



Washington State Low Impact Development Training: Statewide Needs Assessment

Final Report

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TABLE OF CONTENTS

TABLE OF CONTENTS 2

LIST OF ACRONYMS 3

EXECUTIVE SUMMARY 4

Overview 4

Summary of Gaps and Needs for LID Training 5

Next Steps and Issues in Developing LID Training Plan 9

Conclusion 10

I. INTRODUCTION 11

II. METHODOLOGY 13

Statewide LID Training Needs Assessment Survey 13

Current and Potential LID Service Provider Survey 14

III. RESULTS / ANALYSIS 15

Part One: Statewide LID Training Needs Assessment Survey 15

Key findings 15

Survey Results: All Responders 17

Geographic Analysis (Eastern vs. Western WA) 29

Category of Work 31

By Types of Permitted Jurisdiction: Phase I, Phase II Western Washington, Phase II Eastern Washington 35

Part Two: Gap Analysis 38

Audiences for LID Training 38

Topics Addressed / Level of Training Needed 38

Potential to Increase Training Capacity 41

Assistance and Resources Needed 41

Preferences Regarding Training Format, Length, and Travel Distance 42

IV. SUMMARY / NEXT STEPS / RECOMMENDATIONS / CONCLUSION 45

Summary 45

Next Steps and Issues in Developing LID Training Plan 46

Recommendations for Advancing LID in Washington 48

Conclusion 48

APPENDICES 49

LIST OF ACRONYMS

BMP	Best management practice
EW	Eastern Washington (in tables and figures)
GSI	Green Stormwater Infrastructure
LID	Low Impact Development
NPDES	National Pollutant Discharge Elimination System
SESRC	Social and Economic Sciences Research Center
SWMMWW	Stormwater Management Manual for Western Washington
WSDOT	Washington State Department of Transportation
WSU	Washington State University
WW	Western Washington (in tables and figures)
WWHM	Western Washington Hydrology Model

Washington State Low Impact Development Training: Statewide Needs Assessment (Needs Assessment or Report)

Executive Summary

A comprehensive summary designed to provide the general reader with an understanding of the survey results, gaps in LID training throughout the state, and recommendations and next steps.

Section 1: Introduction

This section provides background and context information and explains how the Needs Assessment will be used to develop a statewide LID Training Plan.

Section 2: Methodology

This section explains how the Needs Assessment was compiled, including detailed information about the methodology for conducting two statewide surveys that form the foundation of the Report.

Section 3: Results and Analysis

This section provides details on the results and key findings of the two surveys and analysis and interpretation of those results.

Section 4: Appendices

The appendices contain the individual survey questions and tabular results.



EXECUTIVE SUMMARY

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 (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 and received 388 responses. The second survey, entitled *Current and Potential LID Service Provider 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). Key findings for the Statewide LID Training Needs Assessment Survey are included in Section 3. Key findings for the Current and Potential LID Service Providers Survey are included in Appendix C.

This Needs Assessment Report is a preliminary step towards developing the 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 real estate professionals. Additionally, three existing grants funded through Ecology were augmented to add one-time training elements to the grantees' existing work plan: LID Operations and Maintenance; Western Washington Hydrology Manual (WWHM); 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: "Gap Analysis".

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/land use/development codes (planning/permitting)
- Construction/land development/building /remodeling/landscaping (construction/land development)
- Elected officials/managers/public works directors/other jurisdiction-wide program managers (elected officials/managers)

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 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/current issues, 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.¹

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

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 Training Plan, a chief focus will be on providing trainings on high priority topics that educate stormwater permit holders 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 next section). 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.

¹ It should be noted that in addition to this Needs Assessment and the LID 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, LID operations and maintenance, and introductory trainings to elected officials, real estate professionals, nurseries and landscapers, and members of the Building Industry Association of Washington. The LID Training Plan will include more details on these efforts as well as recommendations for them going forward.

Priorities for training differed considerably across various work categories.

- Designers/engineers identified significantly more topics as priorities than responders from other work categories.
- Operations/maintenance responders identified bioretention, LID resources, and regulatory issues as their highest training priorities.
- Inspection/enforcement responders named permeable paving and bioretention as their top two desired training topics.
- Elected officials/city managers identified technical LID concepts and regulatory/current issues 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.

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 respondents noted introductory level of knowledge for each of the topic identified in Table 15, page 44.

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 in the Puget Sound region.

Mid and advanced level curriculum development and trainings are needed for designers/engineers on all topic areas. This group of responders 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:

- Permitters/planners: site planning and layout and site assessment.
- Inspection/enforcement professionals: permeable paving and

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 Training.

bioretention.

Introductory training is needed for elected officials/managers 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.

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 high priority topics will be necessary moving forward. Current providers indicated a strong interest in expanding their trainings and numerous potential providers expressed strong interest in developing training programs. Coordinating with current providers and bringing in new providers, particularly in Eastern Washington, is an efficient way to move LID training forward and reach target audiences.

Assistance and Resources Needed

Program support is essential, particularly support with funding, 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/current issues 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 weeklong 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. The top three locations for Eastern Washington trainings 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.

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; 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 feasible², the Project Team will address the following key issues as it moves towards completing the Training Plan:

- **Coordinating with initial work now underway through the Ecology LID 101 program being done by the Building Association of Washington.** 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

² Budget and time permitting.

this audience, very few technical or community colleges responded to the survey, yet they are well positioned to help deliver LID training.

- **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 online.** 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, costs 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 (designers/engineers versus permittees/planners and operations/maintenance personnel, 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. Current programs are also limited in terms of 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 will identify exactly what training is needed, where, for whom, and at what level.



I. 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 use best management practice (BMP) to control flow, address water quality treatment, and protect receiving waters. LID strives to mimic pre-disturbance hydrologic processes of infiltration, storage, evaporation, and transpiration by emphasizing the use of existing natural site features integrated with distributed, small-scale stormwater controls. Much of the growth in popularity of LID in Washington State has occurred in the Puget Sound region, where stormwater runoff has been identified as the biggest and possibly the most expensive threat to Puget Sound recovery efforts.



New National Pollution Discharge Elimination System (NPDES) municipal stormwater permits issued by the Washington State Department of Ecology (Ecology) now require LID to be used for new developments and redevelopment unless site conditions are prohibitive. Public and private sector professionals across Washington State and representing a variety of fields related to development will need additional training to meet Ecology's LID requirements. Consequently, Ecology has engaged the Washington Stormwater Center, Veda Environmental, Cascadia Consulting Group, and the Washington State University Social and Economic Sciences Research Center (SESRC) (the Project Team) to develop a comprehensive LID Training Plan to ensure adequate training is available throughout Washington State on LID techniques.

Although numerous LID training programs exist in Washington, Ecology's LID requirements are expected to result in an increase in training demand that will likely exceed current training provider capacity. Additionally, most current LID training programs operate in the Puget Sound region and are unlikely to be sufficient to meet the specific needs of the many Eastern Washington jurisdictions covered by the municipal stormwater permit. Finally, current training programs, for the most part, do not directly address the recently developed LID permit requirements, so updated and expanded curricula are needed.

As a first step towards developing a comprehensive LID Training Plan that addresses these issues, the Project Team conducted a needs assessment through the execution of two statewide surveys:

- **Statewide LID Training Needs Assessment Survey** targeted audiences for LID training and assessed their knowledge, training needs, and training preferences. This survey was an effort to obtain specific information from potential LID practitioners about their current level of expertise on LID topics and how they rank these topics in terms of priority.
- **Current and Potential LID Service Provider Survey** targeted current and potential LID training providers to determine 1) existing program provider capacity to meet training demand and audience-specific training needs, and 2) identify potential LID service providers.



This Needs Assessment Report provides Ecology with baseline information about the status of both LID expertise and current training in the state. It provides a preliminary assessment of existing training programs to determine whether they are meeting the specific needs of specific audiences.

This effort is believed to be the first of its kind in the United States in which a state regulatory agency has conducted a research initiative to identify specific LID training needs and gather input from NPDES municipal stormwater permit holders and affected professionals.

This Needs Assessment Report was designed to identify gaps in current LID training programs in Washington State. Specifically, it is intended to help the state identify 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? Who (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?



II. METHODOLOGY

This section describes the methods used to gather critical baseline information to assess the training needs and opportunities of stormwater professionals throughout the state. In order to obtain this necessary information, the Project Team developed a comprehensive set of research questions that informed the creation of two online surveys:

- **Statewide LID Training Needs Assessment Survey**, which targeted stormwater professionals (likely recipients of LID training).
- **Current and Potential LID Service Provider Survey**, which targeted current and potential LID training providers.

Both surveys were carried out as part of a larger effort to develop a comprehensive LID Training Plan for Washington State, which is due to be released in late spring, 2013. More detailed descriptions of the methodology used for each survey is described below.

Statewide LID Training Needs Assessment Survey

A web-based survey containing 65 questions (Appendix A) was developed by the Washington State University Social and Economic Sciences Research Center (SESRC) to collect data from various professional groups in Washington State in order to determine their familiarity with LID regulations and perception of their training needs. A non-probability sample was used by e-mailing potential responders as well as representatives of various state and industry organizations who were then encouraged to forward the survey link to individuals they felt would be interested in LID training. At least 500 individuals associated with stormwater coordination efforts throughout the state³ were contacted and encouraged to forward the survey to others. In addition, the link and information on the survey were placed on two relevant websites.



The SESRC obtained 388 responses, 298 of which were fully completed surveys and 90 of which were partially completed. The SESRC compiled results into tables (Appendix B) for selected questions, and cross tabulations

³ Please see: <http://www.ecy.wa.gov/programs/wq/stormwater/municipal/CoordinationOpps.html>.

were developed to enable comparison of responses by subgroups of responders (such as responders whose work is mainly in Western Washington compared to Eastern Washington). Because a non-probability sample was used, no response rate or margin of error can be calculated. The number of responders for each question varies because responses to certain questions throughout the survey routed the responder to a specific set of questions (referred to as branching) and because some responders declined to answer all questions they were asked.

Current and Potential LID Service Provider Survey

Veda Environmental and Cascadia Consulting Group worked with Ecology and the Washington Stormwater Center to develop a web-based survey for both current and potential LID service providers. A total of 43 questions were developed to:

- Better understand the current capacity of existing Low Impact Development training programs in Washington State.
- Identify and characterize organizations interested in becoming LID training providers.



The survey was administered using Survey Monkey, an online survey tool. Branching logic was used to direct current and potential providers to different sets of questions relevant to the responder. Survey invitations were distributed by email to organizations known or expected to be interested in providing LID training, such as community and technical colleges. The survey was also distributed on a listserv maintained by Ecology for stormwater professionals. To improve response rates, organizations that received direct emails were also contacted by phone.

Of the 87 survey responses received, 83 people responded to the survey between December 6, 2012, and January 9, 2013. Of this group, 55% (46 responders) said their organization currently provides LID training, and 45% (37 responders) said that their organization might be interested in providing LID training. Four responders were excluded from the results because they were not currently providing and/or were not interested in providing LID training.

The survey addressed a variety of core topic areas. Current LID program providers were asked detailed questions pertaining to program geographic focus, training level(s) provided, target audiences, topics covered, evaluation techniques, willingness to expand programs, and support needed for expansion. Potential program providers were questioned on topics including work geographic focus, interest in providing training(s), support needed to provide trainings, and LID expertise/experience level.

Results for each question asked of the two groups (current and potential providers) were summarized in a report titled *DRAFT: Assessment of Current and Potential Low Impact Development Training Programs in Washington State*, (See Appendix C). This report also includes the complete list of survey questions, summary tables for each question, and written responses to open-ended questions.



III. RESULTS / ANALYSIS

This section includes two parts. **Part one** contains a full report of the findings from the Statewide LID Training Needs Assessment Survey. **Part two** contains an analysis of the gaps and priority needs for LID training in Washington identified as a result of assessing the results of the Needs Assessment Survey and the Current and Potential LID Service Provider Survey. *Note that the results of the Current and Potential LID Service Provider Survey have already been summarized in a separate document of the same title*, which is included in the Appendix for reference (Appendix C). This Needs Assessment Report is the first reporting of the findings of the Needs Assessment Survey and therefore the full findings of that survey are contained herein.

Part One: Statewide LID Training Needs Assessment Survey

Key findings

Who Responded

Geographically, the majority of responders (73%) work primarily in Western Washington. Less than one-quarter (21%) of responders work primarily in Eastern Washington.

By type of employer, people who work for Western Washington Phase II⁴ jurisdictions—both cities and counties—made up the largest group (29%) of survey responders, followed by people who work for Phase I jurisdictions (18%).

Responders represented a wide range of work categories. More than half of all responders were designers/engineers (32%) or permitters/planners (23%).

CURRENT KNOWLEDGE OF/EXPERIENCE WITH LID (INCLUDING REGULATORY ISSUES)

Responders were asked about experience with specific techniques and whether they had an introductory, mid-level, or advanced level knowledge about specific LID topics.

⁴ The Phase II permit for Western Washington covers at least 80 cities and portions of five counties with an effective date of September 1, 2012. The updated 2013-2018 permit will become effective on August 1, 2013.

Responders across the state frequently reported having experience with bioretention facilities, and many Western Washington responders also reported experience with rain gardens and permeable pavements. Responders expressed far less experience with all other LID techniques.

The majority of Western Washington responders noted an introductory level of knowledge in only one category (green roofs) whereas the majority of Eastern Washington responders noted an introductory level of knowledge in eight out of 13 categories. Eastern and Western Washington responders reported similar average levels of knowledge about site planning and layout and site assessment.

The majority of designers/engineers reported having an introductory level of knowledge in green roofs while permittees/planners reported introductory knowledge in green roofs, rainwater collection, and hydrologic modeling. Operations/maintenance personnel and elected officials/city managers reported introductory levels of knowledge in more LID topics.

Compared to responders who work at Western Washington Phase I and II jurisdictions, responders who work at Eastern Washington Phase II jurisdictions reported substantially lower average levels of current knowledge across all LID topics, with at least half of responders from this group characterizing their current knowledge as introductory for each topic.

Both categories of responders noted advanced levels of knowledge in only two topic areas. For Eastern Washington responders, this was site planning and layout and site assessment. For Western Washington responders, this was purpose of LID and bioretention.

Designers/engineers had by far the most number of LID topics in which more than half of responders reported having advanced level of knowledge (eight of thirteen). For permittees/planners and operations/maintenance personnel, there was only one category each in which more half of responders reported advanced knowledge. For inspection/enforcement personnel and elected officials/city managers, there was no category in which more than half of responders reported advanced knowledge.



CONCERNS WITH LID

Cost of maintenance was a pressing concern across all work categories, but particularly among elected officials/city managers, 77 percent of whom reported “a lot” or “extreme” concern. Design standards, designer/engineer/builder knowledge, and lack of training also rated of high concern across many of the work categories.

Priorities for Training

Less than one-third of Eastern Washington responders rated any single topic as a high priority. The top four priorities rated by Western Washington responders include permeable paving (45% rated as high priority), bioretention (41%), site assessment (41%), LID resources (40%).

As a group, designers/engineers rated the highest number of topics (five) as high priorities (permeable paving, bioretention, hydrologic modeling, LID resources, site assessment). Permitters/planners and operations/maintenance personnel identified two priority topics (site planning and layout and site assessment, and bioretention and LID resources, respectively). Elected officials/city managers overall noted only one high priority topic: regulatory/current issues.

Two-thirds of responders expressed a need for training “immediately,” or before their jurisdictions adopt LID requirements.

Survey Results: All Responders

Who Responded

Three hundred and eighty-eight (388) people responded to the survey. More than half (54%) responded on behalf of all employees within their jurisdiction, business, or organization that might need LID training; less than half (46%) responded as individuals. *Note that not all 388 responders addressed every survey question. Numbers included in tables and charts accompanying this section reflect the actual number of responders who answered that question.*

More than one-third (37%) of responders participated in the survey as a direct result of getting a request via Ecology’s listserv; one-third did so as a result of being asked by a local government (33%). The remaining responders were asked to respond by the Washington Stormwater Center (13%); Building Industry Association of Washington (5%); Association of Washington Cities (3%); or Association of Washington Counties (2%). (See Table 1)

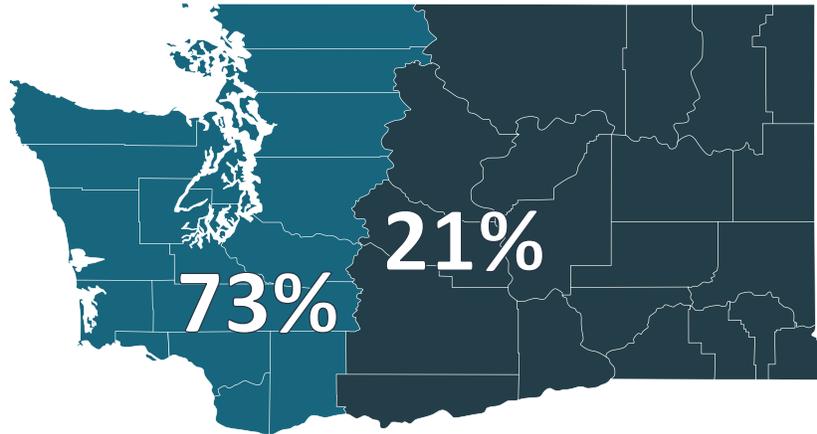
Table 1. How responders learned about the Needs Assessment Survey (388 responders)

Organization Name	Number of Responders
Ecology stormwater or water quality listserv	136
Local jurisdiction	123
Washington Stormwater Center	49
Building Industry Association of Washington	17
Association of Washington Cities	10
Association of Washington Counties	8
Other professional association	8
Other	19
TOTAL RESPONDERS	370

Geographic Location/Focus of Work

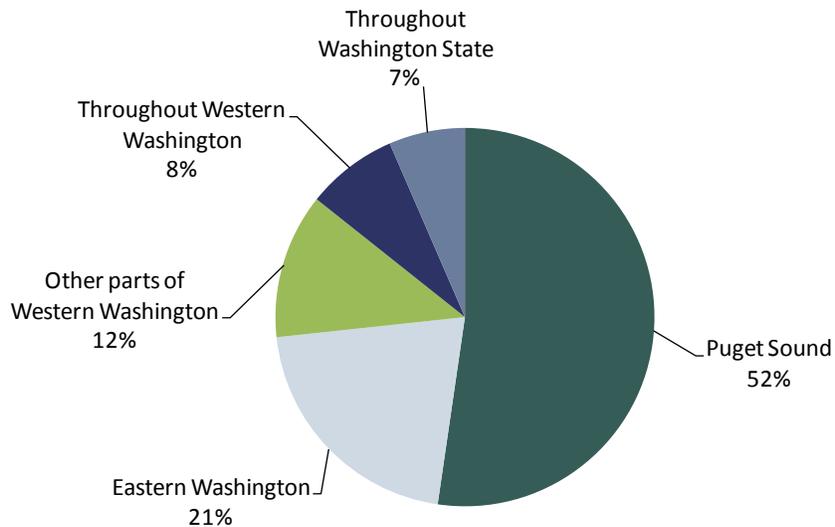
Almost three-quarters (73%) of survey responders said the main location of their work is in Western Washington, twenty-one percent (21%) work primarily in Eastern Washington, and 7 percent of work throughout Washington State. (See Figure 1)

Figure 1. Percentage of responders working primarily in Western and Eastern Washington (386 responders)



The majority of responders work specifically in the Puget Sound region (52%), twelve percent (12%) work in other parts of Western Washington, and eight percent (8%) work throughout Western Washington. (See Figure 2)

Figure 2. Main location of work done by responders (386 responders)



Type of Entity

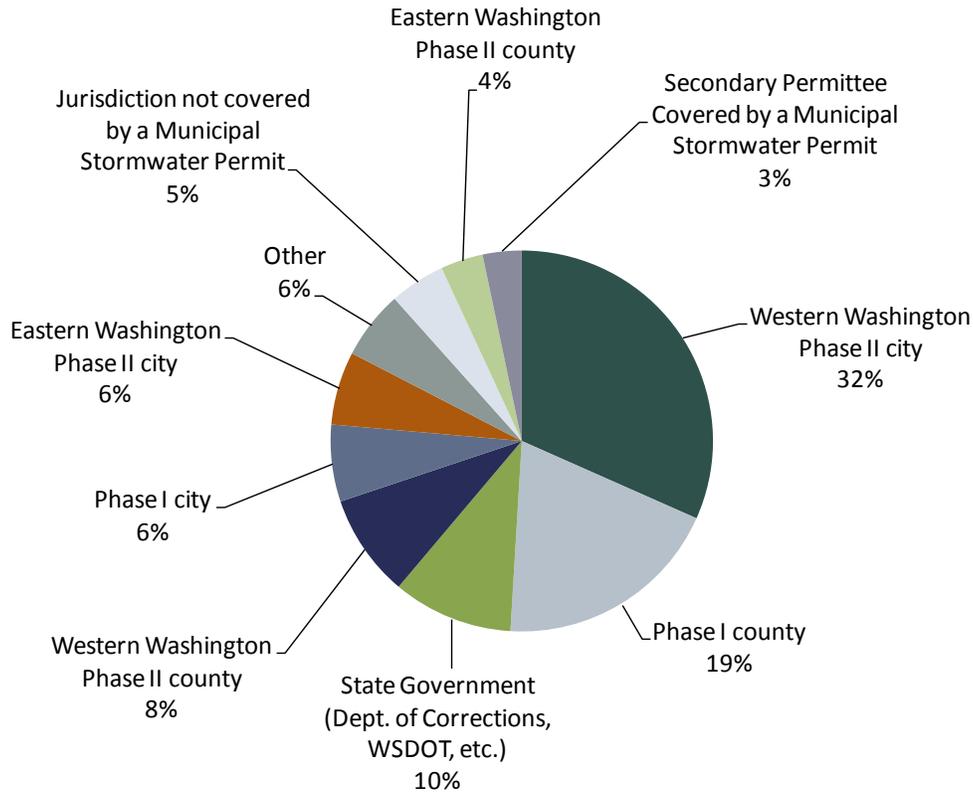
Almost three-quarters (72%) of responders work for a government agency—city, county, state, federal or tribal—and nearly one-quarter (22%) work for private businesses or corporations. The remaining responders were split evenly between non-government organizations and private citizens. (See Table 2)

Table 2. Types of organizations represented by responders

Responder Type	Frequency	Valid Percent
Governmental Entities		
Western Washington Phase II city or county	111	29%
Phase I city or county	71	18%
Other government covered by an NPDES permit	53	14%
Eastern Washington Phase II city or county	27	7%
Government entity not covered by a permit	13	3%
Unidentified type of government	5	1%
Non-Governmental Entities		
Private business or corporation	85	22%
Interested citizen or nonprofit organization	21	5%
TOTAL	386	100%

Of the responders who work for government agencies, more than one-third (40%) work for Western Washington Phase II cities and counties; a quarter (26%) were from Phase I cities and counties; and 10% work for Eastern Washington Phase II cities and counties. The remaining 24% work for a mix of jurisdictions not covered by a municipal stormwater permit, state agencies, secondary permittees, and other jurisdictions. (See Figure 3)

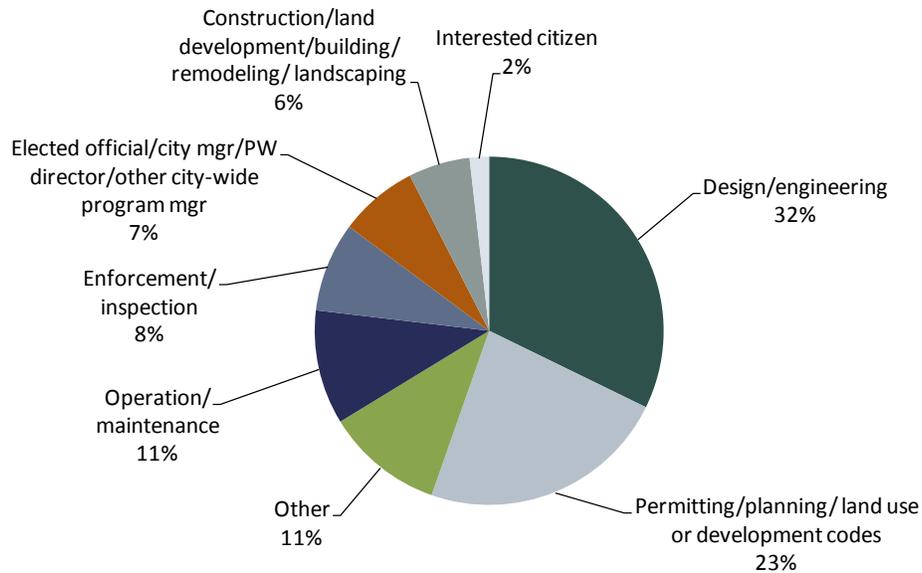
Figure 3. Sub-category of jurisdiction for responders who work for a government entity (275 responders)



Category of Work

Responders represented a wide range of work categories. The top two categories, which account for more than half of all responders, were design/engineering (32%) and permitting/planning (23%). Operations/maintenance professionals represented 11% of responders, and construction/land development professionals represented less than 6% of responders. (See Figure 4)

Figure 4. Main categories of work done by responders (385 responders)

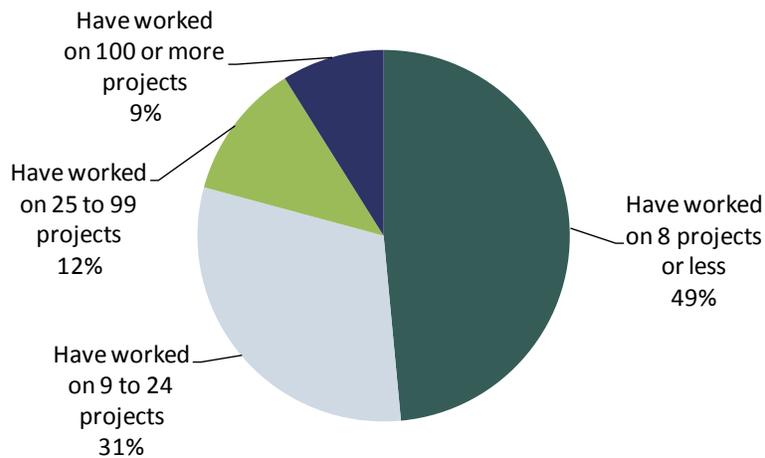


Current Level of Knowledge and Experience with Stormwater Management/Permitting and LID Practices

General knowledge level

Responders reported a lot of familiarity and experience regarding LID. Almost all (91%) responders are familiar with the concept of LID, and more than three-quarters (77%) have been involved in implementing LID projects. Of the 77 percent of responders that have implemented LID projects, nearly one-third (31%) have worked on between 9 and 24 projects. (See Figure 5)

Figure 5. Experience working on projects implementing LID BMP, GSI, LID principles, or LID facilities (337 responders)



Frequency of use

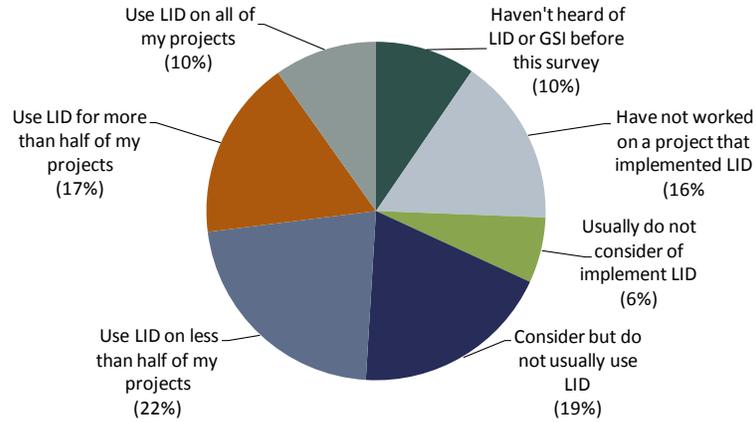
When asked to report on the frequency of use of LID practices, responders' experience varied⁵ and is as follows:

- 10% had not heard of LID or GSI before the survey
- 16% had not worked on a project that implemented LID
- 6% usually do not consider it
- 19% consider but do not use LID
- 22% use LID on less than half of their projects
- 17% use LID for more than half of their projects
- 10% use LID for all of their projects (See Figure 6)



⁵ This was asked in three branching questions: Have you heard of LID/GSI (stop if no); Have you used LID (stop if no); How often do you use LID.

Figure 6. Frequency of use of LID BMPs, GSI, LID Principle, or LID Facilities (367 responders)



Knowledge of specific LID topics and subtopics

31% of responders said that their overall understanding of the purpose of LID is “advanced.”

When asked to identify their level of understanding on specific LID topics, the top four topics in which the largest share of responders reported having an “advanced” level of understanding were:

- Purpose of LID (31% of responders)
- Bioretention (26%)
- Site planning and layout (26%)
- Site assessment (25%)

The top four topics in which the largest share of responders reported having an “introductory” level of knowledge were:

- Vegetated/green roofs (67% of responders)
- Hydrologic modeling (45%)
- Rainwater collection systems (44%)
- Compost-amended soils (43%) (See Table 3)

Table 3. Percent of responders by reported levels of knowledge (233 or more responders)

	Introductory	Mid-level	Advanced
Overall understanding of the purpose of LID	26%	43%	31%
Technical LID concepts	29%	45%	26%
Bioretention areas	31%	44%	26%
Rain gardens	36%	42%	22%
Permeable paving	36%	42%	22%
Vegetated/green roofs	67%	25%	8%
Rainwater collection systems	44%	42%	14%
Site assessment	33%	42%	25%
Site planning and layout	38%	36%	26%
LID resources	37%	42%	21%
Hydrologic modeling	45%	34%	22%
Compost-amended soils	43%	39%	17%
Regulatory/current issues related to LID	30%	50%	20%

Knowledge of NPDES Stormwater permit issues and LID requirements

The majority of responders said that they are familiar with Municipal Stormwater Permits (84%) and with the new LID Municipal Stormwater permit regulations (68%). When asked about their local jurisdiction’s plans for implementing the 2012 Manual (or an equivalent manual), responders stated the following:

- 16% said their jurisdiction has already adopted the 2012 Manual (of 259 responders)
- 47% are “on schedule” to adopt the 2012 Manual per Ecology requirements
- 6% will adopt the 2012 Manual sooner than is required
- 31% don’t know or are unsure⁶

When asked how the new requirements will affect them, responders most commonly stated:

- 34% said LID regulations will directly affect their work
- 3% said it will impact the work of the employees they supervise or manage
- 42% will impact both their own work and the work of employees they supervise or manage

Responders who said new LID requirements would indirectly impact or not impact their or their employees’ work were not asked any additional questions, such as current level of expertise or priorities and preferences for trainings.



⁶ Note that more than 100 responders were not asked this question due to branching. This survey therefore is not the best approach to gain useful information about timing for manual adoption. The survey cannot say what percentage of responders work for jurisdictions that have already adopted or plan to adopt on schedule the 2012 Manual or equivalent manual.

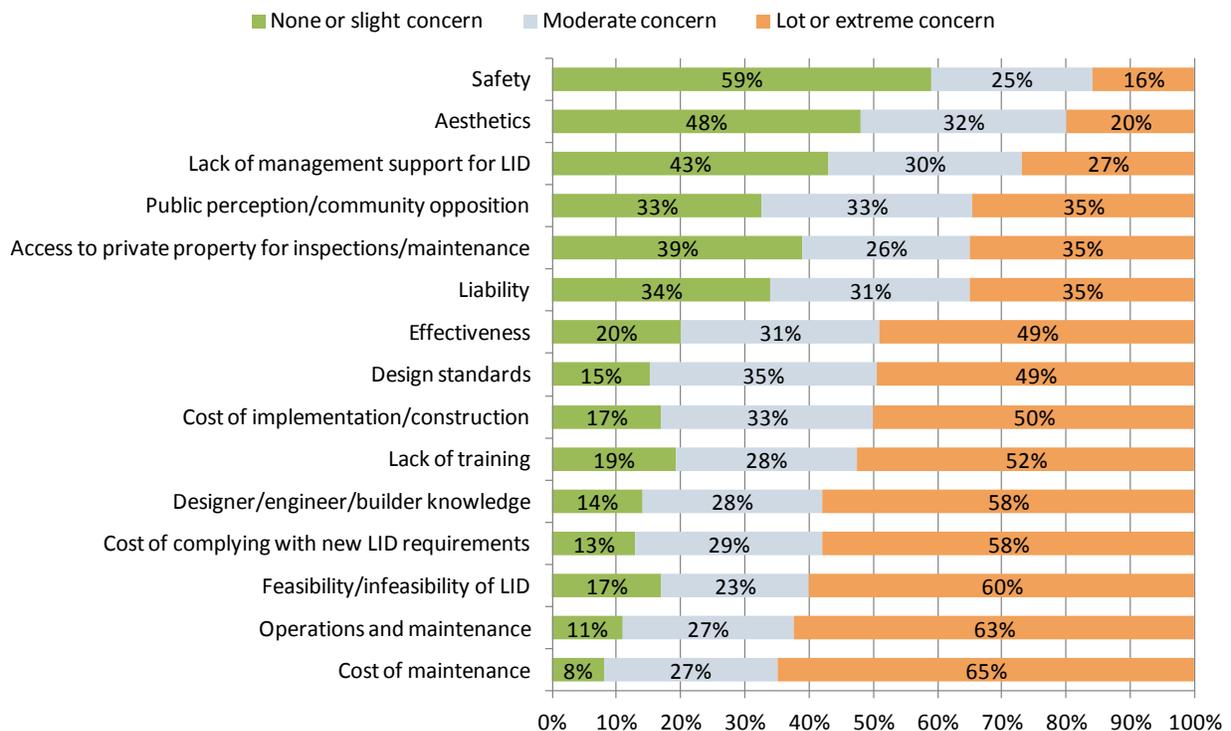
Concerns with LID

Responders expressed high levels of concern with a range of LID-related issues from cost of maintenance to lack of training and numerous others. (See Figure 7)

The top six issues for which responders expressed “a lot” or “extreme” concern were:

- Cost of maintenance (65% of responders)
- Operations and maintenance (63%)
- Feasibility (60%)
- Cost of complying with new regulations (58%)
- Designer/engineer/builder knowledge level (58%)
- Lack of training (52%)

Figure 7. Level of concern with specific issues related to LID (227 to 230 responders)



Topics and Level of Training, Training Formats, and Locations

Responders were asked to rate 13 main LID training topics as being low, medium, or high priority to help them or their employees comply with the new LID requirements. Any topic with greater than 30% responder response is ranked as “high priority” and is listed below. **The following seven topics are considered high priorities for training:**

- Permeable paving (41%)
- Bioretention areas (40%)
- Site assessment (39%)
- LID resources (38%) (e.g. 2012 LID Technical Guidance Manual for Puget Sound; Stormwater Management Manual for Western Washington, etc.)
- Regulatory/current Issues related to LID (36%)
- Site planning and layout (36%)
- Hydrologic modeling (32%)



Responders overall rated rainwater collection systems and vegetated/green roofs as having the lowest priority.

Almost three-quarters (71%) of responders were “very” or “extremely” interested in learning more about the new LID regulations.

Length and Timing of Classes

Most responders are willing to attend half-day (88%) and full-day (75%) classes, and another 40 percent are willing to attend a two-day class. Evening classes and week-long classes were very unpopular, with 58 percent of responders saying they would not attend an evening class, and 66 percent saying they would not attend a week-long class. (See Table 4)

Table 4: Willingness of responders to attend half day, full day, or two day classes.

Length of Class	No	Maybe	Yes
Half day	2%	10%	88%
Full day	6%	19%	75%
Two days	17%	42%	40%

When asked how soon people anticipated needing training, nearly one-quarter (24%) said immediately, more than one-third (40%) responded that they will need it before their local jurisdiction adopts LID requirements, 19 percent said don’t know or are unsure, and 17 percent said when their local jurisdiction adopts LID requirements.

Consequently, LID training programs will need to be developed quickly because nearly two-thirds of responders or their employees need training immediately or before their jurisdictions adopt LID requirements.

Preferred Locations for Training and Willingness to Travel

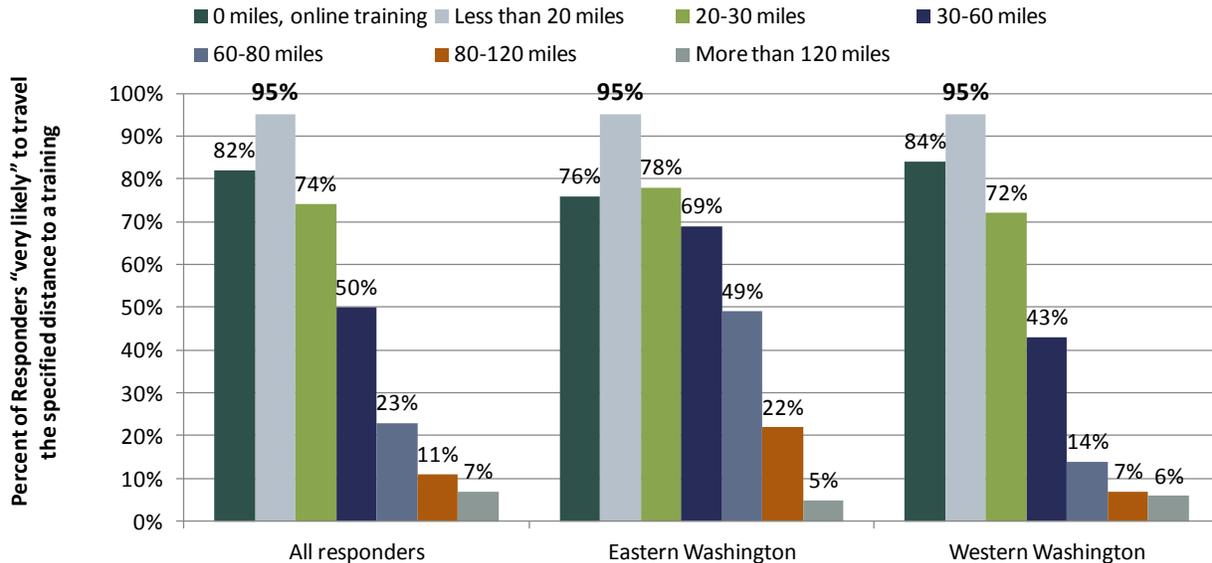
In terms of overall responders (as noted previously, the majority of whom work primarily in Western Washington), the top four cities people were willing to travel to for training were, in order, Seattle, Tacoma, Everett, and Olympia. Not surprisingly, this list was very different when looking only at Eastern Washington responders. (See Table 5)

Table 5. Responder preference for training location

	All responders	Western WA	Eastern WA
#1	Seattle (42%)	Seattle (50%)	Spokane (48%)
#2	Tacoma (38%)	Tacoma (46%)	Yakima (45%)
#3	Everett (23%)	Everett (29%)	Tri-Cities (42%)
#4	Olympia (22%)	Olympia (25%)	Wenatchee (32%)
#5	Mt. Vernon (17%)	Mt. Vernon (21%)	Ellensburg (26%)
#6	Bellingham (14%)	Bellingham (18%)	Moses Lake (24%)

All responders expressed a fairly strong willingness (greater than 50% indicating “very likely”) to travel up to 60 miles for training). After 60 miles, however, Western Washington responders’ willingness dropped sharply, while Eastern Washington responders decreased, but not as sharply. (See Figure 8)

Figure 8. Responder willingness to travel



Training format

Most overall responders (82%) appear willing to participate in web-based training; this differed slightly for Eastern Washington responders, 76 percent of whom are willing to do web-based training, versus 84 percent of Western Washington responders. When asked whether they would be interested in having one day of training dedicated to demonstration sites or visits to LID research facilities, 84% percent of responders said yes.

Geographic Analysis (Eastern vs. Western WA)

Current Level of Knowledge

Responders from Western Washington reported higher average levels of **current knowledge** than responders from Eastern Washington in all topic areas, as shown in Table 6 and in Appendix B (Figure B-1). However, the two groups had fairly similar average levels of knowledge about site planning and layout and site assessment. Responders from both Western and Eastern Washington reported their lowest levels of knowledge were about vegetated/green roofs. The two groups also reported relatively low average levels of knowledge about rainwater collection, compost-amended soils, and hydrologic modeling, compared to other topics. Eastern Washington responders also reported lower average levels of knowledge about rain gardens, LID resources, permeable paving, and bioretention areas.

Table 6. Percent of responders from Western and Eastern Washington reporting introductory level of knowledge

	Western Washington (n≈184)	Eastern Washington (n≈44)
Overall understanding of the purpose of LID	22%	41%
Technical LID concepts	26%	48%
Bioretention areas	27%	50%
Rain gardens	27%	80%
Permeable paving	30%	61%
Vegetated/green roofs	64%	90%
Rainwater collection systems	39%	70%
Site assessment	32%	45%
Site planning and layout	37%	49%
LID resources	32%	59%
Hydrologic modeling	44%	50%
Compost-amended soils	40%	63%
Regulatory/current issues related to LID	28%	44%

Topics on which more than 50 percent of responders reported introductory knowledge are highlighted in the above table.

Priorities for Training

Compared to responders from Eastern Washington, responders from Western Washington placed a higher **priority** on learning about all LID topics except overall understanding of LID, as shown in Table 7 and in Appendix B (Figure B-2). On average, Western Washington responders placed a high priority on learning about permeable paving, bioretention areas, site assessment, LID resources, and current/regulatory issues. Less than one-third of Eastern Washington responders placed a high priority on learning about any specific LID topic.

Table 7. Percent of responders from Western and Eastern Washington rating topics a high priority

	Western Washington (n≈184)	Eastern Washington (n≈44)
Overall understanding of the purpose of LID	24%	28%
Technical LID concepts	44%	47%
Bioretention areas	41%	30%
Rain gardens	30%	19%
Permeable paving	45%	31%
Vegetated/green roofs	13%	12%
Rainwater collection systems	20%	13%
Site assessment	41%	23%
Site planning and layout	37%	26%
LID resources	40%	29%
Hydrologic modeling	37%	11%
Compost-amended soils	26%	20%
Regulatory/current issues related to LID	38%	27%

Topics that more than 40 percent of responders rated as a high priority are highlighted in the above table.

Experience with LID Practices

Bioretention is by far the most commonly used LID technique by all responders, both those who primarily work in Western Washington (73%) and those who work primarily in Eastern Washington (65%), as shown in Table 8.

However, Western Washington responders were more likely than Eastern Washington responders to use permeable pavements (62% compared to 22%) and rain gardens by (56% compared to 13% respectively).

Of the remaining techniques, 17 percent of Western Washington responders use vegetated roofs, compared to only two percent in Eastern Washington. Rainwater collection is practiced by 20 percent of Western Washington responders and 9 percent of Eastern Washington responders. Finally, minimal excavation foundations are hardly used by Western (8%) or Eastern (9%) Washington responders.

Table 8. Comparison of percent of responders who said they or most of their employees currently use specific LID techniques

	Eastern Washington (n=96)	Western Washington (n=171)
Rain gardens	13%	56%
Vegetated/green roofs	2%	17%
Bioretention facilities	65%	73%
Permeable pavement	22%	62%
Rainwater collection systems	9%	20%
Minimal excavation foundations	9%	8%

Category of Work

Note: due to the small number of responders, responses from the construction/land development/building/remodeling/landscaping work category are not reported in the cross tabulations. Input and feedback from this group can be obtained through the pilot LID 101 trainings that are now being developed as part of this statewide training program.

Current Level of Knowledge

Responders who described themselves as designers/engineers reported higher levels of current knowledge than responders in most other work categories for all topic areas, except vegetated/green roofs and rainwater collection. Responders in all five categories of work highlighted in Table 9 reported low levels of knowledge about vegetated/green roofs. Table 9 and Appendix B (Figure B-3) present the percentage of responders in each work category that reported having an introductory level of knowledge in each topic area.

Designers/engineers reported the highest levels of knowledge about hydrologic modeling among these five work categories. Permitters/planners reported lower levels of knowledge about rainwater collection systems than the other four work categories. Operations/maintenance and inspection/enforcement responders reported lower levels of knowledge about site planning and layout, site assessment, LID resources, and compost-amended soils. Elected officials/city managers reported low levels of knowledge about all topics compared to the other four work categories; their highest level of knowledge was in overall understanding of LID and regulatory/current issues.

Table 9 highlights topics on which more than 50 percent of responders reported introductory knowledge.

Table 9. Percent of responders reporting introductory level of knowledge, by work category

	Design & Engineering (n≈88)	Planning & Permitting (n≈53)	Operations & Maintenance (n≈23)	Inspection & Enforcement (n≈22)	Elected Officials & City Managers (n≈21)
Overall understanding of the purpose of LID	17%	26%	28%	33%	39%
Technical LID concepts	21%	30%	28%	39%	48%
Bioretention areas	20%	29%	33%	33%	61%
Rain gardens	30%	30%	39%	48%	50%
Permeable paving	28%	36%	38%	33%	52%
Vegetated/green roofs	65%	72%	60%	68%	73%
Rainwater collection systems	37%	55%	38%	44%	57%
Site assessment	14%	38%	52%	50%	52%
Site planning and layout	19%	41%	58%	68%	48%
LID resources	23%	33%	61%	46%	52%
Hydrologic modeling	20%	55%	67%	83%	57%
Compost-amended soils	33%	42%	57%	58%	55%
Regulatory/current issues related to LID	23%	26%	40%	44%	36%

Priorities for Training

Design/engineer and permitter/planner responders placed a high priority on learning about site assessment. Design/engineer responders also prioritized permeable paving, bioretention areas, hydrologic modeling, and LID resources. Permitter/planner responders also prioritized site planning and layout.

Although rating all topics slightly lower priority overall, operations/maintenance responders gave higher priority to bioretention, LID resources, and regulatory issues than to other topics. Inspection/enforcement responders gave slightly higher priority to permeable paving and bioretention areas than to other topics. Elected officials/city managers gave high priority to learning about technical LID concepts and regulatory/current issues.

Table 10 and Appendix B (Figure B-4) present the percentage of responders in each work category who rated each training topic a high priority. Topics that more than 40 percent of responders rated as a high priority are highlighted in the table.

Table 10. Percent of responders rating topics a high priority, by work category

	Design & Engineering (n=88)	Planning & Permitting (n=53)	Operations & Maintenance (n=23)	Inspection & Enforcement (n=22)	Elected Officials & City Managers (n=21)
Overall understanding of the purpose of LID	29%	16%	12%	25%	30%
Technical LID concepts	52%	45%	33%	38%	44%
Bioretention areas	48%	36%	42%	25%	35%
Rain gardens	29%	33%	33%	13%	23%
Permeable paving	51%	37%	32%	39%	39%
Vegetated/green roofs	12%	17%	16%	0%	9%
Rainwater collection systems	23%	16%	16%	13%	22%
Site assessment	42%	43%	33%	33%	29%
Site planning and layout	36%	48%	25%	23%	32%
LID resources	45%	36%	42%	25%	30%
Hydrologic modeling	47%	35%	12%	4%	22%
Compost-amended soils	26%	23%	26%	29%	18%
Regulatory/current issues related to LID	34%	31%	44%	25%	41%

Experience with LID Practices

Design/engineering professionals reported higher rates of implementation of LID techniques in their projects than any other work category, with nearly 50% of those respondents reporting using LID on at least half of their projects. (See Table 11)

Table 11. Responder consideration of LID implementation, by work category

	Design & Engineering (n=101)	Planning & Permitting (n=70)	Operations & Maintenance (n=25)	Inspection & Enforcement (n=22)	Elected Officials & City Managers (n=18)
Usually do not consider implementing LID	2%	10%	12%	23%	11%
Considered, but do not usually use LID	22%	33%	24%	27%	22%
Use LID on less than half of my projects	28%	21%	28%	41%	39%
LID for more than half of my projects	31%	23%	20%	-	28%
Use LID on all of my projects	18%	13%	16%	9%	-

*Q06 categories 7 and 8 were removed for lack of response.

Concerns with LID Practices

Cost of maintenance appears to be the most pressing concern for all work categories, especially elected officials/city managers. Design standards, designer/engineer/builder knowledge, and lack of training also rated of high concern across many of the categories. Safety and aesthetics rated consistently low among responders while other topics such as liability, management support, public perception, and even effectiveness rated of low to moderate concern.

By Types of Permitted Jurisdiction: Phase I, Phase II Western Washington, Phase II Eastern Washington

Current Level of Knowledge

Responders who work for all NPDES permitted jurisdiction types reported low levels of current knowledge about vegetated/green roofs. Responders who work for Phase II Eastern Washington jurisdictions reported substantially lower average levels of current knowledge across all topics, with at least half of responders from this group characterizing their current knowledge as introductory for each topic, as shown in Table 12.

Responders from Phase I jurisdictions across the state reported similar but slightly higher average levels of current knowledge than Phase II Western Washington (WW) responders for most topics, as shown in Table 8 and Appendix B (Figure B-5). The exception was that Phase II WW responders reported slightly more average knowledge about site planning and layout, site assessment, and regulatory/current issues, and relatively less knowledge about compost-amended soils.

Table 12 highlights topics on which more than 50 percent of responders reported introductory knowledge.

Table 12. Government-sector responders reporting introductory level of knowledge, by NPDES permit type

	Phase I (n=45)	Phase II (Western WA) (n=71)	Phase II (Eastern WA) (n=15)
Overall understanding of the purpose of LID	21%	23%	50%
Technical LID concepts	21%	29%	67%
Bioretention areas	21%	27%	63%
Rain gardens	26%	26%	87%
Permeable paving	27%	34%	69%
Vegetated/green roofs	61%	66%	94%
Rainwater collection systems	42%	48%	80%
Site assessment	35%	34%	69%
Site planning and layout	45%	36%	69%
LID resources	33%	36%	75%
Hydrologic modeling	46%	43%	75%
Compost-amended soils	35%	49%	69%
Regulatory/current issues related to LID	32%	22%	63%

Priorities for Training

Responders who work for Phase I and Phase II Western Washington jurisdictions placed a high priority on learning about permeable paving and bioretention areas, as shown in Table 13.

Phase I jurisdictions also placed a high priority on site assessment. Phase II WW jurisdictions also rated learning about LID resources and regulatory/current issues as a higher priority on average than other topics, as shown in Appendix B (Figure B-6). More than half of Phase II Eastern Washington jurisdiction responders placed a high priority on learning about overall understanding of LID; on average they also rated bioretention areas and site planning and layout as a higher priority than other topics.

Table 13 highlights topics that more than 40 percent of responders rated as a high priority.

Table 13. Percent of government-sector responders rating topics a high priority, by NPDES permit type

	Phase 1 (n=45)	Phase II (Western WA) (n=71)	Phase II (Eastern WA) (n=15)
Overall understanding of the purpose of LID	15%	20%	53%
Technical LID concepts	34%	40%	60%
Bioretention areas	43%	42%	38%
Rain gardens	33%	27%	25%
Permeable paving	53%	45%	31%
Vegetated/green roofs	18%	9%	13%
Rainwater collection systems	22%	13%	6%
Site assessment	44%	36%	33%
Site planning and layout	37%	33%	38%
LID resources	23%	49%	38%
Hydrologic modeling	35%	31%	0%
Compost-amended soils	28%	26%	6%
Regulatory/current issues related to LID	26%	36%	38%

Experience with LID Practices

Respondents from the non-government sector reported using LID knowledge and practices on a much greater proportion of their projects than government respondents. Nearly 35 percent of non-government respondents reported using LID on more than half of their projects as opposed to roughly 20 percent to 25 percent of government respondents.

Comparisons among government types show that Phase I governments appears to use LID on a greater proportion of projects than Phase II governments, while Eastern versus Western governments is roughly equivalent. Eastern government respondents report more implementation of LID on all of their projects, but there are only four responses in this category. (See Table 14)

Table 14. Use of LID by type of organization and permittee type

Use of LID by type of organization and permittee type					
	Phase I gov't (n=67)	Western WA Phase II gov't (n=105)	Eastern WA Phase II gov't (n=26)	Other covered gov't (n=52)	Non-governmental (n=92)
No	3.0%	2.9%	19.2%	19.2%	13.0%
I have not worked on a project that implemented some type of LID	16.4%	14.3%	23.1%	13.5%	16.3%
Usually do not consider implementing LID	6.0%	9.5%	3.8%	5.8%	3.3%
Considered , but do not usually use LID	20.9%	25.7%	23.1%	17.3%	10.9%
Use LID on less than half of my projects	26.9%	25.7%	3.8%	21.2%	21.7%
LID for more than half of my projects	17.9%	15.2%	11.5%	13.5%	21.7%
Use LID on all of my projects	9.0%	6.7%	15.4%	9.6%	13.0%

Part Two: Gap Analysis

This section describes the gaps and needs for LID training in Washington identified as a result of findings from the two surveys. Five specific areas addressed in the Gap Analysis include:

- **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.

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: Construction/land development professionals (69% of current providers train this audience); Design and engineering professionals (59%); Operations and maintenance professionals (49%); Permitting/planning professionals (46%). However, the majority of current providers (56%) train concerned citizens on non-technical LID topics. This audience is not a focus for technical training.

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. Results showed that fewer than 5 percent of current LID training providers work primarily in Eastern Washington with an additional 21 percent indicating that they work throughout the state. Although more potential providers work in Western Washington than in Eastern Washington, there were several from Eastern Washington who expressed strong interest in providing training. ***Because this area is underrepresented by current training programs and 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 / Level of Training Needed

Topics Addressed

There is high demand across all potential training participants for classes on each of the seven priority topic areas identified by all potential training participants. (See Table 15)

Current providers are covering most of the priority topics identified by potential training participants. These topics include permeable paving, bioretention, site assessment, and site planning and layout.

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. 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.

Three priority topic areas identified by potential training participants are *not* a focus of current providers. These topics include LID resources, regulatory/current issues, 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. Note: Ecology is now offering courses on Hydrologic Modeling.

Although Eastern Washington responders did not identify a single topic area as a priority, this was likely a result of the limited overall understanding of LID expressed by these responders. Eastern Washington responders noted an “introductory” level of knowledge for 8 of 13 topic areas, which is a significantly lower level of knowledge than that of Western Washington responders. Therefore, **all topic areas are potentially important for Eastern Washington responders, particularly the priority topics identified by all responders (see next section for Level of Instruction recommended).** Additionally:

- Given the lower level of knowledge Eastern Washington responders indicated across most topics, priority should be given to immediately offering introductory level classes on an overall understanding of LID.
- Since most current providers target audiences in the Puget Sound region, courses for all priority topics will need to be developed for and/or expanded to Eastern Washington. For some topics, this will likely be done most effectively via webinar (e.g., “regulatory/current issues related to LID,” and potentially “overall understanding of the purpose of LID”). For other topics, trainings will need to be developed for presentation in priority Eastern Washington cities.

Two priority topics Western Washington responders identified – hydrologic modeling and LID resources – are not a frequently covered topic by current providers. 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 the topic “hydrologic modeling”, classes should be developed only for these topics rather than including it as a topic within a broader class (as is being done currently).

Priorities for training differed considerably across various work categories, with designers/engineers identifying significantly more topics as priorities than responders from other work categories. Although rating topics slightly lower overall, operations/maintenance responders gave higher priority to bioretention, LID resources, and regulatory issues than to other topics. Inspection/enforcement responders gave slightly higher priority to permeable paving and bioretention areas than to other topics. Elected officials/city managers gave high priority to learning about technical LID concepts and regulatory/current issues.

- **Design/engineering.** Since this work category represented the majority of survey responders and indicated the most topics as priorities for training, **this is a priority audience for customized and targeted training programs.** Two of the priority topics identified by this audience – hydrologic modeling and LID Resources – are not frequently offered by current providers, as noted previously.
- **Planning/permitting.** This audience identified site planning and layout and site assessment as priority topic areas, which are frequently provided by current providers. However, this was the

second largest group of responders to the survey, and therefore current providers unlikely have capacity to meet demands of this audience.

- **Operations/maintenance.** This audience identified bioretention and LID resources as priorities for training. The latter topic is not frequently provided by current providers and therefore expansion of that topic to this specific audience is likely needed.

Level of Training Needed

Introductory level training is needed for all priority topic areas identified in Table 15, since one third or more of responders noted introductory level of knowledge for each of them. Of all topics, hydrologic modeling rated highest in terms of number of responders needing introductory level training.

There is strong demand for both mid-level and advanced training for the highest priority topics identified in Table 15—permeable paving and bioretention. The majority of trainings currently offered provide introductory or mid-level technical levels on these topics. Slightly more than a third of responders stated they provided advanced trainings. Additional mid-level and advanced trainings are therefore needed on these topics.

Two tiers of courses should be considered for each of the highest priority topics: A high-level advanced course and a low to mid-level advanced course, where the latter is flexible enough to accommodate a large number of low or medium knowledge level potential trainees.

Responders from Western Washington reported higher levels of current knowledge than responders from Eastern Washington in all topic areas, and Eastern Washington responders expressed a significantly lower level of understanding on almost all LID topics than Western Washington responders. Introductory and mid-level courses in Eastern Washington on all of the priority topics identified in Table 15 will be particularly important; most notably, overall understanding of the purpose of LID.

Eastern and Western Washington responders have similar average levels of knowledge about site planning and layout and site assessment; since this is a priority topic, mid-level and advanced trainings are needed in both Eastern and Western Washington. Responders from both Western and Eastern Washington reported their lowest levels of knowledge were about vegetated/green roofs.

Responders who described themselves as designers/engineers reported higher levels of current knowledge than responders in most other work categories for all topic areas, except vegetated/green roofs and rainwater collection. Notably, they also reported that they needed the most advanced training in all topic areas. It will be important to design both mid-level and advanced classes on all priority topics for this priority audience.

Permitting/planning and inspection/enforcement professionals need more mid-level training for the priority topics that they identified. For permitters/planners that includes site planning and layout and site assessment. For inspection/enforcement professionals, that includes permeable paving.

Elected officials and real estate professionals indicated a need for more introductory training or no training at all. For this audience, it will be most important to provide introductory and mid-level training on priority topics such as overall understanding of the purpose of LID and regulatory issues.

When comparing jurisdiction type (Phase I; Western Washington and Eastern Washington Phase II, etc.), it is evident that **introductory level courses on priority topics will be particularly important in Eastern Washington Phase II jurisdictions**, as these responders reported substantially lower average levels of current knowledge across all LID topics.

Potential to Increase Training Capacity

Current providers indicated a strong interest in expanding their trainings. Working directly with current providers to expand training programs to reach target audiences on priority topics is the most efficient way to move forward.

If more resources were available, **responders most commonly said they would expand their trainings by:**

- Reaching out to more people in their current audience (91%)
- Providing trainings more often (83%)
- Providing more advanced trainings on their current topics (80%)
- Reaching out to new types of audiences (74%)

Assistance and Resources Needed

Responders most commonly described needs for additional staff and funding. Program development and implementation, including attracting and keeping knowledgeable staff, can only be done with stable, long-term funding. Current providers of LID training programs describe their funding regimens as temporary and short-term. Building a statewide program on six-month or less-than-one-year financing does not create a stable base or professional training group. If there is a longer commitment to a statewide LID training program, stable, long-term funding needs must be addressed.

When asked what 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.** Current providers, however, are much more interested in adapting existing curricula to meet Ecology's needs rather than being asked to develop entirely new curricula. Potential providers are more interested in adopting curricula developed elsewhere.

More than half of current providers (51%) said they would be willing to modify their existing curriculum if funding were available for trainings that met new curriculum standards. Nearly one-fifth (19%) of responders said they would be willing to adopt a new curriculum if funding were available.

All responders said that they were definitely (79%) or maybe (22%) interested in using LID training resources created by Ecology.

More than half (61%) of responders said their program could serve as a model to be replicated elsewhere in Washington. Twenty-two responders provided further detail on what made their program a good candidate for replication, with the majority referencing their experience.

Ten current providers reported that participants received a certificate after completing their training while six providers offered credits. These results indicate that most training programs around the state do not provide certification and/or continuing education credits. Neither of the two surveys asked whether or not receiving a certificate and/or continuing education credits was an incentive for participation.

Preferences Regarding Training Format, Length, and Travel distance

Although most programs currently offered are classroom/lecture based, 16% are web-based. Most overall responders (82%) appear willing to participate in web-based training; this differed slightly for Eastern Washington responders, 76% of whom are willing to do web-based training, versus 84% of Western Washington responders. This training type should be further developed and made available to stormwater practitioners.

Length and timing of trainings. Most responders are willing to attend half day (88%) and full day (75%) classes, and another 40% are willing to attend a 2-day class. Evening classes and weeklong classes were very unpopular, with 58% of responders saying they would not attend an evening class, and 66% saying they would not attend a weeklong class.

Location of trainings: All responders expressed a fairly strong willingness (greater than 50% indicating “very likely”) to travel up to 60 miles for training. After 60 miles, however, Western Washington responders’ willingness dropped sharply, while Eastern Washington responders decreased, but not as sharply.

The top three locations for Western Washington trainings include: Seattle (50%); Tacoma (49%); Everett (29%).

The top three locations for Eastern Washington trainings include: Spokane (48%); Yakima (45%); Tri-Cities (42%).

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.

Table 15. Priority topics identified overall, by region, and by work category

Topics most frequently covered by current providers		Priority topics for training overall	Priority topics by region (in priority order)		Priority topics by work category (in priority order)			
ALL RESPONDERS			EASTERN WA RESPONDERS	(WESTERN WA RESPONDERS)	DESIGN/ENGINEERING	PLANNING/PERMITTING	OPERATIONS/MAINTENANCE	ELECTED OFFICIALS/CITY MANAGERS
1	Overall understanding of the purpose of LID	Permeable Paving	None reported	Permeable Pavements	Permeable Pavements	Site Planning and Layout	Bioretention	Regulatory/Current Issues
2	Rain Gardens	Bioretention Areas		Bioretention	Bioretention	Site Assessment	LID Resources	
3	Bioretention Areas	Site Assessment		Site Assessment	Hydrologic Modeling			
4	Site Planning and layout	LID Resources		LID Resources	LID Resources			
5	Permeable Paving	Regulatory/Current Issues related to LID			Site Assessment			
6	Site Assessment	Site Planning and Layout						
7	N/A	Hydrologic modeling						



IV. SUMMARY / NEXT STEPS / RECOMMENDATIONS / CONCLUSION

Summary

New municipal stormwater permits issued by the Washington State Department of Ecology now require LID to be used for new developments and redevelopment unless site conditions are prohibitive. These permit requirements apply to jurisdictions across Eastern and Western Washington and will affect public and private sector stormwater professionals working in a variety of capacities. There is an urgent need for these professionals to receive technical LID training on a variety of subjects, as well as training on the new regulatory requirements resulting from the permits. Although a large number of entities currently provide LID training in Washington State, these entities tend to focus their trainings in the Puget Sound region and do not currently appear to have capacity to meet the growing demand.

The Washington Stormwater Center, Washington State University Social and Economic Sciences Research Center, Veda Environmental, and Cascadia Consulting Group conducted two separate statewide surveys targeting the following audiences: stormwater practitioners and others who are likely candidates for training, and current and potential providers of LID Training. The first survey, entitled “Statewide LID Training Needs Assessment Survey” received hundreds of responses and contained 65 questions aimed at better understanding, among other things, current knowledge on LID topics and priorities for training. The second survey, entitled “Current and Potential Service Provider Survey” received 87 responses and contained questions aimed at understanding current levels and types of trainings being offered, audiences being targeted for training, and capacity to expand (or build) training programs.

The survey results show important key findings, as well as gaps that will need to be addressed in the next phase of the Project Team’s work. Among the key findings and gaps are:

- Demand for LID training exceeds current capacity to train.
- Many current providers of LID training are very interested in expanding their trainings, provided sufficient resources are provided such as curricula.

- Although more potential providers work in Western versus Eastern Washington, there were several from Eastern Washington that expressed strong interest in providing training. Because this area is underrepresented by current training programs, and 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.
- Needs for training (both level of training as well as subject matter) differ considerably between Western Washington, where LID has gained a firmer foothold, and Eastern Washington, where LID is just now beginning to take root.
- Needs for training (both level of training as well as subject matter) differ considerably across professions/work categories.
- Responders have serious concerns about a number of LID issues; topping the list is cost of maintenance and operations/maintenance. Developing regionally specific case studies could help address some of these concerns.
- Further research and work is needed in terms of developing and implementing a statewide training plan, particularly in terms of building provider capacity in Eastern Washington. Developing case studies that directly address issues of high concern such as cost of maintenance regarding LID will be particularly important.

Further assessing these key findings and gaps will be the next task of the Project Team as they work to complete a comprehensive LID Training Plan for Washington State.

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. **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; schedule for training plan implementation.
 - LID Training Plan to include four-year vision, goals, and objectives.

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 the Needs Assessment Report. Where feasible⁷, the Project Team will address the following key issues as it moves towards completing the Training Plan:

- **Find new ways to engage the building/construction industry** in advancing LID principles and techniques as well as developing the LID Training Plan. This key audience was underrepresented in the Needs Assessment survey despite extensive efforts to engage them. The low response rate indicates that current methods to reach and engage these audiences need to be assessed, as 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. Reaching out to these entities to further determine their capabilities and interests will be important moving forward in developing a comprehensive LID Training Plan.
- **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. Because this area is underrepresented by current training programs and 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.
- **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. They seem well positioned to be providers of LID technical training in Washington, and additional stakeholder research will be helpful in developing a training plan.
- **Develop an LID Training Plan that takes into account the different training needs – both topic area and level of training –between Eastern and Western Washington, as well as between different professional groups.** The Training Plan should also reflect various types of trainings that people are interested in, from web-based (webinars) to in-classroom and field-based trainings. Audience-specific trainings for different LID subjects are necessary moving forward.
- **Conduct additional research of current providers to review and assess participant evaluations, if feasible.** 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.

⁷ Budget and time permitting.

- **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.

Recommendations for Advancing LID in Washington

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, costs of complying with new regulations, and other issues.** People expressed 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 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 (designers/engineers versus planners/permitters, and operations/maintenance personnel, etc.), and between types of regulated entity (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.



APPENDICES

- A. SESRC Survey questions
- B. Cross-tabulation Figures
- C. Assessment of Current and Potential Low Impact Development Training Programs in Washington State
- D. Current and Potential LID Service Provider Survey questions
- E. Complete list of Jurisdictions and Professional Associations that Responded

The Statewide Low Impact Development Training Needs Assessment Survey

Front end of web instrument: Accessing survey questionnaire and registering:

[Survey Introduction Page]

Welcome to the Statewide Low Impact Development Training Needs Assessment Survey!

The Washington Stormwater Center at Washington State University (WSU) is conducting this survey to:

- a) Determine familiarity with Low Impact Development (LID) principles and practices and
- b) Identify training needs throughout Washington State.

Please note: This is a separate survey from the Current and Potential Low Impact Development Training and Service Provider Survey that some of you may have also received. Both surveys are being carried out as part of a larger effort to develop a comprehensive LID Training Plan for Washington State. More information on the LID program plan development will be posted on the Washington Stormwater Center web site.

Your help in completing this survey will inform the content and format of future LID trainings for stormwater management and ensure that these trainings address YOUR needs in meeting new state and local requirements for the use of LID. New municipal stormwater permits issued by the Washington State Department of Ecology to be implemented in the future, require LID to be used for new developments and redevelopment, unless site conditions are prohibitive. Low impact development (LID), also known as green stormwater infrastructure (GSI), is a stormwater management strategy that can improve flow control, water quality treatment and protection of receiving waters. LID emphasizes the use of existing natural site features integrated with distributed, small-scale stormwater controls to mimic natural drainage processes.

This survey is funded by the Washington State Department of Ecology and should take no more than fifteen to twenty minutes to complete.

Thanks for your help! If you have any questions about the study, or technical difficulties with the survey, please contact study director Bruce Austin at the WSU Social and Economics Sciences Research Center (email: bwaustin@wsu.edu) or phone 1-800-833-0867 and ask for the "Statewide LID Training Needs Assessment Survey".

[LINK TO DEFINITIONS PAGE: LID Training Survey Main Training Topics explanation table.docx]

[REGISTRATION PAGE]

What is your email address? _____

This information will only be used by Washington State University's Social and Economic Sciences Research Center for the purpose of processing this survey and the compilation of data. All contact information will be discarded at the end of the survey analysis .

Please indicate which organization asked you to complete this survey:

[list each organization or source]

Building Industry Association of Washington

Association of Washington Cities

Department of Ecology Stormwater or Water Quality Listserv

Association of Washington Business

Washington State Association of Counties

Local jurisdiction _____

Washington Stormwater Center

Other Professional Association _____

Other _____

Module 1. Classification

Q01. Are you answering this survey for a jurisdiction, business, or organization about the training needs for all employees?

1. Yes
2. No

[Q02 creates a check variable for branching and analyzing level of response, if they answer "Yes" to Q02 then the questions below should include the language for fills FILL1, FILL2 and FILL3:

The language for FILL1:

If they answer "Yes" then FILL1 = "is done by your organization"

If they answer "No" then FILL1 = "you do"]

The language for FILL2:

If they answer "Yes" then FILL2 = "most of your employees"

If they answer "No" then FILL2 = "you"]

The language for FILL3:

If they answer "Yes" then FILL3 = "their"

If they answer "No" then FILL3 = "your"]

Q02. Do you currently supervise or manage employees or workers in your workplace that will need to be familiar with and knowledgeable about stormwater runoff, low impact development (LID) and/or meeting the new regulations for LID?

1. Yes
2. No

Q03. Which best describes the type of organization you represent?

City, county, state, tribal or federal government or jurisdiction	1
Private business	2
Corporation	3
Nonprofit organization	4
Interested citizen	5

Q04. Which best describes the main location of work that [FILL1]?

1. Eastern Washington
2. Puget Sound
3. Other parts of Western Washington
4. Throughout Western Washington
6. Throughout Washington State
7. Outside of Washington State

Q05 [Ask if Q03 = 1 “City, county, state government or jurisdiction”] Which best describes the sub-category of “City, county, state government or jurisdiction” describes your organization?

State Government (Department of Corrections, WSDOT, etc.)	1
County – Covered by the Phase I Municipal Stormwater Permit	2
City– Covered by the Phase I Municipal Stormwater Permit	3
County – Covered by the Western Washington Phase II Municipal Stormwater Permit	4
City– Covered by the Western Washington Phase II Municipal Stormwater Permit	5
County – Covered by the Eastern Washington Phase II Municipal Stormwater Permit	6
City– Covered by the Eastern Washington Phase II Municipal Stormwater Permit	7
Secondary Permittee Covered by a Municipal Stormwater Permit	8
Another Jurisdiction not covered by a Municipal Stormwater Permit	9
Other please specify: _____	10

Q06. Which best describes the main category of work [FILL1]? (based on your answer you will be asked which sub-category describes your work)

Construction / Land development / Building / Remodeling / Landscaping	1
Design / Engineering	2
Permitting / Planning / Land Use or Development Codes	3
Enforcement / Inspection	4
Elected Official / City Manager / Public Works Director / or other City-wide Program Manager	5
Operation / Maintenance	6
Real Estate Sales / Purchasing / Lending	7
Interested citizen	8
Other -please specify _____	9

Q07. [Ask if Q06 =1 "Construction"] Which best describes the sub-category of "Construction / Land development / Building / Remodeling / Landscaping" work that [FILL1]? (Choose all that apply)

Construction specialty areas	CHECK
Large / Heavy Industrial Construction	1
Small / Light Industrial Construction	1
Large Commercial Construction	1
Small Commercial Construction	1
Large Subdivisions or Multi-Family Residential	1
Single Family Residential	1
Landscaping	1

Q08. [Ask if Q06 =1 "Construction"] Which best describes the sub-category of "Construction / Land development / Building / Remodeling / Landscaping" work that [FILL1]? (Choose all that apply)

Construction specialty areas	CHECK
Excavation/Land Clearing/Site Prep- including Equipment Operators	1
Landscaping Contractors/Staff	1
Asphalt Paving Contractors	1
Concrete Construction Firms Paving / Construction	1
Permeable Asphalt Paving	1
Permeable Concrete Paving / Construction	1
Permeable Paver Paving	1
Foundation Contractors/Construction	1
Roofing Contractors/Construction	1
Paving Stone/Concrete	1
Septic System Installer/Installation	1
Water Systems Installer/Installation	1
Painting / Finishing / Dry Walling Installation	1
Plumbing & Electrical contractors/Installation	1
Electrical Installation	1
Concrete, Asphalt, or Permeable Paver Suppliers	1
Composting, Recycling, Soils, Gravel & Sand Distributors/Supplier	1
Building Materials Suppliers	1
Nursery / Plant / Landscaping Supplier owners/staff	1
Landscape Architect / Designer	1

Q09 [Ask if Q06 =2 “Design/Engineering”] Which best describes the sub-category of “Design/Engineering” work that [FILL1]? (Choose all that apply)

Design/Permitting specialty areas	Check
Engineered Building or Site Plans / Specifications	1
Non-engineered Building or Site Plans / Specifications	1
Stormwater Site or Permanent Stormwater Pollution Prevention Plans / Specifications	1
Temporary Erosion & Sediment Control Plans / Specifications	1
Industrial Stormwater Pollution Prevention Plans / Specifications	1
Construction Stormwater Pollution Prevention Plans / Specifications	1
Small & Large On-site Septic System Designs	1
Water Systems Designs	1
Engineering Review of Building or Site Plans / Specifications	1
Non-engineering Review of Building or Site Plans / Specifications	1
Construction Cost Estimating	1
Certified Erosion & Sediment Control Lead (CESCL) Inspections	1
Project Management / Engineer Inspections	1
Other please specify: _____	1

Q10. [Ask if Q06 =2 or 3 “Design/Planning/ Land Use or Development Codes”] Which best describes the sub-category of “Permitting / Planning / Land Use or Development Codes” work that [FILL1]? (Choose all that apply)

Permitting / Planning / Land Use or Development Codes specialty areas	Check
Engineering Review of Building or Site Plans	1
Non-engineering Review of Building or Site Plans	1
Permitting of Building Plans or Site Plans	1
Permitting of Grading / Land Clearing Permits	1
Permitting of Temporary Erosion & Sediment Control Plans or Construction Stormwater Pollution Prevention Plans	1
Permitting of Industrial Stormwater Pollution Prevention Plans	1
Permitting of Septic Systems / Wastewater Treatment Systems	1
Building / Land Use Code Writing or Code Development	1
Critical Areas Code Writing or Code Development	1
Shoreline Management Act Code Writing or Code Development	1
Zoning / Land Use / Long-term Jurisdictional Planning	1
Zoning / Land Use / Short-term Jurisdictional Planning	1
Stormwater Management Program Planning	1
Watershed Management or Water Resources Planning	1
Other please specify: _____	1

Q11. [Ask if Q06 =4 “Enforcement/Inspection”] Which best describes the sub-category of “Enforcement/Inspection” work that [FILL1]? (Choose all that apply)

Enforcement/Inspection specialty areas	Check
Building Code / Land Development Code Enforcement	1
Construction Inspection / Enforcement	1
Certified Erosion & Sediment Control Lead (CESCL) Inspections / Enforcement	1
Building Inspection / Enforcement	1
Utility Inspection / Enforcement	1
Stormwater Management or Water Quality Inspections / Enforcement	1
Plumbing Inspections / Enforcement	1
Electrical Inspection / Enforcement	1
Fire Marshal Inspections / Enforcement	1
Other please specify: _____	1

Q12 [Ask if Q06 = 6 “Operation/Maintenance”] Which best describes the sub-category of “Operation/Maintenance” work that [FILL1]?

Operations /Maintenance specialty areas	Check
Stormwater Management Program Manager/Planner	1
Parks Maintenance	1
Facilities Maintenance	1
Landscape Maintenance	1
Utility Maintenance	1
Stormwater facilities/ system Maintenance	1
Ferries and Airport Maintenance	1
Public Works Director/Manager	1
Road Maintenance	1
Asset Management	1
Other please specify: _____	1

Q13. [Ask if Q06 = 5 “Elected Official / City Manager / Public Works Director / or other City-wide Program Manager”] Which best describes the sub-category of “Elected Official / City Manager / Public Works Director / or other City-wide Program Manager” work that [FILL1]?

Management specialty areas	Check
City or County Elected Official	1
City or County Manager	1
State House and Senate Members	1
Attorney / Legal Counsel	1
Public Works Director	1
Planning Commissioner or Board Member	1
Stormwater Management Program Manager	1
Maintenance Staff Manager	1
Facilities Manager	1
Water Quality or Water Resources Program Manager	1
Policy Manager / Director	1
Port Officials/Staff	1
Other please specify: _____	1

Q14. [Ask if Q06 = 8 “Interested Public Citizen”] Which best describes the sub-category of “Interested Citizen” work that [FILL1]?

Interested Citizen/Business	Check
University Researcher or Extension	1
University student	1
Concerned Citizen	1
Member of a Environmental or Service Group	1
Other please specify: _____	1

Q15. [Ask if Q06 = 7 “Real Estate Sales / Purchasing / Lending”] Which best describes the sub-category of “Real Estate Sales / Purchasing / Lending” work that [FILL1]?

Real Estate Sales / Purchasing / Lending	Check
Lender/ Banker	1
Realtor	1
Real Estate Investor	1
Other please specify: _____	1

[Q1J---VARIABLE CALCULATION for analysis only. What is the industry respondent is most associated with? (use NAICS Classification --[use 2 digit or 3 digit group categories see list below last page for for references. 23=construction; 56=waste management; 54=professional services (engineering, architecture, inspection, landscape).

If Q1A construction=yes; Design/permitting =yes; Enforcement/Inspection=yes; Management=yes; Operation/Management=yes; Assign NAICS 2 digit code 23-Construction; Otherwise=Other.]

Q16. How many years experience do you have in your current area of work or industry?

1. < 3 years
2. Over 3 years to 5 years
3. Over 5 years to 10 years
4. Over 10 years to 20 years
5. Over 20 years

Module 2 Training Needs

Q17. New municipal stormwater permits issued by Ecology to be implemented in the future, require LID to be used for new developments and redevelopment, where feasible. Low impact development (LID) is a stormwater management strategy that emphasizes conservation and the use of existing natural site features integrated with distributed, small-scale stormwater controls to more closely mimic natural hydrologic patterns in residential, commercial, and industrial settings. LID can also be referred to as Green Stormwater Infrastructure (GSI). In this survey we will be using the term LID in most instances.

Prior to this survey have [FILL2] ever heard of the term Low Impact Development (LID) or Green Stormwater Infrastructure (GSI)?

1. Yes
2. No

Q18. [Ask if Q17 = 1 “Yes”]. Have [FILL2] ever worked on a project that implemented some type of LID Best Management Practice (BMP), Green Stormwater Infrastructure (GSI), LID Principle, or LID facility?

1. Yes, Please Provide an estimated # of Projects you have worked on that implemented some type of LID Best Management Practice (BMP), Green Stormwater Infrastructure (GSI), LID Principle, or LID facility.
2. I have not worked on a project that implemented some type of LID Best Management Practice (BMP), Green Stormwater Infrastructure (GSI), LID Principle, or LID facility.
3. I have worked on a project where some type of LID Best Management Practice (BMP), Green Stormwater Infrastructure (GSI), LID Principle, or LID facility was considered but not implemented.

Q19. [Ask if Q18 = 1 OR 3] How often do [FILL2] usually implement some type of LID Best Management Practice (BMP), Green Stormwater Infrastructure (GSI), LID Principle, or LID facility on your projects?

1. Usually do not consider of implement LID
2. Considered but do not usually use LID
3. Use LID on less than half of my projects
4. LID for more than half of my projects
5. Use LID on all of my projects

Q20. *The Washington State Department of Ecology issues Municipal Stormwater Permits to designated cities and counties in Washington State.*

Are [FILL2] familiar with or know about the Municipal Stormwater Permits?

1. Yes
2. No

Q21. [Ask if Q20 = 1]. *The Washington State Department of Ecology reissued the Municipal Stormwater Permits that will be implemented by permitted communities within the next few years. The use of LID, where feasible, will be required for all new developments and redevelopments.*

Are you familiar with or know about these new LID Municipal Stormwater Permit Regulations?

1. Yes
2. No

Q22. *Many cities and counties in Washington State are required to, plan to, or already have implemented LID requirements within their local codes. If you work in multiple jurisdictions please answer the following 3 questions based on the jurisdiction that will trigger your training needs.*

How would [FILL2] BEST describe [FILL3] familiarity regarding local LID codes or requirements?

1. My local jurisdiction has already implemented some LID codes / requirements. Am familiar with / have a good understanding of these LID codes / requirements.
2. My local jurisdiction has already implemented some LID codes / requirements. However, not familiar with these LID codes / requirements.
3. My local jurisdiction plans to implement some LID codes / requirements. Am familiar with LID concepts and potential requirements.
4. My local jurisdiction plans to implement some LID codes / requirements. However, not familiar with LID concepts and potential requirements
5. Not aware if my local jurisdiction has or plans to implemented some LID codes / requirements.

Q23. [Ask if Q22 = 1, 2 or 3]. **When does your local jurisdiction plan to implement the 2012 Stormwater Management Manual for Western Washington (or an equivalent Stormwater Management Manual)?**

1. My local jurisdiction has already adopted the 2012 Stormwater Management Manual for Western Washington.
2. On schedule with the dates / requirements in the Municipal Stormwater Permit(s).
3. Sooner than is required in the Municipal Stormwater Permit(s). Please provide date or year if known. _____
4. I don't know / not sure.

Q24. If your local jurisdiction implemented- or will implement- stormwater requirements that make LID required where feasible for development and redevelopment projects, how would you BEST describe how these new requirements will affect you or your organization?

1. LID regulations will directly affect my work.
2. LID regulations will impact the work of employees I supervise or manage.
3. BOTH, LID regulations will directly affect my work activities and the work of the employees I supervise/manage.
4. LID regulations will indirectly affect my work or the work of employees I supervise/manage.
5. I don't think these LID requirements will affect my work or my employees' work activities.

[If Q24=4 or 5 then skip to QLAST end of survey, Thank You statement]

Q25. *The legislature is providing funding to ensure that both public and private entities involved in stormwater management and land use development have the necessary skills and knowledge to comply with upcoming LID requirements for new and redevelopment projects as established in updated Municipal Stormwater Permits. To assist with the development of training content, please identify the current level of LID expertise, tell us what level of instruction you believe [FILL2] will need in a training course(s), and prioritize each topic listed below to provide [FILL2] with the knowledge and skills necessary to help comply with the new LID requirements.*

[Programmer: Pop-up window with definitions to be added - DEFINITIONS PAGE: LID Training Survey Main Training Topics explanation table.docx]

Main Training Topics	Current Level of LID Expertise			What level of instruction is needed to meet training needs?			Priority?		
	intro	Mid	Advanced	Intro	Midlevel	Advanced	Low	Medium	High
Overall understanding of the purpose of LID (<i>Impacts of urbanization on watersheds; goals and objectives of LID practices, definition of LID</i>)	1	2	3	1	2	3	1	2	3
Technical LID concepts (<i>,Best Management Practices</i>)	1	2	3	1	2	3	1	2	3
Bioretention areas	1	2	3	1	2	3	1	2	3
Rain Gardens	1	2	3	1	2	3	1	2	3
Permeable Paving (including asphalt, concrete, and pavers)	1	2	3	1	2	3	1	2	3
Vegetated/Green Roofs	1	2	3	1	2	3	1	2	3
Rainwater collection systems	1	2	3	1	2	3	1	2	3
Site Assessment	1	2	3	1	2	3	1	2	3
Site Planning and layout	1	2	3	1	2	3	1	2	3
LID Resources (including the DOE Stormwater Management Manual and LID Technical Guidance Manual for Puget Sound)	1	2	3	1	2	3	1	2	3
Hydrologic Modeling	1	2	3	1	2	3	1	2	3
Compost Amended Soils	1	2	3	1	2	3	1	2	3
Regulatory/Current Issues related to LID (<i>NPDES stormwater permit requirements, etc.</i>)	1	2	3	1	2	3	1	2	3

Q26 [Ask if Q25 Bioretention priority = 2 or 3] Which bioretention sub-topics would [FILL2] most like to be offered in trainings and what level of instruction is needed to meet [FILL3] training needs?

Bioretention sub-topics	Current Level of LID Expertise			What level of instruction is needed to meet training needs			Priority?		
	Intro	Mid	Adv	Intro	Mid	Adv	Low	Medium	Adv
Siting	1	2	3	1	2	3	1	2	3
Design / Sizing / Modeling	1	2	3	1	2	3	1	2	3
Construction	1	2	3	1	2	3	1	2	3
Plant Selection	1	2	3	1	2	3	1	2	3
Bioretention soil media design	1	2	3	1	2	3	1	2	3
Site assessment	1	2	3	1	2	3	1	2	3
Water quality treatment	1	2	3	1	2	3	1	2	3
Inspection and verification	1	2	3	1	2	3	1	2	3
Operations and maintenance	1	2	3	1	2	3	1	2	3
	1	2	3	1	2	3	1	2	3
	1	2	3	1	2	3	1	2	3
Current research on flow control and water quality treatment performance	1	2	3	1	2	3	1	2	3

Q27 [Ask if Q25 Permeable Paving priority= 2,3] Which Permeable pavement sub topics would [FILL2] most like to be offered in trainings and what level of instruction is needed to increase [FILL3] knowledge?

Permeable Paving sub-topics	Current Level of LID Expertise			What level of instruction is needed to meet training needs			Priority?		
	Intro	Mid	Adv	Intro	Mid	Adv	Low	Medium	High
Siting	1	2	3	1	2	3	1	2	3
Design / Sizing / Modeling	1	2	3	1	2	3	1	2	3
Construction	1	2	3	1	2	3	1	2	3
Pervious Pavement Materials	1	2	3	1	2	3	1	2	3
Site Assessment	1	2	3	1	2	3	1	2	3
Water quality treatment	1	2	3	1	2	3	1	2	3
Inspection and verification	1	2	3	1	2	3	1	2	3
Operations and maintenance	1	2	3	1	2	3	1	2	3
Current research on flow control and water quality treatment performance	1	2	3	1	2	3	1	2	3

Q28 [Ask if Q25 Vegetated/Green Roofs priority=2,3] Which Vegetated/Green Roof sub-topics would [FILL2] most like to be offered in trainings and what level of instruction is needed to increase [FILL3] knowledge?

Vegetated/Green Roofs	Current Level of LID Expertise			What level of instruction is needed to meet training needs?			Priority?		
	Intro	Med	Adv	Intro	Med	Adv	Low	Medium	High
Design / Sizing / Modeling	1	2	3	1	2	3	1	2	3
Construction	1	2	3	1	2	3	1	2	3
Plants and engineered growth media	1	2	3	1	2	3	1	2	3
Water quality treatment	1	2	3	1	2	3	1	2	3
Inspection and verification	1	2	3	1	2	3	1	2	3
Operations and maintenance	1	2	3	1	2	3	1	2	3
Current research on flow control and water quality treatment performance	1	2	3	1	2	3	1	2	3

Q29 [Ask if Q06A Roof rainwater collection systems priority=2,3] Which Roof rainwater collection systems sub topics would [FILL2] most like to be offered in trainings and what level of instruction is needed to increase [FILL3] knowledge?

Roof rainwater collection systems sub-topics	Current Level of LID Expertise			What level of instruction is needed to meet training needs?			Priority?		
	Intro	Med	Adv	Intro	Med	Adv	Low	Medium	High
Siting	1	2	3	1	2	3	1	2	3
Design / Sizing / Monitoring	1	2	3	1	2	3	1	2	3
Construction	1	2	3	1	2	3	1	2	3
Water quality treatment (including for potable water use)	1	2	3	1	2	3	1	2	3
Inspection and verification	1	2	3	1	2	3	1	2	3
Operations and maintenance	1	2	3	1	2	3	1	2	3
Current research on flow control and water quality treatment performance	1	2	3	1	2	3	1	2	3

Q30 [Ask if Q25 Site Assessment priority =2, 3] Which Site Assessment sub-topics would [FILL2] most like to be offered in trainings and what level of instruction is needed to increase [FILL3] knowledge?

Site Assessment sub-topics	Current Level of LID Expertise			What level of instruction is needed to meet training needs			Priority?		
	Intro	Mid	Adv	Intro	Mid	Adv	Low	Medium	High
Construction Stormwater Site Pollution Prevention Plans (SWPPPs)	1	2	3	1	2	3	1	2	3
Permanent Stormwater site plans	1	2	3	1	2	3	1	2	3
Soil Analysis, infiltration tests, and characterization	1	2	3	1	2	3	1	2	3
Hydrologic patterns and features	1	2	3	1	2	3	1	2	3
Native forest and soil conservation areas	1	2	3	1	2	3	1	2	3
Wetlands	1	2	3	1	2	3	1	2	3
Riparian management areas	1	2	3	1	2	3	1	2	3
Streams	1	2	3	1	2	3	1	2	3
Flood plains	1	2	3	1	2	3	1	2	3
Sub-basin delineation	1	2	3	1	2	3	1	2	3
Site mapping process	1	2	3	1	2	3	1	2	3

Q31 [Ask if Q25 Site Planning and Layout priority =2,3] Which Site Planning and Layout sub-topics would [FILL2] most like to be offered in trainings and what level of instruction is needed to increase [FILL3] knowledge?

Site Planning and Layout sub-topics	Current Level of LID Expertise			What level of instruction is needed to meet training needs			Priority?		
	Intro	Mid	Adv	Intro	Mid	Adv	Low	Medium	High
Choosing Stormwater Management BMPs	1	2	3	1	2	3	1	2	3
Site preparation and compaction problems	1	2	3	1	2	3	1	2	3
Protecting native soils, vegetation, and existing LID	1	2	3	1	2	3	1	2	3
Tree management	1	2	3	1	2	3	1	2	3
Sediment and erosion control	1	2	3	1	2	3	1	2	3
Construction planning and sequencing	1	2	3	1	2	3	1	2	3
Site inspection	1	2	3	1	2	3	1	2	3
Road crossings	1	2	3	1	2	3	1	2	3
Lot layout	1	2	3	1	2	3	1	2	3
Building Design	1	2	3	1	2	3	1	2	3

Q32 [Ask if Q25 Regulatory/Current Issues Related to LID priority = 2, 3] Which Regulatory/Current Issues Related to LID sub-topics would [FILL2] most like to be offered in trainings and what level of instruction is needed to increase [FILL3] knowledge?

Regulatory/Current Issues sub-topics	Current Level of LID Expertise			What level of instruction is needed to meet training needs?			Priority?		
	Intro	Mid	Adv	Intro	Mid	Adv	Low	Medium	High
NPDES Stormwater permit requirements, including new requirements for LID	1	2	3	1	2	3	1	2	3
How to comply with technical requirements for operations and maintenance	1	2	3	1	2	3	1	2	3
Reviewing plans and specifications with LID BMPs or techniques	1	2	3	1	2	3	1	2	3
Stormwater site and subdivision code and ordinance writing.	1	2	3	1	2	3	1	2	3
General Development code writing and ordinance development	1	2	3	1	2	3	1	2	3

Q33 [Ask if Q25 Compost Soil amendment priority = 2, 3] Which Compost Soil Amendment sub-topics would [FILL2] most like to be offered in trainings and what level of instruction is needed to increase [FILL3] knowledge?

Compost Amended Soils sub topics	Current Level of LID Expertise			What level of instruction is needed to meet training needs?			Priority?		
	Intro	Mid	Adv	Intro	Mid	Adv	Low	Medium	High
Methods	1	2	3	1	2	3	1	2	3
Developing a soil management plan	1	2	3	1	2	3	1	2	3
Construction sequencing	1	2	3	1	2	3	1	2	3

Q34 Which LID RESOURCES would [FILL2] most like to be trained on and what level of instruction is needed to meet [FILL3] training needs?

LID Resources topics	Current Level of LID Expertise			What level of instruction is needed to meet training needs?			Priority?		
	Intro	Mid	Adv	Intro	Mid	Adv	Low	Medium	High
WA Dept of Ecology's 2012 Stormwater Management Manual for Western Washington	1	2	3	1	2	3	1	2	3
WA Dept of Ecology's 2005 Stormwater Management Manual for Western Washington	1	2	3	1	2	3	1	2	3
WA Dept of Ecology's Stormwater Management Manual for Eastern Washington	1	2	3	1	2	3	1	2	3
LID Technical Guidance Manual for Puget Sound	1	2	3	1	2	3	1	2	3
Integrating LID into Local Codes: A Guidebook for Local Governments	1	2	3	1	2	3	1	2	3
Rain Garden Handbook For Western Washington Homeowners	1	2	3	1	2	3	1	2	3
Eastern Washington LID Technical Manual	1	2	3	1	2	3	1	2	3
Outreach and Communications to ensure successful LID efforts (Messaging, Social Marketing, Existing Outreach Materials)	1	2	3	1	2	3	1	2	3
Construction Erosion & Sediment Control Lead (CESCL) Program	1	2	3	1	2	3	1	2	3
Available Priority Systems	1	2	3	1	2	3	1	2	3
Costs associated with LID (<i>costs and benefits of LID compared to conventional stormwater management</i>)	1	2	3	1	2	3	1	2	3

Q35. Are there any other LID training topics [FILL2] would like to see covered that we have not asked about?

1. Yes--→ [\[go to open ended comment box on same screen leave space for at least 250 characters\]](#)
2. No

Q36. [\[Ask if Q02 = 2 No \(supervise or manage employees\)\]](#) Please describe the most useful component or topic to you personally for meeting LID requirements? *Please feel free to talk about more than one workshop if needed.*

[\[Open Ended Comment Box\]](#)

Q37. [Ask if Q02 = 1 Yes (supervise or manage employees)] For the employees you supervise or manage, please describe what would be the most useful LID training components or topics for them to further develop their work skills in a way that helps your business meet the new LID requirements?
 [Open Ended Comment Box]

Q38. Are there any other topics or skills trainings you would like to see offered as part of the Low Impact?
 [Open Ended Comment Box]

Q39. Are there any low impact development (LID) topics that are particularly relevant to your work or business that we have not asked about? ?
 [Open Ended Comment Box]

Module 3. Opinions (Attitude, Beliefs, Current Behaviors)

Q40 How much concern do you have with each issue regarding low impact development?

	How much concern do you have with this issue?				
	None	Slight	Moderate	A lot	Extreme
A. Feasibility / Infeasibility of LID	1	2	3	4	5
B. Cost of implementation / construction	1	2	3	4	5
C. Cost of Maintenance	1	2	3	4	5
D. Cost of complying with new LID requirements	1	2	3	4	5
E. Operations & Maintenance	1	2	3	4	5
F. Access to Private Property for Inspections / Maintenance	1	2	3	4	5
G. Safety	1	2	3	4	5
H. Effectiveness	1	2	3	4	5
I. Aesthetics	1	2	3	4	5
J. Lack of training	1	2	3	4	5
K. Design Standards	1	2	3	4	5
L. Designer/Engineer/Builder Knowledge	1	2	3	4	5
M. Liability	1	2	3	4	5
N. Public Perception/Community opposition	1	2	3	4	5
O. Lack of management support for LID	1	2	3	4	5

Q41. Which ONE issue (A-J) above is your biggest concern regarding low impact development? (Write the letter in the blank below)

_____ Letter from Q13 above

Q42. How much do you think implementing low impact development Best Management Practices (BMPs) and Principles will improve water quality in Washington State?

- 1=Not at all
- 2=A small improvement
- 3=Moderate improvement
- 4=Quite a lot of improvement
- 5= Tremendous improvement

Q43. In your opinion how important is low impact development for preserving the environment and protecting the ecosystem?

- 1. Not at all important
- 2. Slightly important
- 3. Moderately important
- 4. Very important
- 5. Extremely important

Q44. How interested are you in hearing more about this issue of low impact development and new regulations?

- 1. Not interested at all
- 2. Slightly interested
- 3. Moderately interested
- 4. Very interested
- 5. Extremely interested

Q45. What do you think is the main reason that low impact development techniques or BMPs are not currently used for development or redevelopment?

[Open Ended Comment Box]

Q46. For the following statement, please indicate how much you agree or disagree. "The value of the surrounding ecosystem is worth the time and effort it takes to protect it by using low impact development best management practices"

- 1=Do Not Agree at All
- 2= Slightly Agree
- 3=Moderately Agree
- 4=Very Much Agree
- 5= Completely Agree.

Q47. Does the business or organization you work for have someone specifically assigned to ensure stormwater management practices are enforced and that they meet the local codes or ordinances at each construction, building, or project work site?

Yes-→ **Q47A. What is this person's job title?** _____
No

Q48. What LID techniques or BMPs do [FILL2] currently use, have installation, operation, or maintenance responsibilities related to, or have influence over in your current position, if any?

	Yes	No
Rain Gardens	1	2
Vegetated Roofs	1	2
Bioretention facilities	1	2
permeable pavement	1	2
water re-use on site	1	2
Minimal excavation foundations	1	2

Check here if None of the above

Module 4: Support for LID Training (Contingent Valuation Questions)

Q49. How soon do you anticipate that [FILL2] will need training on LID?

1. Immediately, need LID training now.
2. Before my local jurisdiction adopts LID requirements or before the dates / requirements in the Municipal Stormwater Permit(s).
3. When my local jurisdiction adopts LID requirements or on schedule with the dates / requirements in the Municipal Stormwater Permit(s).
4. Don't know / not sure.

Q51. Please rate the amount of time [FILL2] are willing to spend to attend low impact development training? Assume that the training topic applies to your profession and is of interest to [FILL2].

	No	Maybe	Yes
Half day	1	2	3
Full day	1	2	3
2-3 hour Evening Class	1	2	3
Two Day Class	1	2	3
Three Day Class	1	2	3
Week Long Class	1	2	3
Other: Please describe	1	2	3
[Open ended Comment Box]			

Q52. Do you think Owners, Managers, and/or Executive Leaders at your company, the business or organization you work for will be motivated by the new requirements to support employee training in order to meet low impact development and storm water regulations?

1. Yes
2. No

Q53. If your employer supported and approved taking work time for training, how likely would [FILL2] be willing to travel to attend a low impact development training at each location?

	Not at all	Probably	Most Definitely
Aberdeen	1	2	3
Bellingham	1	2	3
Ellensburg	1	2	3
Everett	1	2	3
Moses Lake	1	2	3
Mount Vernon	1	2	3
Olympia	1	2	3
Port Angeles	1	2	3
Seattle	1	2	3
Tacoma	1	2	3
Vancouver WA	1	2	3
Yakima	1	2	3
Spokane	1	2	3
Wenatchee	1	2	3
Tri-Cities	1	2	3

Q54. Please rate how far [FILL2] would be willing to travel to attend an LID training. Assume that the training topic applies to your profession and is of interest to [FILL2].

	Not Likely	Possibly	Very Likely
0 miles, Online Training	1	2	3
Less than 20 miles	1	2	3
20-30 miles	1	2	3
30-60 miles	1	2	3
60-80 miles	1	2	3
80-120 miles	1	2	3
More than 120 miles	1	2	3

Q55. [Ask if Q02 =1 Yes] Would you be willing to support PAID work time for your employees responsible for LID requirements to attend training?

1. Yes
2. No

Q56. [Ask if Q55 = 1 Yes] How much paid work time on average would you be willing to allow for each employee to attend one LID training session?

	Not at all	Probably	Most Definitely
Less than 3 hours	1	2	3
Over 3 hours up to 4 hours	1	2	3
Over 4 hours up to 6 hours	1	2	3
Over 6 hours up to 8 hours	1	2	3
Two days	1	2	3
Three days	1	2	3
More than three days	1	2	3

Q57. [Ask if Q02=1 Yes] At the location where you work what percent of or what number of employees need LID training?

_____percent of employees or _____number of employees

Q58. Please rate the level of LID training needed for each type of staff in your organization or community? Assume the training topics would apply appropriately to the staff type. (For example Engineers would be receiving training on designing / reviewing site plans using LID; whereas maintenance works would receive training on maintaining LID facilities.) If a type of staff does not apply to your organization / community or you aren't sure what type of training is needed for this staff type please answer N/A.

Staff Type	Introductory	More than Introductory but less than Advanced	Advanced	N/A
Engineers	1	2	3	4
Permit Writer / Reviewers / Planners	1	2	3	4
Operations / Maintenance / Landscaping Crew Members	1	2	3	4
Operations / Maintenance / Landscaping Supervisors	1	2	3	4
Elected Officials / Upper Level Policy Management	1	2	3	4
Inspectors / Enforcement Officials	1	2	3	4
Fire Marshals	1	2	3	4
General Public / Citizens	1	2	3	4
Builders / Developers	1	2	3	4
Real Estate Brokers, etc.	1	2	3	4

Q59. What types of topics should be included in the most advanced, in-depth, or complex LID trainings?

[Open Ended Comment Box]

Q60. Would you like to have one day of a training dedicated to demonstrations in the field, site visits, and/or to special LID research facilities or attractions as part of this training, if it was appropriate to the topic?

1. Yes
2. No

Q61. Are you interested and qualified to provide LID training services for the LID training now being developed?

1. Yes-----→ Q62
2. No

Q62. Please provide your areas of expertise and contact information so we may contact you.

[Open Ended Comment Box]

Q63. [Ask if Q24 = 1, 2, 3] How soon would you [FILL2] need to begin LID training services to best suit your needs?

1. Within the next 3 months
2. Within the next 4 months to 9 months
3. Within the next year
4. Within the next two years
5. Within the next four years

End Module: For statistical analyses

Q64. Does the business you work for have more than one physical location?

1. Yes
2. No

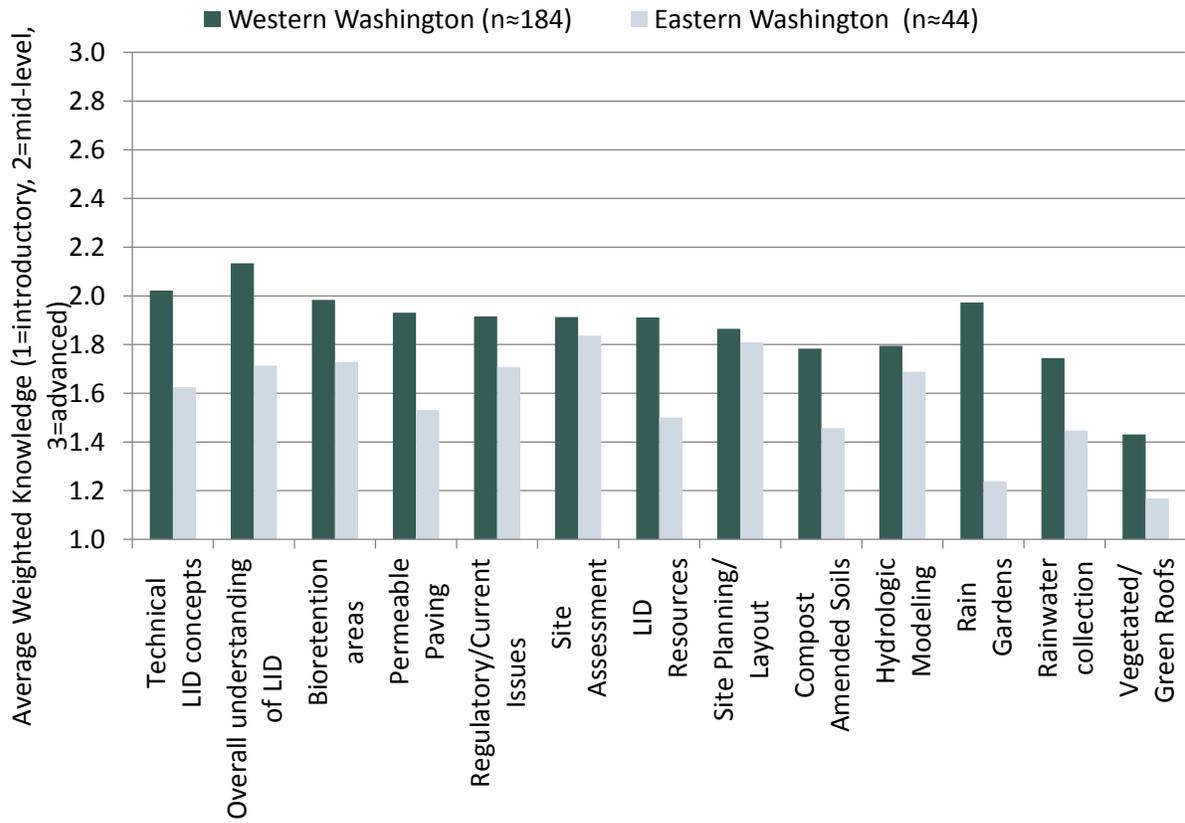
Q65. To help gauge the impact of this training on servicing future jobs, how many positions in your organization will have individuals retiring, leaving or coming open where new hires to these positions will need LID training? (Please give your best estimate)

_____ Number of open positions in the next 5 years
_____ Number of open positions in the next 10 years

QLAST. Thank you statement and final comments.

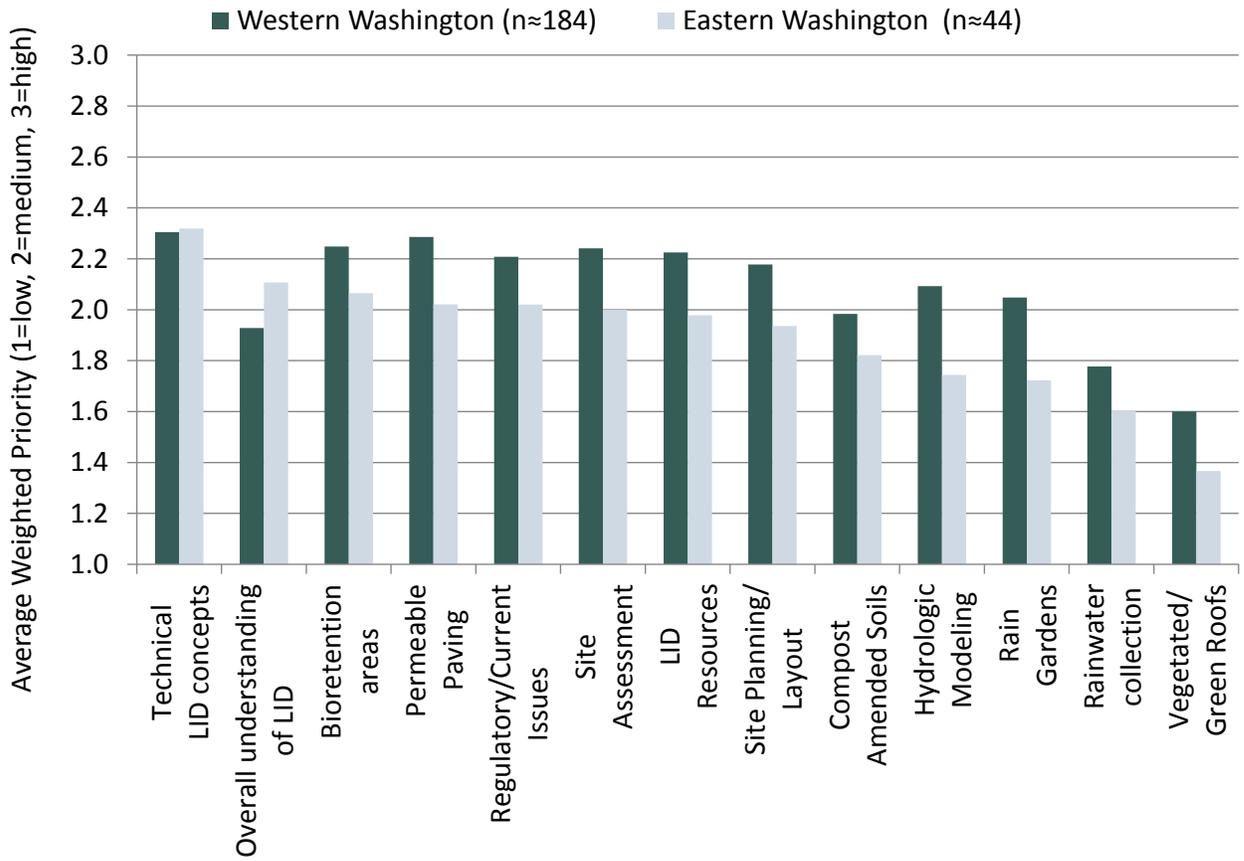
Cross-tabulation Figures

Figure B-1. Comparison of average self-reported current knowledge among Western and Eastern Washington responders



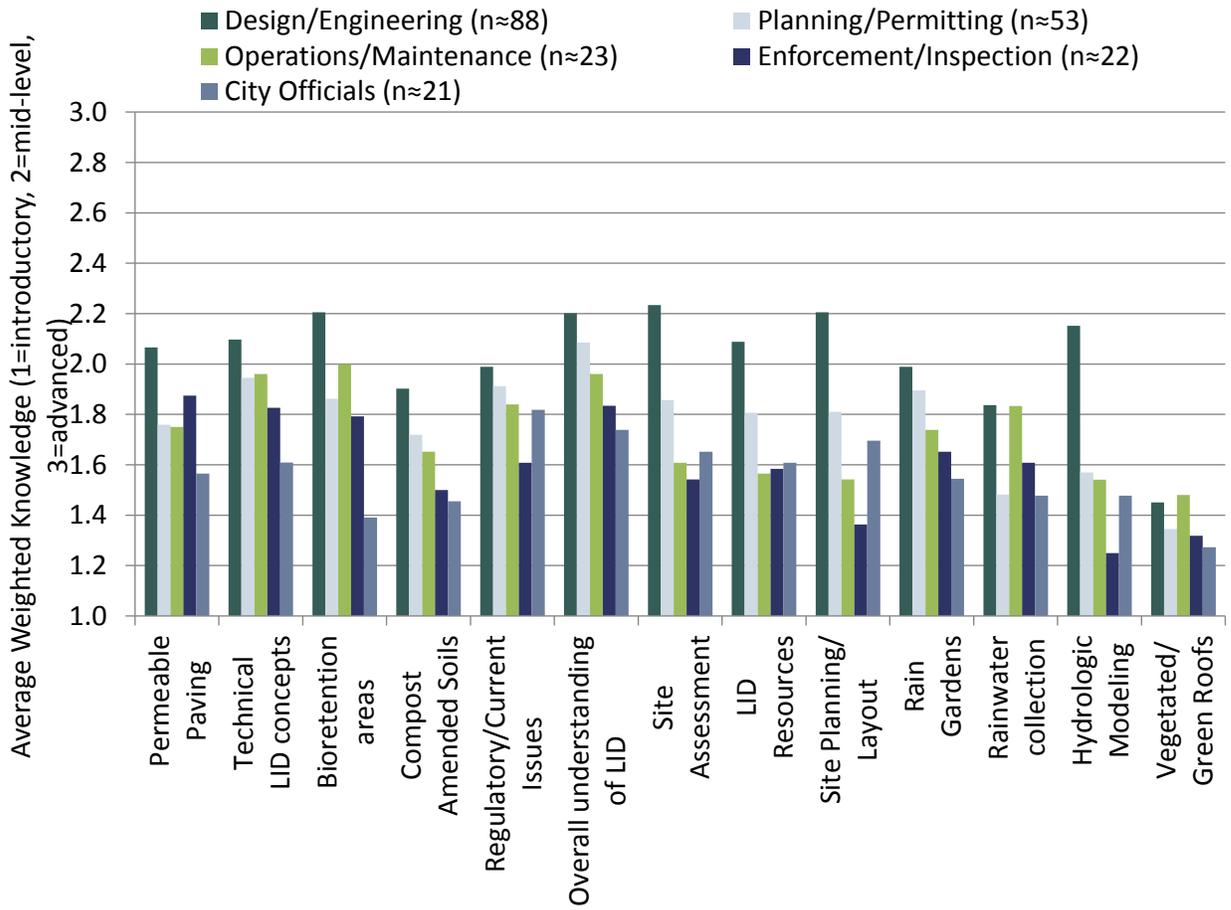
Cross-tabulation Figures

Figure B-2. Comparison of priority among Western and Eastern Washington responders



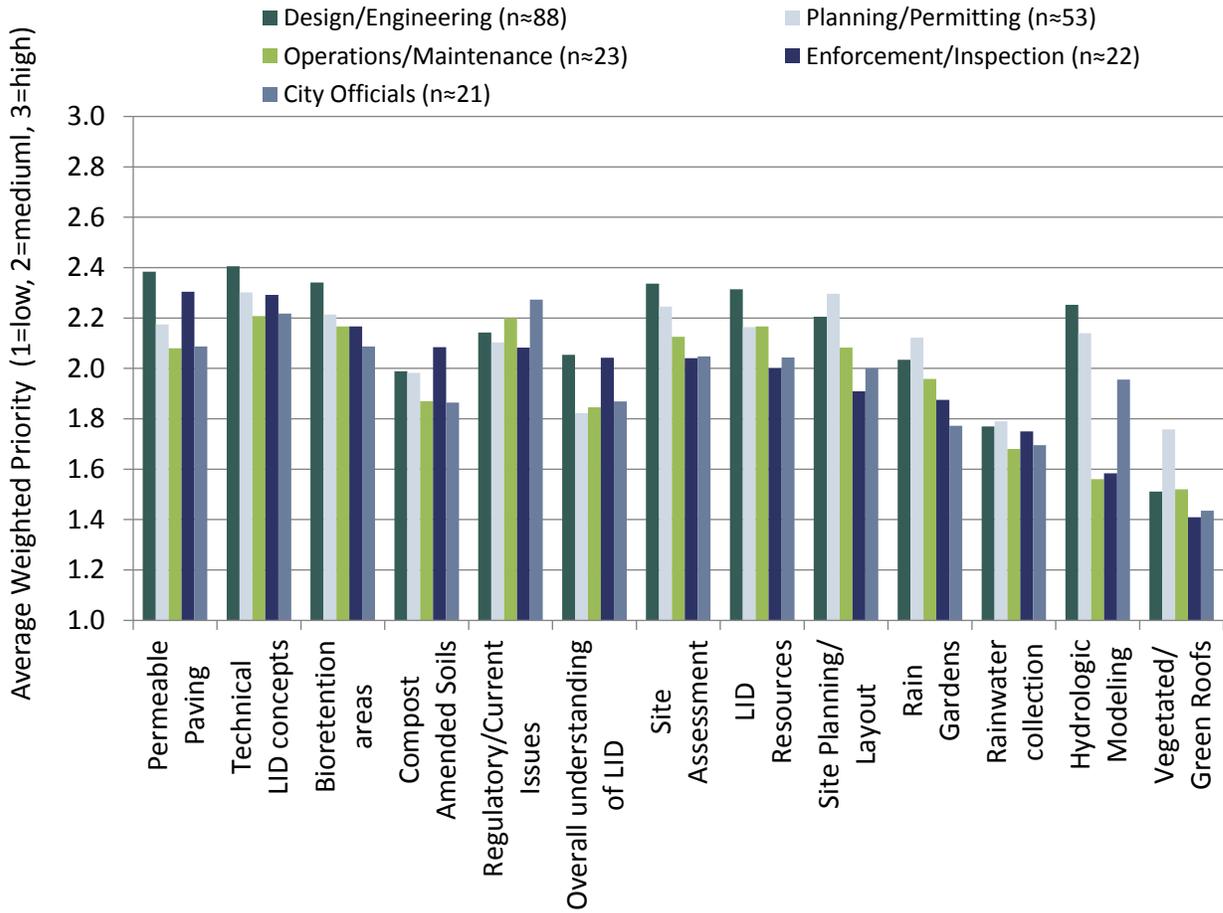
Cross-tabulation Figures

Figure B-3. Comparison of average self-reported current knowledge, by category of work



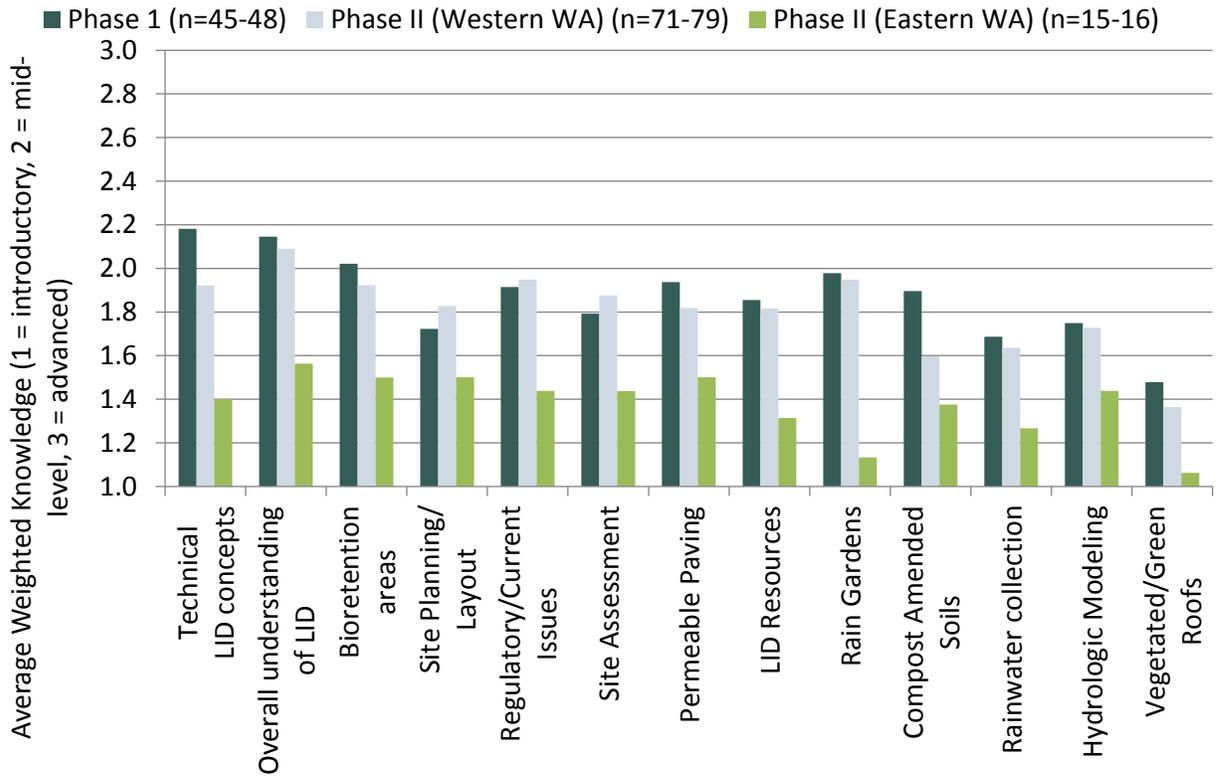
Cross-tabulation Figures

Figure B-4. Comparison of average priority ratings among responders, by category of work



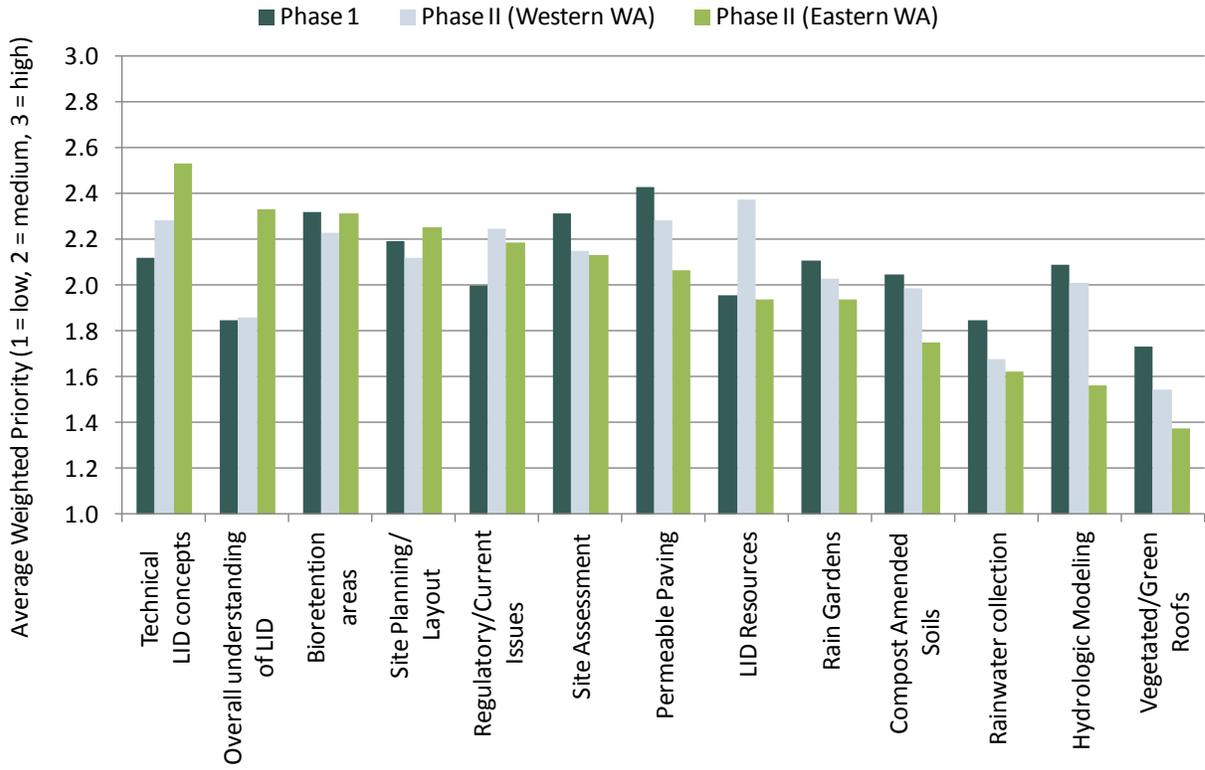
Cross-tabulation Figures

Figure B-5. Comparison of average self-reported current knowledge by government-sector responders, by NPDES permit type



Cross-tabulation Figures

Figure B-6. Comparison of average priority rating among government-sector responders, by NPDES permit type



Assessment of Current and Potential LID Training Programs in WA

Washington Stormwater Center, WSU Research and Extension Center
and Washington State Department of Ecology

DRAFT: Assessment of Current and Potential Low Impact Development (LID) Training Programs in Washington State



Prepared by:



December 28, 2012

Table of Contents

EXECUTIVE SUMMARY2

BACKGROUND AND OVERVIEW4

HIGHLIGHTS5

 CURRENT PROVIDERS 5

 POTENTIAL PROVIDERS 5

KEY FINDINGS ON CURRENT PROVIDERS.....7

 AUDIENCE 7

 TRAINING LEVELS, TOPICS, AND FORMAT..... 8

 INSTRUCTORS..... 9

 FUNDING SOURCES 9

 MARKETING..... 9

 EVALUATION DATA 9

 WILLINGNESS, OPPORTUNITIES, AND NEEDS TO EXPAND TRAININGS 10

KEY FINDINGS ON POTENTIAL PROVIDERS11

 LIKELY AUDIENCE AND TRAINING TOPICS 11

 PRIOR EXPERIENCE AND ASSISTANCE NEEDED TO BEGIN TRAININGS..... 11

SUMMARY AND NEXT STEPS12

Assessment of Current and Potential LID Training Programs in WA

EXECUTIVE SUMMARY

New municipal stormwater permits issued by the Washington State Department of Ecology (Ecology) require Low Impact Development (LID) to be used for new developments and redevelopment unless site conditions are prohibitive. Public and private sector professionals in a variety of fields related to development are expected to need additional training to meet these requirements. Consequently, Ecology engaged the Washington Stormwater Center, Veda Environmental, and Cascadia Consulting Group to develop a detailed LID Training Plan (Plan) to ensure adequate training is available on LID techniques.

This report summarizes the key findings of a web-based survey conducted to inform the development of the Plan. The web-based survey, whose target audiences included both current and potential LID Service Providers, was designed to a) better understand the current capacity of existing LID training programs in Washington State to meet increased demands for training and b) identify entities interested in and positioned to be providers of LID training. The survey addressed a variety of core topic areas. For current providers, these included (but weren't limited to): geographic focus of LID Training programs; level of LID training provided; target audiences; topics covered by trainings; evaluation techniques; willingness to expand programs; and incentives/support needed for expansion. For potential providers, these included (but were not limited to): geographic focus of work; level of interest in providing LID trainings; incentives/support needed to provide trainings; and level of expertise/experience with LID topics.

Of the 87 survey responses received, 75 were submitted by the deadline and are reflected in this report. Of these 75, **43 (57%) are current providers** of LID Training Programs, and **32 (43%) are potential providers** of LID Training Programs. Numerous favorable comments regarding Ecology's efforts to develop an LID Training Plan were received, including "We are happy to have this survey started. Projects fail due to a lack of training. We believe that LID can only be successful if it is tied to training."

Key findings from the web-based survey include:

Current providers

- 37% are public entities; 32% are private entities; 20% are universities/colleges; 11% are "other".
- 50% work primarily in the Puget Sound region; fewer than 5% work in E. Washington.
- The vast majority of LID Training programs offered are geared towards construction/building/engineering audiences. Very few programs are geared towards operations/maintenance or enforcement/inspection.
- Most programs are introductory/mid-level; fewer than 1/3 are advanced.

Potential providers

- 55% are public entities; 19% are private entities; 15% are universities/colleges; and 11% are "other".
- 35% work primarily in the Puget Sound region; 25% work primarily in E. Washington.
- Approximately 1/3 have "lots" of experience with trainings and workshops; 41% have "some".

Key recommendations and next steps identified as a result of this survey include:

- The majority of current LID Training programs are in the Puget Sound region. However, **25% of potential LID providers work primarily in Eastern Washington, making expansion of programs to that region feasible utilizing existing networks.**

Assessment of Current and Potential LID Training Programs in WA

- Of interested potential providers who responded to the survey, **over 70% are public sector entities, including community and technical colleges.**
- Current providers are primarily offering trainings in four topic areas: General LID Information; Bioretention; Permeable Paving; and Site Planning. Potential Providers expressed greatest interest in providing training in: General LID Information; Bioretention and Permeable Paving. **In developing an LID Training Plan, it will be important to develop effective incentives and strategies for providers to ensure delivery of programs beyond these core topic areas.**
- Although most programs currently offered are classroom/lecture based, 25% are web-based. **These web-based programs will be further studied to determine replication potential.**
- 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.** Current providers, however, are much more interested in adapting existing curriculums to meet Ecology's needs rather than being asked to develop entirely new curriculums. Potential providers are much more interested in adopting curriculums developed elsewhere.

This report presents key findings that summarize responses from current providers and interested potential providers. Detailed survey results are included in Appendix A, and further analysis of the results will be included in a comprehensive report to be prepared in January 2013 entitled *LID Training in Washington State – Needs Assessment Report*.

Assessment of Current and Potential LID Training Programs in WA

Background and Overview

New municipal stormwater permits issued by the Department of Ecology require Low Impact Development (LID) to be used for new developments and redevelopment unless site conditions are prohibitive. Public and private sector professionals in a variety of fields related to development are expected to need additional training to meet these requirements. Consequently, the Washington Department of Ecology has engaged the Washington Stormwater Center, Veda Environmental, and Cascadia Consulting Group to develop a detailed plan to ensure adequate training is available on LID techniques.

To help inform this plan, Veda Environmental and Cascadia Consulting Group conducted a web-based survey to better understand the current capacity of existing LID training programs in Washington State to meet increased demands for training. The survey was also designed to identify and assess organizations interested in becoming LID training providers.

Survey invitations were distributed by email to organizations known or expected to be interested in providing LID training and by a listserv maintained by the Department of Ecology for stormwater professionals. To improve response rates, organizations that received direct emails were also contacted by phone. Between December 6 – 18, 2012, 75¹ people responded to the survey. Of these respondents, 57% (43 responders) said their organization currently provides LID training, and 43% (32 responders) said that their organization might be interested in providing LID training. Current providers were asked detailed questions about their training programs, including about opportunities and resource needs to expand. Potential providers were asked about their prior experience and assistance needs regarding offering LID trainings.

This memo presents key findings that summarize responses from current providers and interested potential providers. Note that not all respondents answered every question; reported percentages are based on the number of people who responded to each question. Appendix A presents additional summary tables with the number of respondents to each question as well as written responses to open-ended questions. Further analysis of these survey results will be included in a comprehensive report to be prepared in January 2013 entitled *LID Training in Washington State – Needs Assessment Report*.

¹ Twelve (12) additional responses were received after the Dec. 18 deadline, bringing the total number of respondents to 87. This memo does not reflect these late responses. A forthcoming report entitled *LID Training in Washington State – Needs Assessment Report* (due January 2013) will incorporate these responses.

Assessment of Current and Potential LID Training Programs in WA

Highlights

- 75 responses were received. Of these, **43 (57%) are current providers** of LID Training Programs, and **32 (43%) are potential providers** of LID Training Programs.

Current providers

- 37% are public entities; 32% are private entities; 20% are universities/colleges; 11% are “other”.
- 50% work primarily in the Puget Sound region; fewer than 5% work in E. Washington.
- The vast majority of LID Training programs offered are geared towards construction/building/engineering audiences. Very few programs are geared towards operations/maintenance or enforcement/inspection.
- Most programs are introductory/mid-level; fewer than 1/3 are advanced.
- All LID topics are covered in current programs. However, the vast majority focus on General LID issues, Rain Gardens/Bioretenion, Permeable Pavement, and Site Planning. Topics offered least frequently include: Hydrologic Modeling, Compost Amended Soils, and Regulatory Issues (including NPDES permitting issues and requirements).
- To date, between 2,000 and 2,500 (approximately) people have participated in trainings offered by survey respondents.
- Most current program providers: develop their own curriculum, charge participants to attend, offer courses quarterly, and present information in a classroom/lecture format.
- If funding were available, most respondents were very interested in expanding trainings to meet new state standards. Respondents most frequently cited the need for help with marketing and promotion, as well as curriculum development.

Potential providers

- 55% are public entities; 19% are private entities; 15% are universities/colleges; and 11% are “other”.
- 35% work primarily in the Puget Sound region; 25% work primarily in E. Washington.
- Approximately 1/3 have “lots” of experience with trainings and workshops; 41% have “some”.
- Most (60%) have “some” expertise on LID. Few (19%) had “lots”.

Assessment of Current and Potential LID Training Programs in WA

- If funding were available, all respondents were very interested in developing LID Training programs. Respondents most frequently cited the need for help with curriculum development and training materials, as well as topic experts.

Assessment of Current and Potential LID Training Programs in WA

Key Findings on Current Providers

Forty-three (43) respondents whose organizations currently provide LID training provided information on their current audience, trainings, instructors, funding sources, marketing, and evaluation data. They were also asked about opportunities to modify or expand their programs to meet new training needs.

Audience

- More than half of current providers (53%) said the main location for their work was the Puget Sound area. Respondents also commonly stated that their organization worked throughout Washington State (20%) and throughout Western Washington (15%). Fewer than 5% of current providers said the main location for their work was in Eastern Washington. A list of organizations represented by the survey respondents is provided below.
- Respondents most commonly said their audiences for LID training were:
 - Construction, land development, building, remodeling, and landscaping professionals (69%).
 - Design or engineering professionals (59%).
 - Concerned citizens (56%).
 - Operations or maintenance professionals (49%).
 - Permitting, planning, and land use or development codes professionals (46%).
- Almost all current providers (95%) provided trainings on residential LID projects, while 71 percent provided trainings for commercial projects.

Organizations represented by survey respondents:

(Note: Three entities were represented more than once)

Adopt a Stream Foundation	Kitsap County Surface and Stormwater Mgmt
Associated Earth Sciences, Inc.	Master Builders Association of Pierce Co.
City of Federal Way	Northwest Hydraulic Consultants, Inc.
City of Lacey	O'Brien and Co.
City of Puyallup	Padilla Bay NERR (Coastal Training Program)
City of Shoreline	San Juan Islands Conservation District
City of Spokane	Seattle Public Utilities
Clear Creek Solutions, Inc.	Sightline Institute
Depave	Skagit Conservation District
ECOSS	Snohomish Conservation District
Edmonds Community College	SoundEarth Strategies
Gonzaga University	Sustainable Connections
Green Girl Land Development Solutions	Thurston Co. Water Resources Division
HDR Engineering	

Assessment of Current and Potential LID Training Programs in WA

University of Washington LID/GSI Certificate Program

WA State Dept. of Ecology

WA State Nursery and Landscape Association

Watershed LLC

Weber Thompson

Western Wood Preservers Institute

Whidbey Island Conservation District

WSDOT

WSU – Kitsap County Extension

WSU – Thurston County Extension

WSU – Mason County Extension

WSU – Green Stormwater Infrastructure Program

WSU – Jefferson County Extension

Training Levels, Topics, and Format

- The majority of respondents provided introductory (89%) or intermediate (78%) trainings. Only a third (33%) of respondents stated they provided advanced trainings.
- Current providers most commonly offered trainings on:
 - Overall understanding of the purpose of LID (83%).
 - Rain gardens (75%).
 - Bioretention areas (63%).
 - Site planning and layout (58%).
 - Permeable paving (56%).
 - Site assessment (56%).
- The majority of current providers (86%) stated they developed their curriculum themselves, while nearly a third (31%) said they adopted or adapted an existing curriculum.
- About three-quarters of providers offered trainings that take ten hours or less to complete, and 42 percent of providers offered trainings that take less than five hours. About 15 percent of providers offered trainings that require more than 30 hours.
- Current providers most commonly said they offered trainings about quarterly (29%) or once a year (20%).
- Almost all providers (97%) offered trainings in a classroom or lecture format, and nearly three-quarters (74%) offered training out in the field. Few providers (17%) offered web-based trainings.
- Ten (10) current providers reported that participants received a certificate after completing their training while six providers offered credits.

Assessment of Current and Potential LID Training Programs in WA

Instructors

- When asked about the qualifications of their instructors, current providers most commonly mentioned a university degree (BS, MS, or PhD) and certifications in fields such as Biology, Environmental Studies, and Engineering. They also commonly cited professional experience in the field, as well as WSU – LID/GSI Training Program certification.
- Most (58%) of respondents said instructors were compensated monetarily through various rates and payment types (such as hourly fees, travel expenses, or stipends). One-third of respondents (33%) described another compensation method, including honorariums. A small number (8%) of respondents said that instructors were not compensated.

Funding Sources

- Current providers were asked about the degree to which they relied on various funding sources; responses varied across respondents, without a clear trend.
 - About a quarter (24%) of respondents said they relied on grants for more than two-thirds of program cost, while nearly 45 percent of respondents said they relied on them little to none.
 - Nearly 29 percent of respondents said they relied on fees for attending trainings for more than two-thirds of program cost, while about 46 percent of respondents said they relied on them little to none.
 - About 27 percent of respondents said they relied on their general organization budget for more than two-thirds of program cost, while nearly 39 percent of respondents said they relied on it little to none.
- Over half (56%) of current providers indicated that participants paid for trainings. Costs varied widely, from a low of \$10 per hour to a high of \$200 for four hours.
- Less than half (44%) of current providers offer trainings free-of-charge.

Marketing

- Most current providers marketed their training using a website (86%) or word of mouth (80%). Respondents also commonly mentioned using newsletters (51%) and targeted mailings (40%).
- Most respondents (61%) who provided information on marketing strategies used by their organization did not have information on their annual marketing budget.

Evaluation Data

- The majority (68%) of respondents collected summary data on training participants, such as number of or demographic information regarding participants.

Assessment of Current and Potential LID Training Programs in WA

- All but two current providers said their training had been evaluated. Respondents most commonly said that participants completed post-training surveys (76%) or that their organization completed annual program reports (32%).
- More than a third (35%) of respondents said their organization had trained more than 100 people in the previous year. About a fifth (21%) of respondents trained between 26 and 100 participants, while nearly three out of ten (29%) trained 25 or fewer participants.
- Half of respondents (50%) said that more than 100 people had taken their trainings to date.
- Sixty-five percent of respondents said they would be willing to share information regarding participant data or program evaluation.

Willingness, Opportunities, and Needs to Expand Trainings

- Half of current providers (50%) said they would be willing to modify their existing curriculum if funding were available for trainings that met new curriculum standards. One-fifth (21%) of respondents said they would be willing to adopt a new curriculum if funding were available.
- All respondents said they were definitely (76%) or maybe (24%) interested in using LID training resources created by the Department of Ecology.
- All respondent were definitely (69%) or maybe (31%) interested in expanding their trainings.
- If more resources were available, respondents most commonly said they would expand their trainings by:
 - Reaching out to more people in their current audience (91%).
 - Providing trainings more often (81%).
 - Providing more advanced trainings on their current topics (81%).
 - Reaching out to new types of audiences (75%).
- When asked what assistance they would need to expand their trainings, current providers most commonly mentioned marketing and promotion (69%), development of curriculum and training materials (66%), printing of training materials (45%), and topic experts to serve as trainers (41%). Written responses describing specific assistance needs are presented in Appendix A. Respondents most commonly described needs for additional staff and funding.
- Over half (57%) of respondents said their program could serve as a model to be replicated elsewhere in Washington. Nineteen respondents provided further detail on what made their program a good candidate for replication, with the majority referencing their experience.

Key Findings on Potential Providers

Thirty-two respondents who said their organization does not currently provide LID training said they might be interested in providing LID training, if assistance or funding were available. These interested potential providers were asked about their likely audience and training topics, prior experience with trainings and LID topics, and assistance needed to begin trainings.

See Appendix A for more information about responding entities.

Likely Audience and Training Topics

- Potential providers said their organization mainly worked in the Puget Sound area (36%), Eastern Washington (25%), or other parts of Western Washington (18%).
- Respondents most commonly they would be interested in training the following audiences:
 - Construction, land development, building, remodeling, and landscaping professionals (82%).
 - Design or engineering professionals (78%).
 - Permitting, planning, and land use or development code professionals (67%).
 - Operation and maintenance professionals (56%).
- Potential providers most commonly said they would be interested in offering training on:
 - Overall understanding of the purpose of LID (85%).
 - Bioretention areas (73%).
 - Permeable paving (73%).
 - Regulatory or current issues related to LID (73%).
 - Site assessment (65%).

Prior Experience and Assistance Needed to Begin Trainings

- More than a third (37%) of respondents said their organization had lots of experience with organizing trainings or workshops, and another 41 percent said they had some experience.
- Less than one-fifth (19%) of respondents said their organization had lots of expertise in topics related to LID, while 59 percent said their organization had some expertise in these topics.
- When asked what assistance they would need to begin providing LID trainings, respondents most commonly mentioned the need for curriculum and training materials (77%) and for topic experts to serve as trainers (69%). Marketing and promotion was also commonly mentioned by 46% of respondents. Written responses describing specific assistance needs are presented in Appendix A. Respondents most commonly reiterated their need for training materials and topic experts as well as mentioning additional staff or funding.

Assessment of Current and Potential LID Training Programs in WA

Summary and Next Steps

Response to the survey was strong: 43 current providers and 32 potential providers gave detailed information about their current LID Training programs and/or their interest in providing or expanding LID Training programs. An additional 12 responses came in past the deadline; an analysis of those responses will be included in a report to be issued in January 2013 entitled *LID Training in Washington State – Needs Assessment Report*. It is clear that there is interest from both current *and* potential providers for added support, resources, and assistance for offering LID training in Washington State.

Key findings and recommended next steps are outlined below:

- The majority of current LID Training programs are in the Puget Sound region. However, **25% of potential LID providers work primarily in Eastern Washington, making expansion of programs to that region feasible utilizing existing networks.**
- Of interested potential providers who responded to the survey, **over 70% are public sector entities, including community and technical colleges.**
- Numerous existing programs indicated that they are good candidates for replication. **These programs will be further evaluated to determine replication potential.**
- Current providers are primarily offering trainings in four topic areas: General LID Information; Bioretention; Permeable Paving; and Site Planning. Potential Providers expressed greatest interest in providing training in: General LID Information; Bioretention and Permeable Paving. **In developing an LID Training Plan, it will be important to develop effective incentives and strategies for providers to ensure delivery of programs beyond these core topic areas.**
- Although most programs currently offered are classroom/lecture based, 25% are web-based. **These web-based programs will be further studied to determine replication potential.**
- 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.** Current providers, however, are much more interested in adapting existing curriculums to meet Ecology's needs rather than being asked to develop entirely new curriculums. Potential providers are much more interested in adopting curriculums developed elsewhere.
- There is a **wide range of requirements for LID Training Plan instructors**; however, it is clear that most instructors have higher degrees and/or extensive field experience with LID practices. **The vast majority of instructors are compensated monetarily.** Developing some consistency across training programs in terms of expertise and compensation will be important.
- **A slight majority (56%) of participants pay for LID Training Programs.** Rates vary widely.
- Funding for LID Training Programs also varies widely. **Almost all responders noted that funding is a key factor in expanding training programs.**
- **Evaluation methods for current training programs varies widely.** Very few current providers are evaluating participants before and after training programs to determine how knowledge was gained

Assessment of Current and Potential LID Training Programs in WA

from the program. **In developing a statewide LID Training Plan, it will be important to provide guidance on what constitutes an effective evaluation program or approach.**

- Most responders included detailed comments to accompany their responses. **Highlights of representative written responses include:**

“We are happy to have this survey started. Projects fail due to a lack of training. We believe that LID can only be successful if it is tied to training.”

“Collaboration and support with other organizations would be helpful so we're not competing or duplicating efforts.”

“We would like to expand the LID topics we teach but would need more staff to do so successfully.”

“As a municipality, our first challenge is getting our own staff trained. This includes Planners, Plans Examiners, Inspectors, landscape and stormwater facility maintenance workers, the Transportation Department and design engineers.”

This memo presents key findings that summarize responses from current providers and interested potential providers. Appendix A presents additional summary tables with the number of respondents to each question as well as written responses to open-ended questions. Further analysis of these survey results will be included in a comprehensive report to be prepared in January 2013 entitled *LID Training in Washington State – Needs Assessment Report*.

Current and Potential LID Service Provider Questions

Welcome to the Current and Potential Low Impact Development Training and Service Provider Survey!

The Washington Stormwater Center at Washington State University (WSU) is conducting this survey to better understand the current capacity of existing Low Impact Development (LID) training programs in Washington State to meet increased demands for training. The survey is also intended to identify potential LID service providers to help meet the growing demand.

You are receiving this survey because your organization is (1) currently offering training programs on LID, AND/OR (2) may be interested in expanding or offering new training programs on LID.

As you may be aware, new municipal stormwater permits issued by the Department of Ecology require LID to be used for new developments and redevelopment unless site conditions are prohibitive. LID, also known as green stormwater infrastructure (GSI), is a stormwater management strategy that can improve flow control, water quality treatment, and protection of receiving waters. LID emphasizes the use of existing natural site features integrated with distributed, small-scale stormwater controls to mimic natural drainage processes. LID is implemented by using site design and Best Management Practices to minimize impervious surfaces, native vegetation loss, and stormwater runoff. Some of the more commonly known Best Management Practices include bioretention, rain gardens, permeable pavement, and vegetated roofs.

This survey is funded by the Washington State Department of Ecology and conducted by the Washington Stormwater Center. It should take 15 minutes to complete.

Please complete this survey by 5 pm on Tuesday, December 18th.

Thanks for your help! If you have any questions about the survey, please contact Hilary Wilkinson at Veda Environmental: Hilary@VedaEnv.com.

Please feel free to forward this to anyone you know who might be interested in completing the survey.

Please note: This is a separate survey from the Statewide Low Impact Development Training Needs Assessment Survey that some of you may have also received. Both surveys are being carried out as part of a larger effort to develop a comprehensive Statewide LID Training Plan for Washington State. More information on the LID program plan development will be posted on the Washington Stormwater Center website at: <http://www.wastormwatercenter.org/news/?id=225>

Current and Potential LID Service Provider Questions

Core Information

1. What is the name of the organization that you represent?

2. Has your organization offered LID training within the past year? (LID training refers to individual classes offered on specific LID topics and/or to a series of classes offered on multiple LID topics).

Yes

No

Current and Potential LID Service Provider Questions

Audience

3. Which best describes the main location of work you do or that is done by your organization?

- Eastern Washington
- Throughout Western Washington
- Puget Sound
- Throughout Washington State
- Other parts of Western Washington
- Outside of Washington State

4. What types of audiences do you train? (Select all that apply)

- Construction / Land development / Building / Remodeling / Landscaping
- Design / Engineering
- Permitting / Planning / Land Use or Development Codes
- Enforcement / Inspection
- Elected Official / City Manager / Public Works Director / or other City-wide Program Manager
- Operation / Maintenance
- Real Estate Sales / Purchasing / Lending
- Interested citizen
- Other (please specify):

5. On what types of projects do you provide LID training? (Select all that apply)

- Residential
- Industrial
- Commercial
- Institutional
- Other (please specify):

Current and Potential LID Service Provider Questions

Training Level and Topics

6. What levels of training do you provide? (Select all that apply)

- Introductory
- Mid-Level (e.g. Intermediate)
- Advanced
- Other (please specify):

7. What topics do you provide training on? (Select all that apply)

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Overall understanding of the purpose of LID (Impacts of urbanization on watersheds; goals and objectives of LID practices, definition of LID) | <input type="checkbox"/> Site Assessment |
| <input type="checkbox"/> Bioretention areas | <input type="checkbox"/> Site Planning and layout |
| <input type="checkbox"/> Rain Gardens | <input type="checkbox"/> LID Resources (including the DOE Stormwater Management Manual and LID Technical Guidance Manual for Puget Sound) |
| <input type="checkbox"/> Permeable Paving (including asphalt, concrete, and pavers) | <input type="checkbox"/> Hydrologic Modeling |
| <input type="checkbox"/> Vegetated / Green Roofs | <input type="checkbox"/> Compost Amended Soils |
| <input type="checkbox"/> Rainwater collection systems | <input type="checkbox"/> Regulatory / Current Issues related to LID (NPDES stormwater permit requirements, etc.) |

8. How do you develop the curriculum for your LID Training?

- Our organization develops the curriculum ourselves
- We adopted or adapted an existing curriculum (please describe the source(s) below)

Description:

Current and Potential LID Service Provider Questions

Instructors

9. Briefly describe the qualifications that your instructors have (i.e. degrees, professional experience, etc.)

10. Are instructors compensated monetarily?

- No
- Yes (please describe level of compensation below)
- Other (please explain below)

Description:

Current and Potential LID Service Provider Questions

Funding Sources

11. To what extent do you rely on the following sources to fund your LID trainings?

	Little to none	Less than a third of program cost	One to two thirds of program cost	More than two thirds of program cost
Grants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fees for attending trainings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
General organization budget	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If Other, please briefly describe your other types of funding sources:

12. What is the cost of the training per participant?

- All our trainings are FREE
- Participants pay (please list typical costs below)

Description:

Current and Potential LID Service Provider Questions

Training Format

13. What is the length of time that your training takes?

- Less than 5 hours
- 5 to 10 hours
- 11 to 20 hours
- 21 to 30 hours
- More than 30 hours (please specify below)

Description:

14. How often do you offer trainings?

- About once per month
- About quarterly
- Once a year
- Other (please specify):

15. In what formats do you provide training? (Select all that apply)

- Classroom or lecture
- Field
- Web-based
- Other (please specify):

16. Does the participant receive any certification or credits?

- Certificate
- Credit (please describe and specify how many credits are offered below)

Description:

Current and Potential LID Service Provider Questions

Marketing

17. What marketing strategy does your organization use to recruit its participants? (Select all that apply)

- | | |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Word of mouth | <input type="checkbox"/> Multi-media |
| <input type="checkbox"/> Website | <input type="checkbox"/> Ads or articles in general newspapers or magazines |
| <input type="checkbox"/> Mass mailings | <input type="checkbox"/> Ads or articles in trade or technical newspapers or magazines |
| <input type="checkbox"/> Targeted mailings | <input type="checkbox"/> Ads or articles in newspapers or magazines targeted at a specific audience |
| <input type="checkbox"/> Newsletters | <input type="checkbox"/> Do not have one |

Other (please specify):

Current and Potential LID Service Provider Questions

Marketing

18. What is your annual marketing budget?

- Do not know
- Monetary amount:

Current and Potential LID Service Provider Questions

Participants and Evaluation

19. Do you collect summary data on your LID training such as total number of participants, demographic information regarding participants, etc.?

- Yes
- No
- Other (please specify):

20. How has your training been evaluated? (Select all that apply)

- We complete annual program reports.
- Participants are surveyed after the training.
- Participants are surveyed both before and after the training.
- We conduct other internal evaluations.
- Third-party evaluators have assessed our training.
- We do not evaluate our training.
- Other (please specify):

21. Approximately how many people have completed your training(s) within the last year?

- Under 10
- 11-25
- 26-50
- 50-100
- More than 100
- Other (please specify):

Current and Potential LID Service Provider Questions

22. Approximately how many people have completed your training(s) to date?

- Under 10
- 11-25
- 26-50
- 50-100
- More than 100
- Other (please specify):

23. Would you be willing to share information on your participant data/demographics or program evaluation?

- Yes (please be sure to include your contact information at the end of this survey)
- No

Current and Potential LID Service Provider Questions

Curriculum

The Department of Ecology wants to ensure that local government employees, construction professionals, and others who will need to use LID have the technical training they need to comply with new stormwater permit requirements. Potential outcomes of this project are curriculum standards, such as technical learning objectives, and/or new curricula such as teaching guides, presentations, handouts, and other training resources.

24. If funding were available for LID trainings that used new curriculum or curriculum standards, how would your organization be likely to respond?

- Adopt one or more of the new curricula
- Modify our existing curriculum to meet the new curriculum standards
- Not change our curriculum at all
- Other (please specify):

25. To what extent would your organization be interested in using LID training resources, such as teaching guides and presentations, created by Ecology's program?

- Definitely interested
- Maybe interested
- Not at all interested

Current and Potential LID Service Provider Questions

Resource Needs

26. Are you interested in expanding your program?

- Definitely interested
- Maybe interested
- Not at all interested

27. If your organization had more resources, in what ways would you be interested in expanding your LID trainings? (Select all that apply)

- Provide trainings more often
- Provide longer trainings
- Provide more advanced trainings on our current topics
- Provide trainings on new topics
- Other (please specify):
- Reach out to more people in our current audience
- Reach new types of audiences
- We are not interested in expanding our LID training

28. What assistance or resources would your organization need to expand your existing trainings? (Select all that apply)

- Event planning assistance
- Event space to hold in-person trainings
- Technology (e.g., webinar services, laptops and projectors)
- Topic experts to serve as trainers
- Other (please specify):
- Event staff
- Marketing and promotion
- Development of curriculum and training materials
- Printing of training materials

Current and Potential LID Service Provider Questions

29. Please briefly describe the assistance or resources your organization would need in each of the areas you selected above.

Event planning assistance

Event space to hold in-person trainings

Technology (e.g., webinar services, laptops and projectors)

Topic experts to serve as trainers

Event staff

Marketing and promotion

Development of curriculum and training materials

Printing of training materials

Other

30. Is there other assistance your organization would need to expand your existing trainings?

Current and Potential LID Service Provider Questions

Replication

31. Could your program serve as a model to be replicated elsewhere in Washington?

- Yes
- No
- It depends (please describe):

32. If YES, What makes this program a good candidate for replication?

Current and Potential LID Service Provider Questions

Training Partnership

33. Would your organization be interested in providing LID training, if assistance or funding were available?

- Yes
- Maybe
- No

Current and Potential LID Service Provider Questions

Audience

34. Which best describes the main location of work you do or that is done by your organization?

- Eastern Washington
- Puget Sound
- Other parts of Western Washington
- Throughout Western Washington
- Throughout Washington State
- Outside of Washington State

35. What types of audiences might your organization be interested in serving? (Select all that apply)

- Construction / Land development / Building / Remodeling / Landscaping
- Design / Engineering
- Permitting / Planning / Land Use or Development Codes
- Enforcement / Inspection
- Other (please specify):
- Elected Official / City Manager / Public Works Director / or other City-wide Program Manager
- Operation / Maintenance
- Real Estate Sales / Purchasing / Lending
- Interested citizen

36. What types of topics might your organization be interested in offering training on?

- Overall understanding of the purpose of LID (Impacts of urbanization on watersheds; goals and objectives of LID practices, definition of LID)
- Bioretention areas
- Rain Gardens
- Permeable Paving (including asphalt, concrete, and pavers)
- Vegetated / Green Roofs
- Rainwater collection systems
- Site Assessment
- Site Planning and layout
- LID Resources (including the DOE Stormwater Management Manual and LID Technical Guidance Manual for Puget Sound)
- Hydrologic Modeling
- Compost Amended Soils
- Regulatory / Current Issues related to LID (NPDES stormwater permit requirements, etc.)

Current and Potential LID Service Provider Questions

Capacity

37. How much experience does your organization have in organizing trainings or workshops (whether in-person or web-based)?

- Lots of experience
- Some experience
- Little to no experience

38. How much expertise does your organization have in topics related to LID (either through internal staff or external partners)?

- Lots of expertise
- Some expertise
- Little to no expertise

Current and Potential LID Service Provider Questions

Resource Needs

39. What assistance or resources would your organization need to begin providing trainings on LID topics? (Select all that apply)

- | | |
|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| <input type="checkbox"/> Event planning assistance | <input type="checkbox"/> Event staff |
| <input type="checkbox"/> Event space to hold in-person trainings | <input type="checkbox"/> Marketing and promotion |
| <input type="checkbox"/> Technology (e.g., webinar services, laptops and projectors) | <input type="checkbox"/> Development of curriculum and training materials |
| <input type="checkbox"/> Topic experts to serve as trainers | <input type="checkbox"/> Printing of training materials |
| <input type="checkbox"/> Other (please specify): | |

40. Please briefly describe the assistance or resources your organization would need in each of the areas you selected above.

Event planning assistance	<input type="text"/>
Event space to hold in-person trainings	<input type="text"/>
Technology (e.g., webinar services, laptops and projectors)	<input type="text"/>
Topic experts to serve as trainers	<input type="text"/>
Event staff	<input type="text"/>
Marketing and promotion	<input type="text"/>
Development of curriculum and training materials	<input type="text"/>
Printing of training materials	<input type="text"/>
Other (please describe)	<input type="text"/>

41. Is there other assistance your organization would need to begin providing trainings on LID topics?

Current and Potential LID Service Provider Questions

Contact Information

42. May we contact you to 1) discuss opportunities for your organization to receive assistance in providing LID trainings and/or 2) review summary data or evaluations related to existing LID trainings?

- Yes
- Maybe
- No

43. Please provide contact information for the best person to contact.

Title	<input type="text"/>
First Name	<input type="text"/>
Last Name	<input type="text"/>
Position	<input type="text"/>
Email	<input type="text"/>
Phone	<input type="text"/>

44. Is there any other information about your organization that you would like to share?

Current and Potential LID Service Provider Questions

Thank you for your time. If your organization does become interested in providing LID trainings in the future, feel free to contact project staff for more information.

Hilary Wilkinson at hilary@vedaenv.com.

Current and Potential LID Service Provider Questions

Thank you for your time. Again, if you have any questions regarding this survey please contact Hilary Wilkinson at hilary@vedaenv.com.

Complete List of Survey Responders

Jurisdictions and Professional Associations

Table X. Current and Potential LID Service Provider Survey Responders

	Organization Name	Current Provider	Potential Provider
1	Adopt A Stream Foundation	●	
2	AECOM		●
3	AIA Seattle		●
4	Associated Earth Sciences, Inc.	●	
5	Bellevue College		●
6	Building Industry Association of Washington		●
7	City of Bellevue		●
8	City of Bellevue Water Quality		●
9	City of Centralia		●
10	City of Federal Way	●	
11	City of Lacey	●	
12	City of Mountlake Terrace		●
13	City of Pullman		●
14	City of Puyallup	●	
15	City of Redmond		●
16	City of Richland		●
17	City of Shoreline	●	
18	City of Spokane		●
19	City of Spokane	●	
20	City of Spokane-Engineering Services Department		●
21	City of Walla Walla		●
22	Clark County		●
23	Clear Creek Solutions, Inc.	●	
24	Clover Park Tech College		●
25	Clover Park Technical College		●
26	Compliance Management, Inc.		●
27	Department of Ecology	●	
28	Depave	●	
29	Dept of Ecology	●	
30	ECOSS	●	
31	Edmonds Community College	●	
32	Edmonds Community College	●	
33	City of Olympia		●
34	Gonzaga University	●	

	Organization Name	Current Provider	Potential Provider
35	Green Girl Land Development Solutions	●	
36	Hayman Environmental		●
37	HDR Engineering	●	
38	Herrera Environmental Consultants	●	
39	Kitsap County Surface And Stormwater Management	●	
40	Lewis County		●
41	Master Builders Association of Pierce Co.	●	
42	Muckleshoot Indian Tribe Fisheries Division		●
43	Northwest Hydraulic Consultants		●
44	Northwest Hydraulic Consultants, Inc.	●	
45	Did not respond		●
46	O'Brien & Company	●	
47	Pacific Science Center/Mercer Slough Environmental Education Center	●	
48	Padilla Bay NERR (Coastal Training Program)	●	
49	Pierce County		●
50	Pierce County Public Works & Utilities		●
51	San Juan Islands Conservation District	●	
52	San Juan Islands Conservation District	●	
53	Seattle Public Utilities	●	
54	Sightline Institute	●	
55	Skagit Conservation District	●	
56	Snohomish Conservation District	●	
57	SoundEarth Strategies	●	
58	Spokane Home Builders Association		●
59	Sustainable Connections	●	
60	SvR Design Company		●
61	The City of Kelso		●
62	Thurston County		●
63	Thurston County Public Works		●
64	Thurston County Water Resources	●	
65	University of Idaho		●
66	University of Washington LID Certificate Program Now Called GSI Certificate Program	●	
67	University of Washington, Professional And Continuing Education		●
68	WA Dept of Ecology	●	

	Organization Name	Current Provider	Potential Provider
69	Washington Association of Landscape Professionals		●
70	Washington State Department of Transportation		●
71	Washington State Ferries		●
72	Washington State Nursery & Landscape Association	●	
73	Washington State University Extension--Thurston County	●	
74	Watershed LLC	●	
75	Weber Thompson	●	
76	Western Wood Preservers Institute	●	
77	Whidbey Island Conservation District	●	
78	WSDOT		●
79	WSDOT	●	
80	WSU Extension - Mason And Thurston Counties	●	
81	WSU Extension Kitsap	●	
82	WSU Green Stormwater Infrastructure Program	●	
83	WSU Jefferson County Extension, Contracted With The Jefferson Co. Watershed Stewardship Resource Center & 12,000 Rain Gardens	●	