



Green Building Program 2010 **Accomplishments**

Lower Boise Creek Channel Restoration Project, managed by King County Water and Land Resources Division, achieved a Platinum level rating utilizing the King County Sustainable Infrastructure Scorecard.

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2010 Green Building Program accomplishments

As directed in King County *Green Building and Sustainable Development Ordinance 16147*, we are pleased to present 2010 accomplishments of the King County Green Building Program. This program supports King County's commitment to minimize the environmental impacts of County sites, facilities, and structures in all phases – from design, construction, operation, renovation, and maintenance to deconstruction.

The intent of the Green Building and Sustainable Development Ordinance is to ensure that the design, construction, maintenance and operation of any King County-owned or -financed capital project are consistent with the latest green building and sustainable development practices. Key points of the ordinance are:

- All Leadership in Energy and Environmental Design (LEED®)-eligible capital projects must register with the U.S. Green Building Council and strive to achieve at least a LEED Gold rating.
- All non-LEED-eligible projects must incorporate sustainable development practices, and project managers must fill out the Sustainable Infrastructure Scorecard that shows the strategies that are being used.
- Projects should incorporate an integrated design process and life-cycle assessment to optimize design approaches.

In 2010, King County divisions reported on a total of 170 capital projects. Eleven projects reported to be using the LEED rating system and 135 projects using the Sustainable Infrastructure Scorecard. The majority of County projects are infrastructure projects and not eligible to be LEED certified, and utilize the Sustainable Infrastructure Scorecard.

Many County projects reported recycling or reusing materials on site, therefore diverting them from landfills. On average, 59 percent of construction materials were recycled.

Four projects reported that they had planned or achieved diversion rates of 95 percent or higher. Collectively, the County diverted more than 31,000 tons of construction material from landfills. Some highlighted projects for 2010 efforts include:

- **Brightwater Education and Community Meeting Center** is pursuing LEED Gold for New Construction. Features include natural ventilation and daylighting, radiant floor heating from waste-treatment plant energy, use of reclaimed water, green roof and public education efforts. To date, the Brightwater Treatment System capital project recycled 3,312 tons of construction waste to recycling and reused more than 370,000 tons of material in construction. The project will avoid an estimated 12,543 metric tons of carbon dioxide equivalents (MTCO₂e) in green house gas during construction.
- **May Creek Bridge** was rebuilt, replacing creosote-treated timber along the stream with a wider bridge that improved the movement of water. The new structure was built with precast concrete materials that reduced site disturbance during construction. The use of fly ash as a cement substitute in the concrete mix reduced carbon dioxide emissions by approximately 12,483 pounds. The reduction in construction and materials-related greenhouse gas emissions for the project totaled approximately 229 MTCO₂e.



Aerial view of Brightwater Treatment System campus during construction.



Architectural rendering of the Bow Lake Recycling and Transfer Station, with the goal of achieving LEED Gold.

- **Bow Lake Recycling and Transfer Station** is pursuing LEED Gold certification. The project, which is expected to save more than 40 percent domestic water compared to a conventional project, will collect approximately 1.8 million gallons of rainwater annually for use in the transfer station operation, and save an estimated 172.4 MTCO₂e per year in greenhouse gas emissions. Project specifications required that 50 percent of lumber used will be certified by the Forest Stewardship Council (FSC). In the second phase of constructions, 16.1 kW photovoltaic panels will be installed on the roof.
- **Lower Boise Creek Channel Restoration** diverted 95 percent of construction and demolition materials from landfills, used alternative fuels in construction equipment, preserved existing native vegetation, and used locally sourced materials. Ten thousand cubic yards of soil and rock were reused on site, and 200 cubic yards of large rock were provided to the Pautzky Levee Setback and Floodplain Restoration Project.
- **Black River Building** achieved LEED Silver Certification under the LEED for Existing Buildings Operations and Maintenance. The building adopted high-performance operating and maintenance guidelines for sustainable purchasing, recycling and waste management, site and landscaping, the building exterior, green cleaning, and facility improvements.
- **RapidRide Program** will offer increased alternative transportation options. New shelter stations will be prefabricated from durable steel frames with an estimated life of more than 35 years enabling reuse, offer more bike parking, and include green cleaning methods using no chemicals. Approximately 395 cubic yards of asphalt and cement concrete and 20 tons of steel will be recycled.

Tools developed to assist Countywide green building

The Sustainable Infrastructure Scorecard is designed to be flexible so that it can be adapted for use by a variety of project types. One major effort was developing and providing trainings to county staff on the use of the Sustainable Infrastructure Scorecard and Guidelines manual.

As a service to the Green Building Team, the GreenTools staff developed a training tool on the Green Building and Sustainable Development Ordinance and the Sustainable Infrastructure Scorecard. The training served to assist county project managers to familiarize themselves on the requirements of the ordinance as well as how to utilize the Scorecard. It encompassed project qualifications, documentation checklist, credit explanation, resource examples, and reporting requirements. In addition, an online training tutorial was produced for easy access and convenience to capital project managers.

Challenges and opportunities

The highlights listed above illustrate County agencies' commitment to sustainable practices in building and infrastructure projects. With ongoing support and a commitment to making sustainable development a priority in all capital projects, such practices can become the norm.

Green building efforts should be given a priority in the budget development of a project. The County has executed successful examples, and at the same time maximized its limited

resources. For instance, the County can help make sustainable operation and maintenance practices standard by encouraging LEED certification of existing buildings. To reduce greenhouse gas emissions, divisions may wish to add renewable energy features to facilities when practical. Based on outcomes from installation of solar electric power systems at the Roads Services Renton shops, and Solid Waste Division's Shoreline and Bow Lake transfer stations, the County should consider more such installations at County facilities as the cost of solar energy declines and when innovative ownership or financing arrangements makes this option cost-effective.

An ongoing challenge is the need for better quantitative data. To effectively monitor progress and performance measures, County agencies need a streamlined and consistent database that contains all necessary project tracking information.

Recommendations

- The county should pursue LEED certification of existing buildings and continue to train staff in the use of the Sustainable Infrastructure Scorecard, with the goal of making use of the Scorecard a regular and consistent element of capital project development. In 2011, the Green building Team is focusing on staff training, completing the Green O&M Guidelines manual, promoting life-cycle analysis as part of the alternatives analysis process; developing streamlined reporting; and generally promoting the incorporation of sustainable practices into the county's building projects.
- County divisions should pursue opportunities to develop

more detailed agreements with contractors and consider additional technical review of proposals to increase the environmental benefits of projects, as needed.

- Proactive coordination with key stakeholders from the beginning of projects is recommended. The 98th Street Pedestrian Improvement Project exemplifies this approach. Issues and concerns were identified and addressed through stakeholder coordination and public outreach meetings. Solutions and agreements were incorporated early in the design process. As a result, all partners achieved their objectives and were satisfied.
- The Capital Project Management Work Group should incorporate reporting protocols and criteria for data into its work to ensure the availability of consistent data.
- The County should maintain high expectations, involvement with dedicated stakeholders, and project continuity—all essential for achieving green building objectives and meeting the goals of the King County Strategic Plan, Climate Agenda, Energy Plan and related initiatives.

What follows is a brief description of the structure and background of the Green Building Program. The remainder of this document focuses on two primary areas of progress:

- The status of County projects that qualify for certification under the LEED rating system, and
- The strides made by various agencies of the Green Building Team in integrating green building elements into capital improvement projects.

Lower Boise Creek Channel Restoration Project diverted 95 percent of C&D materials from landfill.



Basic elements of the Green Building Program

In accordance with the *Green Building and Sustainable Development Ordinance*, the Solid Waste Division of the Department of Natural Resources and Parks manages the Green Building Program. The ordinance requires county departments to incorporate green building elements in all construction projects. It establishes the LEED rating system as the guiding principle for meeting this goal. In cases where LEED certification may not be economically feasible or applicable for a project, such as open-air bus passenger shelters, restroom facilities, pump stations, and conveyance lines, County departments are encouraged to apply as many green building elements as possible.

SWD coordinates the Countywide Green Building Team, which provides a forum for exchanging information on green building practices among County agencies and assists in guiding green building practices at County facilities. Team members include representatives from the following agencies throughout the County:

- Department of Executive Services, including
 - Facilities Management Division (FMD)
 - Finance and Business Operations Division (FBOD)
- Department of Transportation (DOT), including
 - Metro Transit Division
 - Roads Division
 - Airport Division
- Department of Natural Resources and Parks (DNRP), including
 - Wastewater Treatment Division (WTD)

- Solid Waste Division (SWD)
- Water and Land Resources Division (WLRD)
- Parks and Recreation (Parks)
- Department of Development and Environmental Services (DDES)
- Department of Community and Human Services (DCHS)
 - Community Services Division, Housing and Community Development (HCD)

The Green Building Team is charged with helping Countywide project teams achieve the maximum possible standards of green building on their projects. The Team also coordinates and incorporates the mandates of other Countywide teams that affect green building such as the Climate Team and the Energy Task Force.

SWD's GreenTools Program provides support to project teams through training and technical assistance. With this support, design teams can achieve the maximum possible standards of green building on their projects by encouraging practices that conserve resources, use recycled-content materials, maximize energy efficiency, and address other environmental and social considerations. These practices result in economic benefits, such as reduced operating costs, enhanced asset value, optimal building performance, and a healthier workplace for employees.

You can find a comprehensive overview of the whole GreenTools Program at the end of this report.

Green building projects that qualify for LEED Certification

Standards for establishing and rating green building practices are based on criteria developed by the U.S. Green Building Council using the nationally recognized LEED rating system. LEED is a point-based system that rates projects according to the number of green building elements incorporated in the project. The types of projects where LEED standards are most readily applied include office buildings, transfer stations, maintenance facilities, recreational facilities, and medical facilities. LEED promotes a whole-building approach to sustainability by recognizing performance in six key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, indoor environmental quality, and innovation in design. Until mid-2008, departments were directed to apply LEED criteria in the pre-design and design phases of projects, and were encouraged to seek the highest LEED certification applicable to the project. With the new ordinance now in place, eligible projects are required to seek a LEED Gold rating.

Since its inception, a number of LEED programs have evolved to suit different types of buildings. These include LEED for New Construction and Major Renovation (NC), Existing Buildings (EB), Existing Buildings Operation and Maintenance (EBOM) (an updated version of LEED EB), Core and Shell (CS), and Commercial Interiors (CI). Project managers are encouraged to register with the U.S. Green Building Council early in the project, but a final rating is not awarded until after the project is completed and monitored for compliance.

In 2010, County departments made significant progress on 11 County building projects in various phases of the LEED certification process. Some of the buildings are in the initial design phases while others were completed this year. Two LEED projects received their certification in 2010: FMD's Ninth & Jefferson Building received LEED CS Gold; and WTD's South Plant Administration Building received LEED NC Gold. These projects are summarized in Table 1 and are described in more detail in the individual agency sections. The table also lists projects that have completed the LEED certification process since the program's inception.

Table 1. Status of County buildings in the LEED Certification process

Project Name	Division	Building Type	Pending Rating	Rating Achieved	Year Rating Achieved
Projects in Design Phase					
1. North County Recycling and Transfer Station	SWD	Industrial	NC - Gold		
2. South County Recycling and Transfer Station	SWD	Industrial	NC - Gold		
3. Factoria Recycling and Transfer Station	SWD	Industrial	NC - Gold		
4. South Regional Roads Maintenance Facility	Roads/FMD	Office/workshop	NC - Silver		
Projects in the Construction Phase					
5. Atlantic/Central Base Operations Complex	Transit	Office	NC - Gold		
6. Brightwater Environmental Education Center	WTD	Meeting/ community center	NC - Gold		
7. Bow Lake Recycling & Transfer Station	SWD	Industrial	NC - Gold		
Projects Completed - Pending Certification					
8. Ryerson Base Improvements	Transit	Office Renovation	NC-Certified		
9. Chinook Building	FMD	Office	CS - Gold CI - Platinum		
10. Black River Building	FMD/DDES	Office	EBOM - Silver		
Projects Completed and Certified					
11. Kent Pullen Regional Communication & Emergency Coordination Center	FMD	Office		NC - Certified	2005
12. King Street Center	FMD	Office		EB - Gold	2004
13. Power Distribution Headquarters	Transit	Office/workshop		NC - Certified	2007
14. Marymoor Maintenance Facility	FMD/Parks	Office/workshop		NC - Certified	2008
15. Shoreline Recycling & Transfer Station	SWD	Industrial		NC - Platinum	2008
16. Atlantic/Central Base Communication and Control Center	Transit	Office		NC - Gold	2009
17. Atlantic/Central Base Tire and Millwright Shop	Transit	Office/workshop		NC - Certified	2009
18. Carnation Treatment Plant Administration Building	WTD	Industrial		NC-Certified	2009
19. 9th and Jefferson	FMD	Office		CS-Gold	2010
20. South Plant Administration Building	WTD	Office/ laboratory		NC - Gold	2010

Green Building Project Descriptions and Accomplishments

(by Department)

Many of the construction projects undertaken by the County do not qualify for LEED certification; however, County departments are committed to using LEED standards as a guideline for incorporating green building practices into all projects. The Green Building Team developed the King County Sustainable Infrastructure Scorecard, an internal tool to facilitate inclusion of such practices as using recycled materials, recycling construction waste, using innovative stormwater control strategies, reducing energy and water use, and other measures that reduce a project’s impact on the environment. The projects described below demonstrate the variety of ways in which these strategies are being employed.

Executive Services - Facilities Management Division (FMD)

FMD staff incorporates green building strategies into projects whenever possible. FMD projects can range from limited efforts of replacing individual systems of a facility that focus on a single strategy to a comprehensive new building capital project designed to achieve LEED certification. One major accomplishment in 2010 was FMD, in coordination with DDES, worked to get the DDES Black River Building certified under the LEED for Existing Building: Operation and Maintenance rating system. The project was started in 2008, and the project team completed and submitted its application for LEED certification. Confirmation of LEED certification will occur in 2011.

Table 2. Facilities Management Division Projects

Project	Green Building Features	Project Description
Elections Building Envelope, HVAC and Controls Upgrade	Energy efficiency	This project includes the removal of the existing water source heat pumps inside the building and installation of rooftop units to provide HVAC for the Elections Building. The existing un-insulated roof will be replaced with a new R30 insulated roof. A centralized building control system will be installed that will provide DDC controls to new and existing equipment and will incorporate the existing lighting control system. Occupancy sensors will be added to provide energy savings during low occupancy or unoccupied periods. Estimated savings in GHG emissions is 451 metric tons/year from lifetime energy and transportation-related emissions. Projected energy savings is 1,103,900 kWh/yr. Estimated cost savings is \$88,000/yr.
Black River Building LEED Certification (LEED EB Silver Certified)	Water efficiency, Energy efficiency, Green O&M guidelines	FMD and DDES submitted for LEED Silver Certification for the Black River Building under the LEED for Existing Buildings: Operations and Maintenance rating system. Water efficiency efforts include upgraded irrigation controller, added weather station and modified watering schedule which reduced irrigation water use by 79%, upgraded 17 flushometers to low consumption solar powered, upgraded 12 manual faucets to water efficient hydro powered automatic faucets to reduce water use by 20% from LEED baseline, and monitoring water use to quantify reduction. Energy efficiencies include achieving Energy Star Certification, performed energy audit to identify energy conservation measures and recommendations, in process of installing 50 occupancy sensors, and monitoring use to quantify reduction. Created high performance O&M guidelines for sustainable purchasing, recycling and waste management, site and landscaping, building exterior, green cleaning and facility improvements. From the baseline date of 12/31/2007 to 8/31/2010, GHG emissions have reduced by 87 MtCO ₂ e/year. Approximately 200 pounds of construction materials was recycled. Purchased 100% Green Power for 2 years from Puget Sound Energy. Cost savings included \$15,250 saved in electricity in 2010, with estimated \$107,550 after lighting upgrade.
Issaquah District Court HVAC	Energy efficiency	Replace existing HVAC with new system that will result in 10% reduction in operating costs.

Table 2. Facilities Management Division Projects Continued

Project	Green Building Features	Project Description
Shoreline District Court HVAC and Fire Alarm Replacement	Energy efficiency	Replace existing HVAC with new system that will result in 10% reduction in operating costs.
King County Correctional Facility Water Pipe Replacement	Pre-fabricated elements, recycled construction materials, commissioning	Replace all existing copper and steel domestic water piping with new polypropylene water piping. Plan and design for long-term maintenance, use of pre-fabricated element, efficient construction delivery and staging, commissioning of domestic water system, and use of LEED Accredited Professional. Ninety-five percent of construction and demolition materials will be recycled.
Maleng Regional Justice Center Energy Efficiency Project	Life Cycle Cost Assessment, energy efficiency, prefabricated elements, recycle C&D materials, commissioning, LEED AP	Provide energy saving HVAC equipment repairs and replacements. Includes replacing supply and exhaust fan motors and heat wheel repairs at the Detention Building and replacing DDC controls with Siemens controls. Fifty percent of construction materials will be recycled, reduce energy use by at least 10% of local code, plan and design for long-term maintenance, commissioning of new fan motors. Reduction in construction and materials-related emissions include 4,640,251 lbs of GHG. Estimated cost savings is \$435,376/yr.
Summary of Major Maintenance Program and small Capital Projects (under \$750,000)	Green cleaning, green materials, modular furniture, LED lighting, energy efficiency, stormwater management, water efficient fixtures, green contract language and specification	<p>Small capital projects in various facilities throughout King County occupied by client agencies, including DAJD, Public Health, Sheriff’s Office, District Court, Superior Court, Records and Elections and Administration. Such project include repair and/or replacement of building systems including mechanical, electrical and plumbing, interior finishes and components (doors, blinds, flooring, wall finishes), building envelope components (windows and exterior wall repair and finishes), and structural repairs.</p> <p>Select project highlights include:</p> <p>Linoleum flooring was specified for 20 Superior Court courtrooms within the King County Courthouse for its sustainability and its visually historic appropriateness (project is currently on hold)</p> <p>Courthouse Exterior South Courtyard wall cleaning – rather than using chemicals detergents, the exterior was cleaned using hot pressurized water except where absolutely necessary in which ProsoCo EnviroKlean BioWash was used sparingly and its runoff collected and properly disposed of.</p> <p>Herman Miller Ethospace systems furniture was installed in Burien District Court for individual workstations and in Renton Public Health to replace the check-in counter. In these projects, systems furniture replaced custom casework and hard wall construction, also reducing the cost and impact of future demolition and replacement.</p> <p>Existing metal halide fixtures used for site lighting were retrofitted to use energy efficient LED lamps.</p> <p>Several projects included energy reduction of 20% or more including HVAC upgrades, heat wheel repair, site lighting upgrades and window replacement and repair projects.</p> <p>Overhead roof system at the Sheriff’s shooting range was retrofitted to divert storm water from running off the formerly unprotected concrete slab and ballistic catchment bin into the ground, preventing further ground water lead contamination.</p> <p>FMD product standards include GS-11 paint, low consumption plumbing fixtures, high efficiency lighting, and “green” cleaning products</p> <p>Use of “green” contract language was included in our construction contracts to ensure proper construction waste management, as well as architect/engineer consultant agreements to ensure sustainable opportunities are discussed/included in the design process .</p>

Department of Transportation - Transit Division

The Transit Division continues to incorporate green building strategies in its projects. Two prime examples are utilization of the Sustainable Infrastructure Scorecard for design and construction of bus shelters along the RapidRide B-Line, as well as energy efficiency efforts in the HVAC system replacement project at the Transit Bellevue Base.

Equally important is Metro Transit’s ongoing service in providing comprehensive alternative transportation options that contribute to Countywide projects achieving individual LEED and Scorecard credits.

Table 3. Transit Division Projects

Project	Green Building Features	Project Description
Bellevue Base Improvements	Energy efficiency, Low VOC emitting materials	Includes replacement of the HVAC systems, installation of new lighting systems, and upgrade of the emergency generator at the Bellevue Base Maintenance and Operations Building. This project is designed to reduce energy consumption thru: air quality monitoring equipment to optimize the use of conditioned air by reducing the HVAC equipment run time and limit the unnecessary exhaust of conditioned air; high efficiency boilers and HVAC equipment installed to reduce energy consumption; real time gas and electrical consumption monitoring to gauge the results of this design and apply the results to future projects; and more efficient lighting fixtures and motion detectors in office areas. All new building systems were commissioned to ensure optimum operating performance. Low VOC emitting sealants and paints were used throughout. The new building system will reduce GHG emissions by 25% to 30% over the baseline. Thirty to forty percent of construction materials is planned to be recycled. Estimate energy savings of \$7,100/year for the Hydronic Heat & Vent Unit representing 35% savings for this system. Estimated savings would be 28% of total building energy use and approximately \$24,000/yr in energy savings.
North Base Garage Roof Liner and Pavement Replacement	Reused materials, energy efficiency, water conservation, recycled materials	This project is part of the Transit Asset Maintenance Program. Includes onsite soil and drain rock reuse; offsite recycling of demolished turf, concrete, and gravel; removal and replanting of 20 trees and shrubs onsite; removal and replanting of 100 shrubs offsite; water conserving landscape irrigation systems; energy efficient parking lot lighting. Over 3000 cubic yards of material will be reused onsite. Over 1200 cubic yards of material will be recycled offsite, in addition to 100 shrubs replanted by Metro Transit Facilities landscaping and King County Nursery.



Green roof of North Base bus garage used by community as sports field.

Table 4. Roads Services Division Projects Continued

Project	Green Building Features	Project Description
KC Metro Transit East Base Air Compressor Replacement	Energy efficiency, water conservation, utility rebate	This project will replace two very inefficient and “once-through” water-cooled air compressors with two new high efficiency air cooled units. An estimated 114,597 kwh will be saved each year. In addition, 131,000 gallons of water used to cool the old compressors will be saved and not go into the waste water system. This is estimated to produce an electric utility rebate of \$25,000-\$30,000 and the yearly electrical utility cost savings are estimated at \$8,600.
RapidRide Program	Alternative transportation options, green cleaning, construction materials recycled, reused materials	New stations will offer a more attractive pedestrian environment and spaces for bike parking. These RapidRide stations will be pre-fabricated from durable steel frames that will be used over and over again. Refurbished and repainted every eight years, the RapidRide shelter frames have an estimated life of 35 to 40 years. Green cleaning methods include pressure washing the shelters with water only, using no chemicals. Approximately 395 cubic yards of asphalt & cement concrete and 20 tons of steel from construction materials will be recycled. Green and renewable resources include reusable cement concrete forms, recycled cement concrete for base material, cement concrete using fly ash, and recycled steel for reinforcing steel bars.
South Base Roof Replacement	Light-colored exterior surface treatment	Removal of the existing Tremco built-up roofing system with gray granule surface and installation of a new complete 45,000 square foot roofing system with white-colored gravel surfacing on the vehicle maintenance building. This feature helps mitigate for heat island effect.



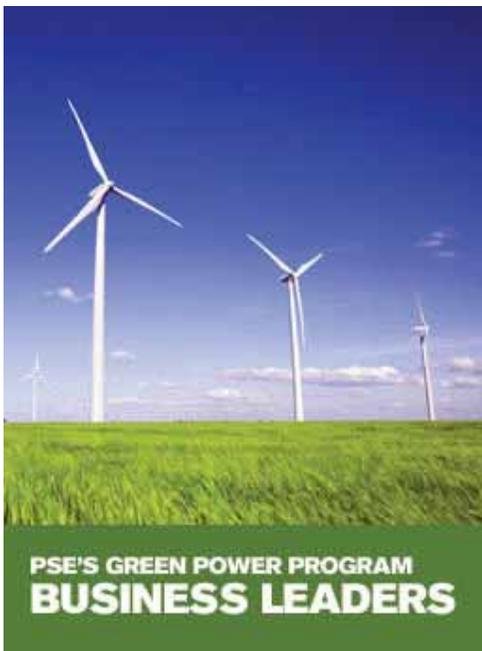
Metro Transit celebrates the grand opening of RapidRide A Line.

Department of Transportation - Road Services Division

Roads continued its efforts to incorporate green building practices into transportation infrastructure projects. The Renton Solar Panel installation project on the C Building was completed and started producing electricity in 2010. Building J is continuing to be designed and slated to be LEED Gold or higher. An ongoing priority of completing road infrastructure and pedestrian improvements was achieved with a total more than 13,000 linear feet utilizing prefabricated components, green materials, heavy equipment using bio-degradable fluids, and reusing onsite materials.

Table 4. Roads Services Division Projects

Project	Green Building Features	Project Description
RSD Renton Facility Solar Panel Construction	Renewable energy	A 4.23 kW photovoltaic power generation system was constructed on the roof top of Building "C", which feeds into Puget Sound Energy's power grid. This project participated in Puget Sound Energy's Energy Production Incentive Program. Lifetime energy and transportation-related emissions reduced by 131 MT. Puget Sound Energy purchase power produced by the system at a rate of 0.18/kW. The System produced 2798 kwh from July 2010 – December 2010. As expected, the system is producing variable amounts of energy based on cloud conditions and available sunlight. Expected annual revenue is approximately \$1000 in addition to free power from panels.
Preston-Fall City Road SE	Pre-fabricated elements, green materials, reused materials	Includes use of precast concrete box culvert, bio-degradable hydraulic fluid in heavy equipment, road closure and detour route, and reused fill material as backfill. Amount of construction waste recycled includes approximately 15 tons of asphalt, 2,420 CY of gravel borrow. Green resources used include fly ash for cement substitute, HDPE pipe recycle content.
Skykomish Storage Building	Energy efficiency, FSC certified wood, green materials, recycled construction materials	The project included design and construction of a pre-engineered building to replace the existing storage building in Skykomish. One-hundred percent building were recycled. The new building used R19 insulation for the roof and exterior walls. All the lighting in this building are energy efficient T-8. The new building is expected to save 40% on energy annually. Estimated savings in lifetime energy and transportation-related GHG emissions is 18 metric tons.



FSC-certified wood beams used in Skykomish Storage Building.

Table 4. Roads Services Division Projects Continued

Project	Green Building Features	Project Description
Renton “J” Building Roof & HVAC Replacement (pursuing LEED Gold or higher)	Energy efficiency, natural lighting, renewable energy, recycled materials	Consists of the replacement of the deteriorating and leaky roof system, inefficient HVAC systems, and an outdated dust collection system. Also included are improvements to building envelope, mechanical and lighting system. The project is currently at 30% design, and will analyze the needs of replacing the energy inefficient windows, damaged siding, and inadequate insulation in roof decks and wall systems. If budget allows, more energy saving measures such as solar walls, solar panels, and skylights will be incorporated into the proposed project. The project will utilize green and renewable materials and recycle existing building materials when possible on construction.
Road Infrastructure - Pedestrian Improvements	Pre-fabricated elements, green materials, reused materials	Several sidewalks were improved in 2010. In all, a total of 13,550 linear feet were constructed with precast concrete box culvert, use bio-degradable hydraulic fluid in heavy equipment, road closure and detour route, reuse fill material as backfill. Projects included were: <ul style="list-style-type: none"> • South 133rd Street • South Star Lake Road • SE Issaquah-Fall City Road • SW 98th Street
May Creek Bridge	Pre-fabricated elements, increased hydraulic opening	The new bridge replacement structure will have prestressed precast concrete slab panels supported by driven H-Piles with cast-in-place concrete pile caps. The bridge will provide two 12-foot-wide traffic lanes with 8-foot-wide shoulders for traffic safety. Support abutments will be constructed outside of the river’s ordinary high water mark. Reduction in construction and materials-related emissions is 228.64 MTCO ₂ e. Use of fly ash in concrete mix reduced CO ₂ emissions by 12,483 pounds.



May Creek Bridge used fly ash in concrete mix.

Table 5. Wastewater Treatment Division Projects Continued

Project	Green Building Features	Project Description
Roads Services Division Efficiency and Conservation Strategy	Energy efficiency	Develop and implement a Roads Services Division Energy Efficiency and Conservation Strategy for the Road Services Division's maintenance facilities beginning with the main maintenance facility. The strategy will formulate energy efficiency, conservation, and usage goals consistent with the County's Green Building Ordinance and Energy Plan. The intent of the strategy is to reduce energy costs while optimizing energy management, shift to more renewable energy, prioritize action to reach these goals, and report on progress.
Renton New Traffic Garage Building	Energy efficiency	Included design and construction of a new 2600 square foot commercial metal building including heated space for striping truck parking, materials for road striping operations, and mechanical room. The strategies for this building were to exceed the minimum requirements by Washington State Energy Code. The new building had R19 & R35 insulation for the roof and exterior. All of the lighting in this building is energy efficient T-8. The new building is expected to save 40%-50% on energy bills annually over what would be expected for a typical storage building of the same size. Actual annual O&M costs were less than projected costs.
Green Power Purchasing Program	Renewable Energy	King County DOT Road Services Division buys 100% green power for all its Maintenance Facilities. Roads services Division is a Leadership Partner in the Puget Sound Energy Green Power Program for 2010. 2,726,808 kwh of power was purchased.
Sunday Creek Bridge	Pre-fabricated elements, habitat restoration, reused materials, recycled materials	Replace Sunday Creek Bridge No. 364C to correct structural and safety deficiencies associated with the existing bridge. It is proposed replacement bridge is a single-span 100-foot-long prefabricated metal galvanized truss bridge, located on the existing alignment. Support abutments will be constructed outside of the river's ordinary high water mark. The proposed bridge will slope allowing surface water to drain from the bridge into quarry spalls at the ends of the bridge. The water will flow over an area with a quarry spall mat that will provide both slope erosion protection and force of flow dissipation. The project will mitigate for the loss of any vegetation cleared during project construction by planting native plants. Construction and materials-related emissions were reduced by 323 MTCO2e. Amount of construction materials recycled included bridge support trusses were large logs which were reused as LWD in the stream; existing riprap for the protecting the existing bridge was reused; and 300-400 cubic yards of material excavated for new abutments was reused a base course for new approaches. Fly ash used in concrete mix reduced CO2 emissions by 4,990 pounds. Savings from reusing materials was about \$100,000.
Maintenance and Moorage Barge	Energy efficiency, low VOC emitting materials, pre-fabricated elements, integrative design process	This project will build a maintenance barge to support passenger-only ferry operations. The barge will be used for daily and light maintenance on the County's ferry fleet as-well-as overnight moorage for up to 3 vessels. The estimated useful life of the barge is 40 years. The barge was sized to be as small as possible; energy saving devises such as LED lighting and water saving features are being incorporated into design; low toxicity hull paint will be evaluated; prefabricated buildings will be used for office and workshop space; and the barge will be designed to function in proposed and future locations.

Department of Transportation – Airport Division

The King County International Airport Facilities Assessment and Energy Evaluation Study was completed in March 2010. The study will guide the Airport's Capital Improvement Projects and Operations and Maintenance Program in addressing Green Building issues. The Facility Assessments survey included 19 airport buildings and the Energy Study evaluated 15 facilities for short and long term investments. Four facilities were identified for demolition or redevelopment.

Department of Natural Resources and Parks - Wastewater Treatment Division

In 2010, WTD worked on three LEED projects: the South Treatment Plant Administration Building; the Brightwater Treatment Plant Environmental Education and Community Meeting Center; and the Carnation Treatment Plant Administration Building. The WTD has an active Green Team which utilized the Sustainable Infrastructure Scorecard specific to WTD, for 58 capital projects in 2010. The West Point Waste to Energy capital project will result in taking a by-product of the wastewater treatment process and turn it into a valuable resource that the West Point Treatment Plant will use to operate wastewater treatment equipment, thereby saving money and reducing the demand for electricity from the utility.

Table 5. Wastewater Treatment Division Projects

Project	Green Building Feature	Project Description
West Point Treatment Plant Digestion System Improvements	Reuse materials, energy efficiency	This project involves mechanical, electrical, instrumentation and control system upgrades to improve the wastewater solids digestion system. The work includes installation of a digester feed preheat loop and heat exchanger, digester feed flow meters, digester liquid level sensors, digester gas flow transmitters, grinders, valves and actuators to enable an active digester. Features include reuse of existing equipment instead of demolishing, optimization of preheat loop to minimize heat load, minimize the possibility of future digester upsets and impacts on surrounding community, innovative modifications to enhance reliability of digestion systems without expanding capacity.
South Treatment Plant Excess Waste Gas Control	Recycled materials, reused material	The South Treatment Plant (STP) produces methane gas as byproduct of the treatment process. This project will replace the existing deteriorating and inefficient flares/waste gas burners with three new Varec-Biogas brand burners. This will improve equipment reliability and effectiveness. Construction materials recycled included 30 tons of steel and 12 tons of concrete. Approximately 20 tons of recycled aggregate was used for fill.
West Point Modular Office Annex	Modular construction, energy efficiency, native plants and drought resistant landscaping	Replace the existing construction management trailers at the West Point Treatment Plant with a one-story modular building to accommodate staff and associated functional areas. Sustainable strategies involve using modular construction techniques to reduce construction waste, reducing energy by using high-rated insulation and heating the building with the plant's existing hot water loop, and landscaping with drought-resistant species to minimize maintenance. Over 60% of the trees, shrubs, and ground covers are native species, and remaining non-native plants are well suited to our climate, requiring little maintenance.



Architectural rendering of West Point Modular Office Annex.

Table 5. Wastewater Treatment Division Projects Continued

Project	Green Building Feature	Project Description
Computer system/ Equipment Replacement	Low VOC emitting materials, energy efficiency, construction materials recycled	Project involves the upgrade of the plant controls system to standardized control system equipment supplied by Emerson. This is one component of the regional control system upgrade which will result in a standardized control system platform for West Point South Plant and Brightwater. Fifty percent of construction waste will be recycled. Upgrades will optimize energy performance by 20% for new and 10% for existing equipment.
West Section Control System Replacement	Low VOC emitting materials, energy efficiency, construction materials recycled	Replace the existing S3 and Forney based computer control systems at the West Point Treatment Plant. Project involves the upgrades of the plant controls system to standardized control system equipment by Ermerson. This is one component of the regional control system upgrade which will result in a standardized control system platform for West Point South Plant and Brightwater. Fifty percent of construction waste will be recycled.
MLK Tunnel Outlet Regulator Re-roof	Green roof, stormwater management	Re-roof existing vegetative green roof that will provide habitat, and buffer thermal impacts on the station and slow stormwater runoff.
Ballard Siphon Project	Demolition and construction waste management practices, reuse of materials, recycled content materials, local sourcing	Primarily a conveyance project that provides additional capacity with new pipes and rehabilitates existing siphons. This project will connect two deep large-diameter shafts with a large-diameter tunnel. Modifications will be made to the existing Ballard Regulator Station to connect new pipes to existing system. Asphalt recycling, packing/crating/waste diversion from landfill, reuse of asphalt spoils or native materials as bedding and fill, recycled content for asphalt patching/overlay and concrete materials, local/regional materials include pipe bedding and gravel fill.
Kent-Auburn Conveyance System Improvements (SW Interceptor)	Reused and recycled materials, erosion control	Construct approximately 5 miles of new sewer in Kent, Auburn, Pacific and Algona ranging from 18 inch diameter to 48 inch diameter. Paving aggregate will be recycled, excavated soils will be backfilled, and erosion control measures will be used.
Interbay Pump Station Upgrade	Energy efficiency, tankless water heater, recycled content materials, regional materials, low VOC emitting materials	This project will replace obsolete mechanical, electrical and controls equipment, as well as increase the capacity of the pump Station to 133 mgd. It will upgrade the HVAC systems, make structural modifications to the existing pump station, build a generator building and provide standby power generation capacity to power the pumps, and provide odor control.
Ravenna Creek Stream Transfer Pipe Extension	Energy efficiency, restoration of open space, native plants, erosion and sedimentation control plans	The scope of the project is to modify the piping and control gate system in the Ravenna Creek structures and associated conveyance system, and to design and implement the necessary modifications to prevent sewage releases into the Ravenna Creek/University Slough stormwater transfer system. Work will include creek bypassing during construction of the Flow Split Structure and pipeline insertion and modifications to two existing drop structures. HDPE pipe provides better hydraulic performance, extended service life, reductions in installation and maintenance costs, smaller carbon footprint, and restoration of vegetated open space with native plantings.
Bellevue Influent Trunk Improvements	Construction and demolition waste management, reuse materials, recycled content materials, local and regional materials	This project will design and construct a replacement parallel Bellevue Influent Trunk (BIT) sewer with expanded capacity to serve the rapidly growing downtown Bellevue area. The BIT will convey flows to the newly upgraded Bellevue Pump Station. Pursuant to a cost share agreement with the City of Bellevue, at the City's own cost, this project will also design and construct a new portion of the City's West Central Business District (West CBD) Trunk in order to connect the City's flows to the BIT further upstream than they currently connect. Recycled asphalt will be used in patching and overlay, pipe bedding and gravel fill will be sourced locally, reuse of asphalt or native materials for bedding and fill.

Table 5. Wastewater Treatment Division Projects Continued

Project	Green Building Feature	Project Description
<p>Brightwater Treatment System (pursing LEED Gold or higher)</p>	<p>Recycled materials, reused onsite materials, community amenity, habitat restoration, public open space, natural ventilation and daylighting, energy efficient lighting, ENERGY STAR® appliances, temperature controls and radiant floor heating a low-flow toilets, use reclaimed water for toilet flushing and outside irrigation, green roof, public education</p>	<p>Includes new construction of treatment plant, deep tunnel conveyance system and marine outfall. Total project site is 114 acres; in which 70 acres of public open space is being created with 43 of those acres for newly constructed salmon habitat. The site also includes a 15,000 square feet environmental education and community center. In addition, 13 miles of conveyance deep tunnel with 5 portals and one pump station, and the outfall is one mile long and 600 ft. deep.</p> <p>Estimated savings in greenhouse gas emissions during construction will be 12,543 MTCO_{2e}. By eliminating the need to haul excavated material offsite, the number of truck trips to and from the site was significantly reduced. Brightwater estimates that this saved 37,000 truck trips of 25 miles each—eliminating approximately 925,000 vehicle miles. The concrete reuse also resulted in 180 MTCO_{2e} reduction.</p> <p>To date, the Brightwater Team has diverted 3,312.68 tons of construction waste to recycling or 70.5% of all construction and demolition materials, reused more than 370,000 tons of material in construction, and saved more than \$500,000 from the reuse and recycling of materials. The project has reused 200 trees and root wads for salmon habitat, and recycled 15,000 cubic yards.</p> <p>The Brightwater Team used 13,800 tons of fly ash as a cement substitute, and used recycled materials in the environmental education and community center.</p> <p>Retaining Excavated Soils Onsite to Visually Screen Wastewater Processing Areas. The construction team used excavated soil to create landforms and buffers—attractively screening processing areas from public view.</p> <p>Creating a Salmon Habitat & Reforestation Area. The northern 43 acres of Brightwater have been redeveloped as a restored and enhanced salmon habitat and reforestation area.</p> <p>Restored approximately 1,350 feet of stream corridor and added 350 feet of new stream corridor, created 29,000 square feet of pond habitat, constructed 4 acres of enhanced emergent, forested wetland habitat, and provided infiltration for stormwater runoff during construction in the established forest.</p> <p>The Environmental Education & Community Center is in the process of pursuing LEED Gold Certification or higher. Sustainable building design elements include natural ventilation and daylighting, installing energy efficient lighting and ENERGY STAR® appliances, utilizing temperature controls and radiant floor heating from waste treatment plant energy, purchasing low-flow toilets that use reclaimed water from the treatment plant, using reclaimed water for irrigation, building a green roof, and educating the public about the project's green building elements.</p>



Rainwater harvesting system and reused salvaged timbers at the Brightwater Environmental Education & Community Center, with the goal of achieving LEED Gold.



Installation of membrane bio-reactor filters (MBRs) at Brightwater Wastewater Treatment Plant.

Table 5. Wastewater Treatment Division Projects Continued

Project	Green Building Feature	Project Description
Energy Efficient Pre-aeration Blowers at West Point Treatment Plant	Energy efficiency, locally sourced materials	Includes mechanical equipment replacement to optimize energy performance by 30%, measurement and verification of energy use, and 20% of materials manufactured locally. This project is expected to reduce energy use by 380,000 kwh/year.
Barton Pump Station Upgrade	Erosion and sedimentation control, light colored surfaces, native plants, energy efficiency, local materials, recycled materials, low VOC emitting materials, LEED AP	Includes renovation of the existing below ground pump station with replacement of two horizontal pumps and motors, piping systems and valves, heating, cooling and ventilating system, electrical systems, instrument and control system, odor control unit and various related utility systems. Features include use of light colored asphalt to reduce heat island effect, second VFD to improve efficiency, HVAC with air economizer, no chemicals in new HVAC system, native and drought tolerant plants, fly-ash, and local concrete and steel.
53rd Ave Pump Station Upgrade	Energy efficiency, recycle construction materials, erosion and sedimentation control plans, low VOC materials	Upgrade systems including asset improvements, add a backup power system, improve flow monitoring, upgrade odor control, and expand the structure. This project is needed to provide continued reliable operation of the 53rd Pump Station. A Seattle City Light (SCL) grant, equaling closed to \$11,000, was awarded to the project based on the energy savings that will be realized through installing the variable frequency drives (VFDs) on the pump motors. The pump station will save approximately 46,000 kWh annually with the drives. Construction waste recycled includes approximately 500 cubic yards of concrete, 24 tons of asphalt, and 13.8 tons of steel.
Skyway Initial Infiltration/ Inflow (I/I) Control Project	Construction and demolition waste management, reuse materials, recycled content materials, local and regional materials, resource conservation	Implementation of the Skyway Inflow/Infiltration (I/I) Reduction Project is intended to test the County's ability to cost-effectively reduce I/I to the point where a conveyance system improvement project downstream can be reduced or eliminated. It will rehabilitate laterals and side sewers on 331 properties. As part of a cost-share agreement with the Skyway Water and Sewer District, the project will also rehabilitate mains and manholes in the project basin at the District's cost. Anticipated to reduce I/I flows by between 1.82 and 2.25 mgd, eliminating the need to construct the 0.27 mg Bryn Mawr Storage facility. Recycled asphalt will be used in patching and overlay, pipe bedding and gravel fill will be sourced locally, and reuse of asphalt or native materials for bedding and fill.
West Point Treatment Plant Waste To Energy Project	Renewable energy	Installation of two 2.3 MW engine generators. The generators will be fueled by digester gas produced as a by-product of the treatment process. It will produce 18,000 mwh of electricity each year equivalent what can power more than 1,607 homes. In addition, almost 100% of all process heat will be produced by the system, eliminating the use of the natural gas fired boiler for daily operations.
Construct Administration Building at Carnation Wastewater Treatment Facility (LEED Certification)	Renewable energy	In April 2009, King County signed a contract for green power with Puget Sound Energy for the facility. This agreement is for 24 months and expires in May 2011.

Department of Natural Resources and Parks - Solid Waste Division

In 2010, SWD continued either planning or constructing four projects that will be applying for LEED certification – North County, South County, Factoria and Bow Lake Recycling and Transfer Stations. Three additional projects are utilizing the Sustainable Infrastructure Scorecard. Planning for the siting of two new solid waste recycling and transfer stations has begun including site selection, environmental assessment, and property acquisition services.

SWD's GreenTools program has also been providing green building assistance on projects for county residents, businesses, cities, and other agencies. This program includes training, financial incentives, research, project review, and development of strategies and policies to support green building throughout the county.

Table 6. Solid Waste Division Projects

Project	Green Building Features	Project Description
Bow Lake Recycling and Transfer Station (pursuing LEED Gold)	Stormwater improvements, restored landscape, low flow fixtures, rainwater harvest, natural day lighting techniques, energy efficiency, recycled content materials, locally extracted and manufactured materials, natural ventilation, PV panels, low mercury lamps	Sixty-three percent energy savings is estimated for transfer building and scale house combined, from efficient lighting, demand control ventilation combined with natural ventilation strategies, efficient cooling, and heat recovery from the large compactors. In addition, the project is predicted to save more than 40% of domestic water over a conventional project and collect approximately 1.8 million gallons of rainwater for use in the transfer building or 59% of the process water for the facility. An estimated reduction of 172.4 metric tons per year in GHG emissions. Green materials used include FSC timber lagging in soldier pile retaining walls approximately 10,000 sq ft. Recycled concrete has been substituted for backfill materials in some areas. Renewable resources include 16.1 kW PV panels on roof are planned for second phase of construction.
Harbor Island Building #3 Demolition	Erosion and sedimentation control, Green contract and specifications language, create open space, salvage materials	Demolition of an existing basement and one story dilapidated wood frame building. Deconstruct salvageable wood beams and columns. Included green contract language and specifications.
Duvall Landfill vegetative cover	GHG sequestration, improvement of soil conditions and habitat	The objective of vegetation management at the closed landfill is to reduce water infiltration through the establishment of a native forest cover. It is planned that western cedar, Douglas Fir and red alder will be planted in a spatially variable manner. Total GHG sequestered is 1010 MTCO _{2e} .
Puyallup Landfill Vegetative Cover	GHG sequestration, habitat restoration	The objective of vegetation management at the closed landfill is to reduce water infiltration through the establishment of a native forest cover. It is planned that western cedar, Douglas Fir and red alder will be planted in a spatially variable manner. Total GHG sequestered is 819 MTCO _{2e} .



Houghton Transfer Station roof structures raised during construction for reuse.

Table 6. Solid Waste Division Projects Continued

Project	Green Building Features	Project Description
Cedar Falls Landfill Gas Passive Bioberm Treatment System	GHG reduction and sequestration	Maintenance work was completed on the system. Bioberm gas passive system is a function of preventing landfill methane gas from dissipating to the atmosphere. This emission prevention to the atmosphere is accomplished by oxygen sustained organism/microbes to consume methane as the gas passes through the hog fuel materials of the bioberm system. The bioberm's performance is reported to be strongly dependent on methane loading rate and availability of atmospheric oxygen.
Houghton Transfer Station Roof Improvement and Mitigation	Construction best management, planning and designing for sustainable development, preserve and maintain natural site, energy efficiency, renewable energy, water management, use of sustainable materials	This project consists of several improvements designed to increase safety and efficiency in the operation of the transfer station while decreasing noise and odor impacts in the surrounding community as follows: reconfiguration of the transfer trailer yard, addition of sound wall, improvement of traffic control pavement markings, frontage improvements along NE 60th Street, raising of the height of the existing transfer building roof, interior lighting, and mechanical systems, and building improvements will also include new skylights, exterior sheet metal wall panels, roof structure with roof membrane, catwalks, top load by floor repairs, and an exterior screen wall. Estimated savings in GHG emissions from construction materials is 1,128,000 pounds.
Factoria Recycling and Transfer Station Replacement Project (pursuing LEED Gold)	Energy modeling, efficiency in design, enhanced commissioning of systems, solar panel, green roof, bike rack, potential trail connection, flexible space for education, public art, water efficient landscaping, green cleaning products, potential purchase of green power, recycled content in building materials, light pollution reduction, indoor day lighting and views to outdoors	The nature of the project is to construct a new facility that will allow increased waste division through improved public recycling, reuse and educational opportunities with a design intended for additional future flexibility/sustainability for recycling and waste as new technologies or solutions come along contributes to overall sustainability in King County. Reduction in GHG emissions will be approximately 135,000 MTCE over life of project. This is in addition to the reduction in emissions from increased recycling. Amount of construction materials recycled has a 100% goal. Regional harvested, extracted, and manufactured building materials are included in strategy. There is a potential in green power purchasing and renewable energy from solar PV.



Architectural rendering of Factoria Recycling and Transfer Station, with the goal of achieving LEED Gold.

Department of Natural Resources and Parks - Water and Land Resources Division

WLRD's capital projects generally involve open space land acquisition, aquatic habitat improvement, river flood control, and/or stormwater flow control and water quality treatment. These projects are not eligible for LEED certification. Hence, using the Sustainable Infrastructure Scorecard is more applicable. WLRD submitted the County's first completed Scorecard for the Lower Boise Creek Channel Restoration Project and achieved a Platinum rating level.

As in past years, WLRD staff has provided a significant amount of technical support to internal King County and private projects in the use of Low Impact Development (LID) techniques. These projects included government properties, commercial, subdivision and single-family residences. In addition, staff assists citizens proposing residential and farm projects through the Rural Stewardship and Farm Planning programs. These programs use LID and other green approaches to limiting environmental impacts from rural-area projects.

Table 7. Water and Land Resources Division Projects

Project	Green Building Features	Project Description
Rainbow Bend Levee Removal and Floodplain Restoration	Preserve and maintain native vegetation, erosion control, use native & drought resistant plants, locally sourced materials, reuse onsite materials, create open space and public amenity	Reduce flood hazards and restore riverine processes along the right bank of the Cedar River between river mile (RM) 11.2 and 11.5 by acquiring frequently flooded properties, removing existing homes and related improvements and removing approximately 900 feet of levee and revetment. The project will also include grading to reconnect historic side channels and/or encourage side channel formation, the addition of large woody debris clusters, and planting native vegetation to restore a more natural floodplain community.
White River at Countyline Setback Levee Project	Erosion and sediment control, integrated design process, design for long term maintenance, recycle C&D materials, use of on-site materials, use of alternative fuels in construction equipment, minimize development footprint, preserve existing native vegetation, create open space, create public amenity, locally sourced materials, recycled-content materials	Involves reconnection of a portion of the White River floodplain for both flood protection and habitat restoration. It will feature a combination of property acquisition, levee modification and floodplain restoration along the left bank of the Lower White River. The project encompasses 115 acres, removes 16 acres of existing levee and revetment prisms, and construction of a 3500 lf biorevetment and 2150 lf setback levee.
Lower Boise Creek Channel Restoration	Implement erosion and sediment control BMP's, develop on brownfield sites, design for long term maintenance, use on site materials, use alternative fuels in construction equipment, preserve existing native vegetation, retain or create open space and corridors, create public amenity, plant drought resistant native plants to eliminate need for irrigation, locally sourced materials, use of recycled content materials, use renewable materials	The lower 500 feet of Boise Creek that was formerly straightened and channelized between elevated road and railroad grades was allowed access to approximately 3 acres of restored White River floodplain. Alluvial fan channel forming processes were supported through placement of approximately 180 pieces of large wood and re-vegetation of the project site. Removal of the elevated railroad right of way included excavation and disposal of buried remnants of the former railroad trestle including soil and wood contaminated with Creosote. Ninety-five percent of construction and demolition materials diverted from landfill. Approximately 10,000 cubic yards of soil and rock were re-used on site and approximately 200 cubic yards of large rock were provided to the Pautske restoration site in return for approximately 200 cubic yards (280 tons) of that project's surplus topsoil. Approximately 10 tons of concrete waste was reused as ballast for log structures. Fallen wood and construction clearing debris was used to construct the engineered log jams, and locally grown native plants were used for re-vegetation. Ten percent of materials sourced from within 500 miles, heavy materials sourced from within 500 miles, and plants sourced within 250 miles.

Table 7. Water and Land Resources Division Projects Continued

Project	Green Building Features	Project Description
Small Habitat Restoration Program (SHRP)	Habitat restoration, locally sourced native plants, reuse onsite salvaged materials	The mission of SHRP is to build small low-cost habitat restoration projects to enhance and restore streams and wetlands. Projects include stabilizing eroding streambanks, restoring fish access to upstream habitat, installing livestock fences, controlling invasive weeds, planting native vegetation and providing technical assistance to landowners and agencies. Individual project costs typically range from \$5,000 to \$20,000. Projects are constructed on private or public property as long as they provide benefits to the public at large. Since 1995, SHRP has performed well over 300 projects in the White, Green, Puget Sound, Cedar-Sammamish-Lake Washington and Snoqualmie River basins.
Lower Tolt River Floodplain Reconnection Project, Phase 2	Reuse onsite materials, minimize footprint, preserve existing native vegetation, create a public amenity, locally-sourced native plants, habitat restoration	Remove approximately ½ mile of training levee from the right bank of the Tolt River and construct a setback levee approximately 800 feet landward. The floodplain area between the two levees has been enhanced, bank protection was provided to the adjacent campground, several engineered log jams were constructed to train future river courses, and extensive landscaping and revegetation was accomplished in the surrounding areas.
Chinook Bend Floodplain Enhancement Phase 2	Integrative design process, use on-site materials in construction	Addresses wildlife habitat restoration by removing barriers that prevent salmon from reproducing. Remove river bank rock revetment in order to allow the river to flow by natural processes, and concurrently maintain protection of the neighboring property. Construction materials recycled include 2,000 cubic yards of rock and 740 cubic yards of earth.



Contractor on Lower Tolt River Floodplain Reconnection Project provided excellent erosion and sediment control measures

Table 7. Water and Land Resources Division Projects Continued

Project	Green Building Features	Project Description
Vashon Island Center Park and Ride Stormwater Retrofit	Erosion and sediment control, use integrated design process, design for long term maintenance, recycle construction and demolition materials, use of on-site materials, minimize development footprint, preserve existing native vegetation, retain or create open space, create public amenity,	The Vashon Island park and ride project will consist of adding 27 porous concrete parking spaces and constructing two rain gardens to reduce stormwater impacts. Project will include drought resistant native species to eliminate need for irrigation.

Department of Natural Resources and Parks - Parks Division

King County is fortunate to have 26,000 acres of parks and recreational space. Many of the Parks projects featured this year were able to reuse and recycle many materials such as signs, fencing, and gravel. In addition, habitat is improved by planting native trees and plants along trail corridors and open spaces. Parks Division projects provide a social benefit to people by maintaining and enhancing its regional trail system, while at the same time promoting alternative transportation options reducing GHG emissions. One prime example is the East Lake Sammamish Trail Master Plan that will provide access to recreation, employment, and retail centers in the Redmond, Sammamish and Issaquah.

Table 8. Parks Division Projects

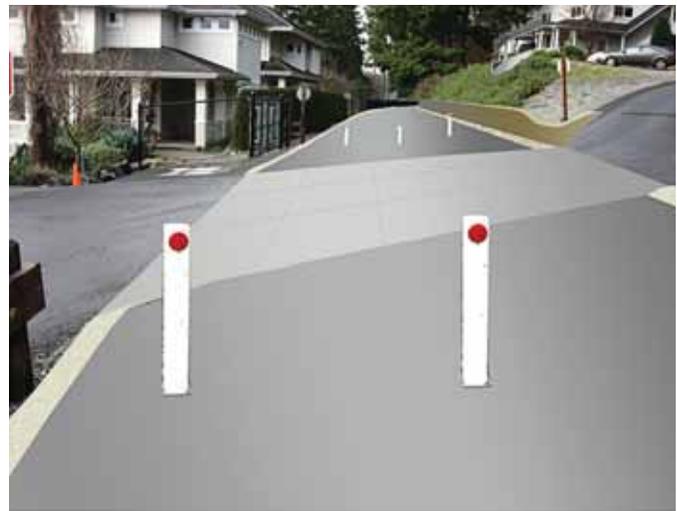
Project	Green Building Features	Project Description
Lake to Sound Trail	Alternative transportation, community amenity, reuse onsite materials, preserve existing vegetation and open space, drought resistant plants, pervious asphalt	Design of 2 separate segments of the greater Lake to Sound Trail totaling 2.5 miles in length. First Regional Trail to use pervious asphalt as construction material.
Burke Gilman Trail Redevelopment Project	Alternative transportation, community amenity, reuse onsite materials	Includes design and construction of an alternative non-motorized transportation corridor and a multi-use trail along 2 miles of the former Burlington Northern Santa Fe railroad corridor along the north end of Lake Washington. This project will improve safety along the oldest and narrowest section of the Burke Gilman trail by redeveloping the segment through Lake Forest Park from Northeast 145th Street to Logboom Park in Kenmore. The trail provides access to recreation, employment, and retail centers. The trail redevelopment includes new, safer updated trail features such as: improved trail surface, improved intersection and crossing treatments, drainage improvements, bridge and abutment replacement and new signage, fencing, and bollards. King County Parks is working to develop a 44-mile seamless urban regional trail corridor that includes the Burke Gilman, Sammamish River, East Lake Sammamish and Issaquah High Point Trails to link Seattle to the suburban cities and the Cascade Foothills. Reused materials include 75 signs, water fountain, split rail and chain link fencing.

Table 8. Parks Division Projects Continued

Project	Green Building Features	Project Description
East Lake Sammamish Trail Master Plan Project	Alternative transportation, community amenity, reuse onsite materials	The East Lake Sammamish Trail (ELST) project includes design and construction of an alternative non-motorized transportation corridor and a multi-use recreational trail along 11 miles of the former Burlington Northern Santa Fe railroad corridor on the east side of Lake Sammamish. The trail will provide access to recreation, employment, and retail center in the Cities of Redmond, Sammamish, and Issaquah and complete a link in the King County regional trails system. Habitat restoration will include planting 510 trees, 2770 shrubs, and seeding 1.6 acres. Amount of construction materials recycled include reuse of 4100 LF of split rail fence, 1200 LF of chain link fence, and 650 cy existing gravel to be reused as subgrade material. Supplemental materials will be added from Issaquah Trail Segment which is in the process of being calculated.
Soos Creek Trail Phase V & VI	Alternative transportation, community amenity, reuse onsite materials, preserve existing vegetation and open space, drought resistant plants, LEED AP	This is the construction of a four mile trail from the terminus of the current Soos Creek Trail Phase IV to the Cedar River Trail. A social benefit to the community is property was purchased to increase the size of the adjacent King County Boulevard Lane Park by 4.9 acres.
Foothills Trail	Alternative transportation, community amenity, minimize project footprint, reuse onsite materials, preserve existing vegetation and open space, drought resistant plants, mitigate GHG emissions, erosion control and sedimentation management, green contract language and specifications, prefab materials, LID, LEED AP	This is the construction of a trail crossing, connection to the Enumclaw Foothills Trail and the construction of a pedestrian bridge across stream V. This project overall is a social benefit to the Puget Sound Region as it is a key link in the trail connection system between Downtown Tacoma and Mt. Rainier National Park. Includes planning and designing for a prefabricated bridge structure, uses LID for run-off treatment, and project designer is a certified LEED professional.



East Lake Sammamish Trail intersection before.



Rendering of intersection design on the East Lake Sammamish Trail after.

Table 8. Parks Division Projects Continued

Project	Green Building Features	Project Description
Tolt River Bridge Improvements on the Snoqualmie Valley Trail	Erosion and sedimentation control, habitat restoration, pre-fab materials, minimize footprint, native plants, reuse onsite materials,	Project consists of the replacement of existing dilapidated, fire damaged timber trestle supported approaches (230 lf) with a bulb tee girder spans and concrete pier foundation system. Project also consists of the scour repair at three bridge piers in contact with the Tolt River. This work consists of approximately 2,000 CYs of excavated river material and the placement of just under 2,000 CYs of rock armor fill material to provide structural support to existing bridge foundation system and prevent future scour. Minimization of footprint by a reduction from 14 timber bent bridge support system to 3 driven concrete shafts as support system. Inclusion of pre-fabricated elements such as pre-cast concrete girders. Planting of approximately 5,000 sf of native species in place of disturbed invasive species to improve riparian habitat. Recycled or reuse of over 95% of demolition materials including the timber support structure, precast deck panels and rail system. Construction materials reused include 2,300 sf of concrete deck panels, 5,000 pounds of steel railings and fence fabric for reuse, and 35 tons of creosoted timbers (20% for reuse and 80% that was fire damaged for recycling as hog fuel).



Deconstruction of Tolt River Bridge on Snoqualmie Valley Trail .

Department Development and Environmental Services

In 2010, DDES staff worked with FMD staff to prepare their existing building, the Black River Building, to qualify and apply for LEED for Existing Buildings Operation and Maintenance (EBOM) certification. The application was completed and submitted in December 2010 for LEED EBOM Silver Certification.

Public Health–Seattle & King County

Representatives from Public Health–Seattle & King County supported efforts by Washington State to adopt an amendment to the plumbing code to allow rain water harvesting and other water reuse systems. Additionally, four plumbing code seminars that included information about this change were conducted. These seminars targeted Public Health–Seattle & King County staff, water purveyors, various county and city building department staff, designers and installers. These efforts were successful and significant achievements in 2010.



Rain water harvesting training offered by King County staff.

King County GreenTools Program

In addition to supporting internal County agencies, the King County GreenTools Program supports cities, the building community, and the public in designing buildings and structures that have less impact on the environment, are energy efficient, and use recycled materials.



Green Building Assistance Provided to the Public and Builders

The GreenTools team collaborated with jurisdictions and industry experts to support green building in urban and rural communities, providing education and technical assistance. For more than a decade, the GreenTools program and Master Builders Association of King and Snohomish Counties have collaborated on the establishment and implementation of the residential Built Green program. Through successful outreach to the residential construction industry and consumers, there are currently over 15,000 Built Green™-certified homes and more than 750 member companies across the two counties. There was a shift in building type certifications this year: 460 projects were certified with an increase of 85 percent in multifamily units, for a total of 2,562 individual dwellings.

In 2010, GreenTools did a “virtual” energy retrofit to the award-winning Eco-Cool Remodel Tool (at www.ecocoolremodel.com). The website now has the most up-to-date information on energy incentives for homeowners and links for energy efficiency in every room of the house. The virtual retrofit was completed in partnership with Home

Performance Washington.

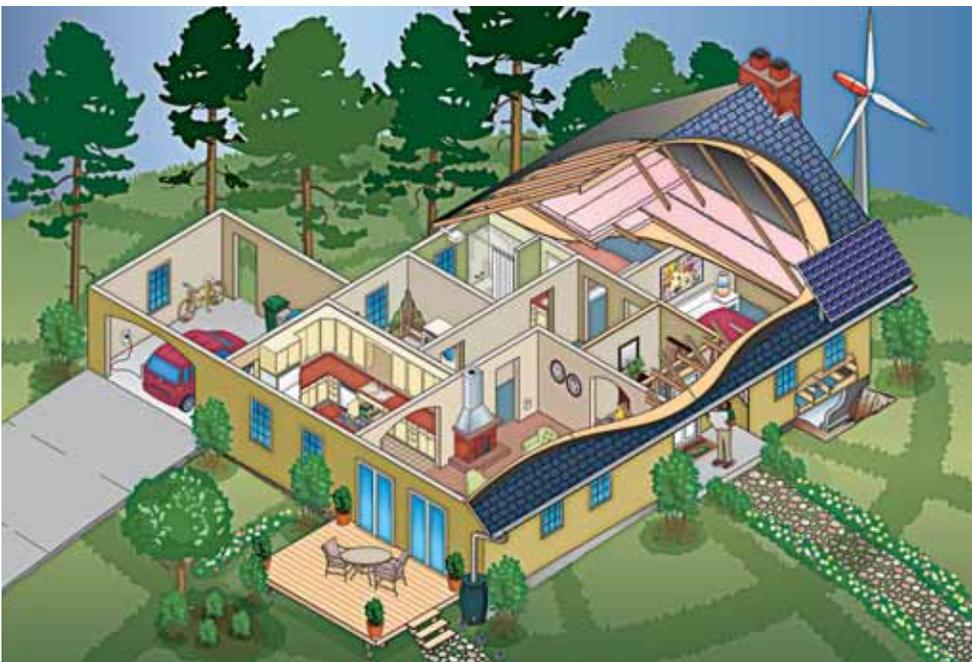
New efforts for the EcoCool Remodel Tool also included “Eco-Cribz,” a series of online videos that follow King County homeowners as they make green renovations to their home. A combination “MTV Cribs” and “Extreme Makeover: Home Edition”, EcoCribz is intended to demonstrate the usefulness of the Eco-Cool Remodel Tool and provide green remodeling information in an engaging format. EcoCribz’ premiere episode, ‘Practical Green’ followed one Issaquah family’s choices to make their home more energy efficient, improve its air quality and provide a more practical use of space.



Coinciding with National Remodeling Month the EcoCool Tool and EcoCribz programs

launched a dynamic social media campaign hosting a first ever Blog-A-Thon. GreenTools allied partners (American Institute of Architects, Cascadia Green Building Council, ICLEI: Local

Governments for Sustainability, Built Green, and other green building experts) were invited to blog about the tool and new video series. This resulted in participation from 39 bloggers, resulting in numerous posts, newsletter stories, tweets and radio interviews. The web pages for the tool and video received a 98% increase in traffic for six weeks and 55 percent through December 2010. Additional support came from DNRP Public Affairs and internal social media experts.



Interactive webpage of EcoCool Remodel Tool provides green building suggestions.

Sustainable Cities Program

The year 2010 was a big year for the Sustainable Cities Program and King County GreenTools, as the program, delivered six roundtable events including the GreenTools Living Future Government Confluence, four technical trainings and two tours. Outreach impact showed an average of 27 attendees representing 19 cities for roundtables, trainings and tours throughout the year.

According to a survey with 33 participating King County cities, the Government Confluence was the major highlight in programming. More than 250 individuals participated, including 14 elected officials from two countries, two states and 12 cities. The Confluence was co-hosted by our collaborative partner the Cascadia Region Green Building Council, but Confluence presenters came from beyond the Cascadia bio-region, with experts from New Jersey, New York, New Mexico, and Ontario, Canada.

The event was also the launching ground for the new GreenTools Toolkit2, a web-based network of tools, resources, examples and a peer-to-peer networking forum to support a municipality's role in making green building a priority and a reality.

Creative event formats encouraged peer-to-peer discussion as well as engaged dialog with leading local regional and national topic experts. The "Book Club" format kicked off the series in unique style, while a tour of the Cedar River Watershed enhanced our wrap up in a natural environment. Roundtable trainings were hosted in the cities of Bellevue, Kirkland, Sammamish, SeaTac and Shoreline.

Programming content covered a wide range of issues from big picture sustainability planning to detailed technical green building including:

- Codes and Policies
- Green Affordable Housing
- Green Sites and Infrastructure
- Indicators and Performance Measurements
- Local Living Economies
- Rating and Certification Systems
- Social Equity
- Urban Food Production

Construction and demolition materials

The GreenTools program, in 2010, continued its strong emphasis on increasing the diversion of construction and demolition (C&D) materials of value from landfills to higher uses. This was accomplished through a combination of general C&D technical assistance, in-depth technical assistance on salvage and deconstruction projects, researching a couple key issues, and exploring long-term options.

C&D technical assistance

The GreenTools program provided direct assistance via phone and e-mail to roughly 500 contractors and homeowners. King County Solid Waste Division customer services provided assistance on C&D related issues to another 2,100 people.

Project-specific salvage and deconstruction assistance, including on-site building assessments, was provided at 18 different King County projects, including the South Park Bridge



Wood beams that will be salvaged in deconstruction project.

and Harborview Hall projects. In-depth salvage and deconstruction assistance was also provided on three non-county owned projects, including the large Bothell Crossroads Project.

One exciting project was the deconstruction of Fagan Hall, a 14,000 square feet dormitory at the now defunct Cedar Hills Alcohol Treatment Facility. The removal of this building was a partnership between several King County agencies with the majority of the salvage and deconstruction work being done by participants in the King County YouthBuild program.

Key research and outreach issues

A number of key C&D related issues were tackled by GreenTools in 2010, including the following:

- Participated in numerous discussions on alternative daily cover (ADC) and industrial waste stabilizer (IWS) in order to evaluate the County's policy on landfill application of C&D materials;
- Produced a document outlining best management practices for addressing asbestos issues at C&D processing facilities;
- Researched issues related to asbestos contamination of carpeting destined for disposal or recycling;
- Rebid the County's contract for salvage and deconstruction and awarded the contract to two different companies: the ReStore and Second Use;
- Led an interactive session on Design For Disassembly (DfD) at the annual EcoBuilding Guild Symposium. Participants received information on the basic principles of DfD and then used materials to create their own tabletop house model. The teams then passed their model on to another team which deconstructed the house, to see how easily and efficiently disassembly was accomplished.

Increasing C&D recycling

GreenTools C&D efforts in 2010 included researching potential policies that might further encourage the recovery of C&D materials for higher valued uses. This was done in coordination with the City of Seattle and focused on the development of a facility certification program and explored the potential of C&D diversion requirements.

Putting the green in affordable housing

Green Building training opportunities were provided to King County Housing and Community Development (KC HCD) staff and non-profit low income housing advocates. Scholarships were provided to attend the 2010 GreenTools Government Confluence, and Living Future Unconference. Free Sustainable Roundtable trainings were provided to KC HCD staff throughout the year. The 2010 GreenTools Government Confluence showcased the YWCA Family Village at Issaquah and Korean Women's Association Transit Oriented Development in Federal Way to illustrate how green building, affordable housing and culturally competent services can be combined for sustainable development that is accessible to all populations.

GreenTools outreach and technical assistance activities included:

- Charrette services to Habitat for Humanity on 10 homes in Renton seeking LEED for Home and Built Green certifications.
- Created Green Building and Remodeling brochure for seniors for the City of Shoreline.
- Partnering with Public Health, DDES, DCHS, and Executive Office on Green Affordable Housing and Healthy Green Housing committees.
- Publishing an article on social equity and green building featuring the YWCA Family Village as the case study in "Trim Tab".

Awards

GreenTools took second place in the 2010 Green Washington Awards, which recognizes Washington companies, nonprofits and government agencies demonstrating leadership to sustainability. The program also received two Communicator Awards in the highest level (gold) from the International Academy of Visual Arts for Print Copy/Writing and Print Special Edition Categories. The award was given to GreenTools for its contribution as guest editor in the "Waste Not" series of Arcade magazine. King County's LinkUp Program also made contributions to this edition.

This material will be provided in alternate formats upon request by contacting the **King County Solid Waste Division**

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