



Tualatin Basin  
WATER SUPPLY

# Tualatin Basin Water Supply Project

Scoggins Dam Raise  
Appraisal Study

**Tualatin River Watershed Council**

**September 2, 2009**



Tualatin Basin  
WATER SUPPLY

SUSTAINING OUR ECONOMY, WATERSHED, AND COMMUNITY

# Presentation Overview

- 1. Reclamation's Safety of Dams Program**
- 2. Dam Raise Appraisal Study Information**
- 3. Costs Review**
- 4. Program Issues**

# Reclamation's Safety of Dams Program

## ■ Key points

- **Scoggins Dam is federally owned**
- **Reclamation's schedule differs from Partner's**
- **Dam raise appraisal study provides key information**
- **Reclamation continuing Risk Evaluation Process – only for the existing Dam**
- **Good coordination with Reclamation**

# Reclamation's Safety of Dams Program

- **Major Program elements**
  - **Safety Evaluation of Existing Dams (SEED)**
    - 100% Reclamation Cost
    - Risk Analysis Process – Expedited actions
  - **Corrective Action Study (CAS)**
    - 85% - Federal and 15% Local cost share
    - Design and Construction of Modification/Repairs

# Safety of Dams – SEED Process

- **Risk Evaluation Steps and Schedule**
  - **Seismic Review Board and Risk Analysis**
    - Risk Analysis Workshop
    - July - October 2009
  - **Dam Safety Assessment Team**
    - Decision Document
    - December 2009
  - **Interim measures to mitigate the risks**
    - January – March 2010
  - **Corrective Action Study (CAS)**
    - Scope, Budget and Schedule
    - January – March 2010

# Safety of Dams – Corrective Action Study (CAS)

- **CAS Program Steps and Schedule**
  - **CAS Scope, Schedule and Budget - Spring 2010**
  - **CAS Work Tasks and Schedule**
    - Alternatives, Mod. Report, and NEPA – Summer 2010
    - Final Design Process – June 2011 – Feb. 2012
    - Congressional Approval for Design– March 2012
    - Final Design, Construction Procurement – 2013 -14
    - Congressional Approval for Construction – 2014
    - **Construction and Startup – 2014 - 2019**

# Safety of Dams Program

## ■ Partnership Involvement

- **Participation in Risk evaluation process and Dam Safety assessment team for existing Dam**
- **Develop information on economic and other impacts for interim measures to mitigate risks, such as reservoir restriction this winter**
- **Continue collaboration with Reclamation management and staff on project elements**

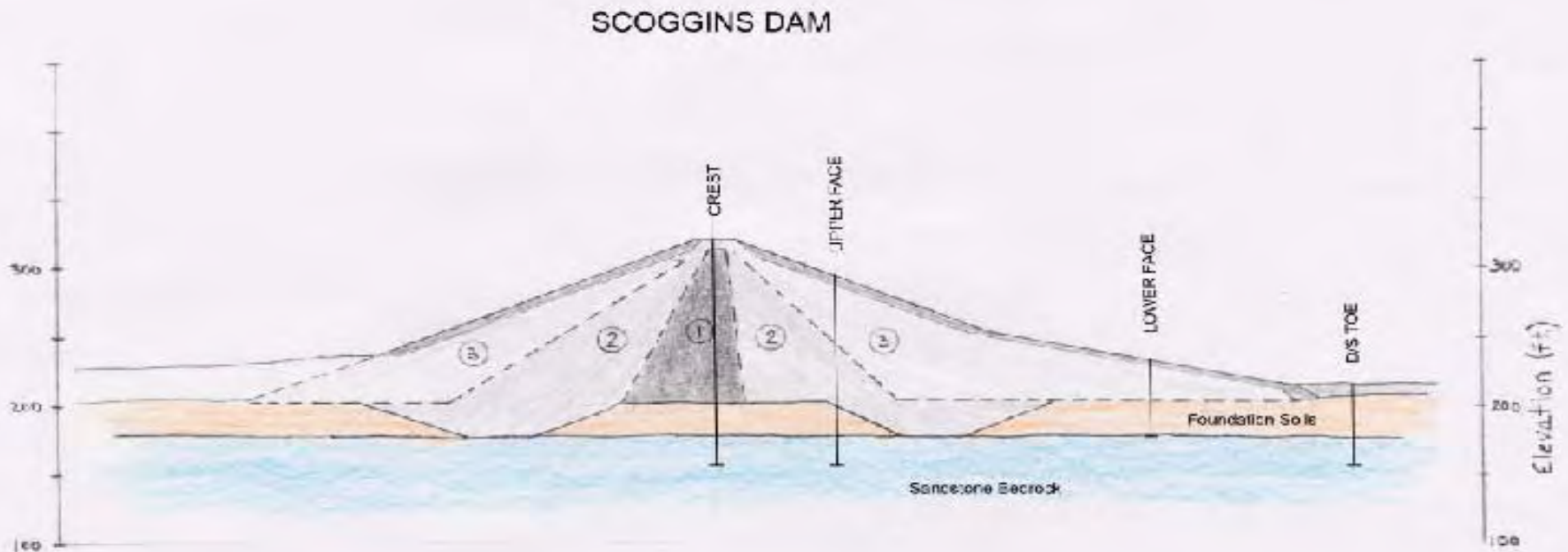
# Partnership Issues

## ■ Concerns of schedule

- Safety of Dam Program actions have taken up to 12 years from beginning of corrective action to start-up of construction (Folsom)
- Reclamation has not determined the schedule – our estimate for dam repairs – no sooner than Spring 2019

## ■ Congressional appropriations delays

# Scoggins Dam Design



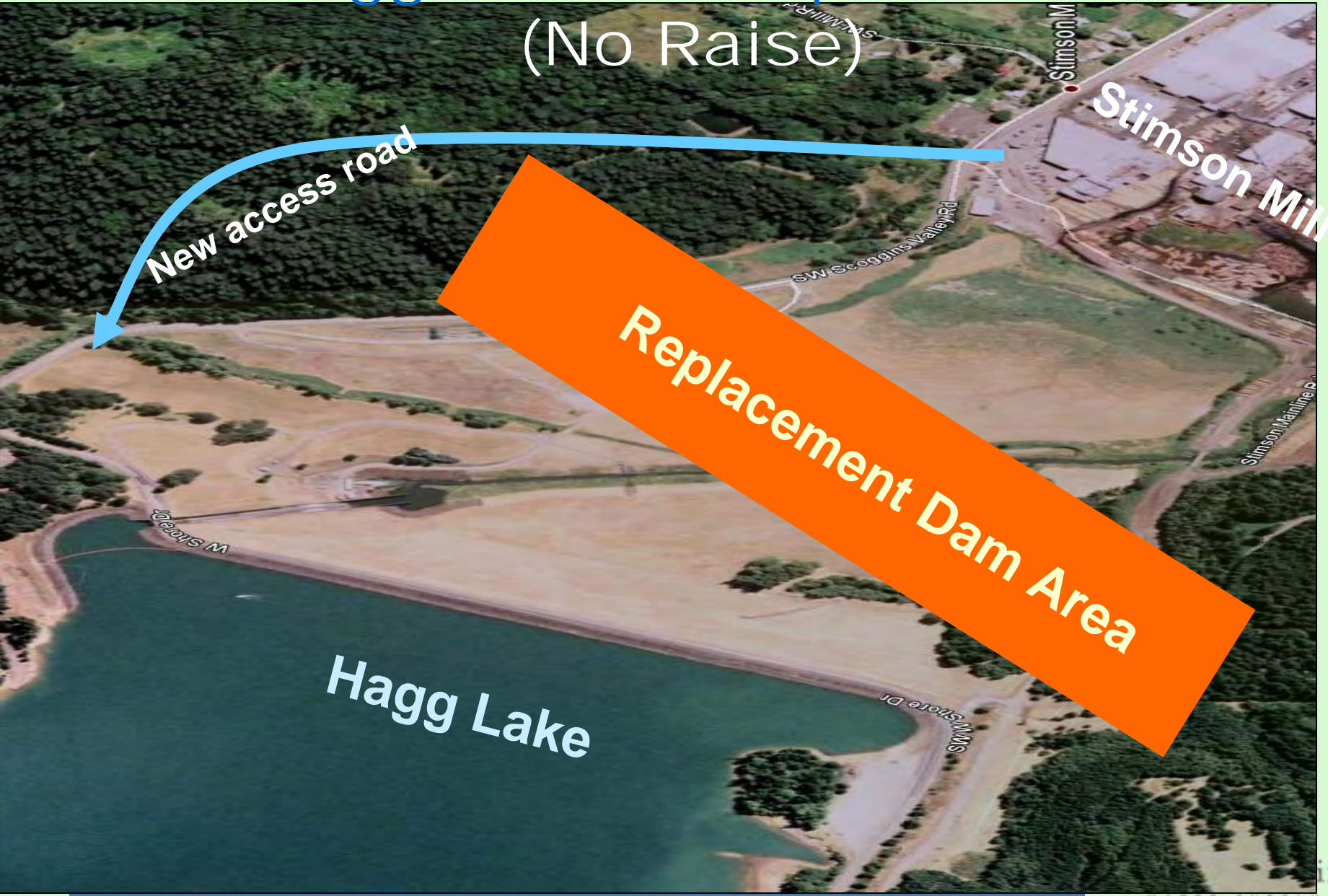
- U.S. Bureau of Reclamation - Designed and Constructed 1970's
- 151-foot-high zoned earth fill embankment
- 53,316 acre-feet active storage capacity
- 2,600 acres area for lake and lands
- 1,100 acres of water at full pool

# Dam Raise Appraisal Study

## Scoggins Dam Assessment

- **Existing Dam Structure is Safe**
  - **Does not meet current earthquake guidelines**
- **Doing nothing is not an option**
- **Required Seismic Improvements for the Current Reservoir Operation**
  - **SEED - Reclamation Risk Analysis**
  - **Seismic Review Board Recommendations**
  - **May be more cost-effective to replace than to repair the existing Dam**

# Scoggins Dam Replacement (No Raise)



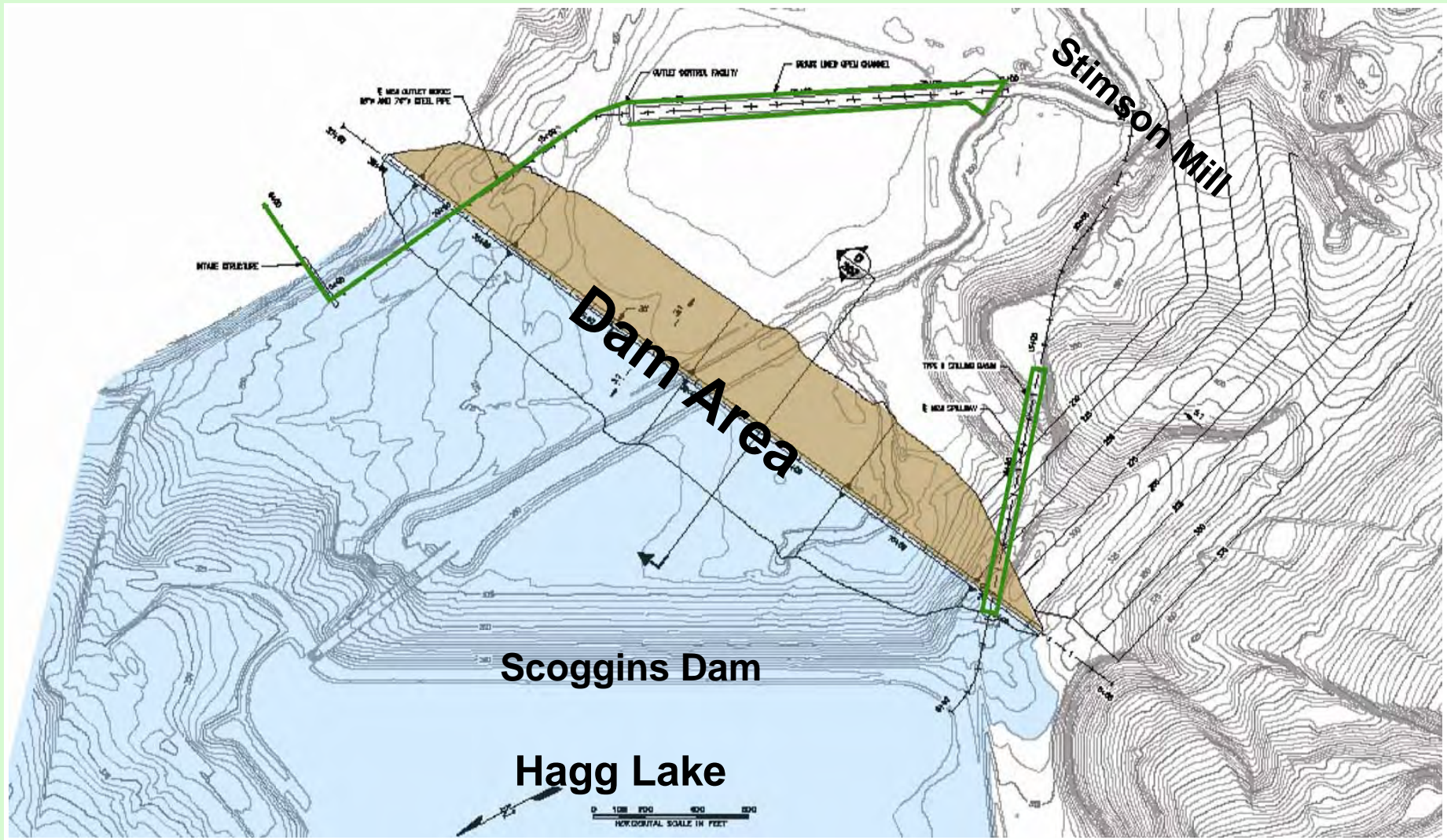
New access road

Replacement Dam Area

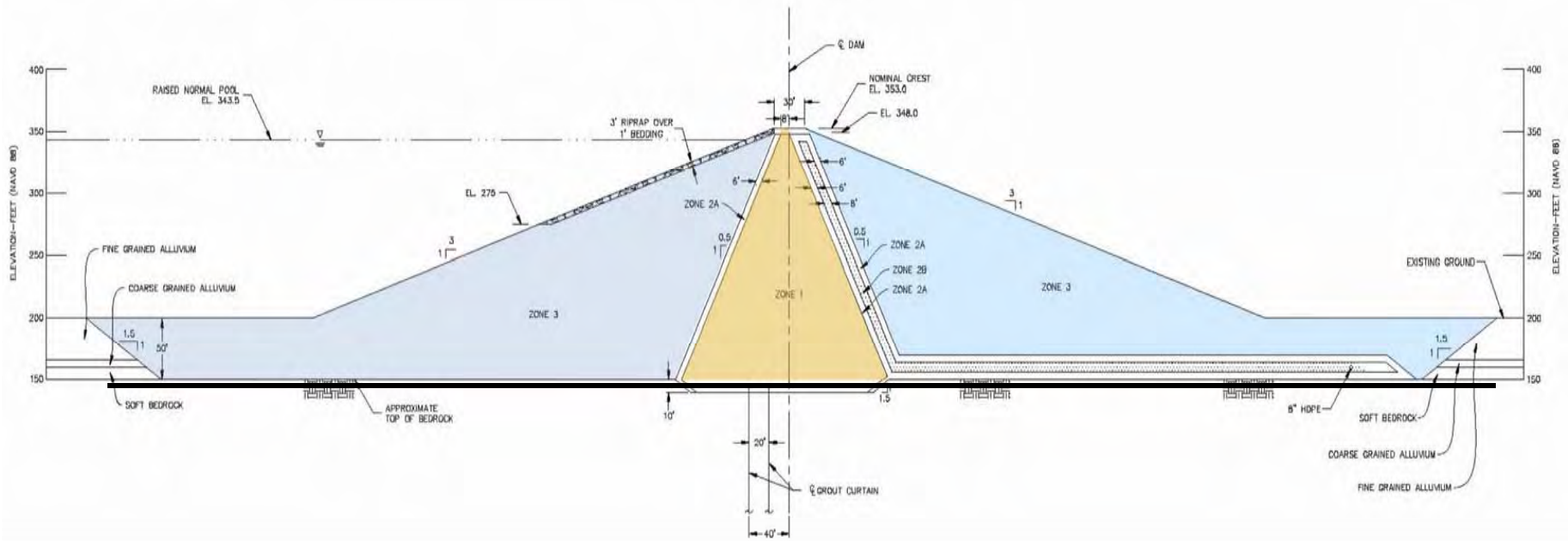
Hagg Lake

Stimson Mill

# Plan of Replacement Dam



# Section of Replacement Dam



**Dam Height – 151 ft   Capacity – 52,600 ac-ft**  
**Base length – 3100 feet   Base width – 700 feet**  
**Side Slope – 3H:1V   Core fill material – Clay**

# Dam Raise Appraisal Study

## Design Alternatives

- **Existing Dam Raise**
  - **Zoned Earthfill**
- **Downstream Dam Raise**
  - **Zoned Earthfill**
- **Downstream Dam Raise – Composite**
  - **Rock Fill/Roller Compacted Concrete**

# Dam Design Alternatives

Hagg Lake

Existing Dam Raise Area

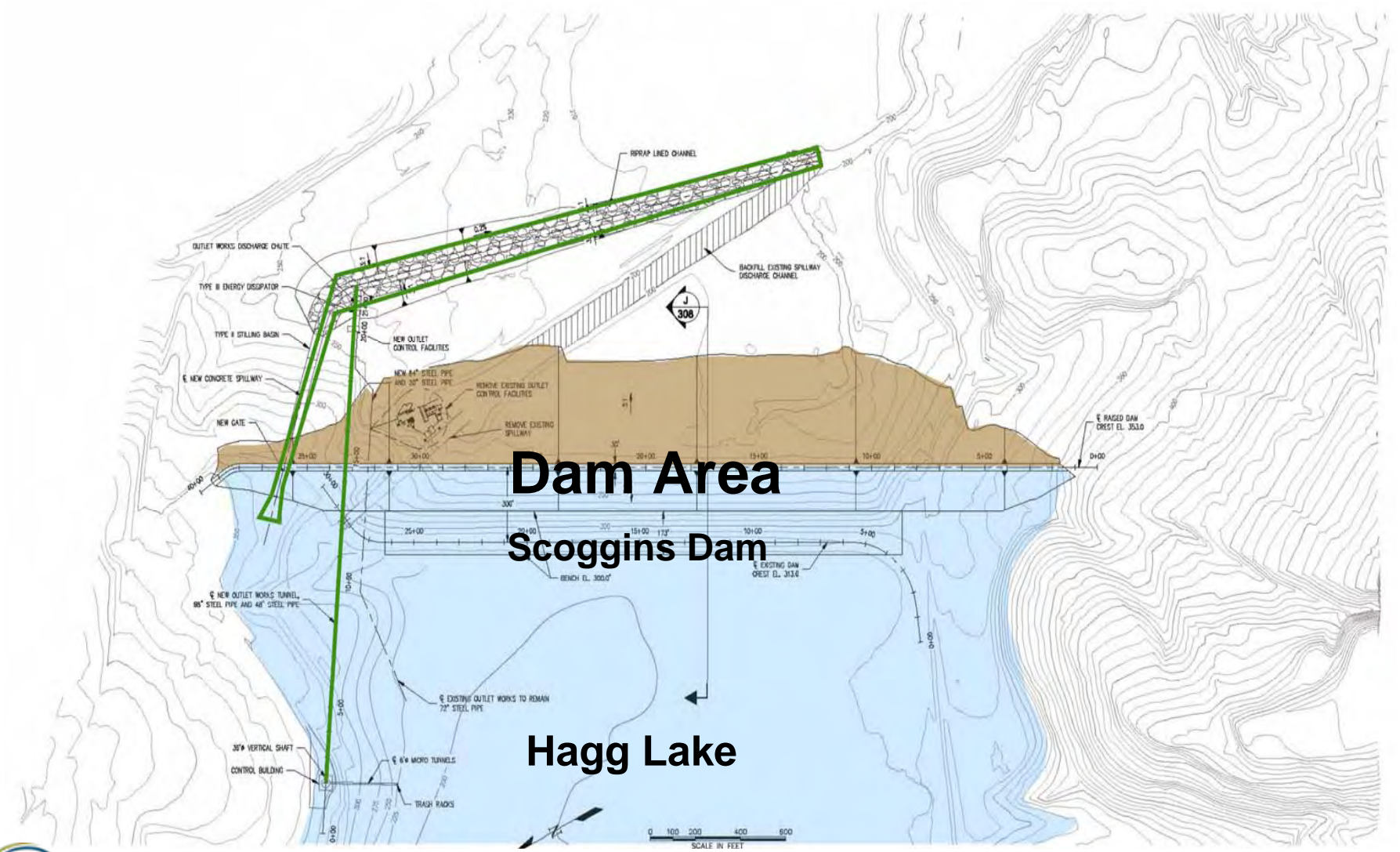
Raised Dam Area - Composite

Replace Existing Dam

Downstream Dam Raise

Stimson Mill

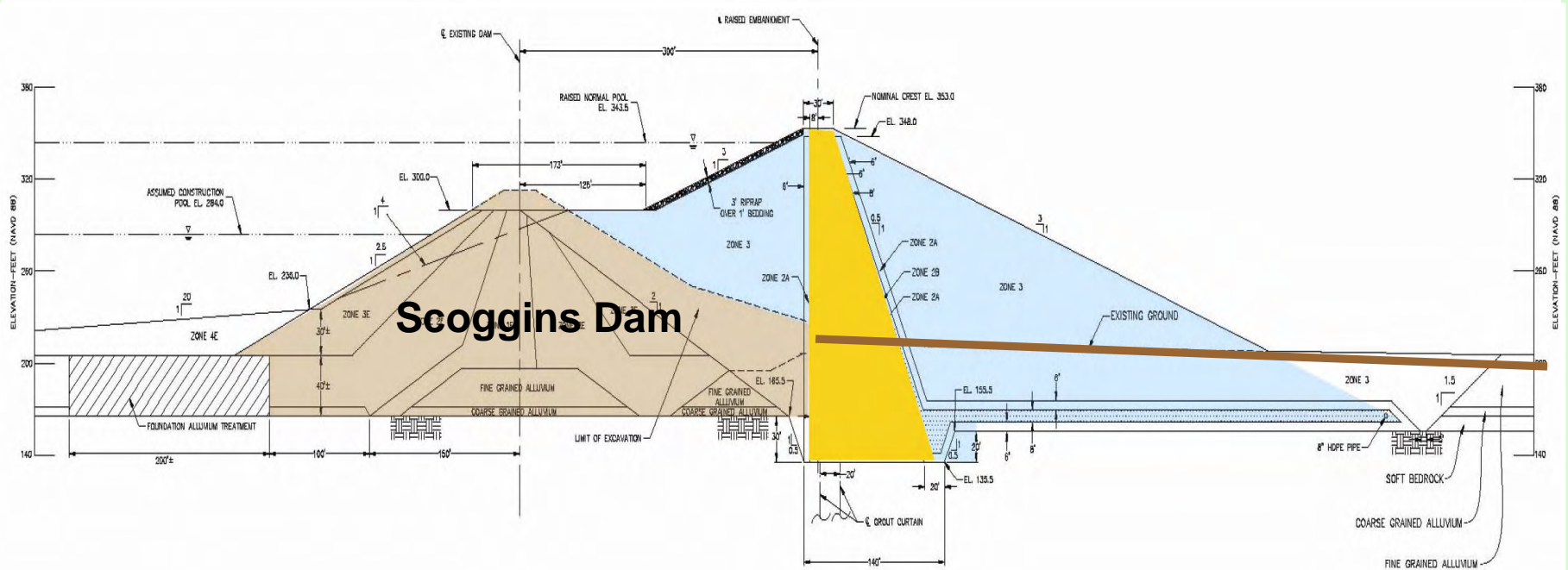
# Plan of Existing Dam Raise



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# Section of Existing Dam Raise

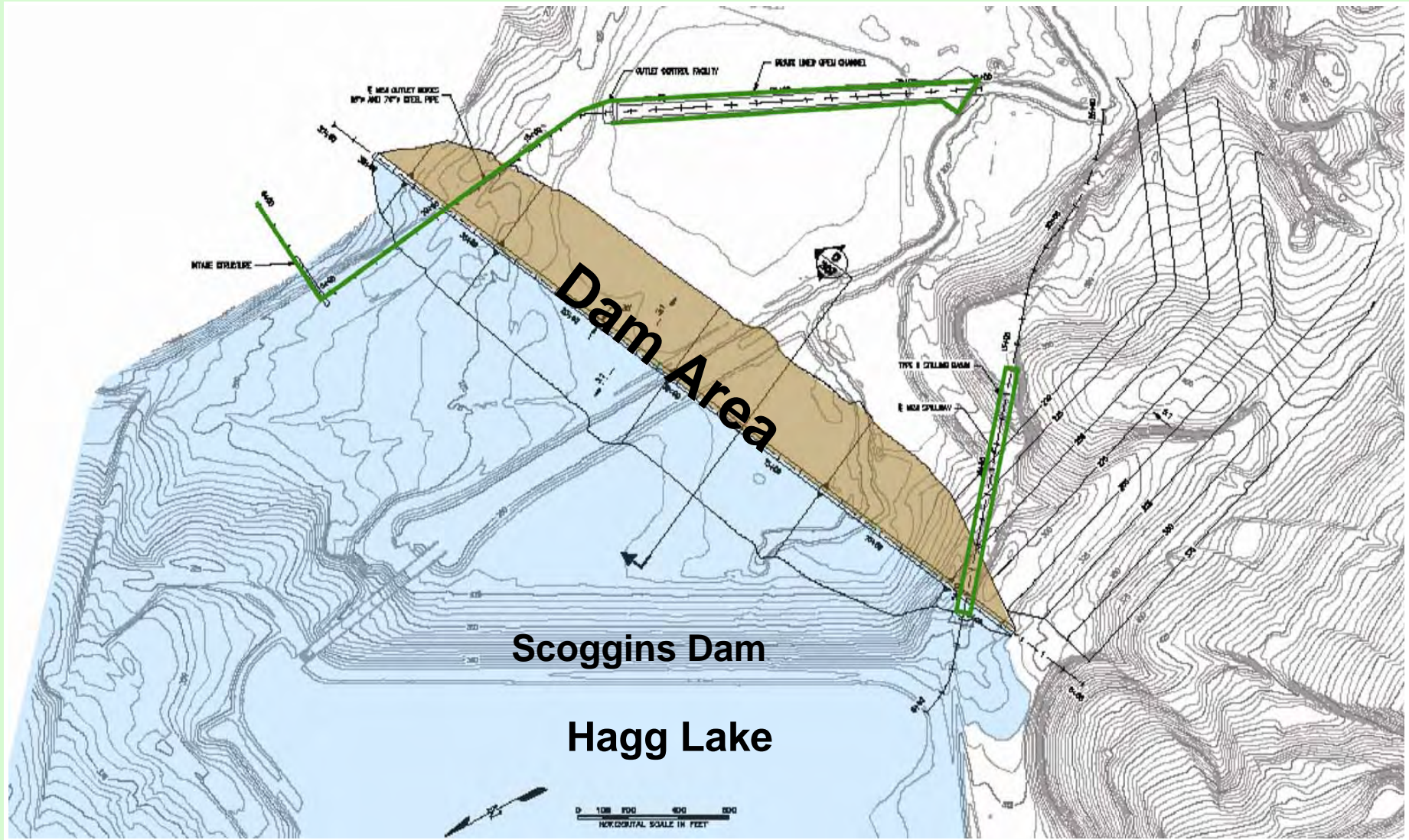


**Dam Height – 220 ft Capacity – 110,000 ac-ft**

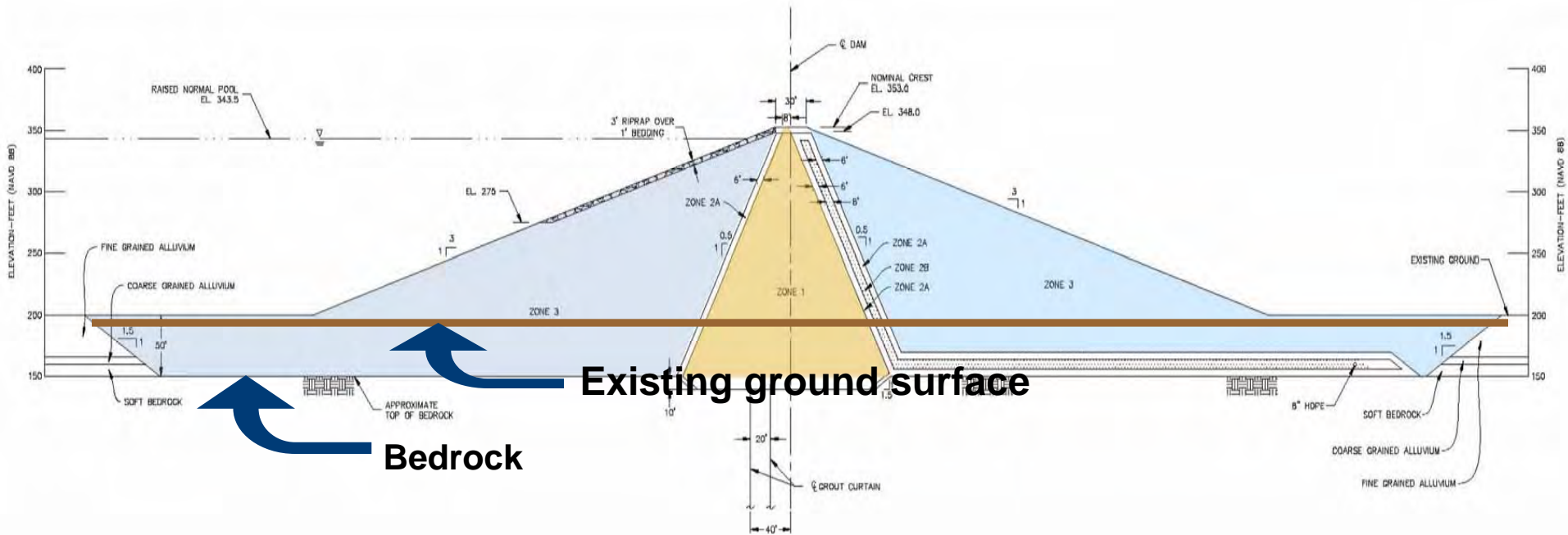
**Base length – 3800 feet Base width – 1200 feet (includes existing dam foundation – 500 ft)**

**Side Slope – 3H:1V Core Fill Material - Clay**

# Plan of Downstream Raised Dam



# Section of Downstream Raised Dam

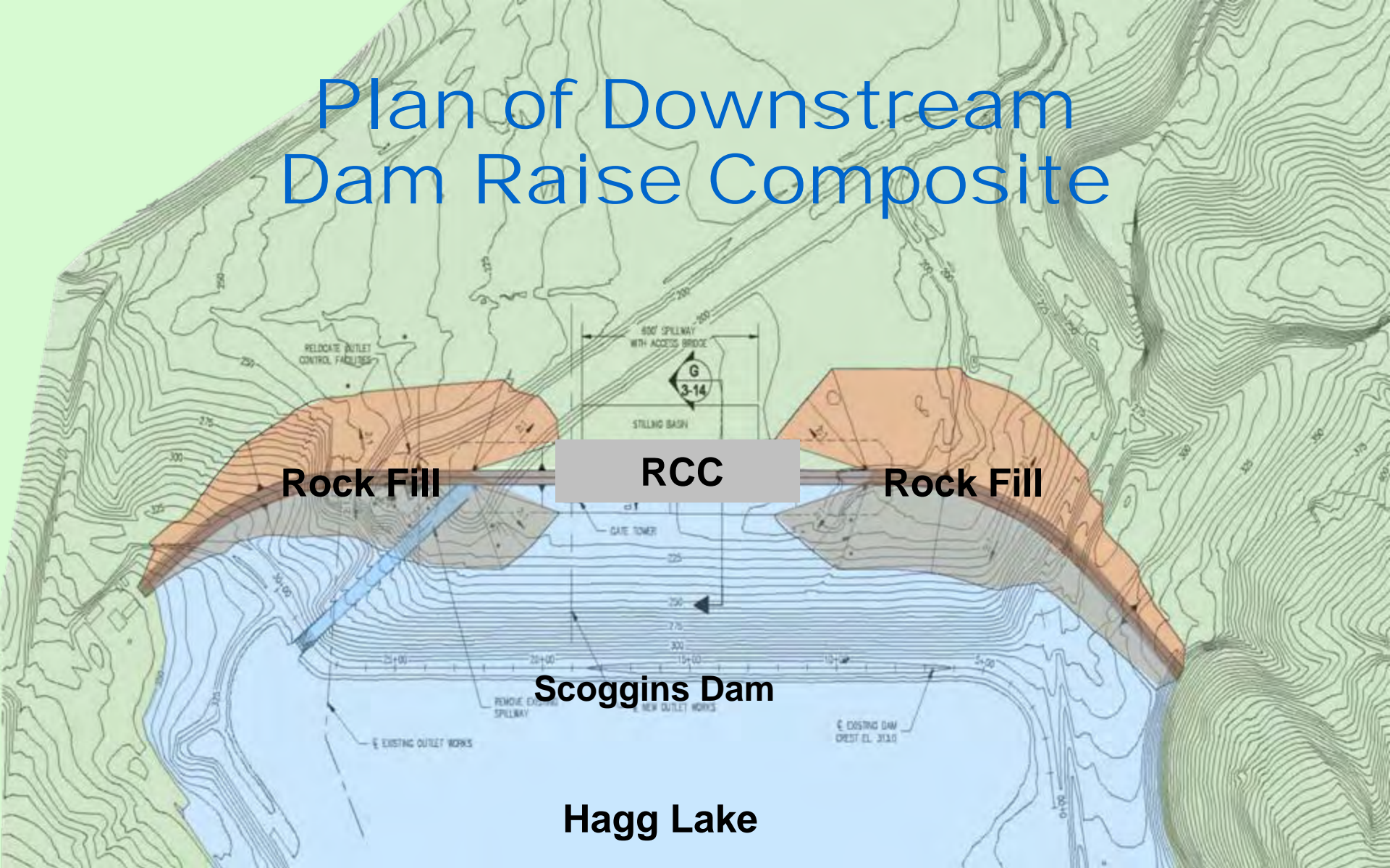


**Dam Height – 220 ft Capacity – 110,000 ac-ft**

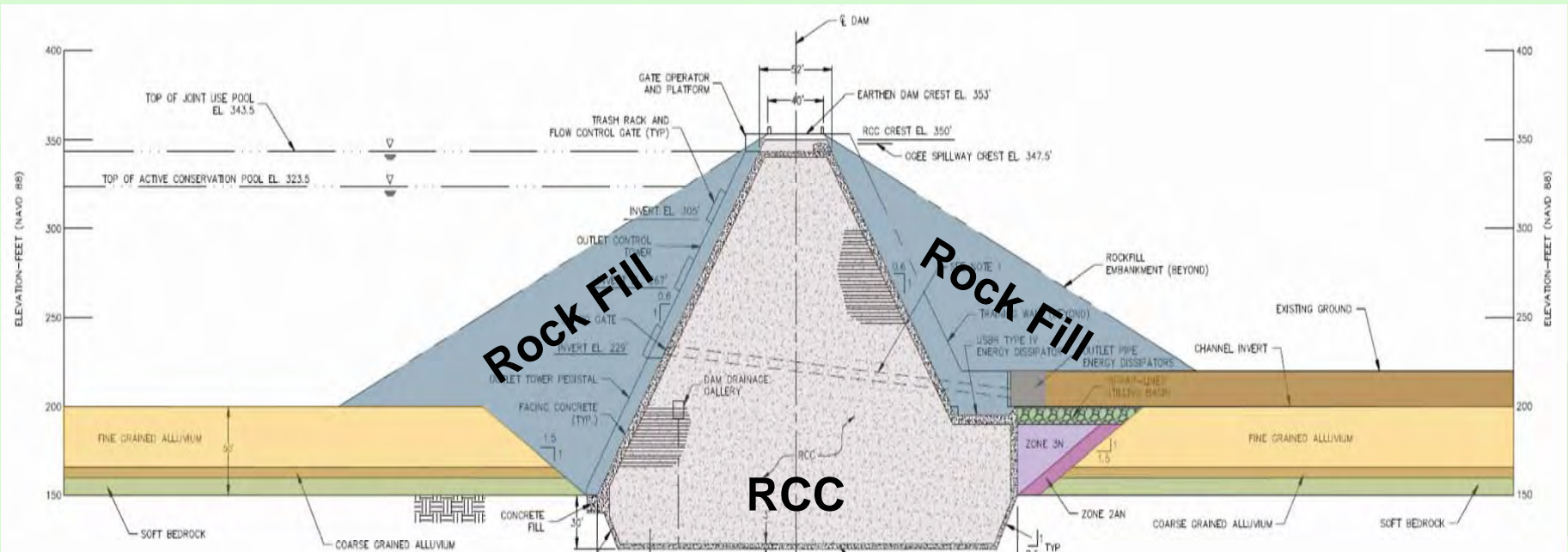
**Base length – 3500 ft Base width – 850 ft**

**Side Slope – 3H:1V**

# Plan of Downstream Dam Raise Composite



# Section of Downstream Dam Raise - Composite Roller Compacted Concrete (RCC) with Rockfill/Earth Core



**Total Dam Height – 230 ft    Capacity – 110,000 ac-ft**

**Base length – 3500 ft    Base width – 1280 ft**

**Side Slope – 3H:1V    Core fill Material – RCC/Clay**

# Dam Raise Project

## ■ Issues

- **Construction Cost Estimates – 15% Level**
- **Construction Impacts**
  - **Reduced Reservoir Level**
  - **Water Supply/Recreation**
- **Existing Dam Structure - Liability**
- **Private Property Impacts**
- **Dam Access Roads**
- **New dam features – Tunnel, Spillway and Outlet Works**
- **Environmental Impacts**
- **Community impacts**

# Decision Model for Dam Designs Evaluation Process

- **Multi-Level Screening Criteria with Weighted Factors**
  - **Community Impacts**
  - **Institutional Issues**
  - **Environmental Impacts**
  - **Operational Impacts**
  - **Design Performance**

# DRAS-Dam Replacement Cost

<b>Cost Element</b>	<b>Existing Dam Replacement – Downstream (\$Millions)</b>
<b>Site work, Dewatering, access Roads</b>	<b>11</b>
<b>Foundation Excavation (3 million yards)</b>	<b>43</b>
<b>Embankment (7 Million yards)</b>	<b>194</b>
<b>Spillway and Outlet Works</b>	<b>30</b>
<b>Base Construction Cost (BCS)</b>	<b>278</b>
<b>Contingencies, Unscheduled items, Eng., Legal, Admin.</b>	<b>111</b>
<b>Total Construction Cost</b>	<b>\$389</b>
<b>Federal Share – 85% = \$331</b>	<b>Local Share – 15% =\$58</b>

# Dam Safety Program – Local Share

<b>Repayment Contractor</b>	<b>Total Contracted Volume (AF)</b>	<b>% share*</b>	<b>Cost Share (\$Millions)</b>
<b>Tualatin Valley Irrigation District (27,020 af- stored)</b>	<b>37,000*</b>	<b>54.5</b>	<b>31.61</b>
<b>CleanWater Services (12,618 af storage)</b>	<b>16,900*</b>	<b>24.9</b>	<b>14.43</b>
<b>City of Hillsboro</b>	<b>5000</b>	<b>7.4</b>	<b>4.27</b>
<b>City of Forest Grove</b>	<b>4500</b>	<b>6.6</b>	<b>3.84</b>
<b>City of Beaverton</b>	<b>4000</b>	<b>5.9</b>	<b>3.42</b>
<b>Lake Oswego Corp.</b>	<b>500</b>	<b>0.74</b>	<b>0.43</b>
(* includes Natural Flow volume)			
<b>Totals</b>	<b>67,900</b>		<b>\$58</b>

# Dam Raise Cost Comparison

Cost Element	Existing Dam Raise – Earthfill (\$Millions)	Downstream Dam Raise – Earthfill (\$Millions)	Downstream Dam Raise- Composite (\$Millions)
Site Work, dewatering, access roads	12	12	11
Foundation Excavation	42	59	67
Embankment	234	295	232
Roller Compacted Concrete - RCC	--	--	273
Spillway and Outlet works - Tunnels	47	31	11
<b><i>Base Construction Cost</i></b>	<b>335</b>	<b>397</b>	<b>594</b>
Contingencies, Unscheduled items, Eng, Legal, Admin	251	245	274
<b><i>Total Construction Cost</i></b>	<b>586</b>	<b>642</b>	<b>868</b>

# Dam Construction Options

Dam Raise Options	Cost (\$ M) (2009 dollars)
<b>Replacement Dam (No Raise)*</b> <b>*Federal Share – 85% = \$331M</b> <b>Local Share – 15% = \$58 M</b>	<b>\$389</b>
<b>Existing Dam Raise</b>	<b>\$586</b>
<b>Downstream Embankment Dam Raise</b>	<b>\$642</b>
<b>Downstream Composite Dam Raise</b>	<b>\$868</b>

# Updated Program Costs

Program Elements	DRAS Alternatives (2009 dollars)		
	Existing Dam Raise – Earthfill (\$Millions)	Downstream Dam Raise – Earthfill (\$Millions)	Downstream Dam Raise-Composite (\$Millions)
Dam Raise and Related projects (roads, Rec. )	650	706	932
<b>Less Safety of Dam – Federal Cost share</b>	<b>-331</b>	<b>-331</b>	<b>-331</b>
<b>Less Local Cost share</b>	<b>-58</b>	<b>-58</b>	<b>-58</b>
Raw Water Pipeline	123	123	123
Intake/Pump Station	52	52	52
JWC WTP	195	195	195
Title Transfer/EIS	13	13	13
<b><i>Total Local Program Cost</i></b>	<b>654</b>	<b>700</b>	<b>926</b>

# Water Supply Program Local Share Only

<b>Partners</b>	<b>Future Allocation Volume (AF)</b>	<b>% share (Expansion Only)</b>	<b>Estimated Cost Share (\$Millions)</b>
<b>Tualatin Valley Water District</b>	<b>23,000</b>	<b>43.4</b>	<b>342</b>
<b>CleanWater Services</b>	<b>16,500</b>	<b>31.1</b>	<b>156</b>
<b>City of Hillsboro</b>	<b>11,500</b>	<b>21.7</b>	<b>171</b>
<b>City of Beaverton</b>	<b>2,000</b>	<b>3.8</b>	<b>24</b>
<b>City of Forest Grove (WTP and RWP)</b>	<b>----</b>	<b>----</b>	<b>6.9</b>
<b>Totals</b> (*based on Downstream raised Dam and does not include Dam safety local share)	<b>53,000</b>	<b>100</b>	<b>\$700</b>

# Program Issues

- **Program will be focusing on these main issues:**
  - **Program Costs Analysis**
    - Federal Funding - Safety of Dams Program
      - How much and when?
    - **Financial Plan - Partners**
      - **Finance Capacity**
      - **Rates and SDC Revenue**
      - **Operational Costs**
  - **Project Schedule Review of 2016 Deadline**
  - **Scenario Planning**
    - **Review of Issues and Options for Regional Solutions**
    - **Public/Stakeholder Review Process**

# Federal Funding Elements

- **Assess how much Safety of Dams funding is needed and by when to support decision-making**
- **Program costs amplify importance of Federal participation**
- **Strategic plan for federal funding considering both Reclamation and Congressional Delegation**
- **Collaborate with Reclamation on the Safety of Dams review to improve the priority and schedule**
- **Assess risk of moving ahead without full information on federal funding and local financing**

# Financial Plan – Local

- **Financial Plan**
  - **Finance Team development**
  - **Review of update costs**
  - **Assess Program phasing and schedule adjustments**
  - **Impacts on Partners financial forecasts**
  - **Operational costs analysis**
  - **Cash flow requirements**
  - **Financing Capacity – Bond Market Issues**

# Impacts of Extending 2016 Deadline

## • Pros

- Allow more time to develop finance plan
- Certainty on Federal funding \$\$\$
- Align with Reclamation review process
- Improves matching new supply with future demand for some partners

## ■ Cons

- Risk of lack of meeting demands when needed
- Issue of reservoir restrictions
- Impact to project momentum
- Escalation of program costs
- Higher costs for certain partners

# Scenario Planning

## Re-evaluating Water Supply Alternatives

- 1. Review of Issues and Options for regional water supply solutions**
- 2. Partnership Opportunities**
- 3. Optimize Resource opportunities**
- 4. Public/Stakeholder information process**
- 5. Strategic action and public information plans to manage potential of a reservoir restriction as a risk reduction mitigation measure**

# Public Communication Strategy

- **Stakeholder Meetings**
  - **Tualatin River Watershed Council - Sept. 2**
  - **CWS Advisory Commission – Sept. 16**
  - **Policy Steering Committee – Sept 15**
  - **Other Public forums –**
    - **August through October 2009**