MEDA
MT Infrastructure Town Hall Meeting – Call to Action
October 13, 2015

City of Laurel Surface Water Intake
Within the Yellowstone River
Heidi Jensen– City Administrator
Presentation Outline

- General history of site, water source and intake structures
- What happened?
- Solution alternatives
- Chosen design
- Challenges in design and construction
- Left – 1955 Intake
- Below – 2003 intake in 2012 and under construction in 2003
What happened?

- **1955 Intake**
  - Unreliable in the winter – freezing
  - 1996-1997 flooding – the river migrated

- **2003 Intake**
  - Designed and constructed in response to 1996-1997 flooding
    - 2011 flooding caused bed scour and channel migration.
  
  intake is no longer submerged at low flows
2011 Flooding Photos
Results of the 2011 Flooding

- Bed scour occurred beneath south spans of highway and railroad bridges.
- Significant volume of material deposited beneath north spans of the adjacent bridges and extended upstream 500 feet.
- Reduced the hydraulic capacity of the bridges.
Submerged Intake

March 18, 2009   2,850 cfs
Approximately 12” over intake

September 21, 2012   2,760 cfs
Approximately 1” over intake
Results of the 2011 Flooding

- Loss of service occurred in January, 2012

- Winter low flows
  - Freezing of the submerged intake screens
    - Not able to produce treated water or supply industrial user with raw water

- Summer low flows
  - Pumps don’t function properly – insufficient
  - Construction of emergency weir in river to utilize 1955 intake and keep 2003 intake submerged
Moving forward from 2011

- Working with FEMA
  - Presidential disaster declaration FEMA-1996-DR-MT was issued due to the 2011 flooding
  - FEMA Public Assistance funds were made available to governmental agencies in response to the declaration

- Alternatives Analysis
Review by Permitting Agencies

- Proposed Alternative – W-weir
  - Would address both the lateral migration and degradation issues that plague the current intake
  - FWP & DEQ stated that a weir alternative would be extremely difficult to permit
First Round Proposed Alternative
W-weir
Moving forward from 2011

- Alternatives Analysis Round 2
- Draft Environmental Assessment
- Proposed Project
## Alternatives Analysis

<table>
<thead>
<tr>
<th>Category</th>
<th>Alt. #</th>
<th>Alternative Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel training/alteration</td>
<td>1</td>
<td>Construct bendway weirs/rock vane</td>
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<tr>
<td></td>
<td>2</td>
<td>Construct W-weir</td>
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<td></td>
<td>3</td>
<td>Construct straight weir</td>
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<td></td>
<td>4</td>
<td>Removal the sediment beneath north side of bridges</td>
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<td></td>
<td>5</td>
<td>Raise the channel grade</td>
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<tr>
<td>Modify intake</td>
<td>6</td>
<td>Lower the existing intake screens</td>
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<td>7</td>
<td>Lower the existing intake screens with concrete modification</td>
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<td></td>
<td>8</td>
<td>Replace existing screens with half-round screens</td>
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<td></td>
<td>9</td>
<td>‘V’ deflector installed downstream of intake</td>
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<td></td>
<td>10</td>
<td>Install hot water heater and appurtenances to utilize hot water flush lines</td>
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<td></td>
<td>11A</td>
<td>Install inline booster pumps in WTP</td>
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<td></td>
<td>11B</td>
<td>Install booster pumps in a new wet well</td>
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<td>12</td>
<td>Remove existing pumps, replace with dry pit submersible pumps</td>
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<tr>
<td>New intake</td>
<td>13</td>
<td>Construct a new intake adjacent to the existing intake</td>
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<td>14</td>
<td>Construct intake 1600 feet downstream</td>
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<td></td>
<td>15</td>
<td>Construct new intake three miles upstream, adjacent to Canyon Creek Ditch</td>
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<td></td>
<td>16</td>
<td>Suspend pipe and intake from highway bridge</td>
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<td></td>
<td>17</td>
<td>Build new bridge to suspend intake and water line</td>
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<tr>
<td>Alternate source</td>
<td>18</td>
<td>Construct diversion to holding pond</td>
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<td>19</td>
<td>Divert water from the Canyon Creek Ditch Co. ditch</td>
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<td>20</td>
<td>Divert water from the Billings Bench Water Assn. ditch</td>
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<td>21</td>
<td>Divert water from both ditches</td>
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<td>22</td>
<td>Groundwater Alternatives – hydraulic connectivity to the Yellowstone River: infiltration galleries, radial collector wells</td>
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<td>23</td>
<td>Vertical groundwater wells</td>
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</tbody>
</table>

*Note: Highlighted alternatives were added after initial review in 2013*
Alternative A

- Replace pumps, remove sediment, modify 2003 intake with half screens, hot water heater, construct new intake adjacent to existing, install W-weir.
- Left – 2003 intake screens
- Below – proposed half round screens
Alternative B

- Construct new intake 3 miles upstream, modify 2003 intake, hot water heater
Alternative C

- Construct infiltration gallery using trench method, modify 2003 intake, hot water heater
Draft Environmental Assessment

- Prepared in July 2014 per FEMA Region VIII guidelines
- Published for public comment in August 2014
- Identified Alternative B as the preferred alternative for Laurel
  - Significant benefit to public health and safety
Proposed Project

- New passive intake 3 miles upstream from WTP
- Major components:
  - Intake screens and protective enclosure
  - Control building
  - Transmission main
  - Connection to existing pump house
New Intake Location
Proposed Project – Screens

*Left:* intake exposed at low flows leads to ice buildup on the screens

*Below:* ice jam at new intake site
Proposed Project – Connection to WTP

- Railroad & Highway crossing
  - Very constrained laterally due to bridges
  - Very constrained on WTP side due to buildings and existing water mains
- Connection to existing pumps house
  - Continued use of 1955 and 2003 intake
  - Operation plan to switch between intakes
Proposed Project – Permitting

- Joint Application
  - SPA 124 Permit (FWP)
  - Floodplain Permit (Carbon & Yellowstone Counties)
  - Section 404 & Section 10 Permits (USACE)
  - 318 Authorization (DEQ)
  - 401 Certification (DEQ)
  - Navigable Rivers LUL or Easement (DNRC)

- MDT and BNSF Permits

- Water Rights – Change in Diversion (DNRC)
Proposed Project – Construction Challenges

- Construction in the river
  - Dewatering
  - Low flows
- Cannot start until irrigation season is over
  - October 15 through April 15
- High groundwater along transmission main route
- Coordinating connection to existing pump house
Proposed Project – Financing

- Total project cost = ~ $12 million
- 75% FEMA Public Assistance Grant
- 25% Local match

Schedule

- Final Design – July 2015
- Bidding – ?????
- Construction – ?????
Community Impacts

- Refinery
- Fire Suppression
- Economic Impact