

# **Beating IHN at Dworshak National Fish Hatchery**

**Nate J. Wiese**

**December 7, 2011**

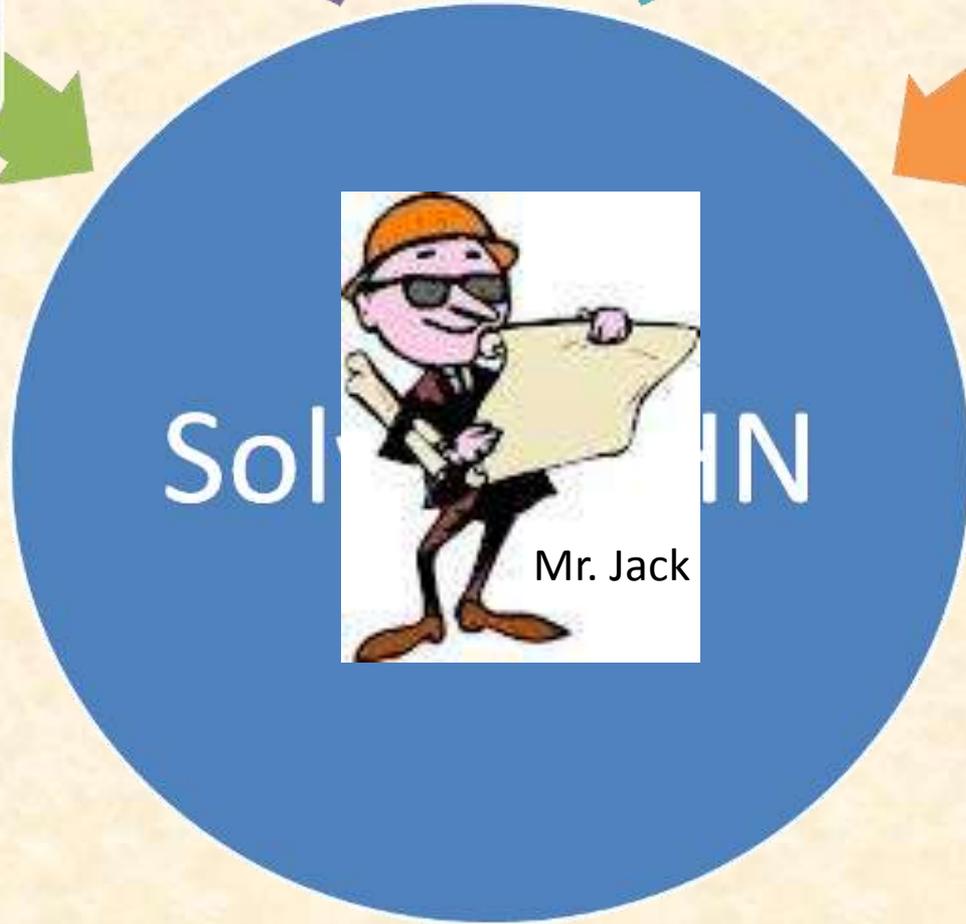
# Dworshak Complex



# IHN Problems

- BY2009 Survival was 50%
- IHN is present in the North Fork water supply





SOLUTION

Mr. Jack

# Addressing the Problems

- North Fork water supply is contaminated
- Reservoir water is available through a shared line from Clearwater Fish Hatchery (IDFG) and is used for nursery rearing
- Clearwater Fish Hatchery has a tremendously successful track record of avoiding IHN epizootics using the Dworshak Reservoir supply line



# Making it Happen!

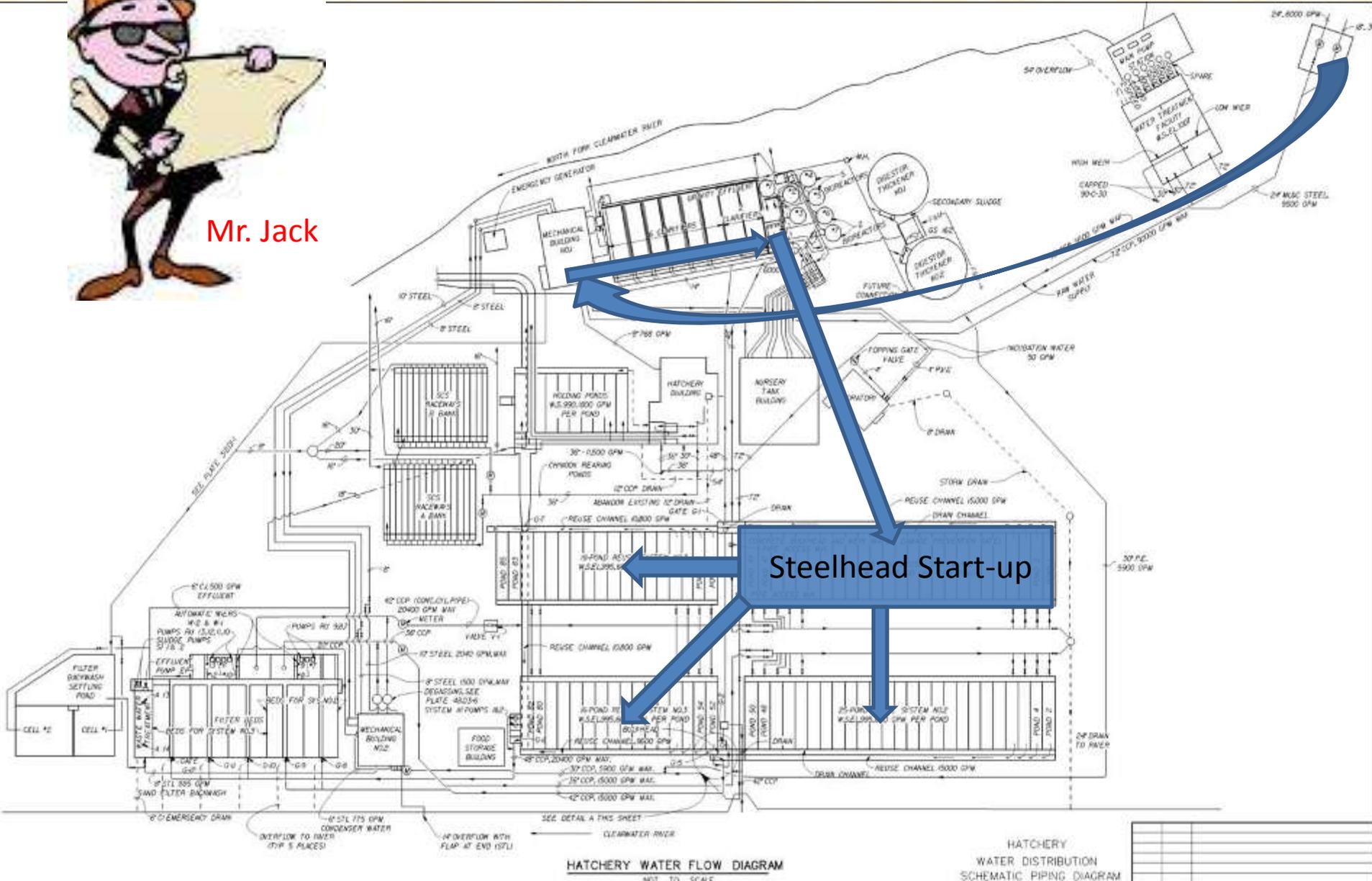
- Dworshak Steelhead are most susceptible to IHN below 90 mm (60 fpp)
- Clearwater Fish Hatchery has 10,000 gpm available for Dworshak during early rearing in July - August



# How to Use the Water?



Mr. Jack



Steelhead Start-up

HATCHERY WATER FLOW DIAGRAM

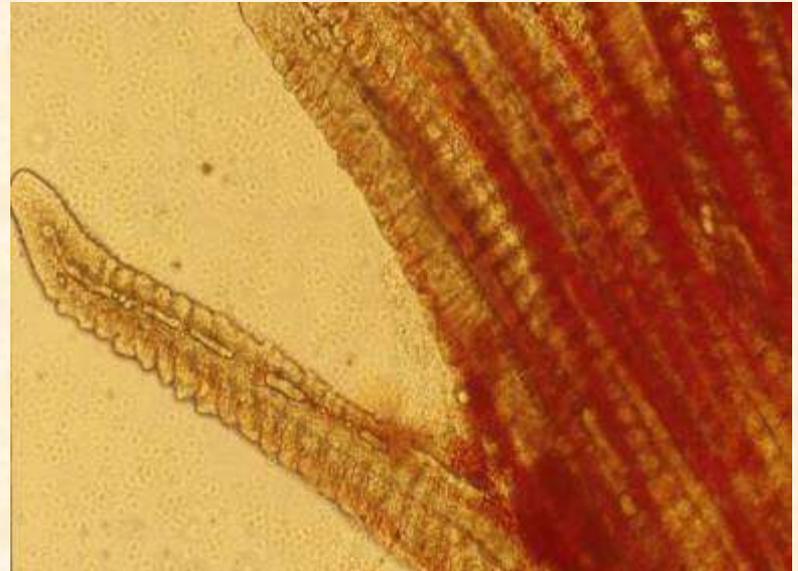
HATCHERY WATER DISTRIBUTION SCHEMATIC PIPING DIAGRAM



# Open Heart Surgery

# Water Degassing

- The new reservoir water had to be degassed
- The crew was able to construct a vacuum degassing system with Jack's design help to address the problem





**New Degassing Towers to Reduce Nitrogen Saturation Levels From 107.5% to 98.6%**

# What Else to Address

- Biosecurity Issues
  - Virkon foot baths, sprayers, etc.
  - Separate equipment for each pond
  - Abandon shared re-use system
  - Replace wooden and porous equipment
  - Flagging IHN positive ponds



# Reduce Stress

- Use pumping and fish counting technology
- High initial investment, but payoff in the long run!
- Limited reservoir water requires more splits/moves



# New Rearing Containers

- Experimenting with Mixed Cell Designs – the results are promising.....but
- In 2010 the Hatchery experienced a severe windstorm that knocked out power and shut down water to both of the mixed cell units



# What was the Result?

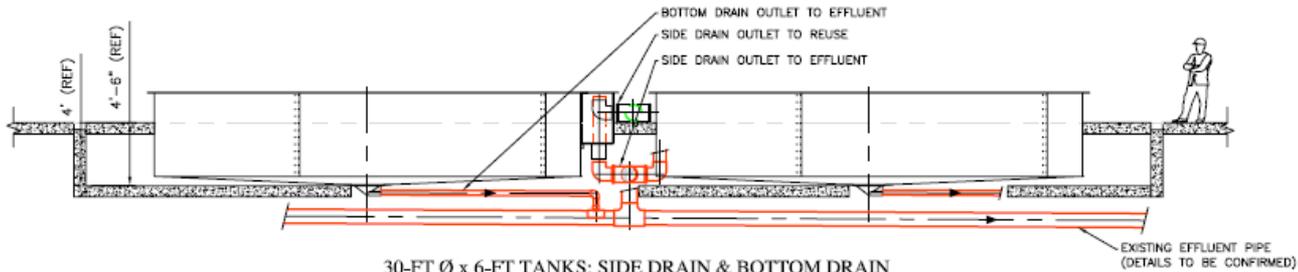
- Brood Year 2010 survival surpassed 90%!
- The Hatchery released 2.2 million steelhead and met its target release goal!
- The Hatchery will be able to start less fry which will reduce energy usage



# What's in the Future?

- Mr. Jack worked with PR Aqua to develop plans for a new re-circ system
- This design would use available water from Clearwater to support the entire fish production goals
- The heart of the design is 30-foot circular tanks dropped into the existing Burrows Ponds



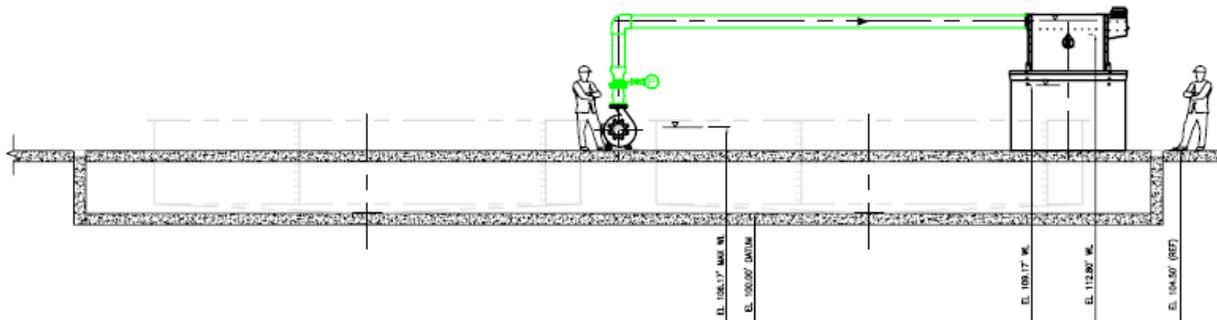


**30-FT Ø x 6-FT TANKS: SIDE DRAIN & BOTTOM DRAIN**

SCALE: 1/8" = 1'-0"

**NOTES:**

1. REFER TO PLAN VIEW FOR ORIENTATIONS.
2. SIDE DRAINS ON BOTH TANKS ARE SIMILAR (RIGHT TANK ASSEMBLY NOT SHOWN).
3. LEVEL CONTROL STANDPIPE ON BOTTOM DRAIN FLOW NOT SHOWN.



**30-FT Ø x 6-FT TANKS: TREATMENT**

SCALE: 1/8" = 1'-0"

**CONCEPTUAL**

**FOR INFORMATION ONLY  
NOT FOR CONSTRUCTION**

**NOTES:**

1. DIMENSIONS ARE IN FEET & INCHES. DIMENSIONS MARKED "REF" ARE REFERENCE DIMENSIONS AND ARE TO BE CONFIRMED BEFORE CONSTRUCTION.

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DRAWING IS ISSUED AS 280x430 MM [11"x17"]. IF LINE SHOWN ABOVE IS NOT 25.4 MM [1"] LONG, ACTUAL SCALE DIFFERS FROM STATED SCALE.

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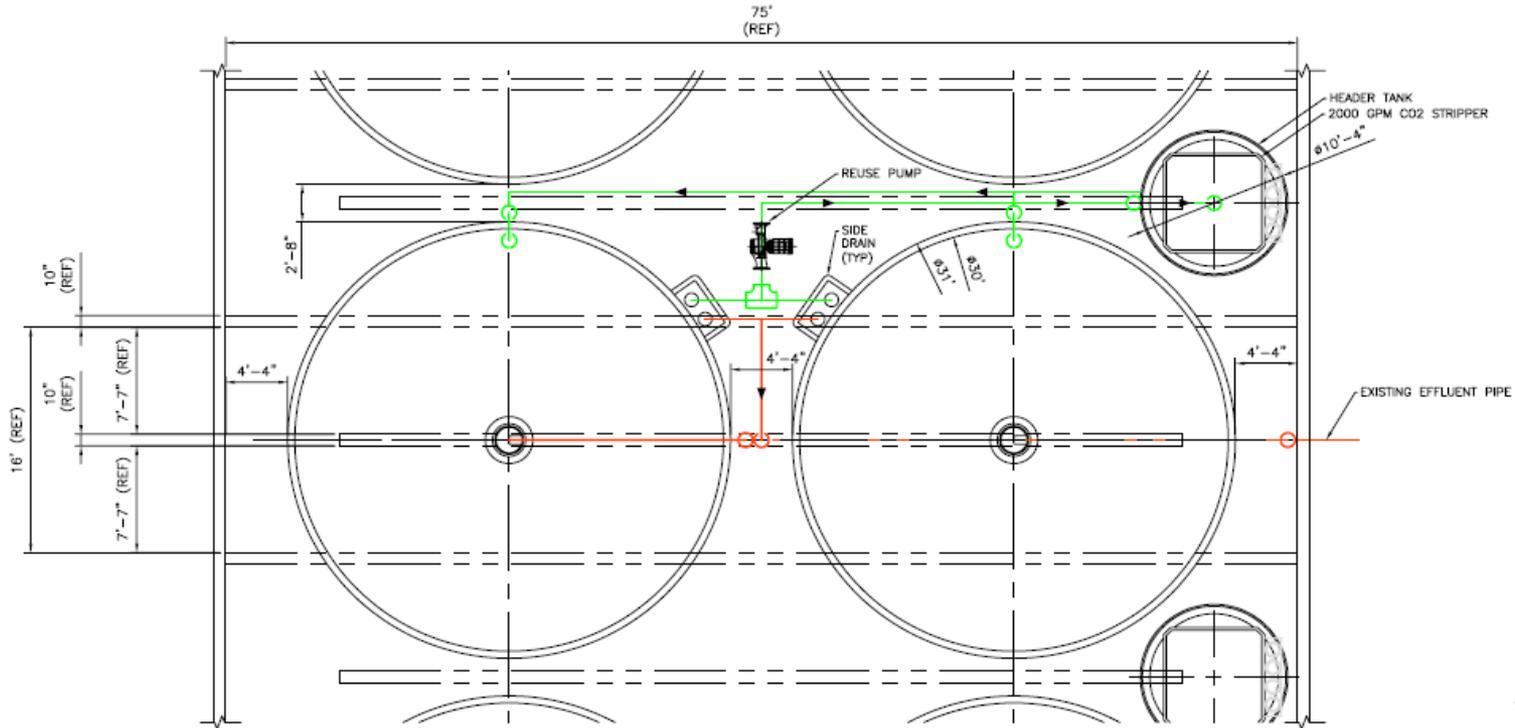
SEAL



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U.S. FISH & WILDLIFE SERVICE  
**DWORSHAK FISHERIES COMPLEX  
BURROUGHS POND RETROFIT  
30-FTØ x 6-FT TANK - SECTIONS**

DESIGNED	DRAWN	CHECKED
KDH	KCG	
DATE: 15DEC10	SCALE: AS NOTED	APP'D: .
DWG. NO. 723-301		REV: A



**30-FT Ø x 6-FT TANKS: LAYOUT**

SCALE: 1/8" = 1'-0"

**CONCEPTUAL**

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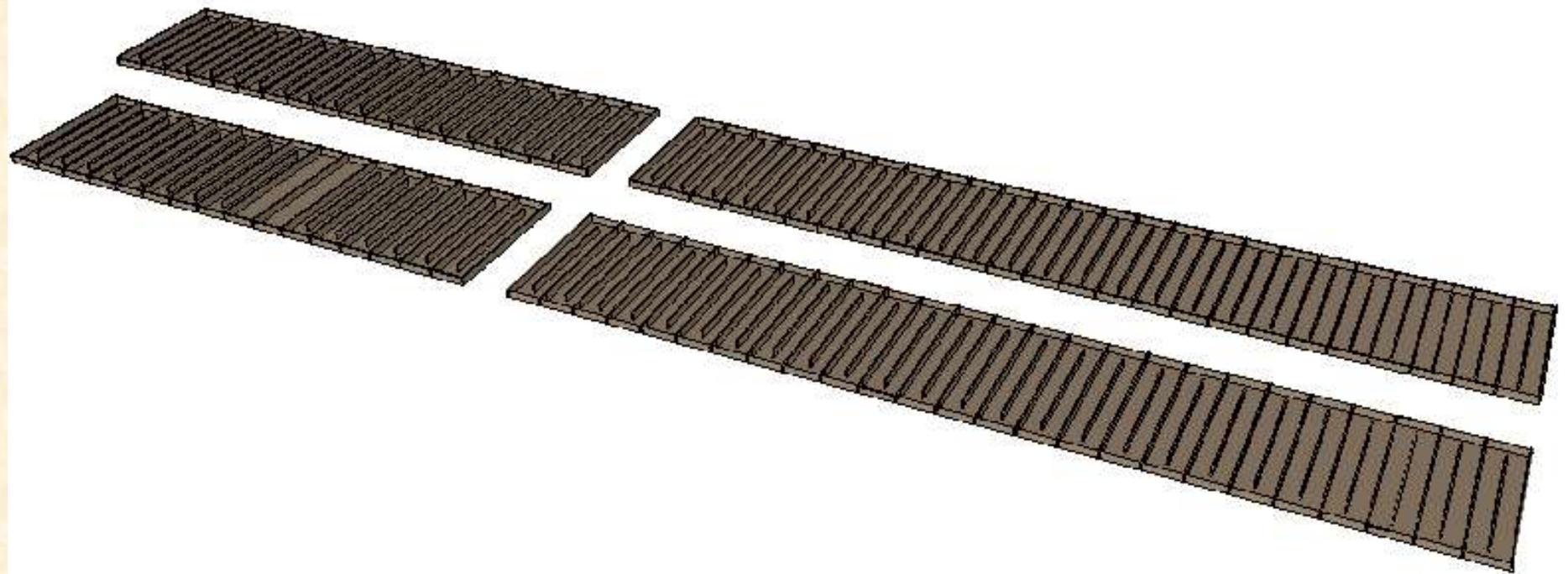
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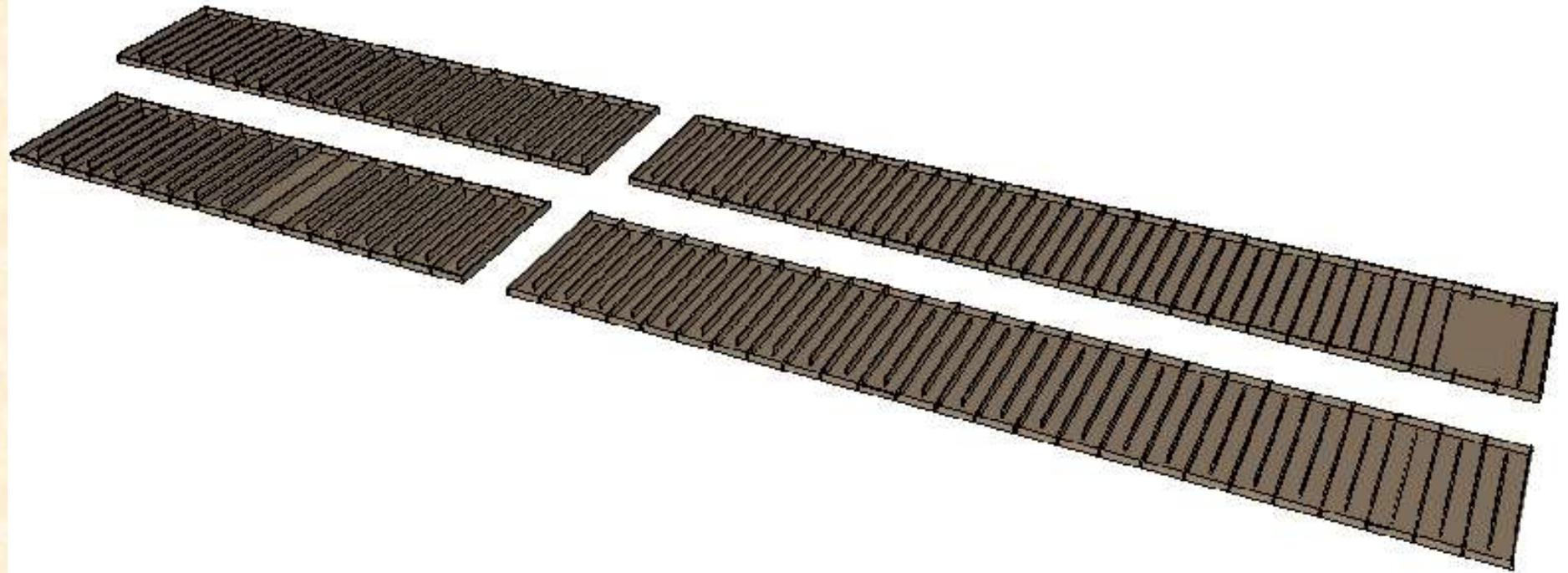
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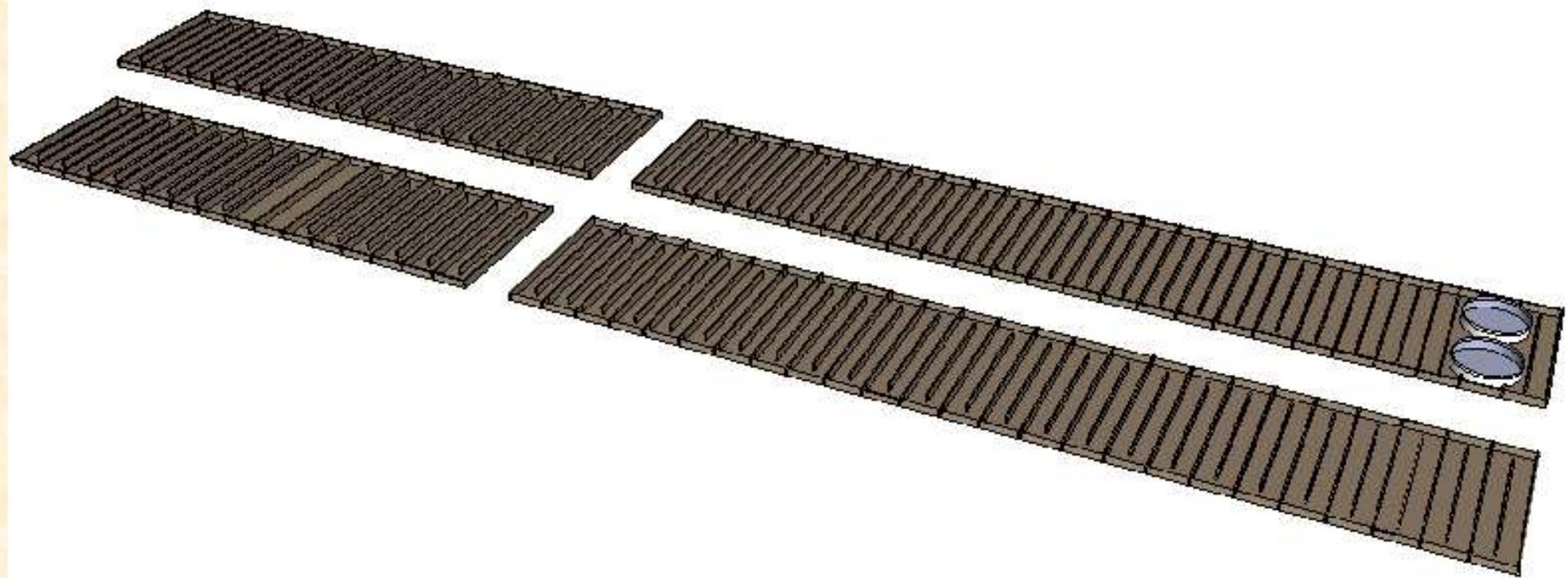
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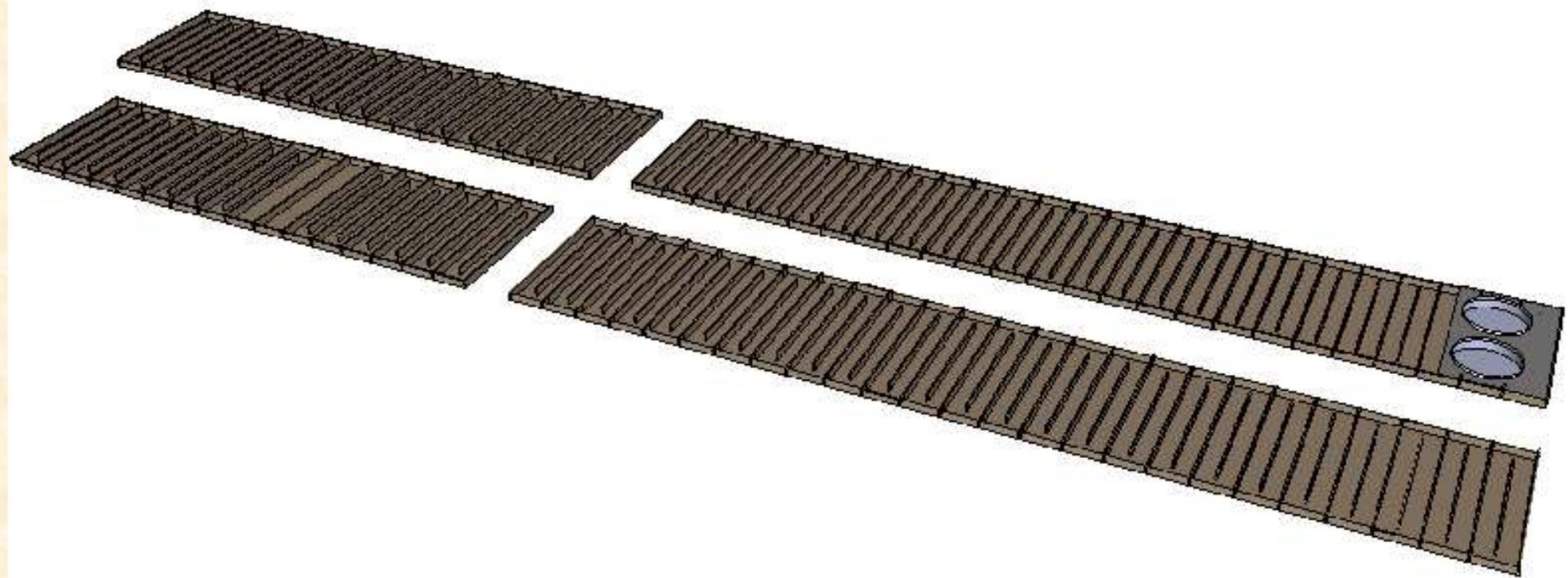
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**30-FT Ø x 6-FT TANK LAYOUT**

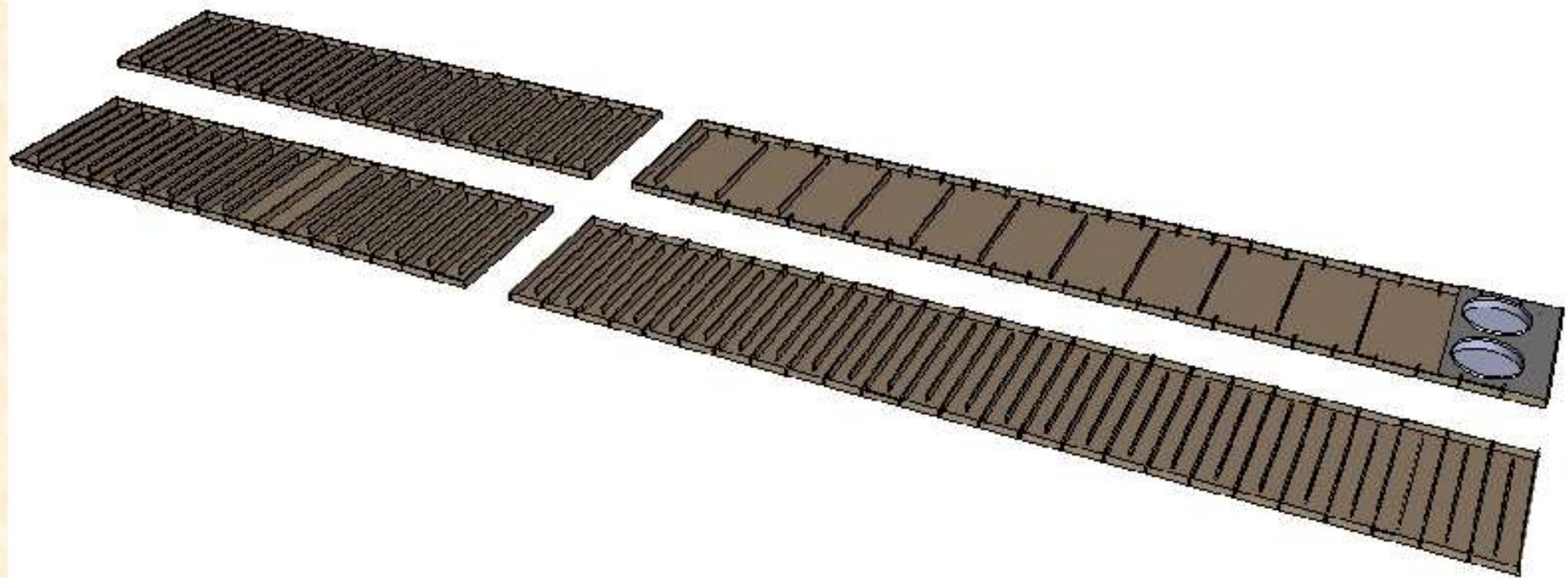
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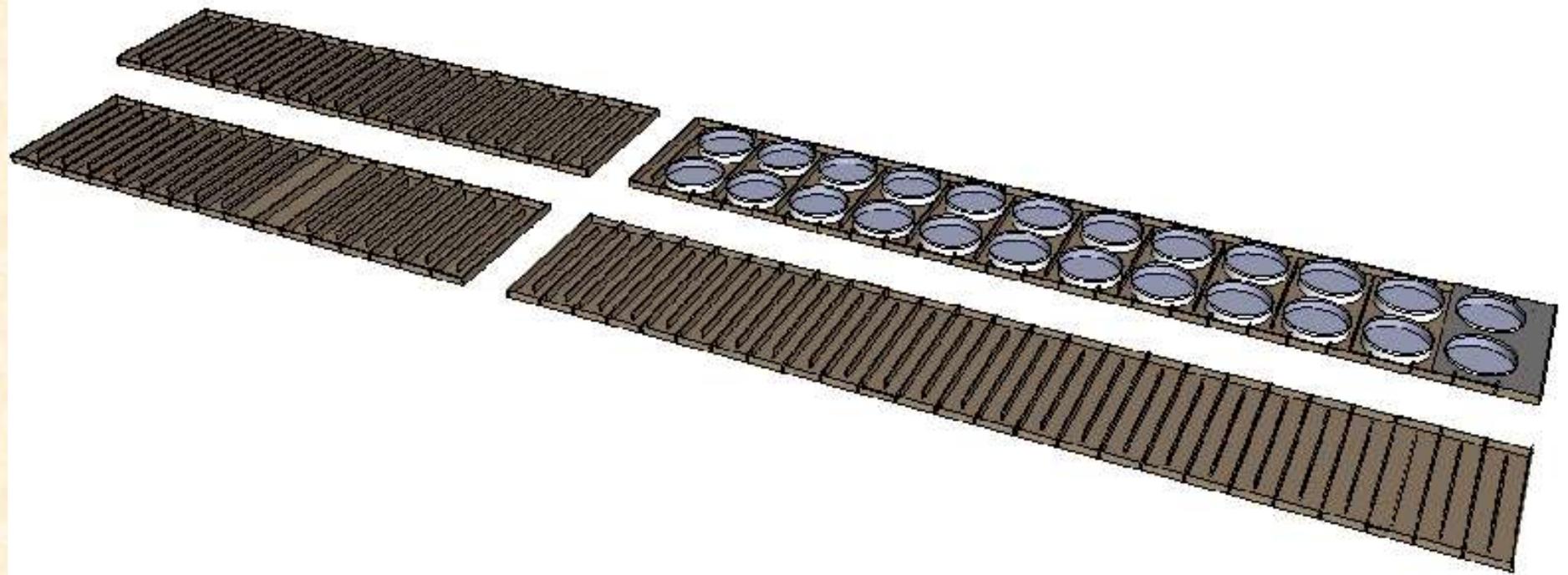


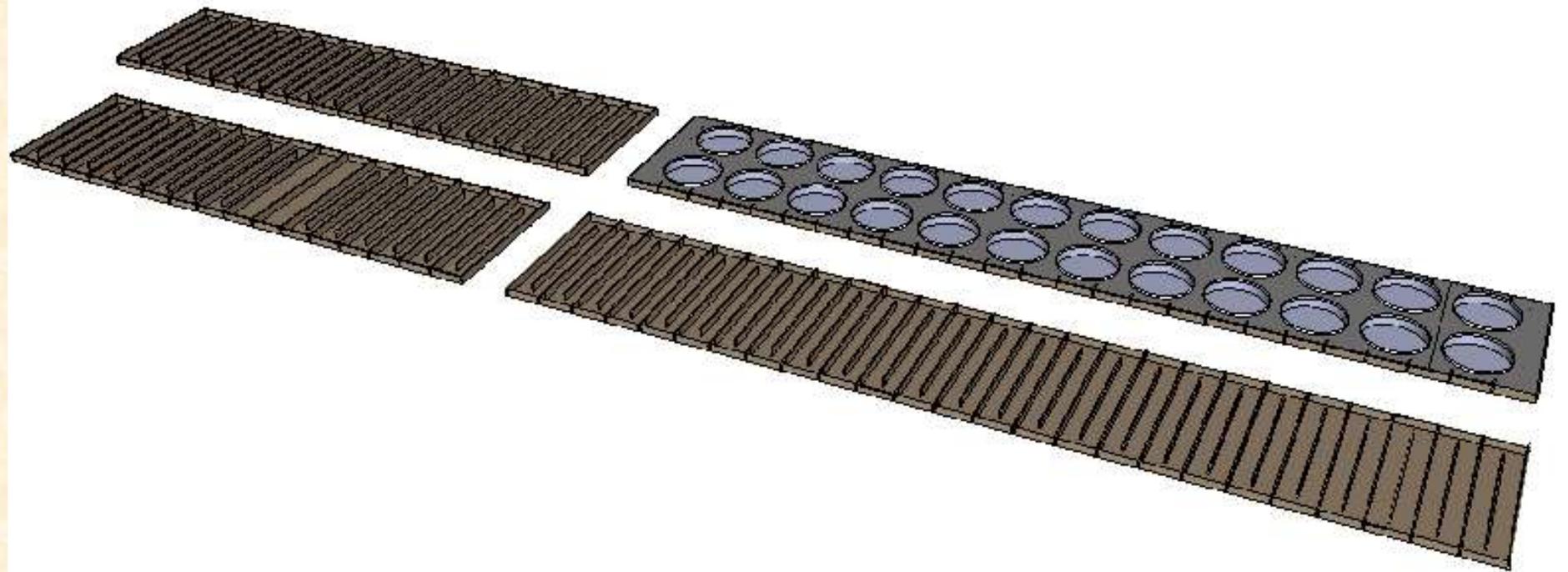


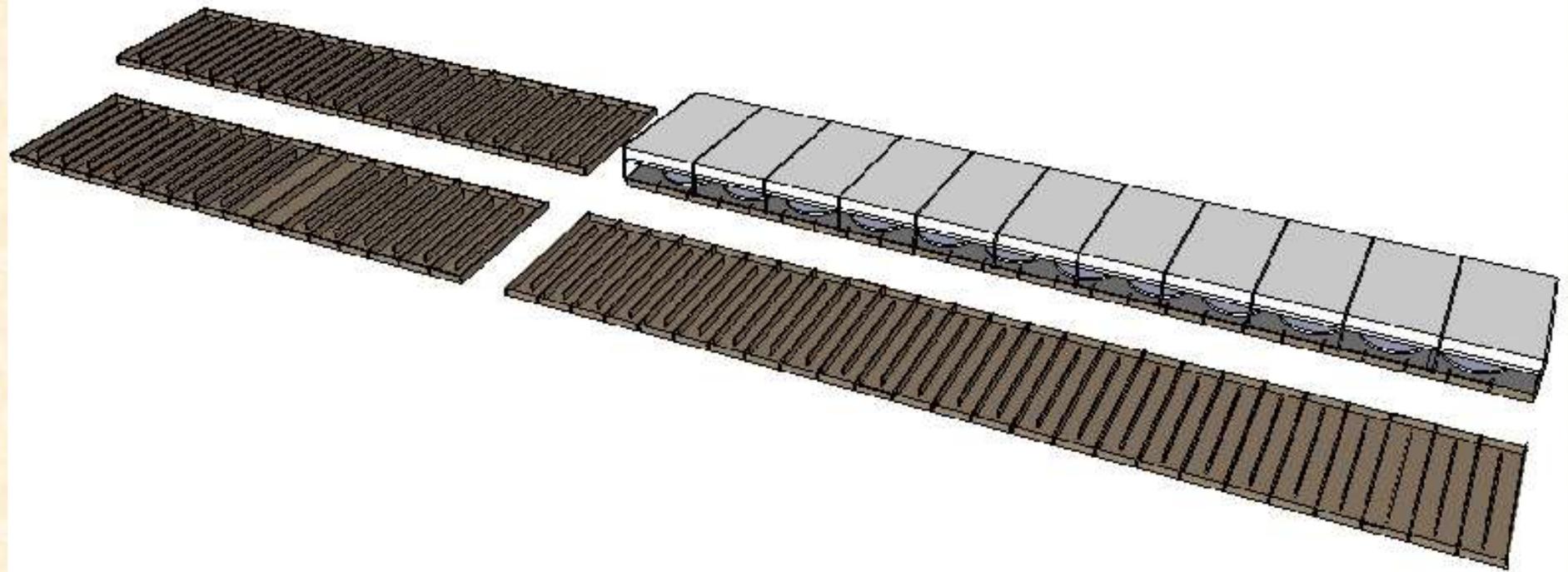


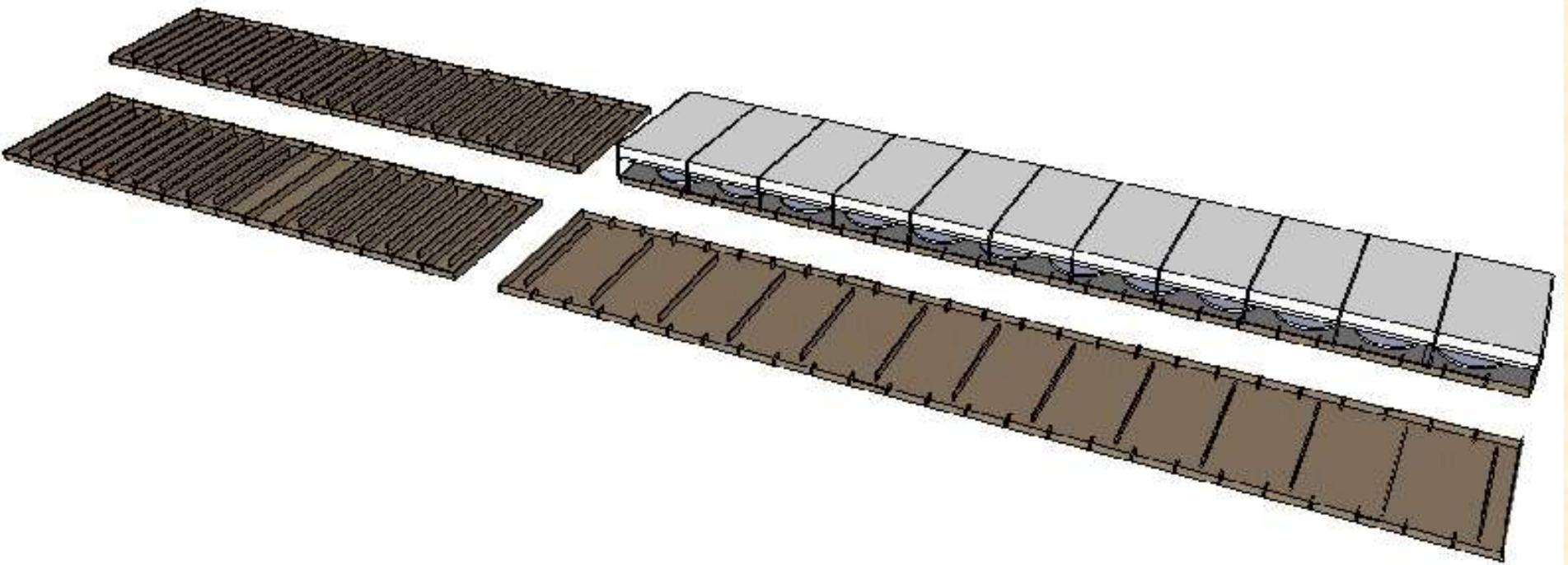


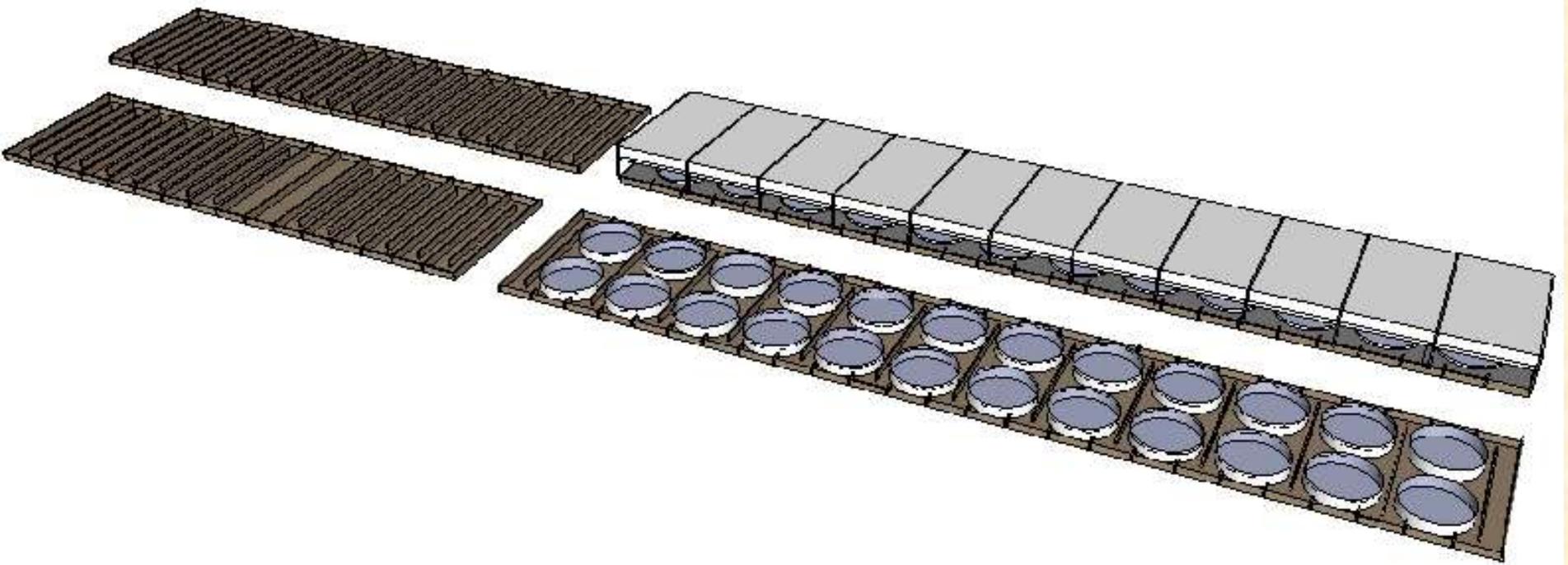


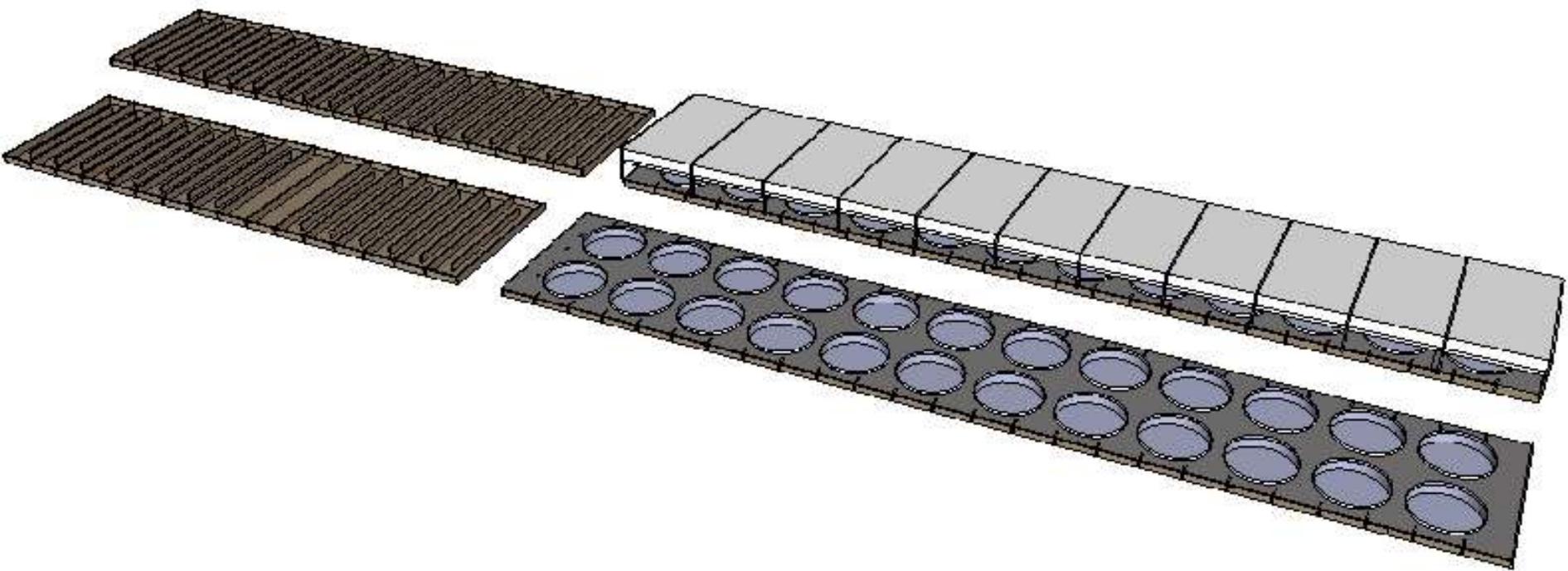


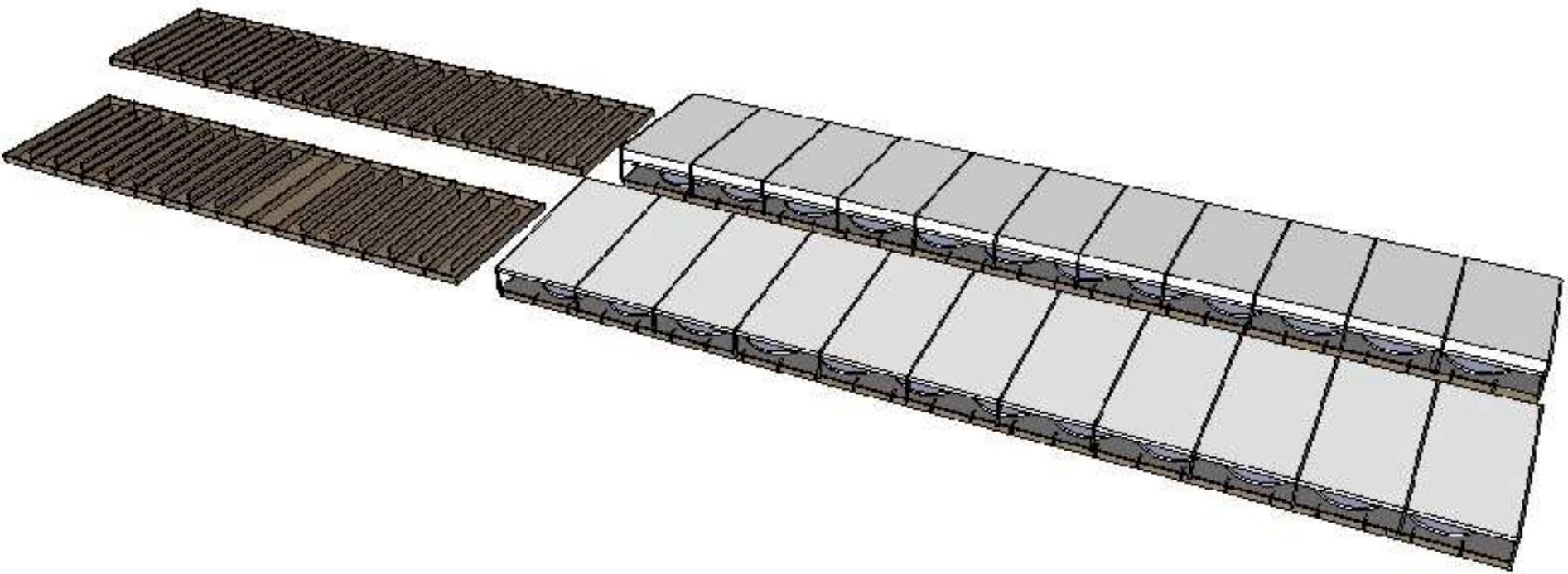


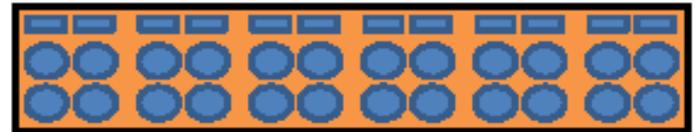
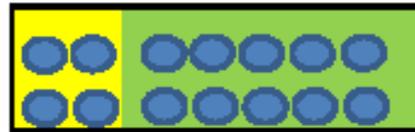
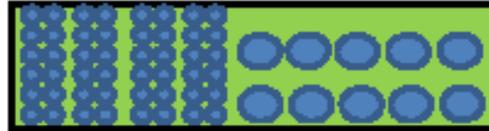




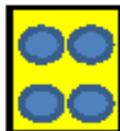






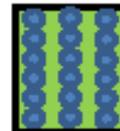


2.1 Million Steelhead @ 1.9 lbs/ft<sup>3</sup> and 5.8 fpp  
 (48) 30' x 6' circular tanks - 24 separate reuse systems  
 10,000 gpm Reservoir water from System 1 reuse  
 43,700 fish/tank - 208 gpm/tank reservoir water

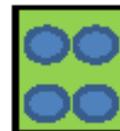


300,000 Coho @ 1.1 lbs/ft<sup>3</sup> and 22 fpp  
 (21 grams & 17.6 kg/m<sup>3</sup>)  
 77,000 fish/tank - 750 gmp/tank river water  
 (4) 30' x 5' circular tanks w/4.5' deep water level

Could Be.....  
 550,000 Coho @ 1.9 lbs/ft<sup>3</sup> and 22 fpp  
 (21 grams & 30 kg/m<sup>3</sup>)



2.65 Million Chinook @ 2.0 lbs/cu ft and 100 fpp  
 (48) 10' x 4' circular tanks



1.8 Million Chinook @ 1.3 lbs/ft<sup>3</sup> and 22 fpp  
 (21 grams & 20.8 kg/m<sup>3</sup>)  
 91,000 fish/tank - 750 gmp/tank river water  
 (20) 30' x 5' circular tanks w/4.5' deep water level

Could Be.....  
 >2.6 Million Chinook @ 1.9 lbs/ft<sup>3</sup> and 22 fpp  
 (21 grams & 30 kg/m<sup>3</sup>)

# Next Steps



# Any Questions?

