CITY OF West Linn

Memorandum

Date: June 11, 2009

To: Patti Galle, Mayor
Members, West Linn City Council

From: Chris Jordan, City Manager CJ

Subject: Solar Highway Project

I have added a presentation on the Solar Highway project to the Council's agenda for June 22. Attached ot this memorandum is the information that will be presented at the town hall meetings scheduled for tonight and next Tuesday.

We hope that following those two sessions and the online forum, we should have a pretty good understanding of any concerns or issues that the community may have with this site for this project in West Linn. With Oregon Transportation Commission scheduled to discuss this on June 23, I want to make sure the Council is fully informed about this project by that time.

Please feel free to attend the town halls and let us know if you have any questions about this project.

Attachment

CITY OF West Linn

Proposed Solar Highway
Informational Town Hall Meeting

Become a Solar Highway Advocate:

1. **Attend Town Hall Meetings**
   - June 11, 2009 at 7:00 at City Hall
   - June 16, 2009 at noon at the West Linn Public Library

2. **Participate Online**
   - http://westlinnoregon.gov/communications/blog/kwyatt/proposed-solar-highway-project-discussion

3. **Share Accurate Information With Your Neighbors**
   - FAQ
   - Solar vs. Trees Information
   - West Linn Public Library Displays

4. **Write Letters**
   - West Linn Tidings
     - *Email: ditel@westlinntidings.com*
     - *Mail: 400 Second Street, Lake Oswego, OR 97034*
   - Oregonian
     - *Email: http://www.oregonlive.com/contactus/*
     - *Mail: 921 SW Washington, Ste. 550, Portland, OR 97205*

Oregon Solar Highways
June 2009
Frequently Asked Questions

What is a "solar highway?"

A solar highway is a renewable way to generate electricity by placing solar panels alongside a road. The panels collect solar energy and send it to the local electric system. Oregon's solar highway — the first one in the United States — is located to the north of the I-205 on-ramp onto southbound I-5, on property owned by the Oregon Department of Transportation.

Why build a solar highway?

- It takes 45 million kilowatt hours each year to run the state's transportation system, and solar panels placed on less than 1 percent of our state's right of way would supply all of the electricity needed for the system — clean, renewable, locally produced electricity from the sun, adding significant value to Oregonians' investment in the transportation system.
- Successful solar highway projects, like the one operating at I-5/I-205, supply the electricity ODOT needs to operate electrical systems along the highways such as interchange lighting and signals, without ODOT paying a premium.

Why is ODOT spending money on solar panels?

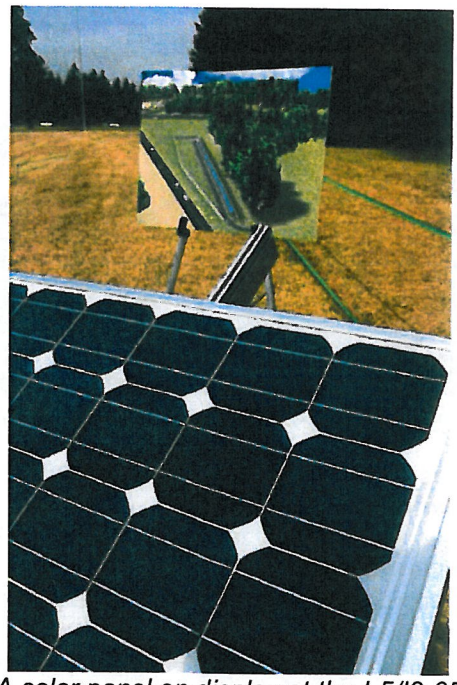
ODOT does not pay for the purchase, installation, operation or maintenance of the solar panels. Private partners and utility companies do, using tax credits, grants, and other incentives.

Where else might ODOT place solar highways in Oregon?

ODOT is exploring several locations throughout the state, including an expansion of the I-5/I-205 site, the Baldock rest area on I-5 northbound, a large site in West Linn, several locations in southern Oregon and others.

What is the process for deciding where to install a solar highway?

ODOT's Office of Innovative Partnerships accepts solicitations for qualified public-private partnership projects. Before moving forward with a potential location for a new solar highway (or any potential project), ODOT and its partners require in-depth research, public input and various other evaluations and assessments. The City of West Linn and Clackamas County have asked ODOT to look into the West Linn site as a potential for a large solar highway project. ODOT has requested that West Linn gather public input to help evaluate the potential site. West Linn will be conducting town hall meetings in June and providing an online forum for information and discussion at http://westlinnoregon.gov/solarhighway



A solar panel on display at the I-5/I2-05 groundbreaking ceremony.

Will the solar panels be distracting to drivers or cause glare from the sun?

Research on solar highway installations in Europe has determined that there is no driver distraction. Obtrusive glare is generally not known to be a problem, as

OREGON SOLAR HIGHWAY

SUSTAINABLE ENERGY AND JOBS – THE NEXT OPPORTUNITIES

Objective: To reduce ODOT's energy use along the highway system and to power the energy it needs with renewable sources.

America's First Solar Highway Project

In 2008, the Oregon Department of Transportation (ODOT) completed the nation's first solar photovoltaic project in the highway right-of-way to light the interchange. ODOT completed the project through an innovative public-private partnership with Portland General Electric, Oregon's largest utility; Solar World US, Oregon's and the nation's largest solar manufacturer; and PV Powered, the nation's largest inverter manufacturer, praised by President Obama for its forward thinking (see photo right).

First solar highway project in Oregon and the nation.

World's Largest Solar Highway Project

Oregon Governor Ted Kulongoski has announced that having completed the first solar highway project in the nation, Oregon now looks to build the largest solar highway project in the world – one that would exceed a 2.8 megawatt project announced recently for Germany.

Project Size: 3 megawatts (3.2 million kilowatt hours/year – about one-sixth of ODOT's needs in PGE's service area)
Project Cost: $20 million
Estimated Employment: 140 to 150 direct and indirect jobs
Potential Start Date: The project could begin as early as late summer 2009.
Location: Portland Metropolitan Area

Next: Largest solar highway project in the world.

Solar Highway Rest Area Project – Interpretive Display

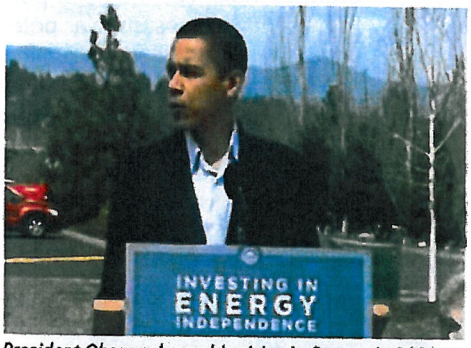
Oregon has the opportunity to develop a large solar photovoltaic project at a major interstate highway rest area that could also offer an interpretive display for the area's more than 50,000 daily visitors.

Project Size: 1.6 megawatts (1.8 million kilowatt hours/year)
Project Cost: $11.1 million
Estimated Employment: 60 to 70 direct and indirect jobs
Potential Start Date: The project could begin as early as late 2009 – or early 2010 with the larger project.
Location: Between Portland and Salem (Baldock Rest Area)

Solar Highway Project – Southern Oregon

Oregon has even greater solar resources in Southern Oregon where there is strong community interest in solar – and the project could be part of the gateway to Oregon.

Project Size: 2 megawatts (2.1 million kilowatt hours/year)
Project Cost: $13.6 million
Estimated Employment: 70 to 80 direct and indirect jobs
Potential Start Date: With full federal funding, the project could begin in early 2010.
Location: Jackson County, Oregon

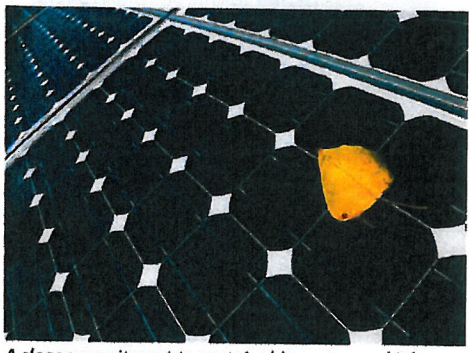


President Obama shares his vision in Oregon in 2008.

Solar Highway Project – Build Out Demonstration Project

Oregon can build out the first solar highway project in the nation, up to three times the initial size.

Project Size: 200 kW (214,000 kilowatt hours/year)
Project Cost: $1.4 million
Estimated Employment: 30 to 35 direct and indirect jobs
Potential Start Date: The project could begin as early as summer 2009.
Location: Interstates 5 and 205 in Tualatin, Oregon



A clear commitment to sustainable energy and jobs.

Result: A More Energy Efficient System

ODOT's goal is to reduce its energy needs by 30 percent by using the best available technologies, such as energy efficient lights. ODOT recently retrofitted 95% of its signals and flashers in the Portland area with power-saving LEDs, resulting in energy consumption reductions equivalent to the annual power needed for over 140 Oregon homes. This effort alone saved $110,000 per year on ODOT's electric bill. ODOT completed similar traffic signal installments in two other regions and plans more in the future. Further, ODOT is currently looking for new opportunities to conserve energy through efficiency lighting, in places like tunnels and maintenance yards.

More Information:

Governor's Senior Transportation Liaison
Chris Warner
Oregon Department of Transportation
355 Capitol Street NE, Room 135
Salem, OR 97301-3871
Phone: (503) 986-3452
Fax: (503) 986-3432
Email: Chris.Warner@state.or.us

ODOT Solar Highway Project Director
Allison Hamilton, Project Director
Oregon Innovative Partnerships Program
Oregon Department of Transportation
355 Capitol St NE, Room 115
Salem, OR 97301-3871
Phone: (503) 986-3732
Email: Allison.M.HAMILTON@odot.state.or.us

Avoided Carbon Emissions from Solar Panel Systems and Sequestered Carbon Emissions from Tree Growth

Trees and Carbon Emissions Sequestration

According to the Environmental Protection Agency, terrestrial carbon sequestration is the process by which trees, plants and crops absorb carbon dioxide through photosynthesis. This absorbed carbon dioxide is sequestered or stored as carbon in biomass such as tree trunks, branches, foliage and roots, and in soil. The term "carbon sinks" is used to refer to forests, croplands and grazing lands, and their ability to sequester more carbon or carbon emissions than they release. In a 2004 study of California forest carbon sinks, Douglas firs (a tree commonly found in Oregon) in a forest were estimated to sequester or reduce carbon emissions by approximately 2 metric tons of CO_2e per acre per year. This means that one Douglas fir will sequester 0.01 metric tons of CO_2e per year, which is equivalent to the CO_2e emissions produced from a passenger vehicle consuming one gallon of gasoline.

Tree Versus Solar Panel Scenario

Many right-of-way sites that are being considered for solar development projects contain trees, with Douglas firs being the most common in Oregon. The shading effects of trees on solar panels can drastically reduce the TSRF and solar potential of a system depending on the number of trees, path of the sun and the amount and time period of the shading. Should the tree or trees be removed to maximize the solar potential of the solar panel system? This is a complex issue because trees provide many benefits, including habitat for wildlife, aesthetics and terrestrial carbon sequestration. Of these benefits, the carbon sequestration can be quantified. The following scenario is provided to highlight the complexity of the tree versus solar panel issue:

> *A ground-mounted solar panel system is sited in an ODOT right-of-way to produce solar electricity output of 100,000 kilowatt-hours (kWh) annually. Each year, the production of 100,000 kWh of solar electricity will reduce carbon emissions by 38.9 metric tons of CO_2e compared to the Pacific Northwest Regional Energy Grid. If shade from a tree or trees reduce the solar potential for the site by 1% the TSRF value of the solar array is reduced to 0.99 and the solar electricity output is reduced to 99,000 kWh. This decrease in solar panel productivity will result in the need for additional Pacific Northwest Regional grid power to be produced, which in turn results in more carbon emissions.*

Will this increase in carbon emissions due to tree shading be offset by the amount of carbon emissions that a tree sequesters?

> *In this scenario, if the 1% reduction due to shade is the result of one tree, the answer is no. If the same amount of shade were produced from 39 trees, the choice between the carbon sequestration of the trees versus the efficiency of the solar panel system would be a tie, based on carbon emissions alone. This is because the annual generation of 100,000 kWh of solar electricity will reduce carbon emissions by 38.9 metric tons of CO_2e. Therefore, a reduction in solar panel efficiency by 1% (TSRF = 0.99) due to tree shading results in an increase in carbon emissions by 0.39 metric tons of CO_2e per year due to that same electricity needing to be produced from the energy grid mix rather than from solar.*

While 39 trees sequester the equivalent avoided carbon emissions from 1,000 kWh of solar electricity production (the amount of lost solar electricity due to shading in this scenario) from the Pacific Northwest grid mix, the tree versus solar tradeoffs cannot be made on this dichotomy alone. Trees vary in shape and size and shade in unique ways depending on their proximity to a solar panel system, the density of foliage and the time of year. Therefore, when considering the trade offs between sequestered carbon from onsite trees versus the loss of solar electricity production from shading, each site must be evaluated on a case-by-case basis.

City of West Linn

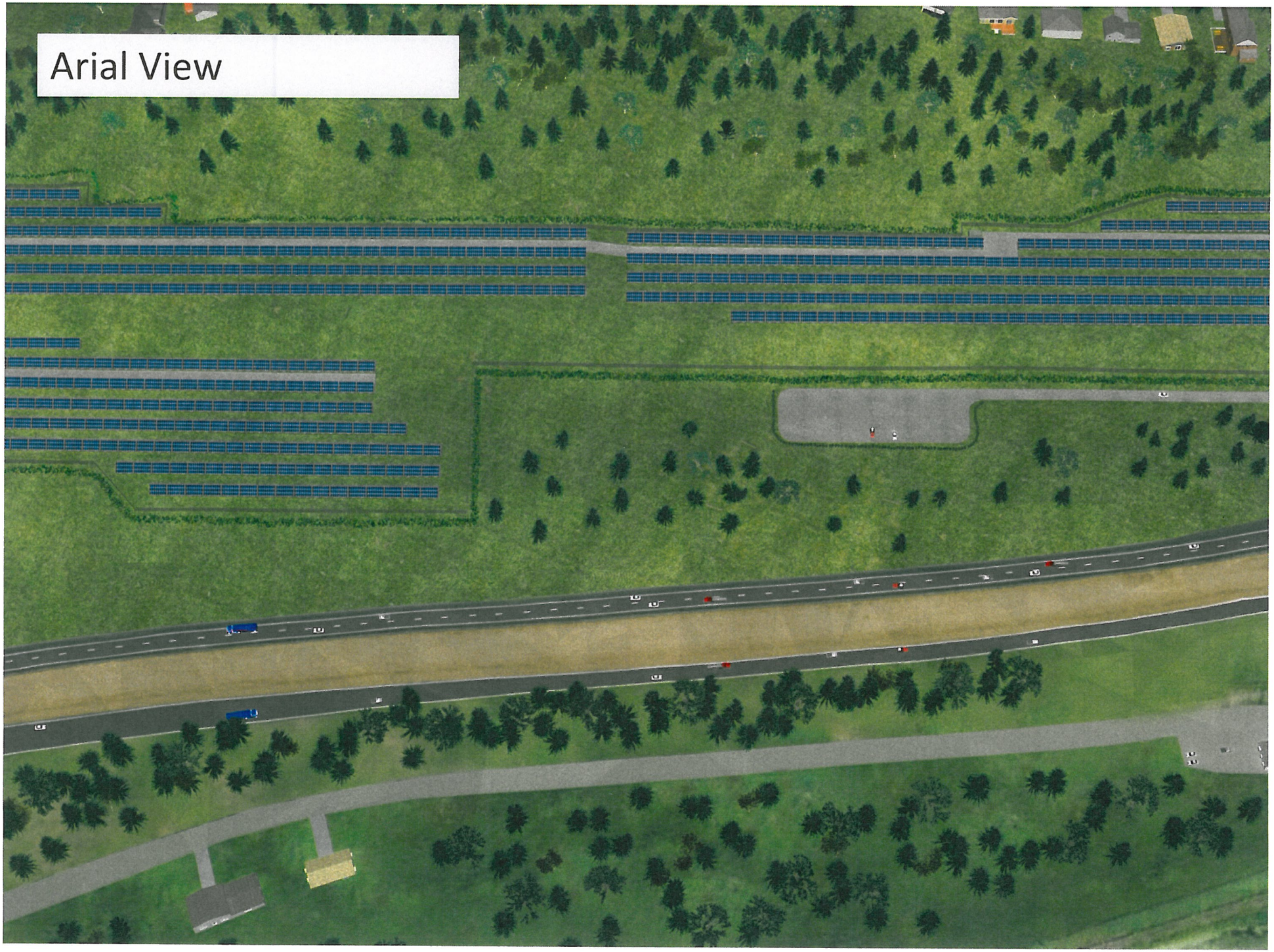
Proposed Solar Highway

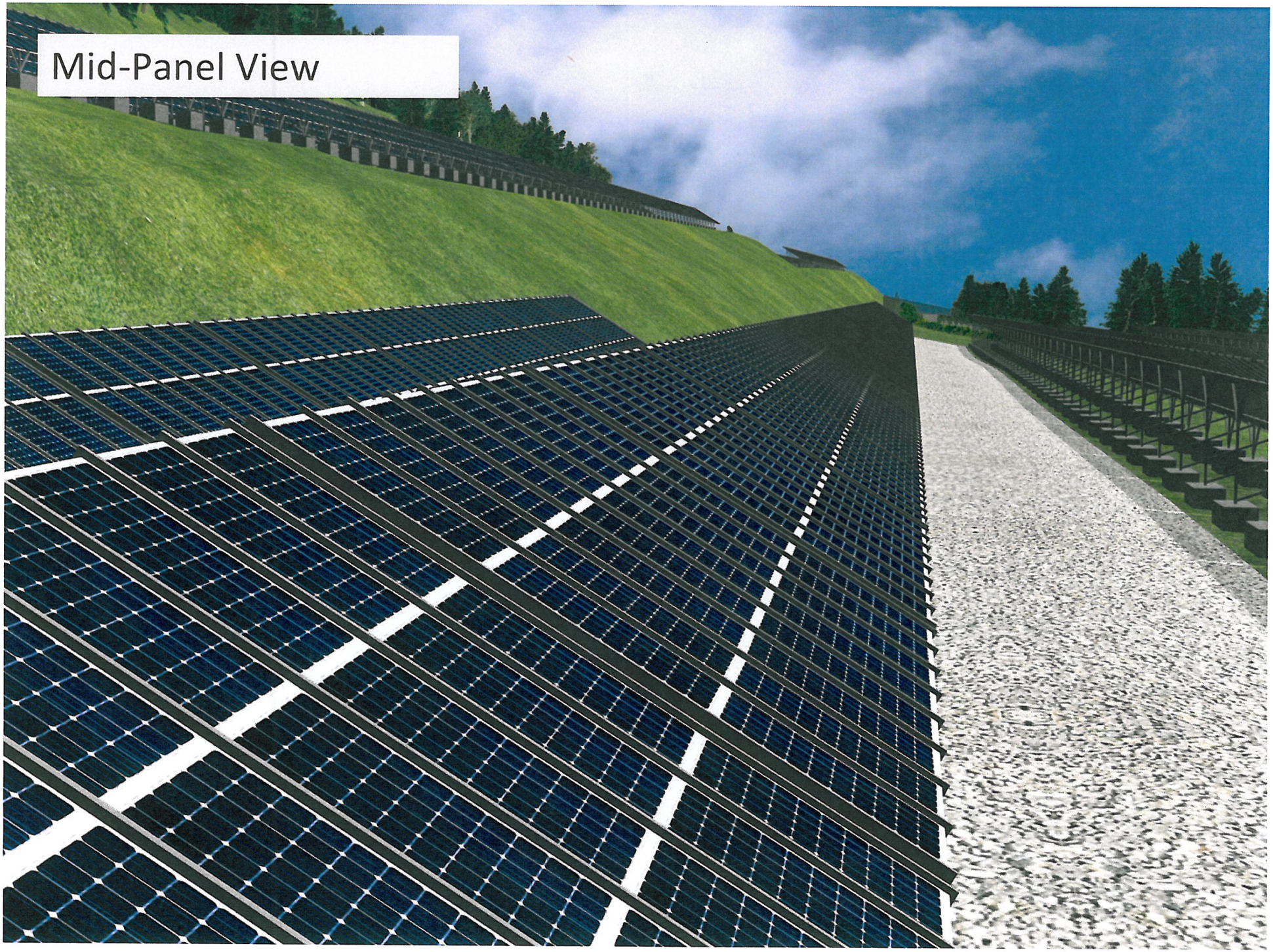
June 11, 2009

Today's Meeting

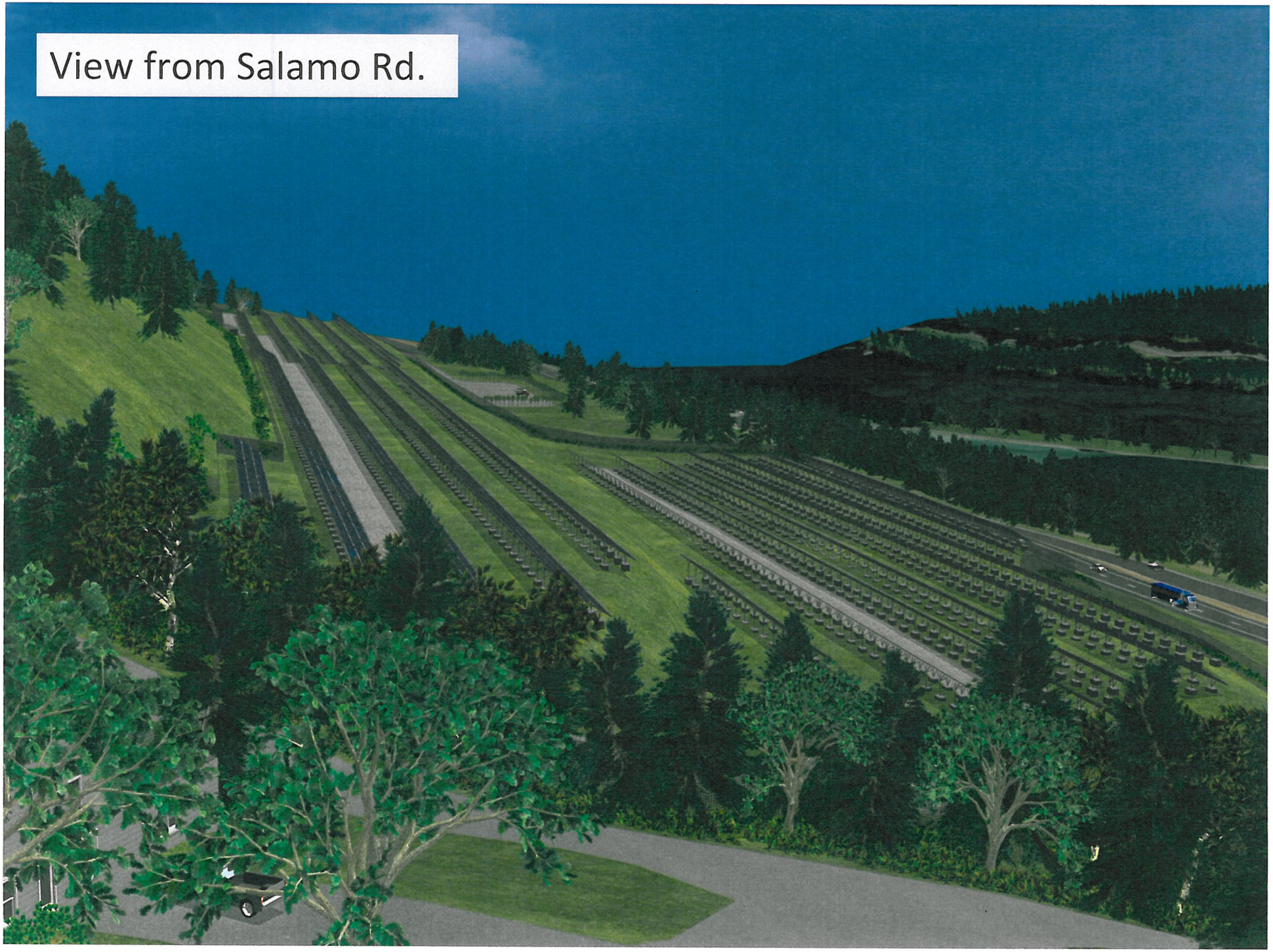
- Introductions
- Information from the City Manager
- Information from ODOT
- Becoming a Solar Highway Advocate
- Questions/Discussion

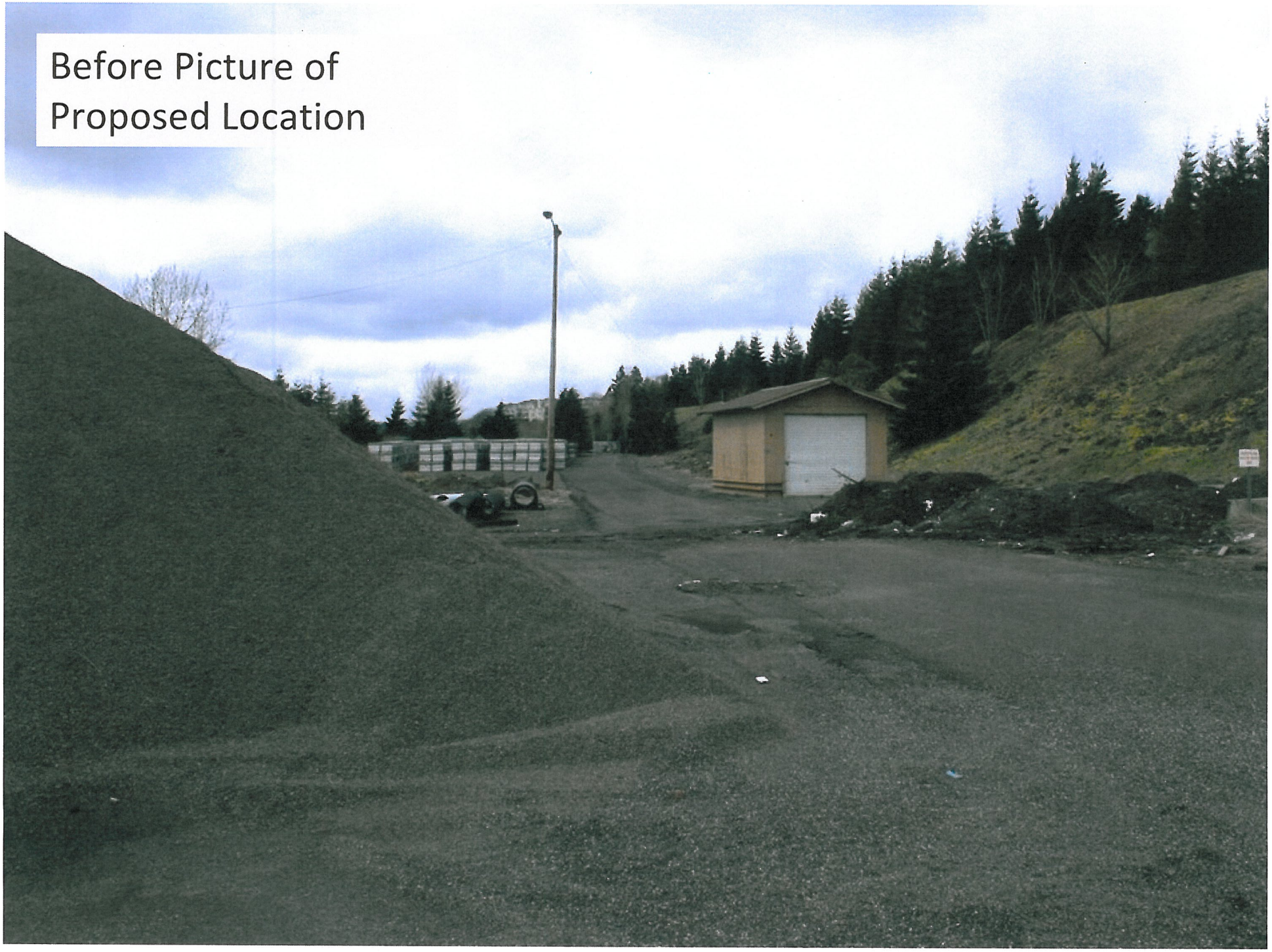

View from Oregon City

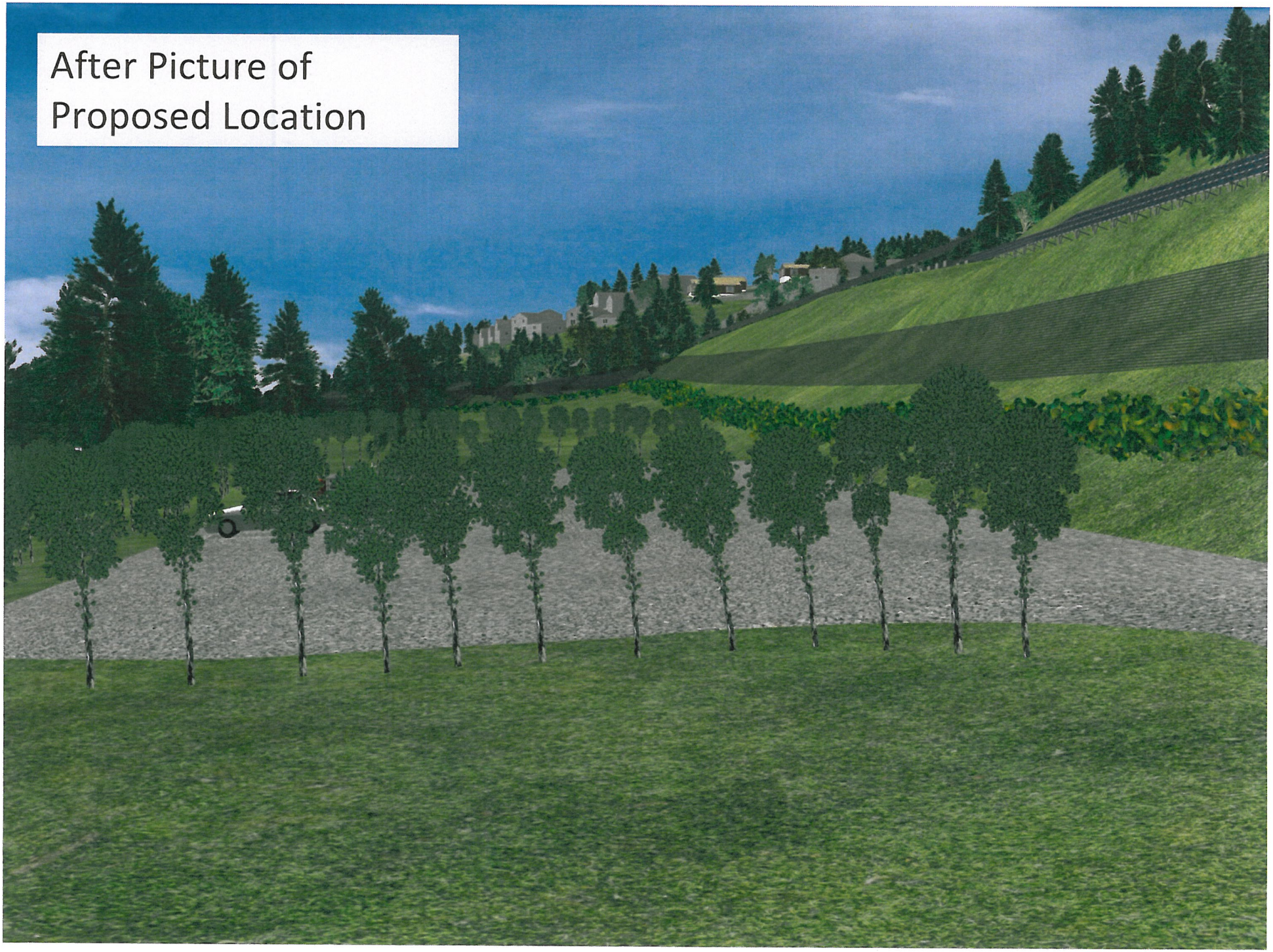

Arial View


Mid-Panel View


Side View


View from Salamo Rd.


Before Picture of
Proposed Location


After Picture of
Proposed Location

Questions/Discussion