



SEATTLE SECTION NEWSLETTER

January 2015
Volume 50 No. 5

Section Officers

October 1, 2014 – September 30, 2015

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WEBMASTER

Eric Knigge
seattleasce@yahoo.com

ASCE Seattle Section Monthly Meeting

Wednesday, January 14, 2015

Place: Mirabella, 116 Fairview Avenue N., Seattle, WA 98109

Cost: Early Bird Registration:
\$40 General Admission
\$15 Students & Unemployed
(Early Bird Rates apply until 11:59 pm, Wed., Jan. 7.)

After January 7:
\$45 General Admission
\$20 Students & Unemployed

Meal: Dinner will be buffet style this month. Please contact Veronica Vong at veronica.vong@abam.com if any special accommodations are required.

5:30 Social
6:30 Dinner
7:00 Program
8:30 Adjourn

Online registration closes Sunday, January 11.

[Click here to register.](#)

For assistance with online registration, please contact Veronica Vong at veronica.vong@abam.com

Direct questions or comments regarding meetings to Section President Stefanie Herzstein at seattleascepresident@gmail.com

Program — Sustainability in Local Agency Projects

Representatives of King County Wastewater Division, Port of Seattle, and WSDOT will describe how sustainability practices are incorporated into projects, and will discuss any changes in how their agencies plan to incorporate sustainability into future projects. Alyson Desmond and Rebecca Gauff of the King County Wastewater Treatment Division (WTD) will walk through a brief history of sustainability work in WTD, how/when the work began, who has been involved, what the agency's sustainability program has accomplished up until now, what its primary focuses have been, and why. Alyson and Rebecca will then introduce the future of sustainability practices in WTD. Wayne Grotheer of the Port of Seattle will review specific projects whose purpose is to improve Port and regional sustainability. His presentation will also present a look ahead as the Port is developing its new Strategy for a Sustainable Sea-Tac (S3) that contains a new set of sustainability goals and that also forms the basis of their Sustainable Airport Master Plan.

The next newsletter deadline is:
5:00 p.m.
Friday, January 23, 2015

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Newsletter Editor:  
**Todd Crandell**  
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#### CHANGE OF ADDRESS:

All changes to your address (including your newsletter e-mail address) should be provided to ASCE at [www.asce.org](http://www.asce.org) or: 1801 Alexander Bell Drive, Reston, VA 20191-4400. The Seattle Section will receive your updated information from ASCE.

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## President's Column

By Gabriel Ng, P.E., M.ASCE, President – ASCE North Branch

**Soap Box:** Welcome to the New Year! As we all get into gear for what 2015 has to bring, I find myself at the beginning of a new chapter in my career. I always dreamed of it, but wasn't quite sure when it would happen. I took the leap of starting my own engineering firm. That makes my commitment and dedication to ASCE that much more important. I've always considered the people I work with as my professional family. I realized when I was working for a larger company I had safety and security in my professional family. But relying on those internal comforts didn't always lead to opportunity or career growth. As I begin this new journey, my ASCE professional family has taken a larger role in my networking and career development. Networking within the ASCE family will take effort and commitment and lead to growth. Taking risks and stepping outward from our comfort zone allows us that growth. I gave a similar talk at a shareholders meeting last year and reminded the audience that networking is a conscious effort to make a connection with someone else. If you are looking for growth in your career development, be intentional and make the effort. ASCE is here to help.

**MRLC (WSBL, WRYMC & WSCL):** Do you know all the acronyms? Well if you're a Member, you should. This coming month we have a magnificent opportunity to host the ASCE Multi-Region (Western) Leadership Conference in Bellevue. This includes workshops for Section and Branch Leaders, Younger Member Council Leaders, and Student Chapter Leaders. A big "Thank You" to the Seattle YMF for putting together the sales pitch two years ago in Sacramento in order to host this year's MRLC here in Bellevue next month. This is a time to showcase the Pacific Northwest to our colleagues around the regions and to show them a great time.

If you haven't attended one of these conferences, this is the time to do it. The cost is reasonable being that it's close to home. The North Branch is

See *President's Column* on page 3

## Bio for January 14 Speakers

**Alyson Desmond, ENV SP** works in the **King County Wastewater Treatment Division's** Resource Recovery Section and currently leads Sustainability efforts in the agency's Capital Program. She holds a Bachelor of Arts degree in Environmental Studies from Seattle University. Alyson has five years of experience in the Wastewater Treatment Division, and has worked within various disciplines, from Project Management and Construction Management, to Engineering and Energy Management. Alyson has been a member of the agency's Sustainability Team since 2012, and the agency's Equity and Social Justice Committee since 2014.

**Rebecca Gauff, PE, LEED AP-O&M, ENV SP**, a Seattle native, has 18 years of wastewater engineering experience. She holds a BSME and Mas-

See *January Speakers* on page 3

planning to caravan down to help make the trip even more economical. What do you expect? We're engineers. If you can't come, I highly encourage you to invite others to attend. This was a career development experience that I will never forget when I first attended two years ago. I know we are in the age of social networking, but this face-to-face networking trumps the myface and tweeter stuff. We need to force our anti-social awkward selves out to have a good time. Looking forward to seeing those of you I know and even many more that I haven't met.

**North Branch Doings:** What does 2015 have in store for our North Branch? Well, we are in the process of sponsoring a new Student Chapter from Washington Engineering Institute (WEI) in Bellingham, headed up by Dave Bren, P.E., M.ASCE. They have established a board of officers and have started bi-monthly meetings. I'm looking forward to seeing what this Student Chapter is capable of doing. They have already started a partnership with the Skagit Fisheries Enhancement Group (SFEG) and Chinook Engineering led by Jay Kidder, P.E., M.ASCE. This partnership includes support of a Family Forest Fish Passage Project (FFFPP) with the field assessment, survey and CAD drafting in the com-

ing year. This is becoming a great real world experience opportunity for these students on a real world, active project. I was able to attend the field assessment and felt like I too was a student learning from the other engineers. We hope to create a legacy project or projects with SFEG, which we've adopted as our primary outreach organization and with whom I have volunteered since before I was a Member.

We also hope to get a lineup of great speakers this coming year, with a presentations on the Oso Landslide (repeat of the one done for the Geotechnical Group), fish passage by WDFW, "Net Zero Water" systems, and rainwater gardens in urban environments. We will be sure to relay these announcements in the Seattle Section newsletters for those interested in making the trek northward. We traditionally meet the 3rd Wednesday of the odd months switching from Mt. Vernon and Bellingham. The January 21st meeting is in Mt. Vernon at the Trumpeter Public House. Dr. Joseph Wartman will present on the Oso Landslide.

I'll leave you with a quote from Henry Ford. He says, "Coming together is a beginning; keeping together is progress; working together is success."

May you all succeed in 2015!

January Speakers (continued from page 2)

ter of Science in Environmental Engineering and Science from the University of Washington, and is a Professional Engineer (Mechanical). Rebecca spent nine years (1997-2006) in private sector wastewater consulting, and has been an engineer with the **King County Wastewater Treatment Division** for eight years (2006-present). Rebecca has been a member of the Wastewater Treatment Division's Sustainability Team since 2008.



Rebecca Gauff

**Wayne Grotheer, P.E.** is currently the Director of the Aviation Project Management Group for the **Port of Seattle**. In this position, he leads the Capital Improvement Program at Seattle-Tacoma International Airport. Wayne has worked for the Port in several different positions since joining it in 2001. Before that, he worked in the technology industry as President of NetCompliance

and Chief Operating Officer of AdvanceOnline. He has also worked for 20 years in the environmental field, first at the U.S. EPA and as a Vice President of Environmental Affairs in the chemical industry. Wayne is a registered professional engineer. He holds a bachelor's of engineering degree from The Cooper Union, New York City, a master's of engineering degree from the University of Washington, and an MBA degree also from the University of Washington.



Wayne Grotheer

**Brian Lagerberg** is the Director of Public Transportation Division for the **Washington State Department of Transportation**.



Brian Lagerberg

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## Employment Notice

To post an employment notice in the newsletter and on the Section's web site, please contact the [newsletter editor](#) in advance of the monthly deadline (the 20th of the month). Rates for advertising are shown on page 2.

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**Job Title:** Senior Engineer  
**Job Number:** 2015-101  
**Hiring Range:** \$5,357-\$6,201 Per Month  
- Exempt  
**Salary Range:** \$5,357 -\$6,837 Per Month  
- Exempt  
**Opening Date:** Wednesday, December  
10, 2014  
**Closing Date:** Open until filled. 1st  
review Monday,  
January 5, 2015

### Selection Process:

Please email resume, City of Monroe application, and cover letter (reference job number 2015-100) to [recruiting@monroewa.gov](mailto:recruiting@monroewa.gov). Application packet is available by visiting our website at [www.monroewa.gov/jobs](http://www.monroewa.gov/jobs). Additional Supplemental Questionnaire may be required after closing date.

### Summary:

Apply professional civil engineering knowledge and skill to a wide variety of public and private public works projects in both the office and field. Assignments are broad in scope and require the use of independent judgment and initiative in making decisions. Incumbents integrate numerous engineering and construction disciplines performing a variety of professional-level engineering tasks including analyzing, researching, planning and designing municipal transportation, drainage, water and wastewater infrastructure.

### Essential Job Functions:

- Review applications for work within City ROW, determine appropriate fee from adopted fee schedule, review traffic control plan, determine impacts on infrastructure, write permit conditions.

- Review building permit applications for utility fees, site grading, erosion control, storm water management, utility connections, utility fees, street frontage improvements, and write review comments
- Represent the Engineering Department at development pre-application meetings and provide comments on proposed developments relative to the engineering design and development standards and the municipal code
- Assist Public Works Department with water, sewer, drainage and street construction engineering issues
- Prepare plans and specifications for Small Works Roster projects for other city departments.
- Provide field inspection support for both capital and private development construction.
- Provide field surveying to gather data for design and/or develop solutions for existing infrastructure problems.
- Assist with fire flow testing of city water system as needed for new development.
- Provide oversight and on-site field inspection and direction for construction engineering problems encountered on street, drainage and public utility installations on private development projects within the jurisdiction of the city.
- Review boundary line adjustment and rezoning applications for impact on city streets, drainage and utilities and compliance with appropriate federal, state and local laws, standards, regulations and policies and prepare written review comments.
- Review commercial site developments, commercial and residential plats, including traffic impact reports, geotechnical reports, storm drainage reports, environmental checklists, critical area reports, architectural plans, landscaping plans, grading plans, utility plans, street plans, and drainage plans for impacts on streets, drainage, flood plain and utilities and compliance with appropriate federal, state and local laws, standards, regulations and polices and prepare written review comments.
- Provide front counter support and coverage for walk-up customers with questions, concerns, comments or complaints on issues handled by the Engineering Department, including, but not limited to traffic, water, sewer, drainage, grading, fencing, sidewalks, and retaining walls.
- Assist with comprehensive plan revisions to transportation, water, sewer, drainage, or the flood plain or on special projects that involve any of those areas.
- Assume the role of project manager on capital projects including, but not limited to, detailed project definition, preliminary cost estimate and schedule, report preparation and presentation to City Council for funding, consultant selection for mapping, environmental assessment, design, scope definition for each consultant, contract management, permitting, public information process, interlocal agreements, right-of-way/easement acquisition, construction document preparation, bidding, contract award, construction management including RFQs, submittal reviews, COPs, progress payments, project testing and acceptance, warranty monitoring, and close-out.
- Assume the role of project engineer on capital projects including, but not limited to all of the above plus project civil engineering design using AutoCAD Civil3D and other design software, prepare project specifications following WSDOT format, and successfully develop the Plans, Specifications and Estimate (PS&E) for construction.
- Pursue grant opportunities to support funding of capital projects.

See [Employment Notice](#) on page 5

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**Employment Notice** (continued from page 4)

- Provide conceptual and/or preliminary engineering design in AutoCAD and cost estimates for proposed projects without preparing final plans, specifications, obtaining permits, or acquiring right-of-way.
- Review and analyze internal work methods, practices and policies and recommend changes to increase efficiency and productivity.
- Review and revise existing city design and construction standards for public improvements.

- Provide written and verbal reports as necessary on assigned projects and contracts; present reports to outside groups, city council, commissions or others as requested; maintain detailed records for assigned activities.
  - Direct other department staff as assigned to complete specific projects in a timely manner.
  - Perform other duties as directed.
- Summary of Minimum Qualifications:**
- A Bachelor's degree in Civil Engineering or related field.

- Five years of progressively responsible civil engineering experience, or an equivalent combination of education and experience.
  - Possession of a valid Washington State Professional Engineering (PE) License.
  - Valid Washington State Driver's License.
  - Knowledge of the principles, practices, methods and techniques of civil engineering and municipal public works projects and private site development from both a design and field construction perspective.
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## University Mentor Night Help Needed

By Paul Grant, P.E., M.ASCE

### Seattle Central College (SCC)

Date: Thursday, January 15, 6:30 to 8:30 p.m.

Location: 1st floor Atrium of Science & Math Building, 1701 Broadway, Seattle

If you are interested in being a mentor for a night for college students, the Puget Sound Engineering Council (PSEC) needs your help! The purpose of the mentor night activity has been to bring as many practicing engineers together with as many students as possible. We are trying to inspire the students, most of whom are freshmen and sophomores as well as high school seniors, toward a career in engineering. The mentor night allows engineers to relay their experience in the profession and answer questions posed by students. The event will be kicked off with a brief introduction of the engineering disciplines represented by the volunteers followed by open forum where the students visit various tables and converse with the mentors. Mentors are encouraged to bring a sample of work that will fit on a 30"x30" table top for potential discussion with the students.

If you are interested in participating, please [sign up online](#).

## Volunteering Opportunity at Future City Competition

By Eset Alemu, P.E., M.ASCE, K-12 Outreach Chair

The Washington state Future City competition is looking for judges to help score participants. This event is organized and sponsored by Institute of Electrical and Electronics Engineers (IEEE). [The competition](#) is open to teams of middle school students (6th, 7th and 8th grade). It is designed to promote teamwork, increase awareness of the need for infrastructure in cities, and expose students to engineering-oriented career possibilities. All this, plus the competition itself is a challenging and rewarding experience for the students!

The teams must simulate their city using SimCity software, build a physical model of it, write a narrative, and give an oral presentation.

Judges are needed in two areas. One is reviewing city narratives and essays (during a flexible 10-day time frame, January 13 - 23). The second one is reviewing physical models and oral presentations the final day of the competition. The final day is Saturday, January 24, 7:30 a.m. - 2 p.m. at DigiPen Institute in Redmond.

For more information please contact the WA Future City judge coordinators Jeanne Harshbarger at [jeanne.harshbarger@washingtonfuturecity.org](mailto:jeanne.harshbarger@washingtonfuturecity.org) and Sarah Davis at [sarah.davis@pse.com](mailto:sarah.davis@pse.com).

Please email [Eset.alemu@gmail.com](mailto:Eset.alemu@gmail.com) if you are available to participate in one or both of these fun and worthwhile events.

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## ASCE Seattle Section Executive Board Minutes for November 11, 2014 Meeting

### Attendees:

Perry Cole  
Liz Korb  
Stefanie Herzstein  
Elizabeth Clark  
Jessica Aguilar  
Evan Sheesley  
Younes Nouri  
Amanda Shellenberger  
Kelly Dean  
Lisa Harbert

Meeting called to order at 4:32 pm by Stef. MOTION to approve agenda and passed unanimously.

MOTION to approve meeting minutes for October brought by Perry and passed unanimously with one correction.

### Old Business

- Roster submitted
- Joint Meeting with Tacoma Olympia Section Meeting not planned but maybe suggest a technical tour
- Outstanding Section/Branch Award submitted

### New Business

#### Treasurer's Report

- No report.

#### Membership Chair Report

- The Section and Branches have 2,458 members (21 new).
- Renewal race that ends December 12 and Seattle is in the top 5.

#### Standing Committees Report

- **Audit Committee:**
  - No updates.
- **Diversity Committee:**
  - Immigrant engineers that were educated outside of the US have contacted ASCE and committee is trying to determine best
  - Cliff Williams is new volunteer. He will work on high school outreach and women re-entry after family leave.
  - Helping with Women in Transportation national seminar.
- **Centennial Committee:**
  - No updates.

- **House and Hospitality Committee:**

- No updates.

- **Legislative:**

- No updates.

- **PSEC:**

- Past Activities
  - UW Bothell Mentor Night – Wednesday October 29th – About 60 students, 34 mentors with about 10 ASCE Section members
  - Seattle Pacific University Mentor Night – Tuesday October 21st
- Planned Activities
  - Engineer of the Year Awards – Request for Nominees in Nov. Newsletter; Nominations committee selections will begin at end of month.

- **RH Thompson Scholarship Chair:**

- No updates.

- **University Advisory Committee:**

- No updates.

- **K-12:**

- No updates.

- **Program Chair:**

- December meeting will be panel discussion on transportation.

- **Professional Practice:**

- No updates.

- **EWB Puget Sound Professionals:**

- No updates.

- **Public Information Chair:**

- No updates.

- **Community Service Chair:**

- No updates.

- **History and Heritage:**

- Submitted for the annual Citation (award). Working on finishing the landmarks brochure and on deciding on which regional landmark to pursue next as a Historic Civil Engineering Landmark. Next H&H meeting is Sat, 11/22 at 8:30 am at Panera @ Northgate.

#### Branch Reports and Action Items

- **North branch**

- November 19, 2014 "Sediment and Phosphorous Inputs from Perennial Streams to Lake Whatcom", Bellingham, WA. Katherine Beeler and

See [November Minutes](#) on page 7

Robert Mitchell, Department of Geology, Western Washington University.

- Elections next month.
- Want status of our first disbursement of annual operating budget.
- Want to volunteer with WRYMC
- New contact is Gabe Ng.

- **Kitsap branch**

- No updates.

- **Boeing branch**

- No updates.

### Technical Committees Reports and Action Items

- **Geotechnical group**

- Held a dinner meeting 16 October 2014 which had 160 attendees, including about 20 students. Dr. Joseph Wartman presented a summary of the Oso landslide event based on his GEER (Geotechnical Extreme Events Reconnaissance) Association reconnaissance and research findings.
- Thursday 20 November 2014 we will hold a dinner meeting at which John Kvinsland of Malcolm Drilling will present a case history of the Block 43 project in the South Lake Union Waterfront district.
- Leading an effort to reinstate a graduate-level case histories course at UW CEE Department. The course is on the 2014-15 Winter Quarter schedule and will be led by Erik Andersen of Aspect Consulting. Approximately four to six practitioners have agreed to present case histories for this course. The course will carry three graduate credits. Any members or affiliates that wish to participate can reach Erik at: Erik O Andersen, P.E., P.Eng. | Senior Associate Geotechnical Engineer | Direct: 206.812.4743 | Cell: 425.772.4705

- **Ports and Harbors**

- Last month they had a meeting on Corrosion Repairs to a Shipping Berth in Mexico. 30 people were in attendance.
- This month is the joint meeting on Reshaping Seattle's Topography. The dinner is at capacity.

- **Structural Committee/ SEAW**

- No update.

- **Urban Development & Transportation:**

- Shane is working on a meeting with ITE for December.

- **Water Resources**

- November 20 (12pm-1pm) at HDR- Mike (Rocky) Hrachovec with Natural Systems Design. HDR's Bellevue Office, 500 108th Ave NE, Suite 1200. Title: Floodplain Restoration in an Urban Setting – Engineering challenges of Seattle's Thornton Creek Confluence project

- **Sustainability**

- November 17th meeting on implementing Envision with the help of LEED.

- **Transportation**

- Joint meeting with ITE in December

### YMF

- **Past Events**

- October 14 – Networking & Officers' Meeting (Seattle)
- October 23 – Green Apple Day Sustainability Committee Project (Sustainability Committee)
- October 29 – Engineering Mentor Night @ UW Bothell (PSEC)
- November 15 – Removal of Invasive Species – Clarke Beach: Mercer Island

- **Upcoming Events**

- November 3 – Eastside Networking
- November 11 – Seattle Networking
- November 15 – Community Service Event, Clarke Beach Cleanup and Restoration
- November 22 – WRYMC 2015 Scavenger Hunt & Pub Crawl Trial Run
- December 16 – Annual Holiday Party and Toys
- February 7 – Popsicle Stick Bridge Competition 2015
- February 20-21 – WRYMC 2015

- **Committee Activities**

- The first officers' meeting was held at a Seattle Networking event on October 24. Chairs reported on what they were currently working on.
- Working with UW Student leaders to potential find a new Professor to lead their group.
- On going soccer league.

- **Action Items**

- Need to change banks to avoid conflict with Geotech Group at BECU. Finalizing documentation with Society to move to US Bank.
- Most of the necessary updates and fixes to functionality of the YMF website have been complet-

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**November Minutes** (continued from page 7)

ed. Still working on a few minor things which should be done by next month.

- o Working on PSEC nominations
  - o Cal Bearman YEOY
  - o Erin Slayton
  - o Kenneth Porter (K-12 Outreach)
  - o James Burke of Tyee Middle School K-12 STEM Engineering

**Miscellaneous**

- Decide not to follow up with Wealth Enhancement Strategies who had contacted us.

- Decide to tell Ceecareers.com that they can pay to post jobs on the website.
- Discuss PSEC nominations.

**Announcements**

- WRYMC.
- December meeting.
- Member renewal.

Next board meeting December 10 at 4:30pm.

Meeting called to a close at 5:20pm.

**Reach over 2,000  
Engineering Professionals**

**Post Your Employment Ad in this Newsletter  
and on the Seattle Section Web Site**

**See advertising details  
on page 2**

# How does Sustainability affect the design process?

As engineers, we will be using and developing new technologies to be more sustainable, and incorporating these requirements and systems into drawings and specifications. Municipalities will require the changes, engineers and scientist will incorporate it into their designs, and contractors will build them as designed. In this respect, the process may not change drastically. However, we will be required to step out of our comfort zone and collaborate to a higher degree with many more stakeholders.

Building sustainable and resilient communities will be paramount in the next century to adapt to climate change, an increase in the frequency and intensity of storm events, greater demands for natural resources, and pressure from governments and agencies. The current infrastructure is aging and needs to be repaired, upgraded, or replaced. The new infrastructure will have to be “whole-system” solutions. Designing sustainably is becoming more mainstream with the advent of Leadership in Energy and Environmental Design (LEED) and Envision rating systems.

Creating communities that decentralize utilities, such as water treatment, stormwater management, and energy production, can reduce the cost to retrofit and update these systems. Transportation projects need to account and allow for more efficient means of movement, creating communities that are walkable with easy access to mass transit, and electric charging stations that are powered by renewable energy along the highway and in our neighborhoods.

To design these facilities, the approach has to be more holistic. We must consider the life-cycle cost of projects and the added value of sustainability. The planning, design, and construction phases of a project will take into account all disciplines more closely than ever: engineers, contractors, scientist, biologists, geologists, governments, Tribes, utilities, and municipalities need to collaborate to promote sustainable solutions that help the regional ecosystem and populations.

## Does it cost more to design and build sustainably?

No, it does not always cost more to design sustainably. Some alternative designs have no change on project cost. Incorporating sustainability into the design process can save project costs or reduce the need for multimillion-

## Sustainability Series

### Part 2 of 3: How is Sustainability Implemented?



By Perry Cole, P.E., S.E., F.ASCE, Immediate Past President; Evan Sheesley, P.E., M.ASCE, President-Elect; and Steve Hannan, P.E.

Part 1, “What is Sustainability?” appeared in the November 2014 issue.

dollar projects to be built. With the advent of LEED and Envision, more sustainable projects and products are being produced and therefore creating a competitive market and reducing costs. In some cases, the alternative project may initially cost more, but the life-cycle cost to manage and operate these projects is less than non-sustainable designs. Operating costs are often the most significant financial burden for business owners and will only increase with time.

Sustainable projects often:

- Add value to communities, buildings, and environment
- Reduce carbon emissions during manufacturing, design, construction, and operation
- Create multi-use space
- Are more resilient to changing operating and environmental conditions
- Add green space by reducing impervious surfaces, using green roofs and walls and incorporating the existing vegetation into the design
- Reduce the disturbance and removal of topsoil
- Create water features instead of water treatment ponds
- Offset the need for new coal, nuclear, and fossil fuel plants
- Balance capital cost with operation and maintenance cost (O&M)
- Consider life-cycle costs
- Educate people about the benefits of being sustainable

## Low Cost Solutions

Here are some examples of sustainable solutions that are low tech and low cost:

See [Sustainability Series](#) on page 10

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**Sustainability Series** (continued from page 9)

- Passive solar – many benefits are achieved by orienting the length of building along the east/west axis and placing the majority of windows on south face. Benefits include reduction in heating, ventilation, and air conditioning (HVAC) costs, increase in natural lighting and promotion of solar photovoltaic (PV) orientation. This is a low cost change that reduces operating costs drastically.
- Attention to detail – During construction, paying attention to the building corners, floor and truss joints, and creating sealed spaces reduces drafts and the amount of HVAC required.
- Green roofs and bio-swales – Increase local storm water treatment by removing total suspended solids, reduce water conveyed to large-scale treatment plants, reduce heat island effect, increase habitat, and increase thermal mass (insulation) in the roof.
- Low flow fixtures reduce the amount of water needed to be treated and counteract the population increases that add to the system.
- Buying local products reduces carbon dioxide by reducing transportation distance and supports the local economy and communities.

**Reduced Life-Cycle Cost**

Here are some examples that cost more upfront but save money over the life of the project. They have additional benefits that need to be considered as well.

- Porous concrete pavement – costs more than conventional concrete but reduces the need for large detention ponds, reduces grading, and increases green space. Porous concrete reduces run-off and improves water quality.
- Renewable energy systems – the rate of wind and solar energy systems being installed is increasing. The initial cost for the systems can pay back the capital costs within 10 years.
- Solar energy – this year, large-scale solar has become similar in cost to coal plants and solar has added benefits. When solar is used as a parking lot cover, in hot environments, drivers come back to comfortable cars in the summer. In rainy areas, the cars are covered and dry. Cars can be charged while people run errands or during work hours. Many grocery stores already provide charging stations as an incentive to shop at their store.
- Wind energy – the cost has reduced due to improved efficiency in the turbines. In addition, wind

- can be used in conjunction with farms because the turbine doesn't take a large footprint and the land-owner gets a supplemental income from the energy. NativeEnergy did a study and found the entire U.S. could be powered from the wind potential on Native American lands.
- Ductless heating systems – these systems can cost more than traditional HVAC but create a more comfortable environment, reduce allergies, are extremely efficient, and save money due to reduced operating cost.
- Wastewater treatment – many plants are installing organic digesters that convert waste into energy and create soil by-products. This creates value from what once was waste.
- Innovations – new technologies will reduce the amount of materials needed, automate processes, reduce the amount of steel or concrete for structures, and create value and savings where we have not thought.

**Project Examples**

Ballard, Seattle – Stormwater and Green Space Solution

In Ballard, the City of Seattle is making a decision regarding combined-sewer overflow (CSO) versus decentralized and neighborhood treatment systems.

1. The first option is to build a massive storage tank for stormwater and CSO. This project will be expensive.
2. The second option is to treat stormwater in neighborhoods with:
  - a. local catchment and infiltration
  - b. small-scale rainwater collection, treatment, and use
  - c. using rainwater to create local water features in parks which also adds aesthetic appeal
  - d. build green streets, community gardens, and bio-swales

Some additional benefits include:

- Water quality treatment is on-site and not conveyed a long distance.
- Receiving waters do not collect the surge of pollution, sediment, and run-off because it is mimicking the natural environment and storing rainwater where it falls.
- The increase in green space reduces heat-island effect and mimics pre-development conditions.

See **Sustainability Series** on page 11

- Safer and more livable and walkable streets.

Seattle decided to go with the second option because it will save money and add value. This project is called *Ballard Natural Drainage* project.

#### Habitat Restoration and Flood Management Solutions

Infrastructure related to water and flood management has seen an increased emphasis due to recent natural disasters and aging levee infrastructure. As a result, federal, state and local governments are investing more funds into habitat restoration, levee set-backs, and flood management projects. These projects are designed to:

- Reduce the damage and cost of flooding
- Provide increased water storage
- Allow the river to return to a more natural state by adding sinuosity, allowing sediment transport and settling
- Restore natural processes by restoring variation to river velocity and geometry
- Regain the flood plain and flood capacity
- Increase habitat for ESA-listed salmonids and other aquatic species.

These projects are a benefit to communities and the environment. Cost benefits include reduction of risk to neighborhoods behind levees, decreased costs related to dredging rivers, and reduced flood damages. The rewards are more spawning, rearing, and foraging habitat for salmonids and other aquatic species to support salmon, additional green space, and the overall enhancement of natural ecosystems.

#### Stormwater Reduction Solution

Many water treatment facilities will need to be upgraded because of increased neighborhood density. The City of Seattle is being proactive and providing rebates to replace old toilets with low-flow toilets, giving away low-flow shower heads and faucet aerators. By reducing the water usage per home, the treatment facility can handle the increase in population density. The same concept is applicable for new buildings. When projects allow infiltration and treat stormwater and wastewater on-site, the existing conveyance and treatment facilities do not have to be expanded or replaced. During large storm events, the environment does not receive the increased run-off because it is infiltrating and evaporating.

#### Energy Production Solution

The City of Seattle is using a similar rebate system to increase renewable energy production in the city. By decentralizing energy production, the system is less prone to black-outs, less energy is lost during transmission, and the infrastructure is more sustainable. The recent increase in population density would require the energy utilities to increase the capacity of the entire energy infrastructure (substations, transmission lines, transformers, and new energy production facilities) from Eastern Washington to the major cities. Up to 20 percent of energy can be lost in transmission.

The City is using the *Solarize Washington Program* to make solar more affordable for the homeowner. The program has already installed 600 systems and 3 megawatts (MW) installed. The systems are projected to pay-back in 6 to 15 years!

The state has a “production incentive program” that gives the energy producer (homeowner) an annual check for the energy produced on-site at over \$0.50 per kilowatt-hour. This credit off-sets the loan payment. Studies in California have found home values increase from 10 to 20 percent with installation of renewable energy systems. The City realized it was cheaper to give incentives to create localized solar energy projects than to upgrade the entire energy infrastructure.

By increasing renewable energy we can reduce the need for coal and nuclear energy. These facilities use millions of gallons for thermal cooling, create carbon dioxide and environmental mitigation for years to come. Seattle is using a model that Germany has used to become one of the leading renewable energy producers in the world.

#### *Who pays for it? (Developers, Government, Owners)*

As stated above, some of these solutions do not add cost to projects. Some of these projects divert the need to complete large projects. Sustainable projects add value that should be considered in life-cycle cost analysis.

For sustainable projects with higher capital costs than “conventional projects,” a combination of government, owners, and developers will likely pick up the bill. Initially, these projects will gain traction by giving incentives to complete these projects. These incentives are provided by governments that can see the long-term benefit of more sustainable projects and reducing carbon

emissions. There are three general ways it can progress from here:

- **Market Shift** – Consumers, communities, the public, and grass roots organizations demand that projects are designed sustainably. Owners and developers hear the request of their clients and start building with sustainability in mind.
- **Government Shift** – Municipalities require that projects follow an updated specification or design manuals such as LEED or Envision. Since all projects would be required to follow the standards, the change in cost of the project would pass to the contractor and to the owner. Government incentives can offset these costs.
- **Combination of these two shifts will work in tandem to cause positive change.**

**Conclusions:**

Building sustainably ensures that we design with future generations in mind. We should strive to reduce the life-cycle cost to operate systems we build, adapt to climate

change, and prevent costly environmental clean-ups. The level of carbon dioxide in the atmosphere is reaching a tipping point, we are reaching peak oil production, and resources are becoming more expensive and scarce as the population increases. We must design projects that last for more than 50 years and work with the natural systems, not attempt to control them. We want to design projects that mimic natural systems.

As more projects are built sustainably, contractors, suppliers, engineers, and all other players involved will become more efficient in the process. The cost to make and transport these products will be reduced. The cost to design and build these projects will also drop when engineers and contractors are more familiar with the process, and competition and working knowledge increases.

When designing sustainably, it is important to look at designing holistically. We need to look at the increased value of adding habitat and green space, reducing runoff, and mimicking nature as a long-term economic benefit. In some instances, there will be an increased upfront cost; however, life-cycle cost and added value can tip the scale to make the project beneficial to our communities