

Ecosystem Services Provided by the Trees within the Footprint of Construction at Capitol Park

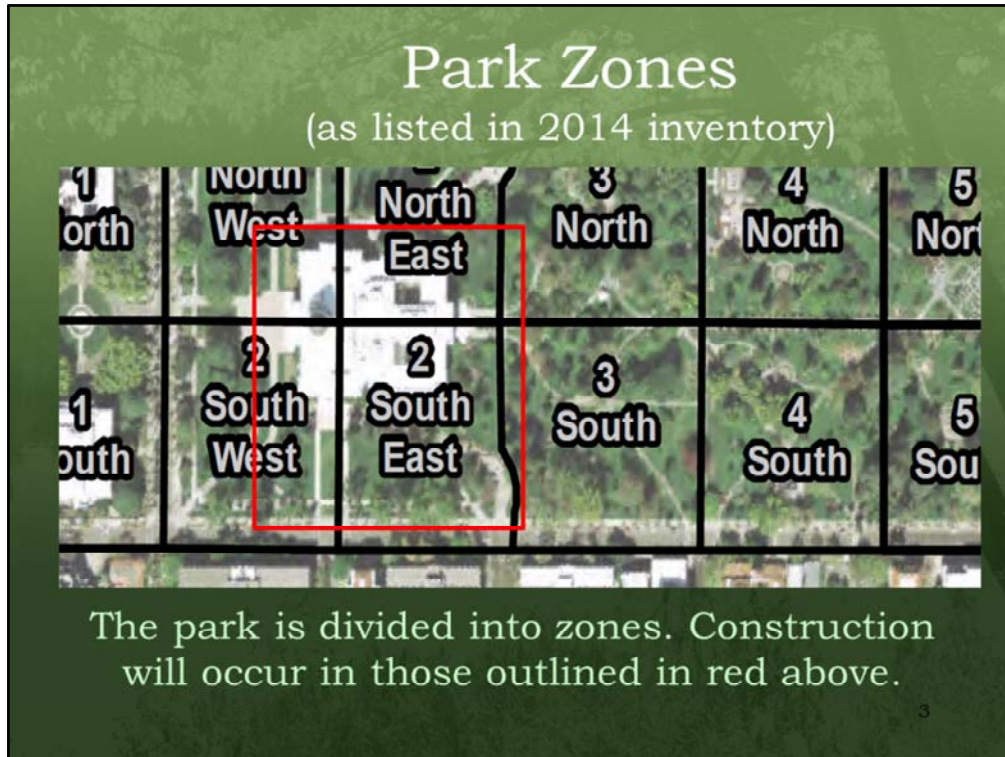
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1

This presentation provides insight into the estimated ecosystem services the trees within the East Annex Project's construction footprint provide. I have run this data because the DEIRs on this project never say which 20-30 trees will be entirely removed, nor where trees that are lifted and stored until construction is complete will end up being transplanted---and not all of those will survive transplanting. Transplanting mature, large trees on top of underground facilities is not possible. And the large trees are where the benefits are and also need the most after-care post transplanting. There are many more than 20-30 trees within the footprint.

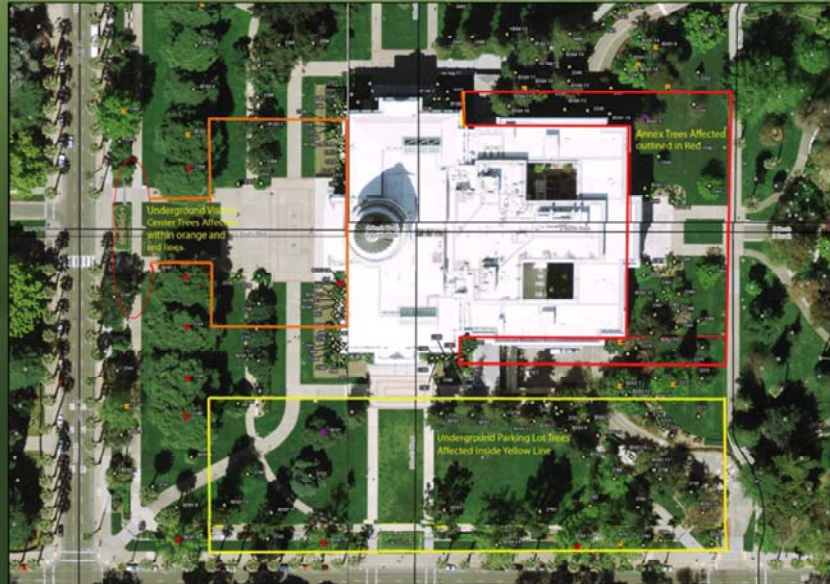


These are the construction zones. The Visitor/Welcome Center is scheduled to be the first constructed. The second will be the New Capitol Annex Building with what is now proposed as a Super Basement in order to align the new East Annex floors perfectly with the old West Wing. The Historic State Capitol Commission wondered why this “new” change did not require another Recirculated Draft EIR because it represents a significant change in construction plans with more impact to trees and to the historic West Capitol. No answer to date. The 3rd and last construction site will be the 2-acre underground parking lot, questioned by many as an unnecessary addition.



This is the park tree inventory map. The blocks affected by proposed construction are outlined in red and provide reference for the next slide.

Approximate outline of Construction on 2014 Tree Inventory—108 Trees Affected



This is a rough outline of the proposed construction sites superimposed on the 2014 tree inventory map. Every dot and number locates a tree. There are 104 trees on or within the outlines. There are 4 more trees outside the outlines but of great concern as they are threatened by the construction of the Visitor Center—these are among the beautiful old deodar cedars that front the “People’s Porch”, the walkway and steps leading to the old West Wing of the Capitol where so many public gatherings are held.

Study Does Not Include

- Trees within 50 feet of the new construction which potentially will be impacted



The photo shows what is often called the People's Front Porch. This is where the new Visitors Center will go underground, potentially impacting 2-4 of the historic Deodar cedars fronting the West Wing of the Capitol.

What Ecosystem Services Do These 108 Trees Provide?



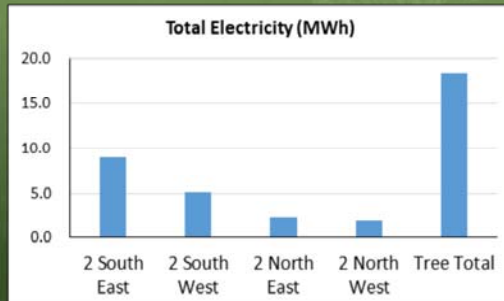
So what are the ecosystem services these trees provide?

Energy Reduction



The benefits assessed for park trees include energy reduction – trees save energy in various ways—from direct shading of buildings, to cooling the air through transpiration thereby reducing temperatures, shading paved surfaces, reducing wind speed and when we use air conditioning less due to these other cooling effects, less power is drawn and energy savings reduce power plant emissions, improving air quality. Energy use includes both gas and electricity.

Energy: The 108 Trees Provide:

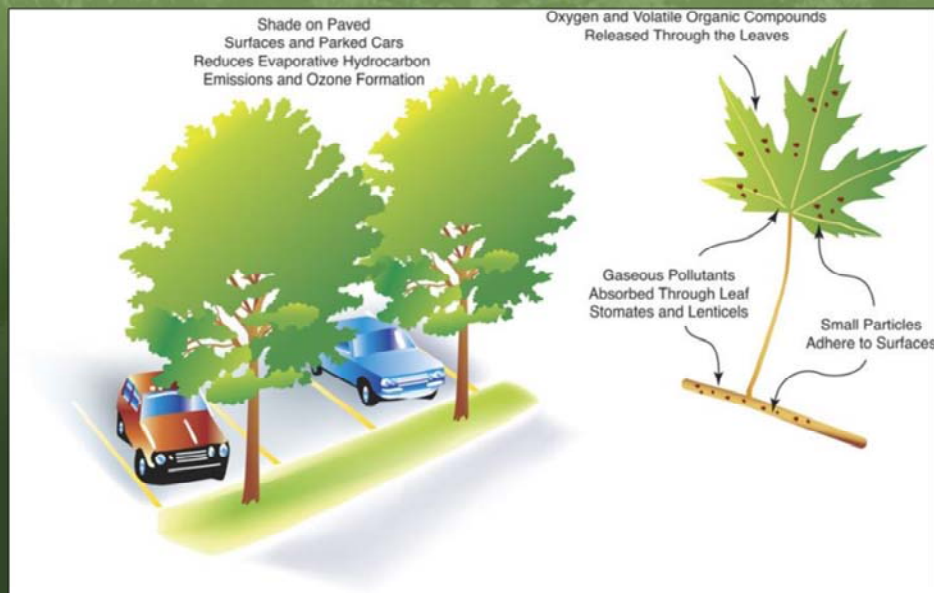


- Total of 18.4 MWh of electricity savings every year
- Enough to power 252 homes for 24 hours
- Also reduces natural gas use by 99 Therms

8

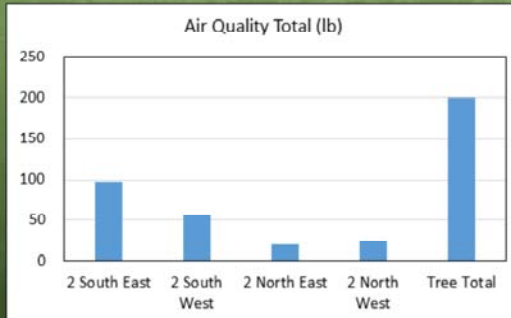
In the case of all services provided, the greatest loss in benefits will be associated with 2 South East and 2 Southwest---where the underground parking lot is planned and also the southern half of the Visitors Center. These trees save 18.4 megawatt hours of electricity every year, enough to power 252 homes for 24 hours. They also reduce natural gas consumption by a small amount of 99 therms.

Air Quality Improvement



Trees absorb gaseous pollutants through leaves and filter small particles out of the air, converting the pollutants to produce oxygen and VOCs.

Air Quality: The 108 Trees Provide:

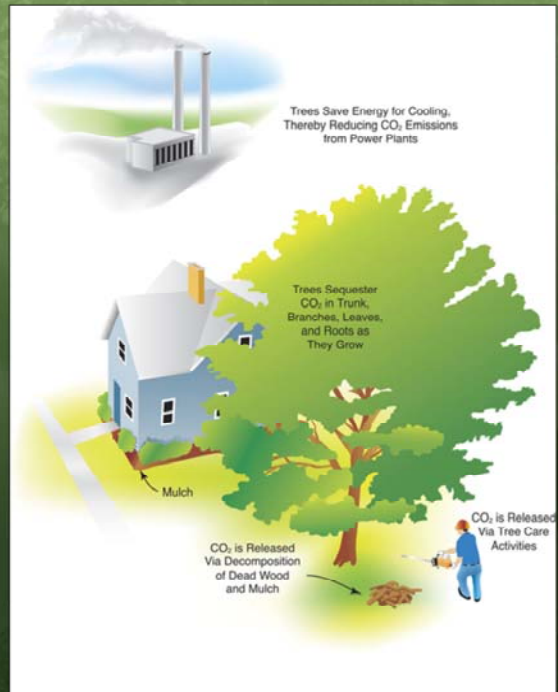


- Air quality components include:
 - Oxygen
 - Nitrogen dioxide
 - Sulfur dioxide
 - Avoided particulate matter (PM10)
 - BVOC emissions
- Total of 198 pounds of air pollutants removed

10

Air pollutants included in the study include oxygen, nitrogen dioxide, sulfur dioxide and Avoided particulate matter. Plants also produce biogenic volatile compound emissions which contribute to global warming. The 108 trees also improve air quality by removing 198 lbs of air pollutants every year.

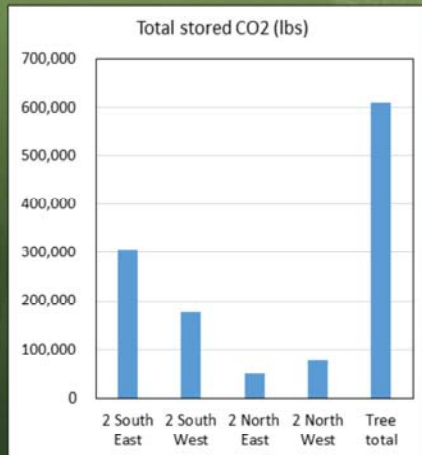
Carbon storage & CO₂ capture



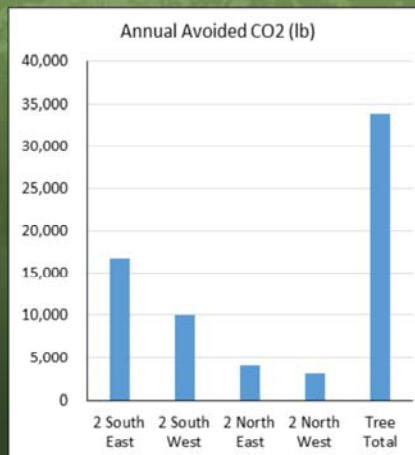
Trees capture and store carbon dioxide in their wood and leaves as they grow---in fact, if you remove the leaves from a tree, then dry out all that tree's wood, half the remaining weight is stored carbon.

Of course, when trees die they decompose and release carbon dioxide unless you do as Assemblymember Cooley did and arrange for the wood to be salvaged and turned into usable items like furniture—then it remains stored. Tree care activities also release carbon dioxide.

Carbon Stored & Sequestered



108 trees store nearly
610 thousand lbs of carbon
in their wood

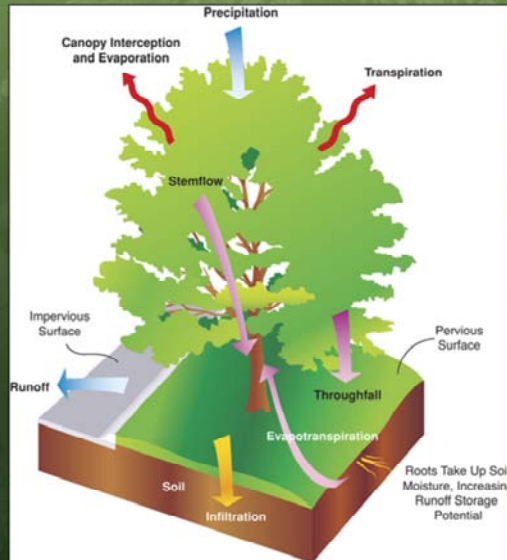


They capture 33,800 lbs of atmospheric
CO₂ every year

12

The trees in this study have stored nearly 610 thousand pounds of carbon in their wood. If these trees are lost, so is the carbon they have stored. They capture 33,800 lbs of atmospheric carbon dioxide every year, reducing the amount of CO₂ that goes into the atmosphere.

Stormwater Runoff Reduction

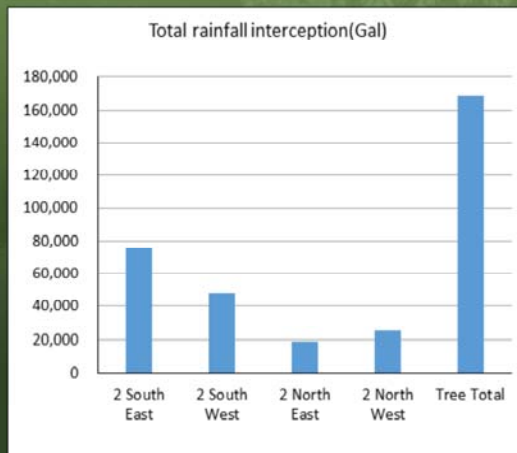


13

Trees reduce runoff volume, peak flow, and flow duration. They slow down the flow and promote infiltration and evapotranspiration, also improving groundwater recharge and reducing the incidence of combined sewer overflow.

By doing these things they provide water quality improvements and reduced treatment costs.

Stormwater Runoff Reduction



- The trees intercept over 168,000 gal of rainfall every year thereby avoiding runoff
- That's equal to over 2000 bathtub fills

14

The 108 trees intercept over 168,000 gallons of rainfall every year thereby avoiding runoff while recharging groundwater levels. That's equal to over 2000 bathtub fulls of water.

Aesthetics/Other?



We have no way to place values on the historical value, the health benefits, the beauty that these trees provide

We only account for the amount that home property values increase due to the presence of trees

That increase in home value is shown in the value of all benefits on the next slide

Benefits Valuation

| Benefits | Total (\$) | \$/tree |
|-----------------|------------|---------|
| Energy | 3,285 | 30.41 |
| CO2 | 254 | 2.35 |
| Air Quality | 2,594 | 24.02 |
| Stormwater | 1,312 | 12.14 |
| Aesthetic/Other | 14,237 | 131.82 |
| Total Benefits | 21,681 | 200.75 |

The trees provide over \$21,600 in benefits every year, mostly due to the large trees over 30 inches diameter at breast height. Also important to note that our models do not model trees that are as large as so many trees in the Park, so this is a clear underestimation of benefits.

16

In placing a dollar amount on the benefits these trees provide you should think in terms of the number of years these trees have grown and will continue growing and multiply that value of \$21,681 by those years. If large trees are completely removed and not replaced because we can't plant large trees on top of underground buildings—we will permanently lose many benefits. If replacement trees are planted, it will take decades for them to reach a size to produce these same benefits

Benefit Summary

| <u>Benefits</u> | <u>Amount</u> |
|-----------------|---------------|
| Electricity | 18.4 MWh |
| Natural Gas | 99 Therms |
| Stored Carbon | 609,967 lbs |
| Sequestered CO2 | 33,843 lbs |
| Air Quality | 198 lbs |
| Stormwater | 168,162 gal |

17

In summary, 108 trees in the construction footprint save 18.4 megawatt hours of electricity, 99 therms of natural gas, 33, 843 lbs of carbon dioxide, 198 lbs of air pollutants and permanently store nearly 610 thousand pounds of carbon in their wood.

Thirty Large or Unique Trees Provide Most Benefits

- Redwoods ranging up to 75 inch dbh
- Bunya-Bunya
- Deodar cedars
- Incense cedars
- Tulips
- Yeddo spruce
- Guadalupe Island cypress
- Cockspur coral
- Jelecote pine
- Southern magnolia

18

There are 30 large, and some unique, trees that provide the most benefits. Among these are the 11 redwoods, bunya-bunya, deodar, incense and western red cedars, tulips, Yeddo spruce, Guadalupe Island cypress, cockspur coral, jelecote pine and southern magnolia.

Loss of Benefits

- Greatest loss area:
 - 2 South West and 2 South East
 - Covers 2-acre underground parking lot
 - Southern half of new underground visitors center
- Greatest historical tree loss:
 - Underground parking lot (redwoods, large conifers, tulips, cockspur coral)
 - Visitors Center (cedars, large conifers)
 - Moon Tree (Annex)



Photo courtesy of Shannon Albers

19

The areas of greatest loss of benefits due to construction are in the 2 South West and 2 South East zones which covers the 2-acre underground parking lot and the southern half of the new underground visitors center. The greatest potential impact to historical trees include those currently existing on the site of the underground parking lot and the visitors center, but also several large redwoods, including the Moon Tree which will be removed with the East Annex construction. We, the public using the park, need to know the landscape plans for each phase of park construction should this project go on. Which trees will be permanently removed, which lifted and held to be transplanted later and where? And what is the estimated survival rate of those transplanted trees.

California considers itself a climate change leader. It seems ironic that legislative leaders are promoting a 2-acre underground parking lot and the damage, removal of so many trees.

Trees at Risk



20