumption 4: Clumping.** Although each topic could be taught separately, this was identified as an unrealistic approach given time and resource constraints. Although courses will likely have to be “clumped” for groups of topics and audiences, for development of the audience-specific training schedules, it was assumed that each topic can be taught at the level most appropriate for the audience. This issue is addressed in the LID Expert Panel Review and Topic “Clumping” and Audience “Grouping” sections of this Appendix.

These schedules also do not address training formats or locations.

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## Audience-Specific Training Schedules

To provide professionals with the knowledge and skills they need in a timely, efficient, and relevant manner, the training will need to cover specific topics, in specific ways, and at specific times. A four-step methodology is used for identifying which topics should be covered, at what level, and at what time, for each audience:

- Step A: LID topics by audience
- Step B: Training levels
- Step C: Curriculum building
- Step D: Audience-specific training schedule

The following sections detail each step of the above methodology.

## Step A: Priority LID Topics by Audience

Schedules for training topics were developed using a phased, sequential approach that first introduces priority topics in Year 1 and then adds trainings on lower priority topics in Year 2. Later years (Years 3-4) focus on progressing to more advanced levels, as appropriate by audience.

Priority topics were identified by comparing two sources of information: audience priority and project team priority (see Table 7 below). The first source of information (Column 1: “Audience Priority”) came from the Needs Assessment Report (Appendix A). As per the Needs Assessment Report, topics rated as a high priority by 40% or more of respondents were labeled “High” priority, topics rated as high priority by between 25% and 39% of respondents were labeled “Medium” priority, and topics rated as high priority by less than 25% of respondents were labeled “Low” priority. The second source of information, (Column 2: “Project Team Priority”), was gathered from the LID Expert Panel. The LID Expert Panel was asked to ground-truth the topics identified as high, medium, and low priorities by each target audience.

Column 1 and Column 2 were compared and an assessment was made to determine the overall priority by audience and LID topic (Column 3: “Overall Priority”). Overall Priority was the primary prioritization factor that was used in developing the Western and Eastern Washington training schedules.

**Table 7. Example Table of LID Topic Priority by Audience**

Topic	Audience Priority	Project Team Priority	Overall Priority
<b>Regulatory/code integration</b>	<b>HIGH</b>	Medium	Medium
<b>Bioretention areas</b>	<b>HIGH</b>	<b>HIGH</b>	<b>HIGH</b>
<b>LID resources</b>	<b>HIGH</b>	<b>HIGH</b>	<b>HIGH</b>
<b>Site assessment</b>	Medium	<i>Low</i>	<i>Low</i>
<b>Rain gardens</b>	Medium	<b>HIGH</b>	<b>HIGH</b>
<b>Permeable paving</b>	Medium	<b>HIGH</b>	<b>HIGH</b>
<b>Compost-amended soils</b>	Medium	<b>HIGH</b>	<b>HIGH</b>
<b>Site planning/layout</b>	Medium	<i>Low</i>	<i>Low</i>
<b>Rainwater collection systems</b>	<i>Low</i>	Medium	Medium
<b>Vegetated/green roofs</b>	<i>Low</i>	Medium	Medium
<b>Hydrologic modeling</b>	<i>Low</i>	<i>Low</i>	<i>Low</i>
<b>Purpose of LID</b>	<i>Low</i>	<b>HIGH</b>	<b>HIGH</b>

## Step B: Level of Training

The Needs Assessment asked responders to rate their level of knowledge for each LID topic as introductory, mid-level, and advanced. Responses from the Needs Assessment are summarized in Column 1 (“Current Level of Knowledge”) in Table 8 (below).<sup>9</sup> This information was used to inform the level of training that audiences will start out at in the four-year training plan, in order that levels of training match current levels of understanding. For example, if operations/maintenance professionals come to the trainings with a mid-level understanding of bioretention but an introductory-level

<sup>9</sup> The Low, Medium, and High categories were discerned using the same quantitative thresholds as used for categorizing topic priorities in Step 1.

understanding of rain gardens, then trainings for this audience should begin at a mid-level for bioretention and at an introductory-level for rain gardens.

The beginning level of training per audience was identified for both Western and Eastern Washington (Columns 3 and 4 in Table 8). Because levels of understanding are generally lower in Eastern Washington than Western Washington, lower levels of knowledge (and beginning level of training) were indicated across all topics for Eastern Washington.

Trainings begin from the “Beginning Level of Training” and progress to the level of training needed for that audience. The “Level of Training Needed” (last column in Table 8 below) was developed using input from the LID Expert Panel.

Through this process, topics were identified that are high priority for audiences but are less understood. For example, if permeable paving is a high priority for the operations/maintenance professionals and is less understood (“low” current level of knowledge), then that topic should be addressed early in the Western and Eastern Washington training schedules.

**Table 8. Example Table of Training Levels**

Topic	Current Level of Knowledge	Overall Priority	Beginning Level of Training: W WA	Beginning Level of Training: E WA	Level of Training Needed
<b>Purpose of LID</b>	Medium	HIGH	MID	INTRO	MID
<b>Bioretention areas</b>	Medium	HIGH	MID	INTRO	MID
<b>Permeable paving</b>	Medium	HIGH	MID	INTRO	MID
<b>Rainwater collection systems</b>	Medium	Medium	MID	INTRO	MID
<b>Rain gardens</b>	Medium	HIGH	MID	INTRO	MID
<b>Regulatory/code integration</b>	Medium	Medium	MID	INTRO	INTRO
<b>Site assessment</b>	<i>Low</i>	<i>Low</i>	INTRO	INTRO	MID
<b>Compost-amended soils</b>	<i>Low</i>	HIGH	INTRO	INTRO	MID
<b>Site planning/layout</b>	<i>Low</i>	<i>Low</i>	INTRO	INTRO	INTRO
<b>Vegetated/green roofs</b>	<i>Low</i>	Medium	INTRO	INTRO	MID
<b>LID resources</b>	<i>Low</i>	HIGH	INTRO	INTRO	MID
<b>Hydrologic modeling</b>	<i>Low</i>	<i>Low</i>	INTRO	INTRO	INTRO

### Step C: Curriculum Building

The LID training topics to be offered within the first year of the Training Plan reflect topics and levels that are currently being offered by LID training service providers as indicated in the Current and Potential Service Provider survey that was administered in December 2012. Current training capacity does not meet current training needs. Therefore, this Training Plan recommends several strategies to build capacity both among current and potential LID training service providers. These recommendations are described in more detail in the Western and Eastern Washington work plans. In addition, curriculum

for those LID topics not currently covered will also need to be developed for both for Western and Eastern Washington audiences.

For the audience-specific schedules, curriculum building was only specified for two audiences: design/engineering professionals and permitting/planning professionals. This is because these were the only two audiences for whom advanced level training was identified as a need in Year 1. Most current providers only provide introductory to mid-level trainings—not advanced level trainings—on LID topics. Topics for which these two audiences were identified to need at advanced level trainings in Year 1 were therefore reserved for training in Year 2, after curriculum is built in Year 1.

### Step D: Audience-Specific Training Schedule

Outcomes from Steps A through C above were compiled to develop audience-specific training schedules (see Table 9). The following approaches were used to create this schedule:

- **LID Topic Prioritization.** Trainings are provided for the top five-seven priority topics early in Year 1 and trainings for lower priority topics begin in Year 2.
- **Current Level of Understanding for Audience.** Trainings begin at the audience’s current level of understanding, by topic.
- **Current Level of Understanding for Location.** Trainings in Eastern Washington begin at more basic levels than in Western Washington, for all topics.
- **Level of Training Needed.** Topics progress to the level of training needed for the audience as identified by the LID Expert Panel.

**Table 9. Example Table of Audience-Specific Training Schedule**

Topic	Western				Eastern			
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
Compost-amended soils	INTRO	MID			INTRO	MID		
Rain gardens	MID				INTRO	MID		
Permeable paving	MID				INTRO	MID		
Purpose of LID	MID				INTRO	MID		
Bioretention areas	MID				INTRO	MID		
LID resources	INTRO	MID			INTRO	MID		
Regulatory/code integration		INTRO				INTRO		
Rainwater collection systems		MID				INTRO	MID	
Vegetated/green roofs		INTRO	MID			INTRO	MID	
Hydrologic modeling		INTRO				INTRO		
Site assessment		INTRO	MID			INTRO	MID	
Site planning/layout		INTRO				INTRO		

Key:	Introductory Course (INTRO)	Mid-level Course (MID)
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## Appendix E. Audience-Specific Training Schedules

### Audience 1. Design / Engineering Professionals

Designers and engineers require the most technical training in LID practices, as they have primary responsibility for designing and engineering LID facilities so that they function properly and comply with permit conditions, including meeting water quality and performance standards. Designers and engineers represent both private industry for LID installations in both private and public settings, as well as public sector professionals.

#### Priority LID Topics

Priority training topics for design/engineering professionals are identified in Table 10 below. As noted in the methodology section, these priority topics were selected based on input from both design/engineering professionals and a panel of LID training experts. Topics that were identified as high priority both by design/engineering professionals and the LID Expert Panel include permeable paving, bioretention, hydrologic modeling, and site assessment.

**Table 10. Priority Topics Identified for Design/Engineering Professionals**

Topic	Audience Priority	Project Team Priority	Overall Priority
<b>Permeable paving</b>	HIGH	HIGH	HIGH
<b>Bioretention areas</b>	HIGH	HIGH	HIGH
<b>Hydrologic modeling</b>	HIGH	HIGH	HIGH
<b>Site assessment</b>	HIGH	HIGH	HIGH
<b>Site planning/layout</b>	Medium	HIGH	HIGH
<b>Compost-amended soils</b>	Medium	HIGH	HIGH
<b>Rainwater collection systems</b>	Low	HIGH	HIGH
<b>Regulatory/code integration</b>	Medium	Medium	Medium
<b>Purpose of LID</b>	Medium	Medium	Medium
<b>Vegetated/green roofs</b>	Low	Medium	Medium
<b>LID resources</b>	HIGH	Low	Low
<b>Rain gardens</b>	Medium	Low	Low

## Level of Training

The reported knowledge of LID topics among design/engineering professionals is listed in Table 11 below. The most familiar topics include site assessment, overall understanding of the purpose of LID, and site planning and layout. Less understood topics include vegetated/green roofs and rainwater collection systems.

The training recommendations focus on those topics that are both high priority and less understood, such as permeable paving.

**Table 11. Levels of Knowledge and Training for Design/Engineering professionals**

Topic	Current Level of Knowledge	Overall Priority	Beginning Level of Training: W WA	Beginning Level of Training: EWA	Level of Training Needed
Site assessment	HIGH	HIGH	ADV	MID	ADV
Purpose of LID	HIGH	Medium	ADV	MID	MID
Site planning/layout	HIGH	HIGH	ADV	MID	ADV
Bioretention areas	HIGH	HIGH	ADV	MID	ADV
Hydrologic modeling	HIGH	HIGH	ADV	MID	ADV
LID resources	HIGH	Low	ADV	MID	INTRO
Regulatory/code integration	HIGH	Medium	ADV	MID	MID
Permeable paving	Medium	HIGH	MID	INTRO	ADV
Rain gardens	Medium	Low	MID	INTRO	INTRO
Compost-amended soils	Medium	HIGH	MID	INTRO	ADV
Rainwater collection systems	Medium	HIGH	MID	INTRO	ADV
Vegetated/green roofs	Low	Medium	INTRO	INTRO	MID

To address both the current level of understanding and the identified priorities for informed designers and engineers, trainings for this audience will:

- **Start from a more advanced level** than for other work categories, but only after providing cursory “refreshers” of introductory materials and ensuring that participants have the tools and resources they need to fill in remaining gaps in their introductory understanding; and
- **Be more intensive** than for other work categories, ensuring that the level of knowledge is sufficient to ensure advanced knowledge. This audience will receive advanced trainings in the majority of categories by Year 4.

## Training Schedule for Design/Engineering Professionals

The following training schedule (Table 12) is based on the identified priorities and needs of this audience and capacity constraints of providers. Because advanced courses are not currently offered by LID service providers, Year 1 will focus on building curriculum for trainings that will commence in Year 2.

**Table 12. Training Schedule for Design/Engineering Professionals**

Topic	Western				Eastern			
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
Permeable paving	MID	ADV			INTRO	MID	ADV	
Bioretention areas	BLD	ADV			MID	ADV		
Hydrologic modeling	ADV				MID	ADV		
Site assessment	BLD	ADV			MID	ADV		
Site planning/layout	BLD	ADV			MID	ADV		
Compost-amended soils	MID	ADV			INTRO	MID	ADV	
Rainwater collection systems	MID	ADV			INTRO	MID	ADV	
Regulatory/code integration		MID				MID		
Purpose of LID		MID				MID		
Vegetated/green roofs		INTRO	MID			INTRO	MID	
LID resources		INTRO				INTRO		
Rain gardens		INTRO				INTRO		

**Key:** Curriculum building (BLD)    Introductory Course (INTRO)    Mid-level Course (MID)    Advanced Course (ADV)

## Audience 2. Operations / Maintenance Professionals

Operations/maintenance professionals from both the public and private sectors will have primary responsibility to ensure that LID facilities are functioning properly and being properly maintained. Proper maintenance of LID facilities is critical to their performance, so these professionals need specialized training that will result in a thorough understanding of the design and engineering of LID facilities, from soil mixes and plant selection to soil compaction issues and longevity of concrete mixes in permeable pavement installations. This chapter lays out a strategy for what types and levels of training operations and maintenance personnel need in order to achieve this. This strategy is based on information gathered directly from operations/maintenance professionals in the Needs Assessment Report, as well as information from LID experts with direct experience training this audience.

### Priority LID Topics

Priority training topics for operations/maintenance professionals are identified in Table 13. As noted in the methodology section, these priority topics were selected based on input from both operations/maintenance professionals and a panel of LID training experts. Topics that were identified as high priority both by operations/maintenance professionals and the LID training expert panel include bioretention areas and LID resources.

**Table 13. Priority Topics Identified for Operations/Maintenance Professionals**

Topic	Audience Priority	Project Team Priority	Overall Priority
Regulatory/code integration	HIGH	Medium	Medium
Bioretention areas	HIGH	HIGH	HIGH
LID resources	HIGH	HIGH	HIGH
Site assessment	Medium	Low	Low
Rain gardens	Medium	HIGH	HIGH
Permeable paving	Medium	HIGH	HIGH
Compost-amended soils	Medium	HIGH	HIGH
Site planning/layout	Medium	Low	Low
Rainwater collection systems	Low	Medium	Medium
Vegetated/green roofs	Low	Medium	Medium
Hydrologic modeling	Low	Low	Low
Purpose of LID	Low	HIGH	HIGH

### Level of Training

The reported knowledge of LID topics among operations/maintenance professionals is listed in Table 14 below. The most familiar topics include overall purpose of LID, bioretention areas, and permeable paving. Less understood topics include hydrologic modeling, LID resources, and vegetated/green roofs.

**The training recommendations focus on those topics that are both high priority and less understood, such as LID resources and compost amended soils.**

The LID Expert Panel was asked to identify the level of training needed by the targeted audience and LID training topic area.

**Table 14. Levels of Knowledge and Training for Operations/Maintenance Professionals**

Topic	Current Level of Knowledge	Overall Priority	Beginning Level of Training:	Beginning Level of Training:	Level of Training Needed
			W WA	E WA	
Purpose of LID	Medium	HIGH	MID	INTRO	MID
Bioretention areas	Medium	HIGH	MID	INTRO	MID
Permeable paving	Medium	HIGH	MID	INTRO	MID
Rainwater collection systems	Medium	Medium	MID	INTRO	MID
Rain gardens	Medium	HIGH	MID	INTRO	MID
Regulatory/code integration	Medium	Medium	MID	INTRO	INTRO
Site assessment	Low	Low	INTRO	INTRO	MID
Compost-amended soils	Low	HIGH	INTRO	INTRO	MID
Site planning/layout	Low	Low	INTRO	INTRO	INTRO
Vegetated/green roofs	Low	Medium	INTRO	INTRO	MID
LID resources	Low	HIGH	INTRO	INTRO	MID
Hydrologic modeling	Low	Low	INTRO	INTRO	INTRO

**Training Schedule for Operations/Maintenance Professionals**

The following table (Table 15) shows a recommended training schedule for operations/maintenance professionals. This table is based on the identified priorities, needs, and knowledge of this audience.

**Table 15. Training Schedule for Operations/Maintenance Professionals**

Topic	Western				Eastern			
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
Compost-amended soils	INTRO	MID			INTRO	MID		
Rain gardens	MID				INTRO	MID		
Permeable paving	MID				INTRO	MID		
Purpose of LID	MID				INTRO	MID		
Bioretention areas	MID				INTRO	MID		
LID resources	INTRO	MID			INTRO	MID		
Regulatory/code integration		INTRO				INTRO		
Rainwater collection systems		MID				INTRO	MID	
Vegetated/green roofs		INTRO	MID			INTRO	MID	
Hydrologic modeling		INTRO				INTRO		
Site assessment		INTRO	MID			INTRO	MID	
Site planning/layout		INTRO				INTRO		

Key:	Introductory Course (INTRO)	Mid-level Course (MID)
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## Audience 3. Inspection / Enforcement Professionals

Inspection/enforcement professionals are employed primarily by NPDES Phase I and II cities and counties and are tasked with inspecting LID facilities to ensure that they meet design specifications, as well as enforcing the new LID requirements. Although this audience requires a less intensive level of technical training than design/engineering professionals, they need enough knowledge to know when LID facilities are complying with permit conditions. Responsible for achieving NPDES program compliance, which now will include LID requirements.

### Priority LID Topics

Priority training topics for inspection/enforcement professionals are identified in Table 16 below. As noted in the methodology section, these priority topics were selected based on input from both inspection/enforcement professionals and a panel of LID training experts. Topics that were identified as high priority both by inspection/enforcement professionals and the LID training expert panel include permeable paving, site assessment, and bioretention areas.

**Table 16. Priority Topics Identified for Inspection/Enforcement Professionals**

Topic	Audience Priority	Project Team Priority	Overall Priority
Permeable paving	Medium	HIGH	HIGH
Site assessment	Medium	HIGH	HIGH
Bioretention areas	Medium	HIGH	HIGH
Compost-amended soils	Medium	Medium	Medium
LID resources	Medium	Medium	Medium
Regulatory/code integration	Medium	Medium	Medium
Purpose of LID	Medium	Medium	Medium
Site planning/layout	Low	Medium	Medium
Rain gardens	Low	Medium	Medium
Rainwater collection systems	Low	Medium	Medium
Vegetated/green roofs	Low	Medium	Medium
Hydrologic modeling	Low	Low	Low

### Level of Training

The reported knowledge of LID topics among inspection/enforcement professionals is listed in Table 17 below. The most familiar topics include permeable paving, bioretention areas, and the overall purpose of LID. Less understood topics include hydrologic modeling and vegetated/green roofs.

**The training recommendations focus on those topics that are both high priority and less understood, such site assessment.**

**Table 17. Levels of Knowledge and Training Inspection/Enforcement Professionals**

Topic	Current Level of Knowledge	Overall Priority	Beginning Level of Training: W WA	Beginning Level of Training: E WA	Level of Training Needed
Permeable paving	Medium	HIGH	MID	INTRO	MID
Bioretention areas	Medium	HIGH	MID	INTRO	MID
Purpose of LID	Medium	Medium	MID	INTRO	MID
Regulatory/code integration	Low	Medium	INTRO	INTRO	MID
Rainwater collection systems	Low	Medium	INTRO	INTRO	MID
LID resources	Low	Medium	INTRO	INTRO	MID
Rain gardens	Low	Medium	INTRO	INTRO	MID
Site assessment	Low	HIGH	INTRO	INTRO	MID
Compost-amended soils	Low	Medium	INTRO	INTRO	MID
Site planning/layout	Low	Medium	INTRO	INTRO	MID
Vegetated/green roofs	Low	Medium	INTRO	INTRO	MID
Hydrologic modeling	Low	Low	INTRO	INTRO	INTRO

**Training Schedule for Inspection/Enforcement Professionals**

The following table (Table 18) shows a recommended training schedule for inspection/enforcement professionals. This table is based on the identified priorities, needs, and knowledge of this audience.

**Table 18. Training Schedule for Inspection/Enforcement Professionals**

Topic	Western				Eastern			
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
Permeable paving	MID				INTRO	MID		
Site assessment	INTRO	MID			INTRO	MID		
Bioretention areas	MID				INTRO	MID		
Compost-amended soils	INTRO	MID			INTRO	MID		
LID resources	INTRO	MID			INTRO	MID		
Regulatory/code integration	INTRO	MID			INTRO	MID		
Purpose of LID		MID				INTRO	MID	
Site planning/layout		INTRO	MID			INTRO	MID	
Rain gardens		INTRO	MID			INTRO	MID	
Rainwater collection systems		INTRO	MID			INTRO	MID	
Vegetated/green roofs		INTRO	MID			INTRO	MID	
Hydrologic modeling		INTRO				INTRO		

Key:	Introductory Course (INTRO)	Mid-level Course (MID)
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## Audience 4. Permitting /Planning Professionals

Permitting/planning professionals at NPDES Phase I and II cities and counties are in perhaps the most important position of any priority audience in terms of LID integration and implementation at the local government level. Planning staff has responsibility to integrate LID into existing codes and standards; permitting staff is responsible for ensuring that LID design and engineering plans meet these code requirements.

### Priority LID Topics

Priority training topics for permitting/planning professionals are shown in Table 19 below. As noted in the methodology section, these priority topics were selected based on input from both permitting/planning professionals and a panel of LID training experts. Topics that were identified as high priority both by permitting/planning professionals and the LID expert panel include site planning and layout and site assessment.

**Table 19. Priority Topics Identified for Permitting/Planning Professionals**

Topic	Audience Priority	Project Team Priority	Overall Priority
Site planning/layout	HIGH	HIGH	HIGH
Site assessment	HIGH	HIGH	HIGH
Rain gardens	Medium	HIGH	HIGH
Regulatory/code integration	Medium	HIGH	HIGH
Purpose of LID	Low	HIGH	HIGH
Permeable paving	Medium	Medium	Medium
Bioretention areas	Medium	Medium	Medium
LID resources	Medium	Medium	Medium
Hydrologic modeling	Medium	Medium	Medium
Compost-amended soils	Low	Medium	Medium
Vegetated/green roofs	Low	Medium	Medium
Rainwater collection systems	Low	Medium	Medium

### Level of Training

The reported knowledge of LID topics among permitting/planning professionals is shown in Table 20. The most familiar topics include the purpose of LID, regulator/current issues related to LID, and bioretention areas. Less understood topics include hydrologic modeling and vegetated/green roofs.

**The training recommendations focus on those topics that are both high priority and less understood, such as site planning and layout.**

**Table 20. Levels of Knowledge and Training for Permitting/Planning Professionals**

Topic	Current Level of Knowledge	Overall Priority	Beginning Level of Training: W WA	Beginning Level of Training: E WA	Level of Training Needed
Purpose of LID	Medium	HIGH	MID	INTRO	MID
Regulatory/code integration	Medium	HIGH	MID	INTRO	MID
Bioretention areas	Medium	Medium	MID	INTRO	MID
Rain gardens	Medium	HIGH	MID	INTRO	MID
LID resources	Medium	Medium	MID	INTRO	MID
Permeable paving	Medium	Medium	MID	INTRO	MID
Site assessment	Medium	HIGH	MID	INTRO	MID
Site planning/layout	Low	HIGH	INTRO	INTRO	MID
Compost-amended soils	Low	Medium	INTRO	INTRO	MID
Rainwater collection systems	Low	Medium	INTRO	INTRO	MID
Hydrologic modeling	Low	Medium	INTRO	INTRO	MID
Vegetated/green roofs	Low	Medium	INTRO	INTRO	MID

**Training Schedule for Permitting/Planning Professionals**

The following table (Table 21) shows a recommended training schedule for permitting/planning professionals. This table is based on the identified priorities, needs, and knowledge of this audience.

**Table 21. Training Schedule for Permitting/Planning Professionals**

Topic	Western				Eastern			
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
Site planning/layout	MID				INTRO	MID		
Site assessment	MID				INTRO	MID		
Rain gardens	MID				INTRO	MID		
Regulatory/code integration	MID				INTRO	MID		
Purpose of LID	MID				INTRO	MID		
Permeable paving	MID				INTRO	MID		
Bioretention areas		MID				INTRO	MID	
LID resources		INTRO	MID			INTRO	MID	
Hydrologic modeling		INTRO	MID			INTRO	MID	
Compost-amended soils		INTRO	MID			INTRO	MID	
Vegetated/green roofs		INTRO	MID			INTRO	MID	
Rainwater collection systems		INTRO	MID			INTRO	MID	

Key:	Introductory Course (INTRO)	Mid-level Course (MID)
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## Audience 5. Construction / Land Development Professionals

The construction/land development professionals includes a broad category of people, from construction workers laying permeable pavements to land developers, general contractors, project managers who oversee civil projects, remodeling experts and landscaping professionals. Together, this work category reflects those individuals who need the most hands-on training with LID practices and techniques since they are the ones physically installing them. Because this audience was underrepresented in the Needs Assessment survey, information contained in this section is a reflection of the Project Team’s own knowledge coupled with interviews with high level representatives from LID training courses who interact frequently with this audience, as well as high-level representatives from the Building Industry Association of Washington (BIAW).

Training for this audience should be held in the off-season, winter specifically (per multiple requests by construction industry professionals attending WSU-Puyallup trainings).

**Note:** the tables below reflect current best thinking of the Project Team as no data for this audience exists from the Needs Assessment survey.

### Priority LID Topics

Priority training topics for construction/land development professionals are identified in Table 22. As noted in the methodology section, this audience is unique in that the Project Team selected the priority topics. The “overall priority” column incorporates input from a panel of LID training experts and leaders in the building industry. The below table does not include information on audience priority due to insufficient response rates from this audience.

**Table 22. Priority Topics Identified for Construction/Land Development Professionals**

Topic	Project Team Priority	Overall Priority
Bioretention areas	HIGH	HIGH
Permeable paving	HIGH	HIGH
Compost-amended soils	HIGH	HIGH
Site planning/layout	HIGH	HIGH
Regulatory/code integration	Low	Medium
LID resources	Low	Medium
Site assessment	Medium	Medium
Purpose of LID	Medium	Medium
Rain gardens	HIGH	Low
Rainwater collection systems	Low	Low
Vegetated/green roofs	Low	Low
Hydrologic modeling	Low	Low

## Level of Training

Data about the current level of knowledge of construction/land development professionals was not identified in the Needs Assessment. Current level of knowledge, shown in Table 23 below, was informed by input from the LID Expert Panel and key informants in the building industry.<sup>10</sup> The most familiar topic identified for this audience is compost-amended soils, and other topics were identified as relatively unfamiliar to construction/land development professionals.

**The training recommendations focus on those topics that are both high priority and less understood, such as site planning and layout, bioretention areas, and permeable paving.**

**Table 23. Levels of Knowledge and Training for Construction/Land Development Professionals**

Topic	Current Level of Knowledge	Overall Priority	Level of Training: W WA	Level of Training: E WA	Level of Training Needed
Compost-amended soils	Medium	HIGH	MID	INTRO	MID
Site assessment	Low	Medium	INTRO	INTRO	MID
Purpose of LID	Low	Medium	INTRO	INTRO	MID
Site planning/layout	Low	HIGH	INTRO	INTRO	MID
Bioretention areas	Low	HIGH	INTRO	INTRO	MID
Hydrologic modeling	Low	Low	INTRO	INTRO	INTRO
LID resources	Low	Medium	INTRO	INTRO	INTRO
Regulatory/code integration	Low	Medium	INTRO	INTRO	INTRO
Permeable paving	Low	HIGH	INTRO	INTRO	MID
Rain gardens	Low	Low	INTRO	INTRO	MID
Rainwater collection systems	Low	Low	INTRO	INTRO	INTRO
Vegetated/green roofs	Low	Low	INTRO	INTRO	INTRO

<sup>10</sup> Table 23 does not include Introductory Knowledge data due to lack of data from the Needs Assessment Report.

### Training Schedule for Construction/Land Development Professionals

The following table (Table 24) shows a recommended training schedule for construction/land development professionals. This table is based on the identified priorities, needs, and knowledge of this audience.

**Table 24. Training Schedule for Construction/Land Development Professionals**

Topic	Western				Eastern			
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
Bioretention areas	INTRO	MID			INTRO	MID		
Permeable paving	INTRO	MID			INTRO	MID		
Compost-amended soils	MID				INTRO	MID		
Site planning/layout	INTRO	MID			INTRO	MID		
Regulatory/code integration	INTRO				INTRO			
LID resources	INTRO				INTRO			
Site assessment		INTRO	MID			INTRO	MID	
Purpose of LID		INTRO	MID			INTRO	MID	
Rain gardens		INTRO	MID			INTRO	MID	
Rainwater collection systems		INTRO				INTRO		
Vegetated/green roofs		INTRO				INTRO		
Hydrologic modeling		INTRO				INTRO		
Key:	Introductory Course (INTRO)	Mid-level Course (MID)						

## Audience 6. Elected Officials / Managers / Public Works Professionals

This audience is comprised of two distinct but related sub-audiences: Elected officials from NPDES Phase I and II cities and counties throughout Washington State, and high-level personnel from those jurisdictions such as Public Works Department Managers, Stormwater Managers, and others in managerial positions. Together, these sub-audiences are in the driver’s seat at the local level in terms of adoption and implementation of new LID requirements, and as such are a high priority for targeted training.

### Priority LID Topics

Priority training topics for elected officials/managers/public works professionals are identified in Table 25 below. As noted in the methodology section, these priority topics were selected based on input from both city officials and a panel of LID training experts. Topics that were identified as high priority both by elected officials and a panel of LID training experts include regulatory/code integration related to LID.

**Table 25. Priority Topics Identified for Elected Officials/Managers/Public Works Professionals**

Topic	Audience Priority	Project Team Priority	Overall Priority
Regulatory/code integration	HIGH	HIGH	HIGH
Purpose of LID	Medium	HIGH	HIGH
Rain gardens	Low	Medium	Medium
Permeable paving	Medium	Low	Low
Bioretention areas	Medium	Low	Low
Site planning/layout	Medium	Low	Low
LID resources	Medium	Low	Low
Site assessment	Medium	Low	Low
Rainwater collection systems	Low	Low	Low
Hydrologic modeling	Low	Low	Low
Compost-amended soils	Low	Low	Low
Vegetated/green roofs	Low	Low	Low

**Level of Training**

The reported knowledge of LID topics among elected officials/managers/public works professionals is listed in Table 26 below. The most familiar topics include regulatory/code integration related to LID and an overall understanding of the purpose of LID. Less understood topics include bioretention areas and vegetated/green roofs.

The training recommendations focus on those topics that are both high priority and less understood, such as rain gardens.

**Table 26. Levels of Knowledge and Training for Elected Officials/Managers/Public Works Professionals**

Topics	Current Level of Knowledge	Overall Priority	Beginning Level of Training: W WA	Beginning Level of Training: E WA	Level of Training Needed
Regulatory/code integration	Medium	HIGH	MID	INTRO	INTRO
Purpose of LID	Medium	HIGH	MID	INTRO	INTRO
Site planning/layout	Low	Low	INTRO	INTRO	INTRO
Rain gardens	Low	Medium	INTRO	INTRO	MID
Site assessment	Low	Low	INTRO	INTRO	
LID resources	Low	Low	INTRO	INTRO	INTRO
Permeable paving	Low	Low	INTRO	INTRO	INTRO
Compost-amended soils	Low	Low	INTRO	INTRO	INTRO
Hydrologic modeling	Low	Low	INTRO	INTRO	
Rainwater collection systems	Low	Low	INTRO	INTRO	INTRO
Bioretention areas	Low	Low	INTRO	INTRO	INTRO
Vegetated/green roofs	Low	Low	INTRO	INTRO	INTRO

To address both the current level of understanding and the identified needs for elected officials/managers/public works professionals, trainings for this audience will:

- **Stay generally high-level for technical topics.** This audience should be well-informed regarding LID techniques and practices, but it will not be necessary for them to receive skill-driven, advanced trainings on technical topics such as hydrologic modeling and mixing compost-amended soils.
- **Focus more on policy implementation** than other work categories, but only after providing cursory introductory materials and ensuring that participants have the tools and resources they need to fill in remaining gaps in their initial understanding.

### Training Schedule for Elected Officials/Managers/Public Works Professionals

The following table (Table 27) shows a recommended training schedule for elected officials/managers/public works professionals. This table is based on the identified priorities, needs, and knowledge of this audience.

**Table 27. Training Schedule for Elected Officials/Managers/Public Works Professionals**

Topic	Western				Eastern			
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
<b>Regulatory/code integration</b>	INTRO				INTRO			
<b>Purpose of LID</b>	INTRO				INTRO			
<b>Rain gardens</b>	INTRO	MID			INTRO	MID		
<b>Permeable paving</b>	INTRO				INTRO			
<b>Bioretention areas</b>	INTRO				INTRO			
<b>Site planning/layout</b>	INTRO				INTRO			
<b>LID resources</b>		INTRO				INTRO		
<b>Site assessment</b>								
<b>Rainwater collection systems</b>		INTRO				INTRO		
<b>Hydrologic modeling</b>								
<b>Compost-amended soils</b>		INTRO				INTRO		
<b>Vegetated/green roofs</b>		INTRO				INTRO		
<b>Key:</b>	Introductory Course (INTRO)	Mid-level Course (MID)						

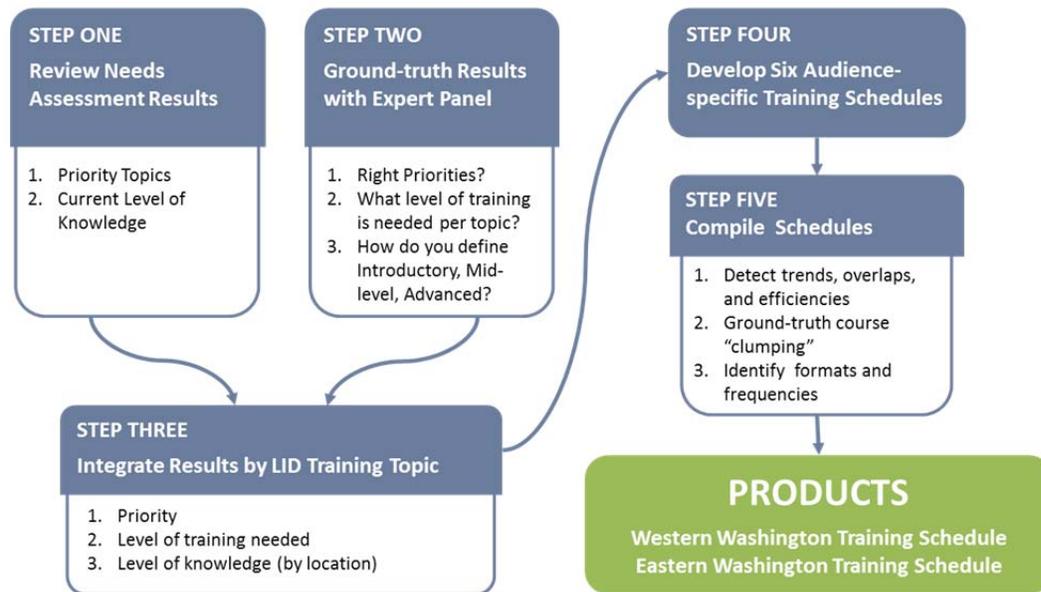
# Appendix F. Guide to Western and Eastern Washington Training Schedules

## Introduction

The audience-specific training schedules were created and served as guides for the development of the Western and Eastern Washington training schedules, ensuring schedules address all audience needs.

Each of the two schedules addresses training needs for the six priority audiences discussed previously. The schedules utilize the six audience-specific schedules compiled to identify trends and similarities across topics and audiences. Efficiencies are identified by “clumping” LID training topics and audiences together. The LID Expert Panel ground-truthed these groupings to ensure that they made sense. See Figure 6 below for a graphical description of each of the steps that were taken to develop the Western and Eastern Washington training schedules.

Figure 6. Process for Developing Western and Eastern Washington Training Schedules



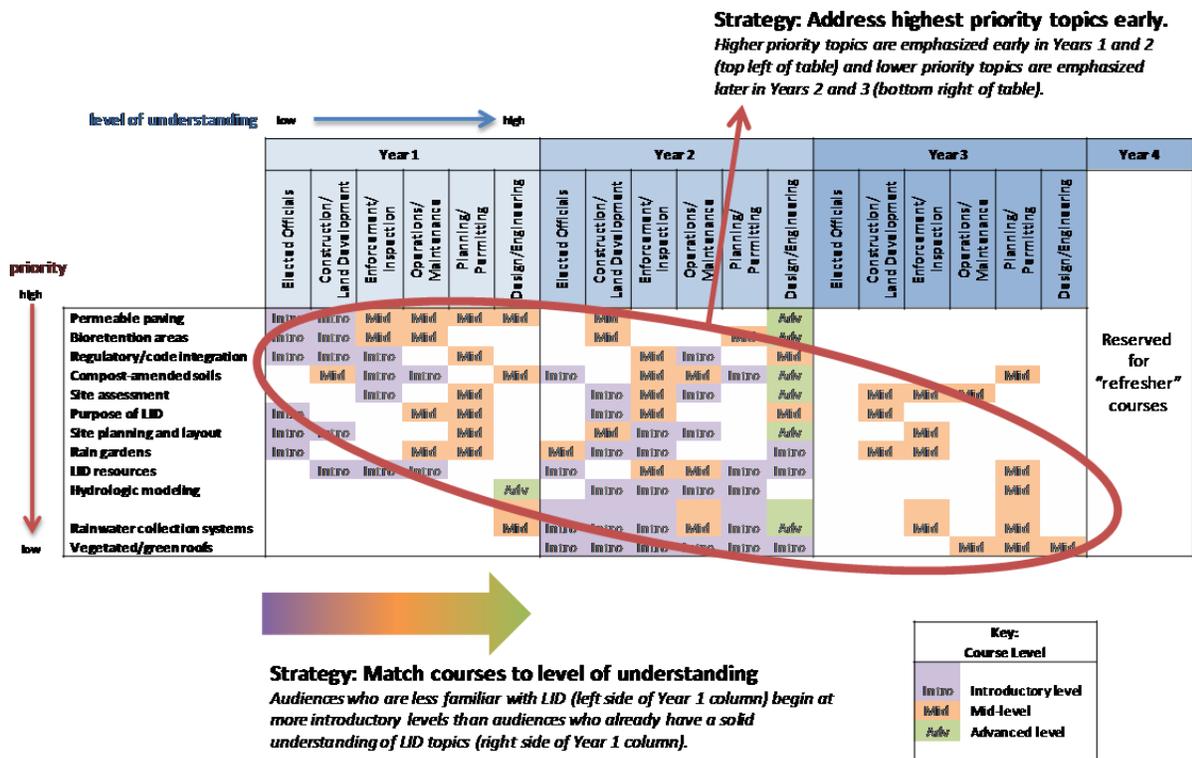
## Trends and Efficiencies

As shown above, the six audience-specific training schedules were compiled and summarized by year and topic into one summary table (see Table 28 below). The summary table shows the topics, levels, and audiences for each year, over four years. **Note that this summary table DOES NOT represent the final Western and Eastern Washington training schedules.** It was simply used as a guide to inform the development of the training schedules. From this summary table, one can quickly identify two of the overarching guiding strategies that were used:

- Strategy 1: Address highest priority topics early.** Topics that were deemed high priority, such as permeable paving and bioretention areas, are more heavily concentrated earlier in the program (Year 1), while lower priority topics, such as green roofs and rainwater collection systems, are reserved for later years. The red circle in Table 28 demonstrates this temporal prioritization of topics.
- Strategy 2: Match course levels to knowledge.** Audiences who were already familiar with various LID topics begin at more advanced levels. Permitting/planning and design/engineering professionals, for example, begin courses at mid or advanced levels, while elected officials/managers/public works professionals will receive largely introductory-level trainings. You can see this trend in the summary table, as the colors flow from purple (Introductory) to orange (Mid-level) to green (Advanced) in Year 1 with the audiences' increased knowledge of LID topics.

Table 28 below compiles the six audience-specific schedules to assess trends and overlaps in training needs among years, topics, and audiences. The table identifies appropriate courses for audiences across years. Audiences are ordered by their identified level of understanding. Topics, listed across rows, are ordered by their identified overall priority across all audiences. The table highlights the highest priority topics early in the training program and matches course levels to the audiences' levels of understanding. Note that although the training schedules for Western and Eastern Washington will span four years, this summary table only includes three years of trainings. This issue is addressed using repetition of trainings.

**Table 28. Summary Table of Audience-Specific Schedules**



The above compiled summary table identifies where efficiencies can be achieved in the training schedules (i.e., where training needs are similar between audiences). By visually assessing trends in topics and course levels across and within years and audiences, the following key observations were identified and used to inform the development of the Western and Eastern Washington training schedules. These trends are identified with colored boxes below. These colored boxes correspond to those used in Table 29.

**Elected officials/managers/public works professionals will need introductory-level briefings.**

While many audiences identified one-three topics with which they were familiar, elected officials/managers/public works professionals expressed unfamiliarity with most LID topics. Furthermore, this group will not require advanced trainings as compared to other audiences. This group is unique in their across-the-board need for introductory-level—and not mid or advanced level—trainings, as demonstrated by the abundance of “Intro” courses in the “Elected Officials” columns of Year 1 and Year 2 in Table 29. Given this uniqueness, the needs of this audience may be best addressed through a customized, multi-topic, intro-level briefing course that covers priority topics in Year 1 and lower-priority topics in Year 2.

**Construction/land development professionals need introductory and mid-level trainings on many topics.** Construction/land development professionals will begin the training program with a limited knowledge of LID topics. Trainings in Year 1 for this group therefore parallel that for elected officials/managers/public works professionals: introductory-level courses on high-priority topics. This group will ultimately require mid-level trainings. This requirement is indicated by the abundance of mid-level trainings in Years 2 and 3 (see Table 29).

**Operations/maintenance and inspection/enforcement professionals share similar training requirements.** Both of these groups demonstrated similar training needs: a mix of introductory and mid-level trainings in Years 1 and 2 on a variety of topics. These groups will begin trainings at more advanced levels than elected officials/managers/public works and construction/land development professionals, and will require mid-level trainings on more topics. In Year 1, both audiences could benefit from an introductory training on regulatory/code integration, mid-level training on the overall understanding of purpose of LID, introductory training on site assessment, introductory training on LID resources, and an introductory and mid-level training on rain gardens. In Year 2, both audiences could benefit from mid-level trainings on site assessment, the overall understanding of purpose of LID, and rain gardens.

**Permitting/planning professionals will need mid-level trainings, as will design/engineering professionals on select topics.** Because the permitting/planning and design/engineering professionals demonstrated a deeper familiarity with priority LID topics than operations/maintenance and inspection/enforcement professionals, this group would benefit from a training that focuses on mid-level, as opposed to mixed intro/mid-level, trainings in Year 1 and 2. The trainings in Year 1 could focus on the top priority topics for this audience, which include regulatory/code integration related to LID, overall understanding of purpose of LID, site assessment, rain gardens, and site planning/layout. The trainings in Year 2 could focus on lower priority topics, such as hydrologic modeling, rainwater collection systems, and vegetated/green roofs.

**Design/engineering professionals will need more advanced trainings.** Design/engineering professionals have a deeper familiarity with LID topics and will need more advanced level trainings than

other audiences. This is shown in Table 29, in which designer/engineering professionals are shown to not require introductory courses (“Intro”) but will require mid- and advanced level courses (“Mid” and “Adv”) in Years 1 to 3. A series of advanced level training courses developed solely for design/engineering professionals should be developed to address the unique, more advanced needs of this audience.

**□ Audience training needs in Year 1 focus on introductory and/or mid-level training on high priority topics.** Permeable paving and bioretention areas were identified as the two highest priority topics across audiences. All audiences—with the exception of elected officials/managers/public works and construction/land development professionals—also indicated at least introductory level knowledge of these two topics. A mid-level training on these two topics in Year 1 could efficiently address these needs. Most audiences also require introductory-level or mid-level training on compost amended soils, regulatory/code integration related to LID, overall understanding of purpose of LID, site planning/layout, rain gardens, and LID resources in Year 1. Permitting/planning professionals and design/engineering professionals tend to require more mid-level training on these topics, inspection/enforcement and operations/maintenance professionals tend to require both introductory and mid-level training on these topics, and elected officials/managers/public works professionals and construction/land development professionals tend to require introductory trainings on these topics. Introductory-level and/or mid-level trainings on these topics in Year 1 would efficiently meet these training needs.

**□ All-audience training needs in Year 2 focus on lower-priority topics.** Most audiences will need introductory-level training on lower priority topics in Year 2. These topics include site planning/layout, hydrologic modeling, rainwater collection systems, and vegetated/green roofs. Many of these audiences—especially permitting/planning professionals—will require mid-level training on some or all of these lower priority topics by Year 3.

Table 29 identifies trends and overlaps among audiences and topics. These trends and overlaps were used to identify opportunities for efficiencies in the development of the Western and Eastern Washington training schedules. For example, audiences and topics were identified that could be “clumped” into one joint training course, such as operations/maintenance and inspection/enforcement professionals. Note that although the training schedules will span four years, this summary table only includes three years of trainings. This issue is addressed using repetition of trainings.

**Table 29. Summary Table Identifying Trends and Overlaps among Audiences and Topics**

		Year 1						Year 2						Year 3						Year 4									
		Elected Officials	Construction/ Land Development	Enforcement/ Inspection	Operations/ Maintenance	Planning/ Permitting	Design/Engineering	Elected Officials	Construction/ Land Development	Enforcement/ Inspection	Operations/ Maintenance	Planning/ Permitting	Design/Engineering	Elected Officials	Construction/ Land Development	Enforcement/ Inspection	Operations/ Maintenance	Planning/ Permitting	Design/Engineering	Reserved for “refresher” courses									
<p>level of understanding</p> <p>low → high</p> <p>priority</p> <p>high ↓ low</p>	<table border="1"> <tr><th colspan="2">Course Level</th></tr> <tr><td>Intro</td><td>Introductory level</td></tr> <tr><td>Mid</td><td>Mid-level</td></tr> <tr><td>Adv</td><td>Advanced level</td></tr> </table>	Course Level		Intro	Introductory level	Mid	Mid-level	Adv	Advanced level	Intro	Intro	Mid	Mid	Mid	Mid	Mid	Mid	Intro	Mid	Mid	Adv								
	Course Level																												
	Intro	Introductory level																											
	Mid	Mid-level																											
	Adv	Advanced level																											
	Permeable paving	Intro	Intro	Mid	Mid	Mid	Mid	Mid	Mid	Intro	Mid	Mid	Adv																
	Bioretention areas	Intro	Intro	Mid	Mid							Mid	Adv																
	Regulatory/code integration	Intro	Intro		Intro	Mid				Intro	Mid		Mid																
	Compost-amended soils		Mid	Intro	Intro		Mid	Intro		Mid	Mid	Intro	Adv						Mid										
	Site assessment				Intro	Mid			Intro	Intro	Mid		Adv			Mid													
	Purpose of LID	Intro		Mid		Mid			Intro	Intro	Mid		Mid																
	Site planning and layout	Intro	Intro			Mid			Mid	Intro	Intro		Adv																
	Rain gardens	Intro		Mid		Mid			Mid	Intro		Intro		Intro		Mid													
LID resources		Intro	Intro	Intro			Intro		Mid	Mid	Intro	Intro							Mid										
Hydrologic modeling						Adv		Intro	Intro	Intro	Intro	Intro							Mid										
Rainwater collection systems						Mid	Intro	Intro	Mid	Intro	Intro	Adv							Mid										
Vegetated/greenroofs							Intro	Intro	Intro	Intro	Intro	Intro			Mid				Mid										

**Trends and Overlaps:**

- All-audience training needs in Year 1 include mid-level trainings on permeable paving and bioretention areas.
- All-audience training needs in Year 2 focus on lower-priority topics.
- Elected officials/manager/public works will only need introductory-level briefings.
- Construction/land development will need introductory-level trainings that progress to mid-level.
- Permitting/planning will need mid-level trainings, and so will design/engineering on some topics.
- Operations/maintenance and inspection/enforcement share similar training requirements.
- Design/engineering will need more advanced trainings.

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## LID Expert Panel Review

The LID Expert Panel discussed the trends and efficiencies identified above and agreed on appropriate course combinations, or “clumps.” In doing this, the LID Expert Panel sought to balance audience needs with resource capacities by identifying course clumps that met the distinct course content and level training needs of the various audiences while also allowing for a realistic number and length of trainings.

The Expert Panel concluded that introductory and mid-level LID trainings could be “clumped”, meaning that multiple topics could be combined across one-two day training programs. The training plan therefore clumps topics together for introductory and mid-level courses. Clumping of these identified trainings with existing trainings such as Certified Erosion and Sediment Control Lead (CESCL) Training (Department of Ecology or Growth Management Act (GMA) Short Course on Local Planning (Department of Commerce) are addressed in the work plan sections of the Training Plan.

For advanced classes, the LID Expert Panel agreed that a more intensive focus on a single technical LID topic over two or more days was most appropriate. However, to be efficient, these classes will still need to have additional topics blended in with them. Advanced topics that the Expert Panel decided could be clumped into a two-day training include the following:

- Bioretention areas and site assessment
- Permeable paving and site assessment
- Hydrologic modeling
- Site assessment and site planning/layout
- Rainwater collection systems and vegetated/green roofs
- LID resources

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## Additional Strategies

With the course and level synthesized and assessed across audiences, the following strategies were used to further define the training courses and delivery formats for the Western and Eastern Washington training schedules:

- **Make sure high-priority topics are covered for all audiences by Year 2.** The training schedules aimed to cover all high-priority topics to the introductory-level or higher by Year 2 to ensure that individual audience priorities are adequately addressed in a timely manner.
- **Match audience-specific schedules where appropriate and possible.** Also to ensure that individual audience priorities are adequately addressed in a timely manner, the schedules aimed to match audiences-specific schedules within a one-year margin.
- **Take advantage of existing courses.** In Year 1, while many providers are building capacity, the training schedule allows for audiences to take advantage of existing available courses. This is especially important in Eastern Washington, where capacity building will be significant.

- **Develop online introductory and mid-level courses on all topics** to 1) train Eastern Washington audiences while training capacity is low; and 2) to allow ample time for Eastern Washington providers to build capacity, minimize program costs, and make the trainings more accessible. The training schedules call for online modules to be provided for all introductory and mid-level courses. These online modules will be available to both Western and Eastern Washington audiences.
- **Offer in-person (not online) technical/advanced courses.** Because highly technical concepts are likely best taught in-person, all advanced courses in the Western and Eastern Washington training schedules should be taught in-person. Topics are introduced sequentially by priority and identified clumping.
- **Offer intro/mid-level courses throughout four-year period.** To make sure everyone has the core knowledge needed to comply with the new LID requirements (especially elected officials who may have high turnover due to election cycles), the Western and Eastern Washington training schedule offers introductory and mid-level “refresher” courses throughout the four-year period.

# Appendix G. Current Service Providers of LID Training in Washington

**Table 30. Current Service Providers of LID Training in Washington**

Entity name	Entity location	Region of service	Audiences trained (see key)	Topics covered (see key)	Level of training offered
<b>Adopt A Stream Foundation</b>	Everett	?	A, E, G, H	A, C, E, H	I
<b>Associated Earth Sciences, Inc.</b>	Kirkland	Puget Sound	B	A, B, C, G, H, J	I, II
<b>Clear Creek Solutions</b>	Olympia	W WA	A, B, C, D	B, C, D, E, J	I, II, III
<b>Ecology</b> (AHBL; Cascadia/Veda)	Olympia	WA State	E	A	I, II, III
<b>Ecology</b> (Cascadia/Herrera)	Olympia	WA State	A (landscape professionals)	?	I, II, III
<b>Ecology</b> (WA Stormwater Center)	Olympia	E WA	?	I (E WA LID Technical Guidance Manual)	I, II, III
<b>Ecology</b>	Olympia	W WA	A-H	I (SWMMWW)	II, III
<b>Ecology</b>	Olympia	WA State	?	J	I, II, III
<b>Ecology</b> (Herrera/Cascadia)	Olympia	WA State	A (composters)	K	I, II, III
<b>Ecology</b> (BIAW/O'Brien & Co)	Olympia	WA State	A		I, II, III
<b>ECOSS</b>	Seattle	W WA	B, C, D, E, F, H	A-H; K, L	I, II, III
<b>Edmonds Community College</b>	Edmonds	Puget Sound	A, B, F	A-L	I, III
<b>O'Brien &amp; Company</b>	Seattle	WA State	A-G	A	
<b>San Juan Islands Conservation District</b>	San Juan Island	Puget Sound	A, B, E-H	A-K	I, II
<b>Sustainable Connections</b>	Bellingham	Puget Sound	A-C, E-G	A	I, II
<b>UW GSI Certificate program</b>	Seattle	W WA	A-D, F	A-L	II, III
<b>WSU GSI Puyallup</b>	Puyallup	WA State	A-F	A-L	II, III

### Key to Audiences

- A.** Construction/land development
- B.** Design/engineering
- C.** Permitting/planning
- D.** Inspection/enforcement
- E.** Elected officials/managers
- F.** Operations/maintenance
- G.** Realtors
- H.** Citizens

### Key to Level of Training Offered

- I.** Introductory
- II.** Mid-level
- III.** Advanced

### Key to Topics

- A.** Overall understanding of purpose of LID
- B.** Bioretention areas
- C.** Rain gardens
- D.** Permeable paving
- E.** Vegetated/green roofs
- F.** Rainwater collection systems
- G.** Site assessment
- H.** Site planning/layout
- I.** LID resources
- J.** Hydrologic modeling
- K.** Compost-amended soils
- L.** Regulatory/code integration

## Appendix H. Professional Associations

Table 31. Professional Associations

Entity name	Entity location	Region of service	Audiences trained (see key)	Topics covered (see key)	Contact
American Association of Code Enforcement (AACE)	Tow, Texas	National	D		<a href="mailto:info@ace1.org">info@ace1.org</a> 830.613.4257
American Concrete Pavement Association	Olympia, WA		A	D	360.539.7804
American Construction Inspectors Association	Pasadena, CA		D		626.797.2242
American Planning Association of Washington (APA)	Seattle, WA		C		<a href="mailto:office@washington-apa.org">office@washington-apa.org</a> 206.682.7436
American Public Works Association Washington State Chapter			A, B, C, D, F		<a href="http://apwa-wa.org/default.aspx">http://apwa-wa.org/default.aspx</a>
American Road and Transportation Builders Association (ARTBA)	Washington, D.C.		A		general@artba.org 202.289.4434
American Society of Civil Engineers	Reston, VA	National	B		703.295.6055
American Society for Engineering Education (ASEE)	Washington, D.C.	National	B		<a href="mailto:outreach@asee.org">outreach@asee.org</a> 202.331.3552
Associated General Contractors of Washington	Seattle, WA		A	B, D, E	
Building Industry Association of Washington	Olympia, WA	Washington State	A	A – L	
Central Washington Home Builders Association		Yakima, Klickitat, Kittitas Counties	A		509.454.4008
Master Builders Association of Pierce County	Tacoma, WA		A		253.272.2112
National Association of Flood and Stormwater Management Agencies	Washington, D.C.				<a href="mailto:info@nafsma.org">info@nafsma.org</a> 202.289.8625
National Ready Mix Association	Silver Springs, MD		A	D	240.485.1139
National Society of Professional Engineers	Alexandria, VA		B		703.684.2800
Spokane Home Builders Association	Spokane, WA		A		509.532.4990
Washington Aggregates and Concrete Association	Des Moines, IA		A	D	
Washington Asphalt Pavement Association	Olympia, WA		A	D	360.539.7804
Washington Association of Landscape Professionals	Edmonds, WA		A		
Washington Association of Maintenance and Operations Administrators (WAMOA)	Yakima, WA		F		<a href="mailto:office@wamoa.org">office@wamoa.org</a> 509.697.4262
Washington Construction Owners and Executives Association	Alexandria, VA		A		<a href="mailto:info@wcoesa.org">info@wcoesa.org</a> 800.788.3548

Entity name	Entity location	Region of service	Audiences trained (see key)	Topics covered (see key)	Contact
Washington Organic Recycling Council	Pasco, WA		A – H	K	360.556.3926
Washington Realtors	Olympia, WA		G	A	800.562.6024

### Key to Audiences

- A. Construction/land development
- B. Design/engineering
- C. Permitting/planning
- D. Inspection/enforcement
- E. Elected officials/managers/public works
- F. Operations/maintenance
- G. Realtors
- H. Citizens

### Key to Topics

- A. Overall understanding of purpose of LID
- B. Bioretention
- C. Rain gardens
- D. Permeable paving
- E. Vegetated/green roofs
- F. Rainwater collection systems
- G. Site assessment
- H. Site planning/layout
- I. LID resources
- J. Hydrologic modeling
- K. Compost-amended soils
- L. Regulatory/code integration

## Appendix I. LID Topic Experts

Note: This is not a comprehensive list of LID topic experts in Washington State.

**Table 32. LID Topic Experts**

LID Training Topic (from survey)		Name of Topic Expert
A	Overall understanding of purpose of LID	Curtis Hinman Hilary Wilkinson, Veda Environmental Gretchen Muller, Cascadia Consulting Group
B	Bioretention	Curtis Hinman, WSU David McDonald, SPU (soil management)
C	Rain gardens	Curtis Hinman, WSU
D	Permeable paving	Curtis Hinman, WSU Lolly Kunkler, SvR (design and siting considerations) Matt Miller, AES (design and siting considerations) Mark Palmer, City of Puyallup (permeable asphalt) Andy Marks, Puget Sound Concrete Specification Council (permeable concrete) Rick Crooks, Mutual Materials (permeable pavers) Kathy Gwilym, SvR (inspection and verification) Michael Bledsoe, Pervious Concrete Inc. (pervious concrete installation ) Keith Mulich, Miles Sand and Gravel (pervious concrete mix design)
E	Vegetated/green roofs	Michael Broili, Living Systems Design Brian Taylor, AMEC
F	Rainwater collection systems	Kathryn Thomason, Contech Engineered Solutions
G	Site assessment	Maria Cahill, Green Girl Land Development Solutions Dennis O'Connor, Habitat Concepts
H	Site planning/layout	Catherine Benotto, Weber Thompson Wayne Carlon, AHBL Tom Campbell, Clearwater Commons Paul Thompson, Arborea Consultants (tree management)
I	LID resources	Hilary Wilkinson, Veda Environmental Gretchen Muller, Cascadia Consulting Group
J	Hydrologic modeling	Alice Lancaster, Herrera Robin Kirschbaum, HDR
K	Compost-amended soils	David McDonald, Seattle Public Utilities
L	Regulatory/code integration related to LID	Wayne Carlson, AHBL Washington Stormwater Center Hilary Wilkinson, Veda Environmental Gretchen Muller, Cascadia Consulting Group
<b>Other LID Training Topics</b>		
	Operations/maintenance	Drena Donofrio, Seattle Public Utilities
	Soil management	David McDonald, Seattle Public Utilities
	Tree management	Paul Thompson, Arborea Consultants