NORTH CLACKAMAS SCHOOL DISTRICT
2006 CAPITAL IMPROVEMENT BOND
UTILIZATION OF GREEN BUILDING DESIGN CONCEPTS
(by category)

SUSTAINABLE SITE

- Erosion And Sedimentation Control
- Construction Activity Pollution Prevention
- Preservation Of Wetlands And Large Trees
- Alternative Transportation, Pathways For Access To Public Transportation' Bicycle Storage & Changing Rooms, Access To Public Transportation
- Site Development, Maximize Open Space By Creating Building Footprints As Small As Practical
- Storm Water Design; Rain Gardens, Bio-Swales, On-Site Detention
- Protect Or Restore Open Space Where Ever Possible
- Reduced Site Disturbance And Land Use By Constructing Two Story Buildings
- Landscape & Exterior Design To Reduce Heat Islands; Parking Lot Planting Areas, Trees And Planting Buffers, Reduced Building Roof Areas By Constructing Compact Buildings
- Light Pollution Reduction – Downward Shielded Fixtures, Shielded Parking Lot And Exterior Lights
- Preference Given To Materials That Have Pre-Consumer Recycled Content

WATER EFFICIENCY

- Water Efficient Landscaping
- Water Use Reduction By Using Computerized Irrigation Controls, Low Flow Fixtures, And Low Flow Flush Toilets
- Water Infiltration From Impervious Surfaces Via Pervious Asphalt Paving, Bio-Swales And Rain Gardens
- Infill Component Of Athletic Fields Includes Silica Sand As A Water Filter
- Drainage Systems For Athletic Fields Will Include On Site Storm Water Filtration And Detention
- Installation Of All Weather Turf At High Play Athletic Fields For Water Conservation And To Maximize Use Of Valuable Open Space

ENERGY & ATMOSPHERE

- Fundamental Building Systems Commissioning To Insure Optimum Operation
- Minimum Energy Performance Established For All Mechanical Equipment
- Refrigerant Equipment Specified With Environmentally Sound Coolants And Digital Controls For Maximum Performance
- CFC Reduction In HVAC & R Equipment
- At Major Remodel Projects Roof Top Heating/Ventilation Units Are Being Replaced With New, More Efficient Mechanical Units
- Installation Of Energy Efficient Boilers, Cooling Equipment And Fans

- Convection Heating Systems To Provide Clean, Fresh Air With Minimum Use Of Electricity
- Buildings Orientation On Sites To Maximize Energy Efficiency
- Upgrade Of Lighting, Boilers, And Heating Units In Remodel Projects To Current Energy Efficiency Standards
- Automated Heating And Cooling Controls With Remote Access For Maximum Efficiency
- Energy Efficient Light Fixtures In New And Remodeled Buildings
- Window “Eye Brows” Shades, Sun Shades, And Interior Blinds To Reduce Heat Gain
- Operable Windows For Natural Ventilation And Cooling
- Use Of Natural Lighting In Commons, Gymnasiums, Hallways
- Energy Saving Appliances In School Kitchens, Staff Rooms And Classrooms
- Kitchen Equipment Specified To Exceed Minimum Energy Efficiency Standards
- Use Of Exhaust Hood To Discharge Excess Heat And Fumes
- Lower Velocity Fans Specified
- Saving Electricity And Using Less Volume Of Supply Air
- Collection Of Food Waste To Eliminate Waste Disposal In Sanitary Sewer System
- High Efficiency Dishwashers In School Kitchens That Use 65% Less Heated Rinse Water

MATERIAL & RESOURCES

- All Contractors Performing Demolition Work Directed To Metro Recycling Programs
- Track Resurfacing Materials Specified To Be Recycled Rubber Granules
- Artificial Turf Installations Specified To Include Minimum Amount Of Recycled Material
- Carpet And Entry Mat Are CRI Green Label Plus Certified And A Platinum Sustainable Choice Product Rated By The Scientific Certification Systems And Backings Specified To Have 10% Post-Consumer And 20% Post Industrial Recycled Content
- Plastic Toilet Partitions Have Post-Consumer Recycled Content, Manufacturers Offer A Program By Which All Solid Plastic Products They Manufacture Can Be Returned For Recycling
- Preference Given To Ceramic Tile, Mosaic Tile, Ceiling Tile And Wall Tile That Have Pre-Consumer Recycled Content
- Reuse Of Existing Materials Where Practical And Economical
- Window Glazing In New And Remodeled Areas High Efficiency Low E Glass Standard To Reduce Heat Loss And Heat Gain

INDOOR ENVIRONMENTAL QUALITY

- Carbon Dioxide (Co_2) Monitoring
- Increase Ventilation Effectiveness
- Low Emitting Materials, Adhesives & Sealants
- Low Emitting Materials, Paints
- Low Emitting Materials, Carpets

- Fabric Wall Covering Indoor Air Quality Certified Under The Greenguard For Children & Schools Program
- R-410A Refrigerant Is Being Used In The Air Conditioning Units Which Is A Non-Hydrochloroflourocarbon And Has Essentially No Global Warming Potential (GWP).
- Controllability Of Systems, Perimeter (Operable Windows, Lighting And Temperature Control)
- Thermal Comfort Ceiling And Wall Insulation Exceed Minimum Code Requirements.
- Thermal Comfort Computerized Heating, Cooling, Ventilation Controls To Balance Comfort, Energy Efficiency, And Air Quality
- Daylight & Views, Daylight 75% Of Spaces For All New Construction
- Natural Light In The Gymnasiums So That Less Light Needs To Be Used During The Day Time Hours
- Low E Glass Is Being Specified To Offset Energy Gain At All Windows

North Clackamas Schools
Energy Conservation and Green Construction
Progress Report

6/22/11

Energy conservation efforts implemented during the 2007-2011 Bond (overview):

- Completed energy audits that identified 328 energy efficiency measures to be implemented in schools.
- Completed 87 projects at existing buildings at a cost of $4,285,333 resulting in an estimated annual energy savings of $266,341 for a simple payback period of 16 years.
- Completed 36 projects at new buildings at a cost of $689,168 resulting in an estimated annual energy savings of $50,325 for a simple payback period of 14 years.
- Received $1,691,000 in energy incentive reimbursement funds over the past 38 months.
- Total estimated annual energy savings for combined projects: $316,666.
- The district is forecasted to receive an additional $1.6 million in energy incentive reimbursements during 2011- 2023.
- Projects in process to utilize ARRA Grant funded lighting upgrades at 16 sites are valued up to $780,000 (not included in the table below).

Recovered Revenue during Bond Period 2007 - 2011			
Source of Incentive	**Received Revenue**	**Anticipated Funds**	**Total Funds (Received and Anticipated)**
Senate Bill 1149	$1,390,211	$1,261,791	$2,652,002
Business Energy Tax Credit (BETC) for Existing Buildings	$37,286	$174,970	$212,256
Business Energy Tax Credit (BETC) for New Buildings Construction	$0	$169,011	$169,011
Energy Trust of Oregon (ETO) for New Buildings Construction	$263,554	$0	$263,554
Total	**$1,691,051**	**$1,605,772**	**$3,296,823**

Average Annual SB1149 Reimbursement Stream	$398,444

During the bond construction planning phases, care was taken by design teams to utilize **Leadership in Energy and Environmental Design (LEED)** concepts and strategies to create efficient and thoughtful school buildings.

School	Architectural Firm	LEED Guidelines Rating Level
Ardenwald Elementary	Mahlum Architects	Silver
Happy Valley Elementary	Boora Architects	Silver
Scouters Mountain Elementary	Dull Olson Weekes Architects	Silver
Verne A. Duncan Elementary	Barrentine Bates Lee Architects	Silver
Happy Valley Middle	Boora Architects	Silver

Note: The above new buildings were designed to meet or exceed the LEED level of silver, however none of the newly constructed buildings have been LEED registered.

Green Building and LEED Concepts
The following are just a few highlights in the applicable categories:

Sustainable Site:
- Preservation of wetlands, large trees and additional buffering plants.
- Protect or restore open space where ever possible.
- Computerized (and centralized) irrigation controls, low flow fixtures.
- Inclusion of public transportation access and bicycle storage.

Water Efficiency
- Water efficient landscaping including storm water design and rain gardens.
- Implemented or upgraded centralized computer irrigation control systems and components.
- Installed low flow plumbing fixtures and low flow flush toilets.
- Applied water filtration principles including pervious asphalt, bioswales, sand-based fields and detention areas.

Energy & Atmosphere:
- Upgraded heating, ventilation and mechanical systems with more energy efficient equipment.
- Installed and/or upgraded mechanical controls with Direct Digital Controls.
- Chloroflourocarbon (CFC) reduction in HVAC and refrigeration equipment.
- High efficiency low thermal emissivity glass standards were applied for glass installations at new and remodeled buildings.
- Installed improved performance energy efficient lighting.
- High efficiency kitchen appliances and equipment selected and installed.
- Natural daylight concepts in applied in gyms, common areas and hallways.

Material & Resources:
- Installed athletic turf and track materials recycled materials.
- Contractor demolition materials were directed to Metro Recycling Programs.
- Reuse of materials where practical and economical.
- Utilized building materials such flooring and bathroom partition produced from minimum recycled content.

Indoor Environmental Quality:
- Carbon Dioxide (CO2) and monitoring and demand control ventilations systems.
- Engineered systems for increased ventilation effectiveness.
- Incorporated low volatile organic compounds (VOC) emitting and Carpet and Rug Instutite (CRI) green label building materials including carpets, paints and others.
- Increased ventilation effectiveness.
- Thermal comfort ceiling and wall insulation in most instances exceeds minimum code requirements.