

Project Status Update PRESENTATION



Feasibility Study for Dry Creek Bypass Pipeline Project

Sonoma County Water Agency

HDR

In collaboration with

Kennedy Jenks

PROJECT
LOCATION MAP

February 2010

Biological Opinion Objectives

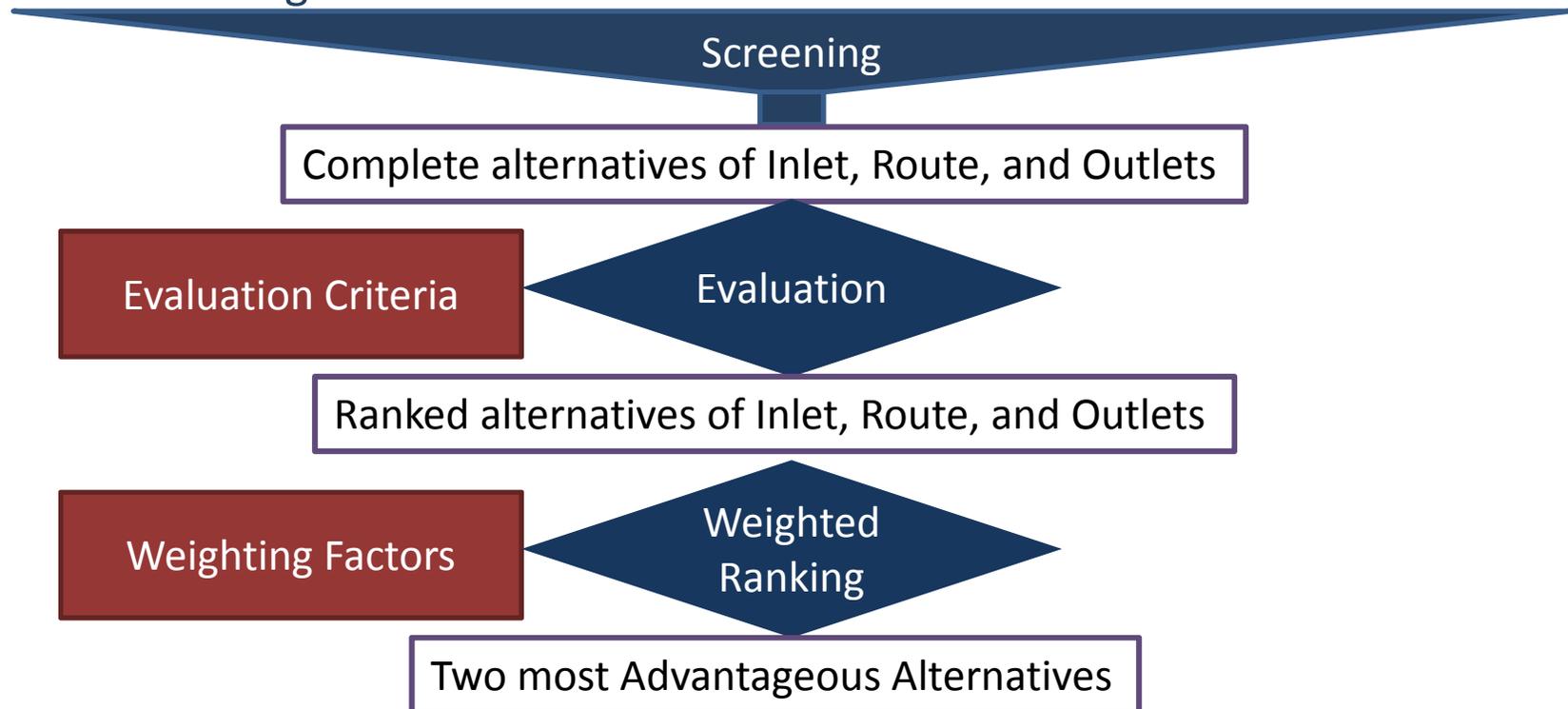
- Investigate the feasibility of a pipeline to bypass Dry Creek
- Assess pipeline alternatives to ensure water delivery while meeting habitat needs in Dry Creek in the unlikely event that habitat enhancement efforts are unsuccessful
- Related work: The Corps will install a new back-up water supply pipeline to the Warm Springs Hatchery

Flow Considerations

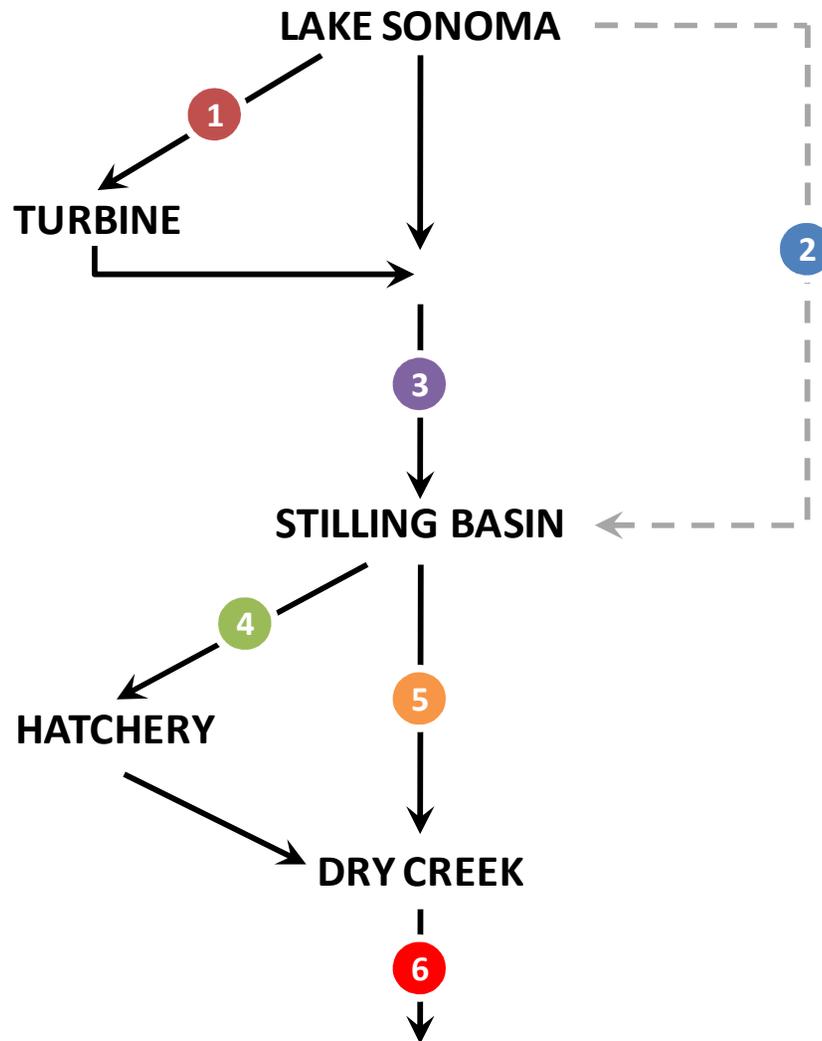
- **Biological Opinion for Dry Creek**
 - SCWA range 40 – 180 cfs
 - Current summer flow 105 cfs
 - Habitat Enhancement Target 110 – 175 cfs
- **Potential Bypass Flows**
 - 80 cfs = 54" pipeline
 - 100 cfs = 60" pipeline
 - 180 cfs = 72" pipeline

Screening and Evaluation Process

Inlet Options	Pipeline Routes	Outlet Options
Headbox at Stilling Basin	Northern	Dry Creek
Siphon over Dam	Central	Russian River
New Works at Left Abutment		
Tie to Existing Control Tower	Southern	



Current Operations



- 1** Vertical Francis Turbine
Operating Range = 75-185 cfs
- 2** Proposed Emergency Supply to
Don Clausen Fish Hatchery
- 3** Normal Low Flow Design up to
600cfs
- 4** Don Clausen Fish Hatchery
Operating Range = 40-60 cfs
- 5** Flow Through Stilling Basin
- 6** Combined Flow From Stilling
Basin & Fish Hatchery

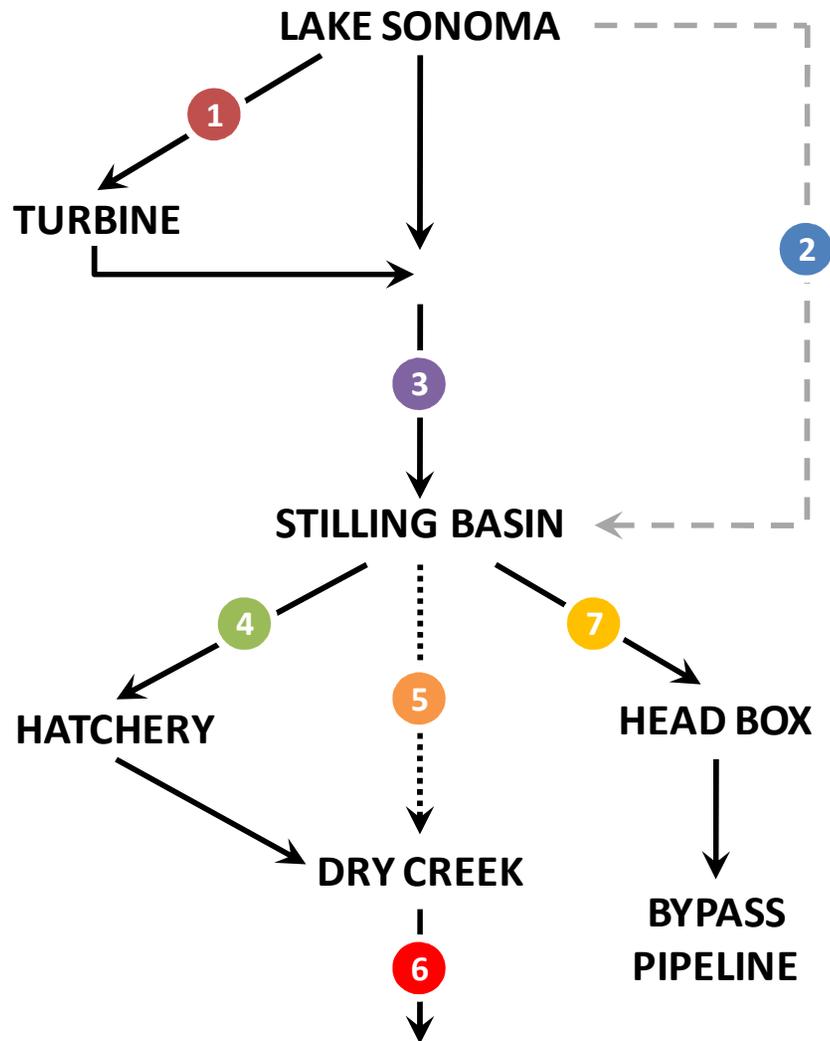
Inlet Options

- **Stand Alone Facilities**
 - **New Outlet Works Facility Through Left Abutment**
 - **New Head Bay Adjacent to Existing Stilling Basin**
 - **Siphon System over Existing Dam**
- **Integrated Facilities**
 - **New Tunnel/Pipeline Tapping into Existing Wet Well**

Inlet Screening

Option	Design & Construction	Facility Operability
Head Box Adjacent to Stilling basin	Satisfactory	Satisfactory
Siphon Over Existing Dam	Unacceptable	Unacceptable
New Tunnel Through Left Abutment	Conditionally Unacceptable	Satisfactory
Integrated Facility	Satisfactory	Satisfactory

Head Box Operations

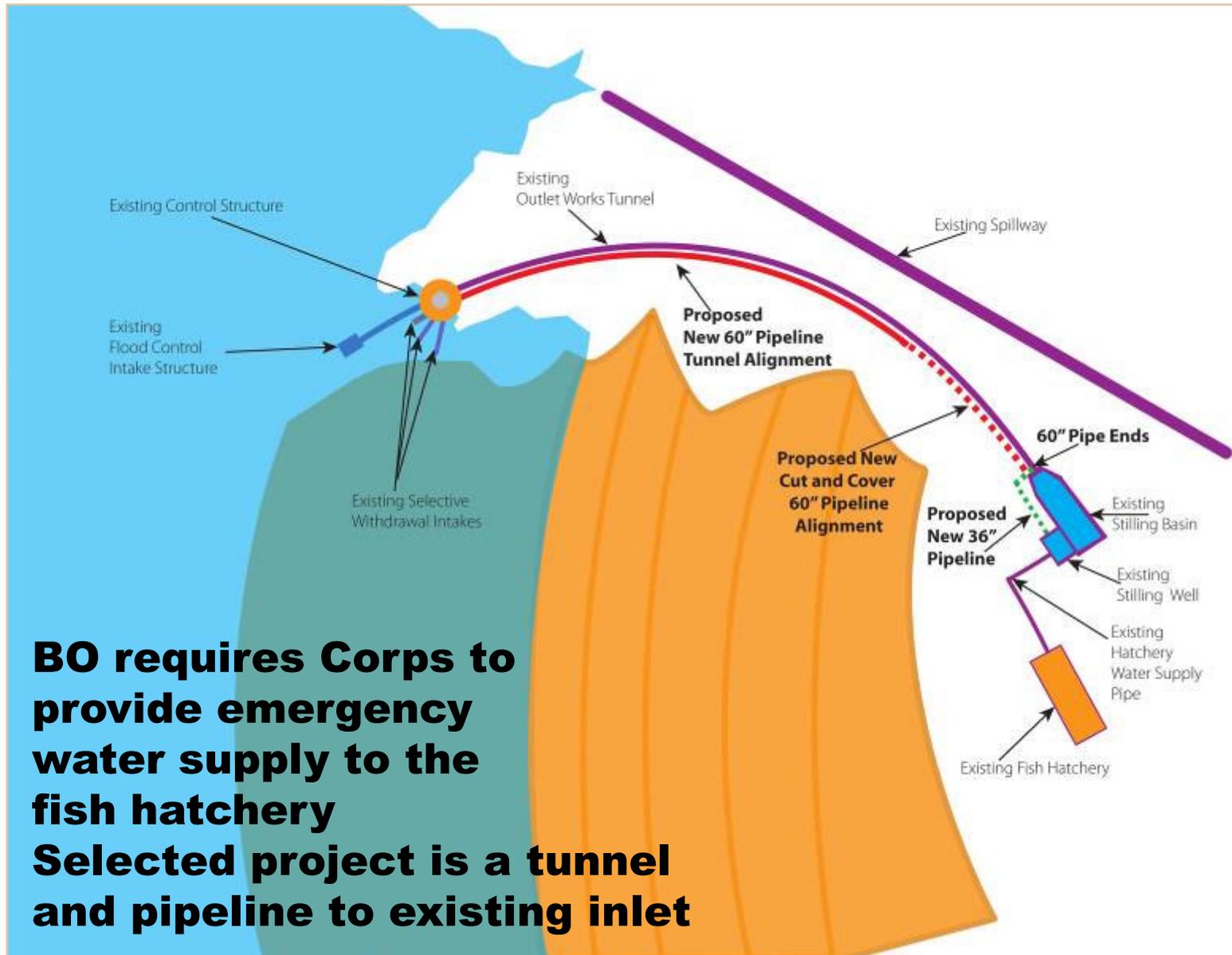


- 1 Vertical Francis Turbine
Operating Range = 75-185 cfs
- 2 Proposed Emergency Supply to
Don Clausen Fish Hatchery
- 3 Normal Low Flow Design up to
600cfs
- 4 Don Clausen Fish Hatchery
Operating Range = 40-60 cfs
- 5 Flow From Stilling Basin may
be 0 cfs
- 6 Combined Flow From Stilling
Basin & Fish Hatchery
minimum 40-60 cfs
- 7 Flow Through Proposed Head
Box = 200 cfs

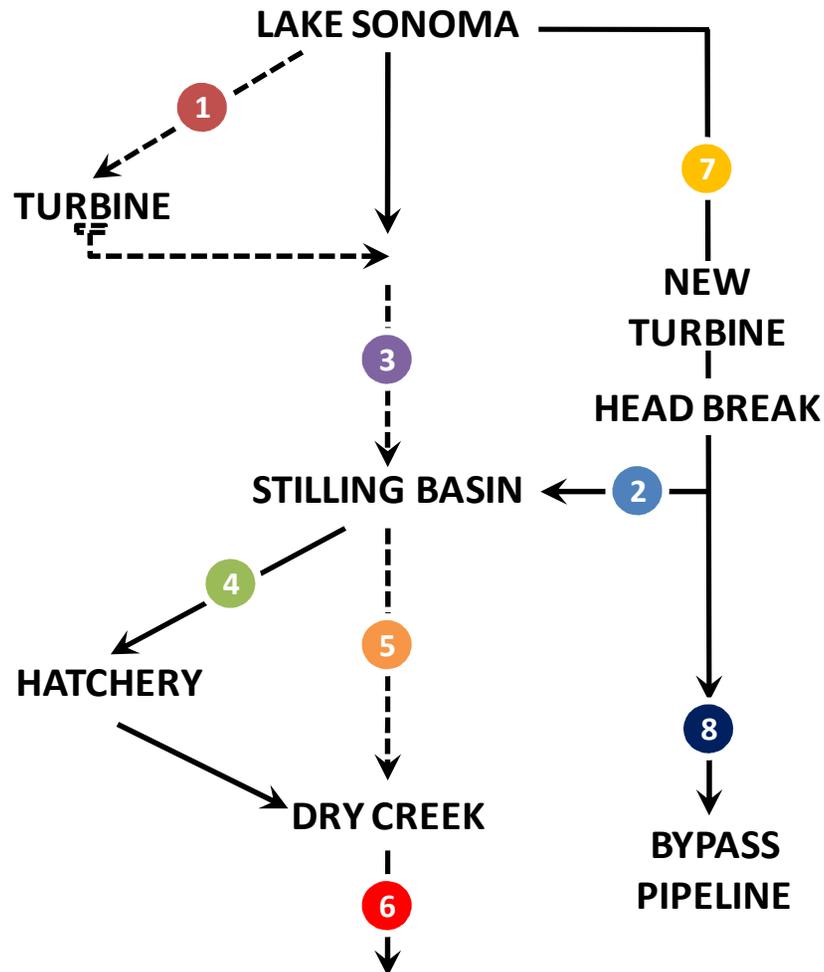
Head Box Structure



Integrated Inlet Requires Partnership with Corps



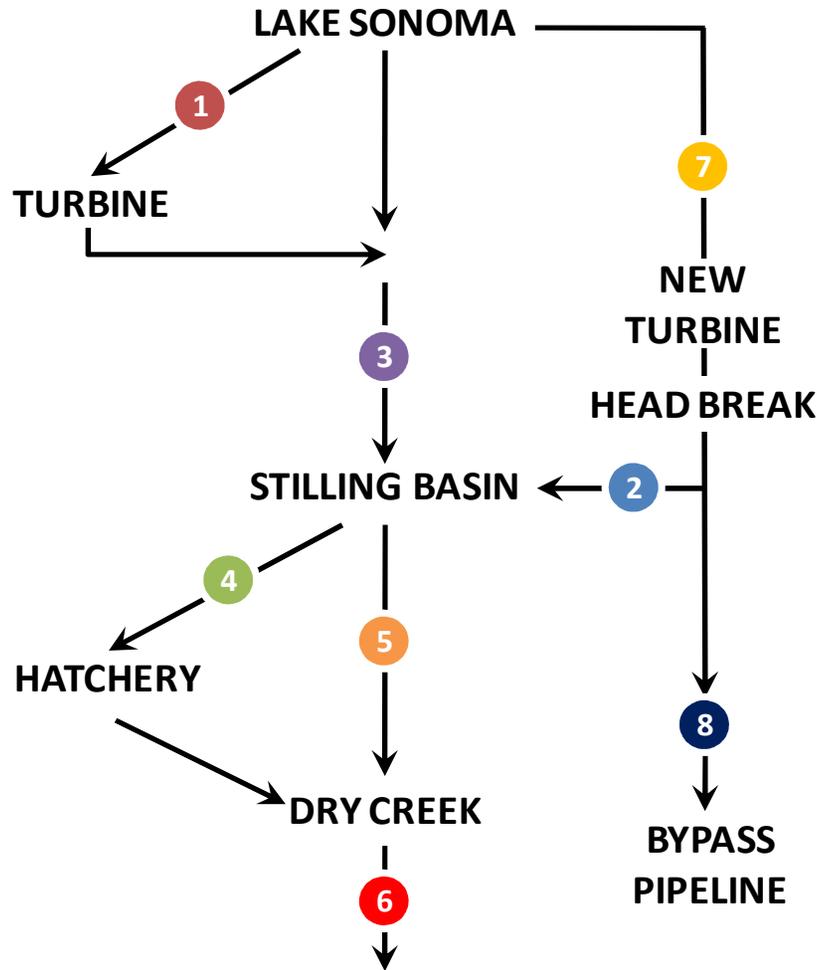
Integrated Facility Operations



- 1 Existing Turbine Used for Emergency Service
- 2 Flow Diverted To Fish Hatchery Operating Range = 40-60 cfs
- 3 Summer flow = 0 cfs
- 4 Don Clausen Fish Hatchery Operating Range = 40-60 cfs
- 5 Flow Between Stilling Basin may be 0 cfs
- 6 Combined Flow From Stilling Basin & Fish Hatchery
- 7 New Power Generation Facility. Operating Range = 100-250cfs
- 8 Flow Through Bypass Pipeline = 200 cfs

Integrated Facility Operations

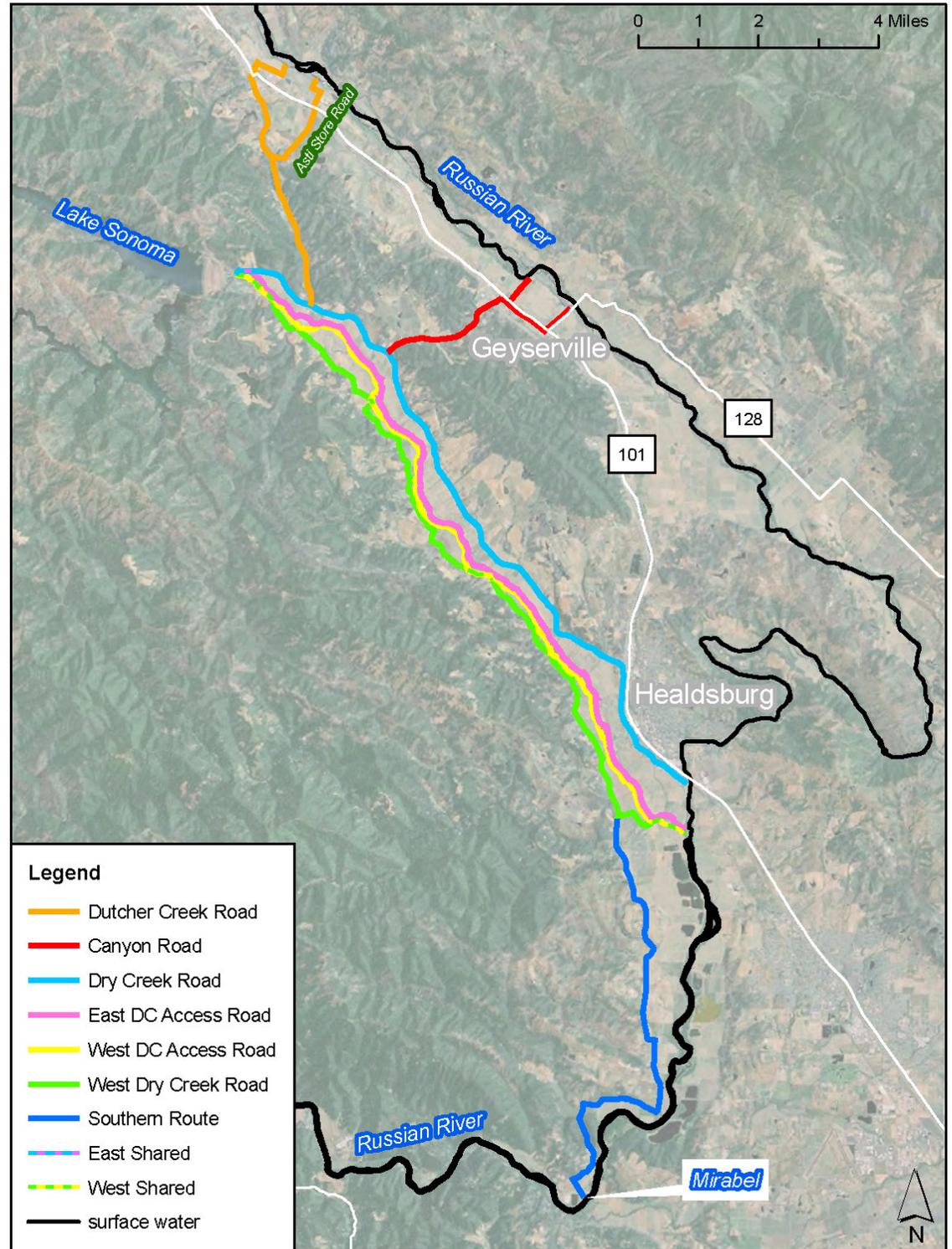
Split Flow



- 1 Existing Turbine operating between 75 and 120 cfs
- 2 Flow Diverted only used in an Emergency min. 25 cfs
- 3 Flow between 75 and 120 cfs
- 4 Don Clausen Fish Hatchery Operating Range = 40-60 cfs
- 5 Flow between 15 and 60 cfs
- 6 Flow no greater than 120 cfs
- 7 New Power Generation. Flow Range = 80- 130 cfs
- 8 Flow Through Bypass Pipeline = 80 - 130 cfs

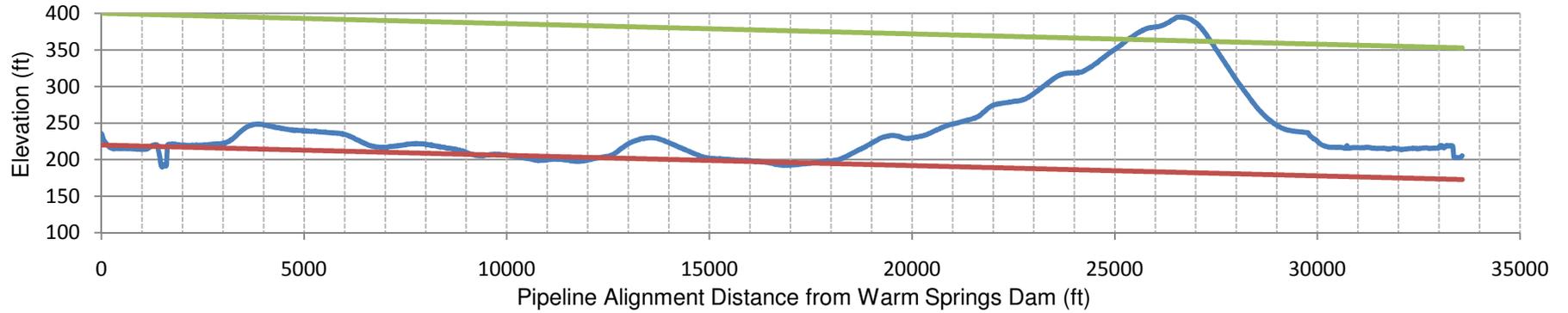
Three Routes with Seven Pipeline Alignment Options

(two shared
segments)

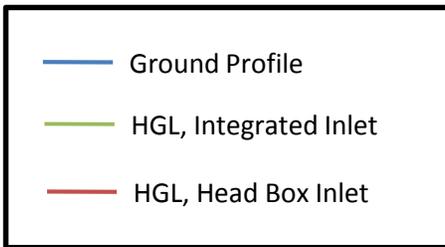
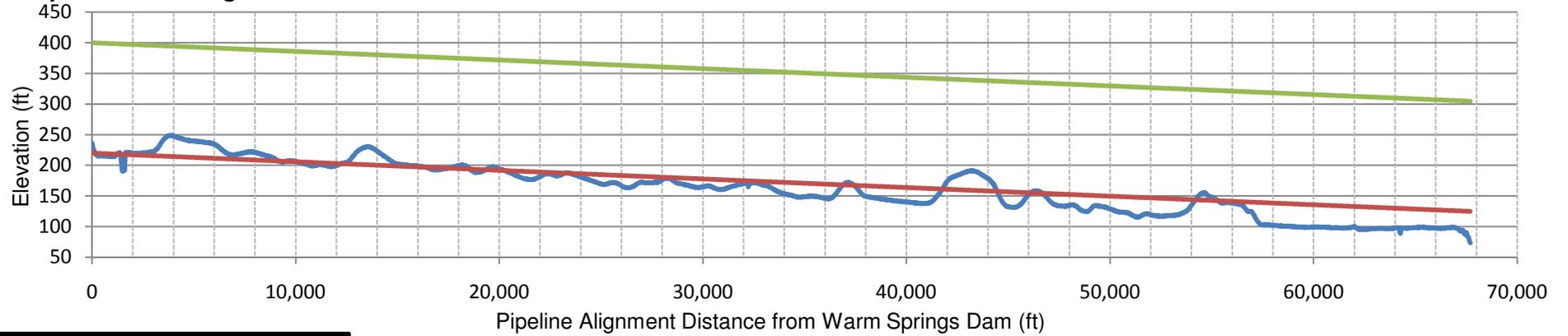


Hydraulic Profiles

Canyon Road Alignment

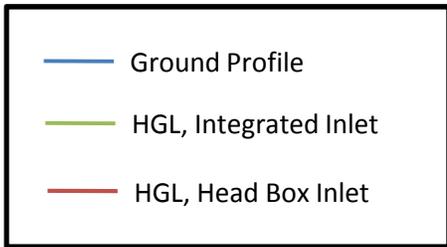
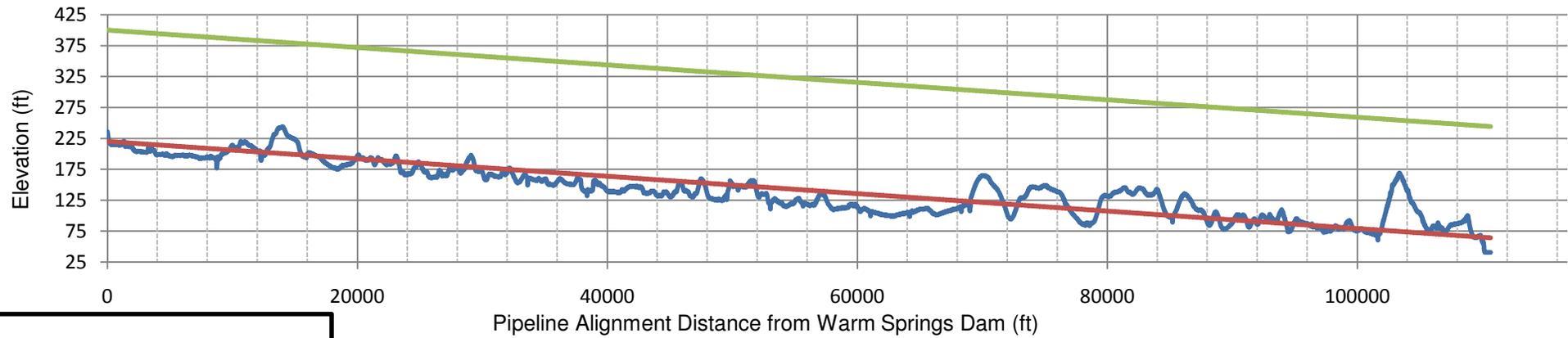


Dry Creek Road Alignment

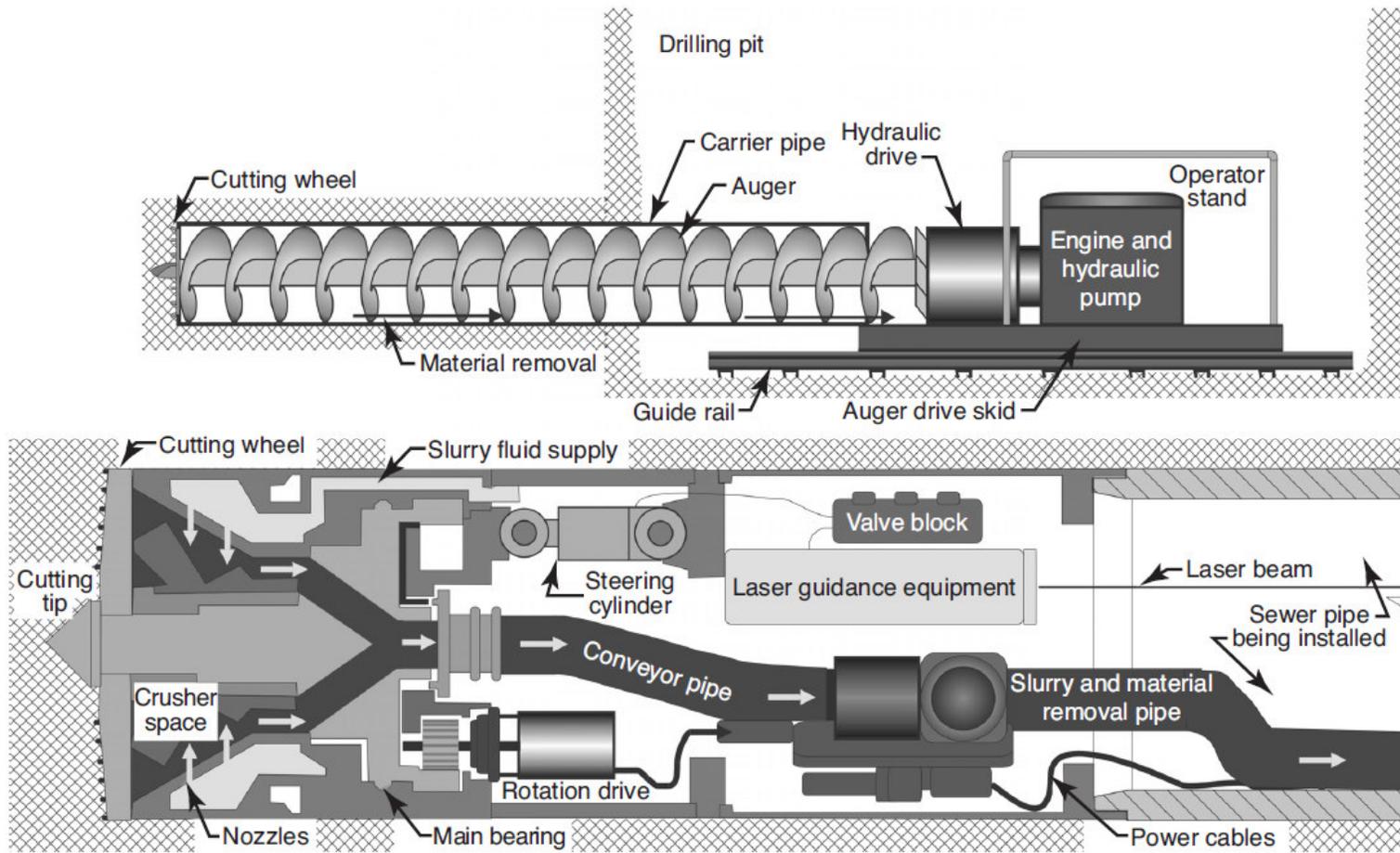


Hydraulic Profiles

West Dry Creek Road to Mirabel Alignment



Tunneling



Route Screening Results

Head box Inlet

Route	Alignment Options	Length	Topography
Northern Route	Canyon Road	Satisfactory	Unacceptable
	Dutcher Creek Road	Unacceptable	Unacceptable
Central Route	Dry Creek Road	Satisfactory	Conditionally Satisfactory
	East River Access Road	Satisfactory	Satisfactory
	West Dry Creek Road	Satisfactory	Conditionally Satisfactory
	West River Access Road	Satisfactory	Satisfactory
Southern Route	Southern Route to Mirabel	Satisfactory	Conditionally Satisfactory

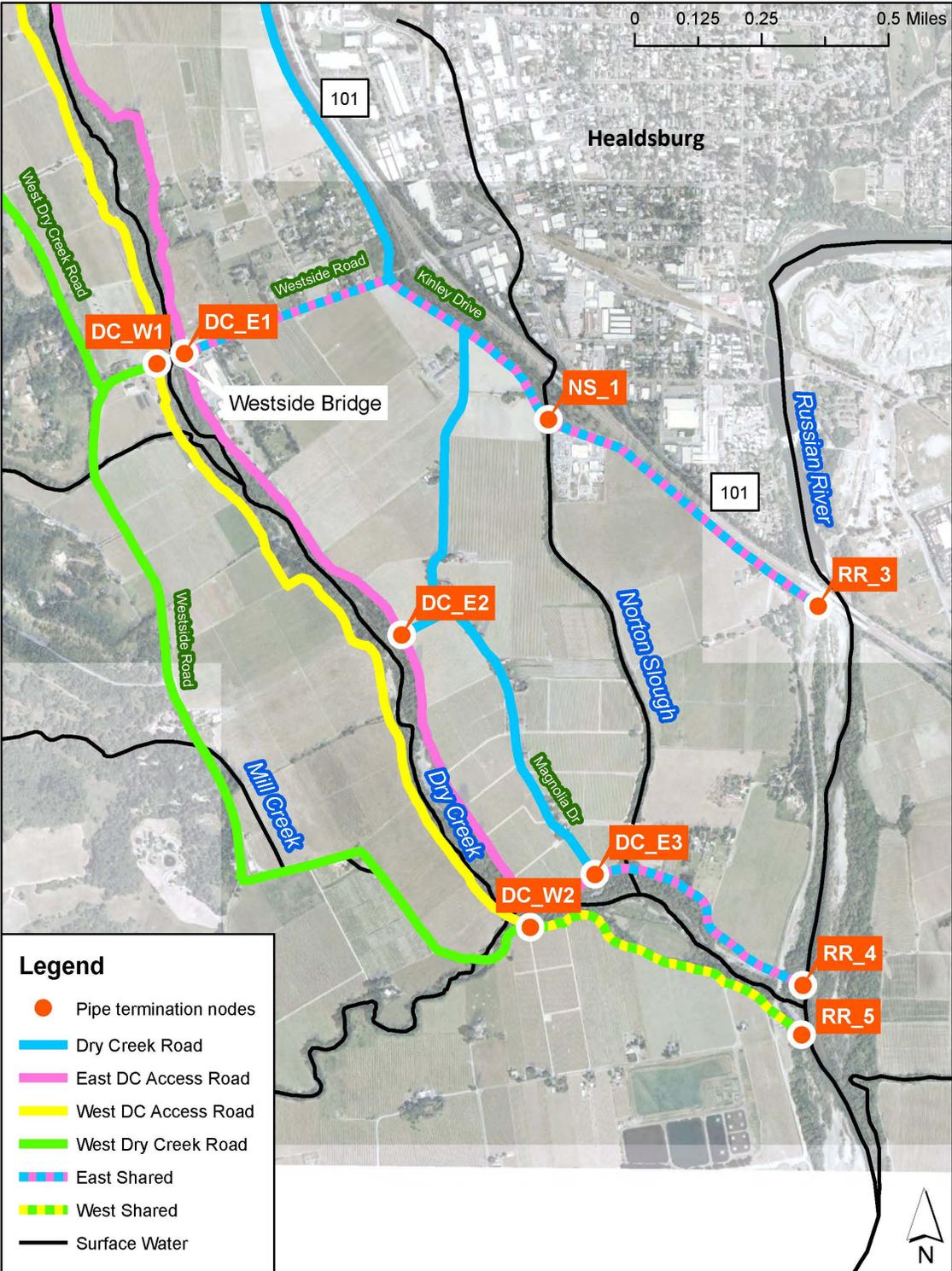
Route Screening Results

Integrated Facility Inlet

Route	Alignment Options	Length	Topography
Northern	Canyon Road	Satisfactory	Satisfactory
	Dutcher Creek Road	Unacceptable	Unacceptable
Central	Dry Creek Road	Satisfactory	Satisfactory
	East River Access Road	Satisfactory	Satisfactory
	West Dry Creek Road	Satisfactory	Satisfactory
	West River Access Road	Satisfactory	Satisfactory
Southern	Southern Route to Mirabel	Satisfactory	Satisfactory

Outlet Locations*

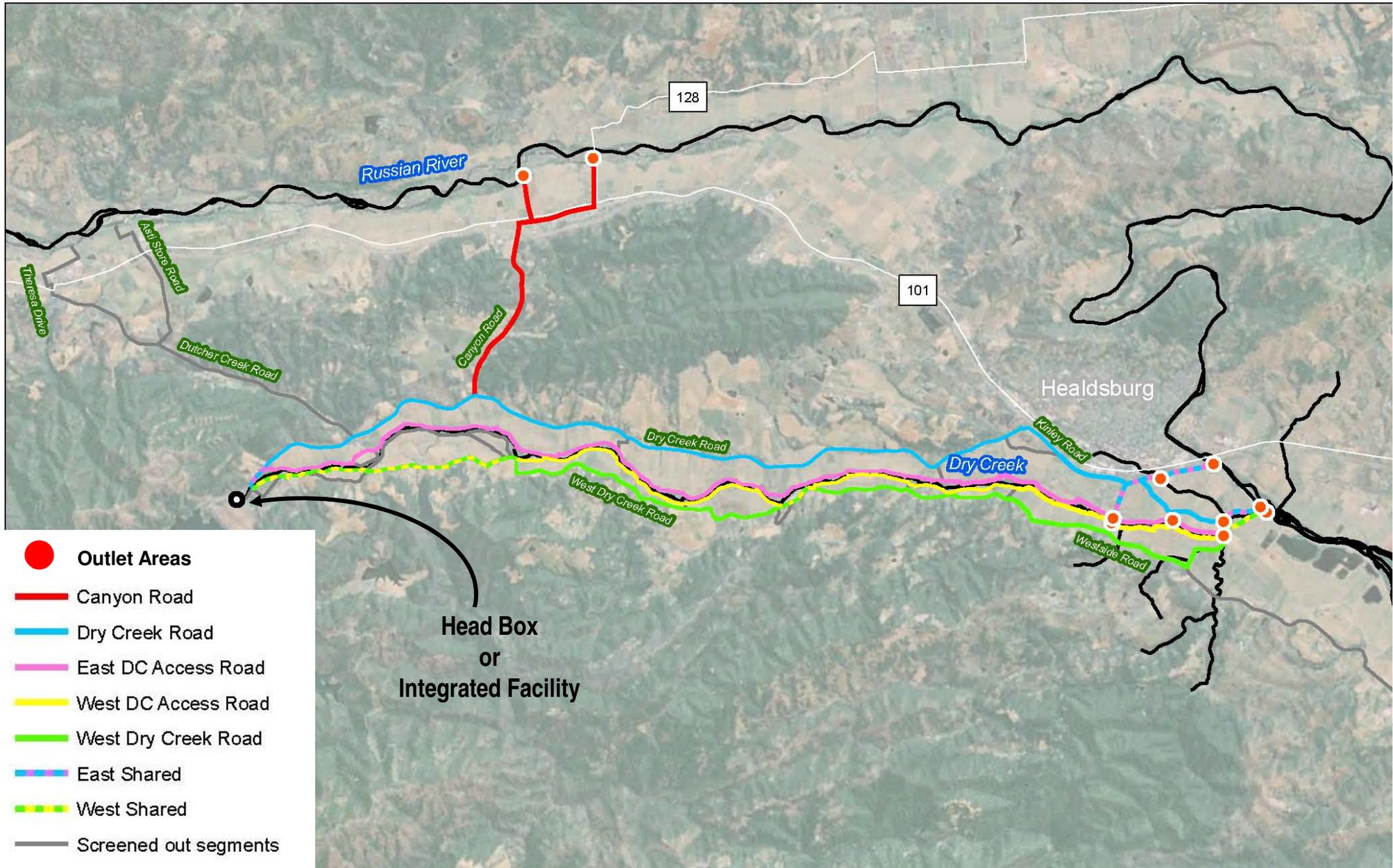
*2 other locations on Russian River near Geyserville



Outlet Screening Results

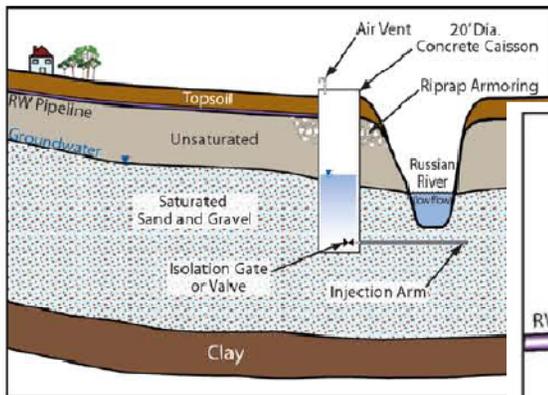
Inlet	Pipeline Alignment	Discharge Reach	Discharge Location
Integrated Facility	Dry Creek to Canyon Road	Upper Russian River	Extension of Canyon Road
			Near Geyserville Bridge
Integrated Facility	Dry Creek Road and West Side Road	Dry Creek	West Side Road Bridge
	Dry Creek Road and Kinley Road		Norton Slough
Head Box	Dry Creek Road and Magnolia Drive		Magnolia Drive
	Dry Creek Road and Kinley Road		Mill Creek Confluence
Head Box	Dry Creek Road and Kinley Road	Russian River	Lower Norton Slough
			Hwy 101 Bridge
Integrated Facility		Dry Creek	Confluence of Dry Creek and Russian River
			West Side Road Bridge
Upper Norton Slough			
Magnolia Drive			
Head Box	East River Access Road	Russian River	Mill Creek Confluence
			Lower Norton Slough
Integrated Facility	West Dry Creek Road and West Side Road	Dry Creek	Confluence of Dry Creek and Russian River
Head Box	West Dry Creek Road and Access Road		West Side Road Bridge
	Head Box	West Dry Creek Road and Access Road	Russian River
	West Dry Creek Road and Access Road	Russian River	Confluence of Dry Creek and Russian River

Screening Results

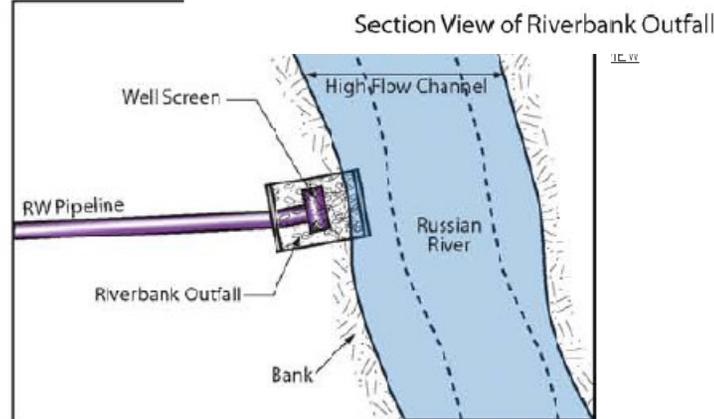
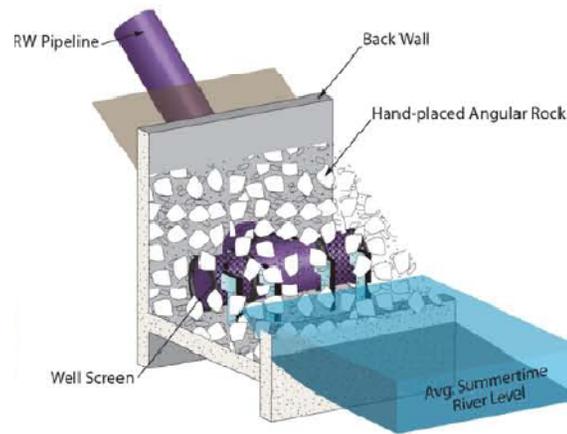


Possible Outlet Facilities Configurations

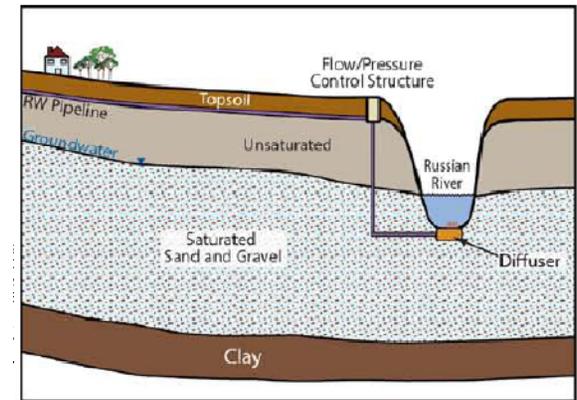
- Riverbank Outfalls
- In-River Diffusers
- In-Bed Diffusers
- In-Bank Diffusers



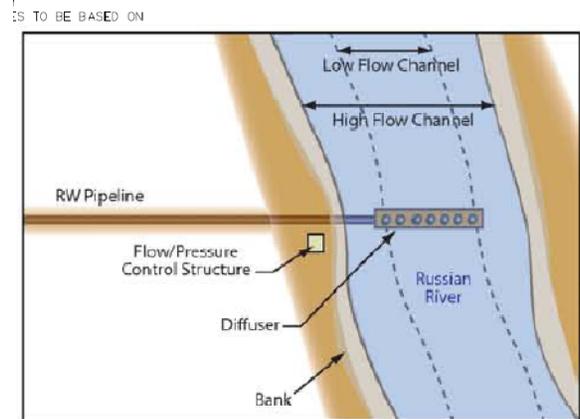
Elevation View of In-Bed Diffusers



Plan View of Riverbank Outfall

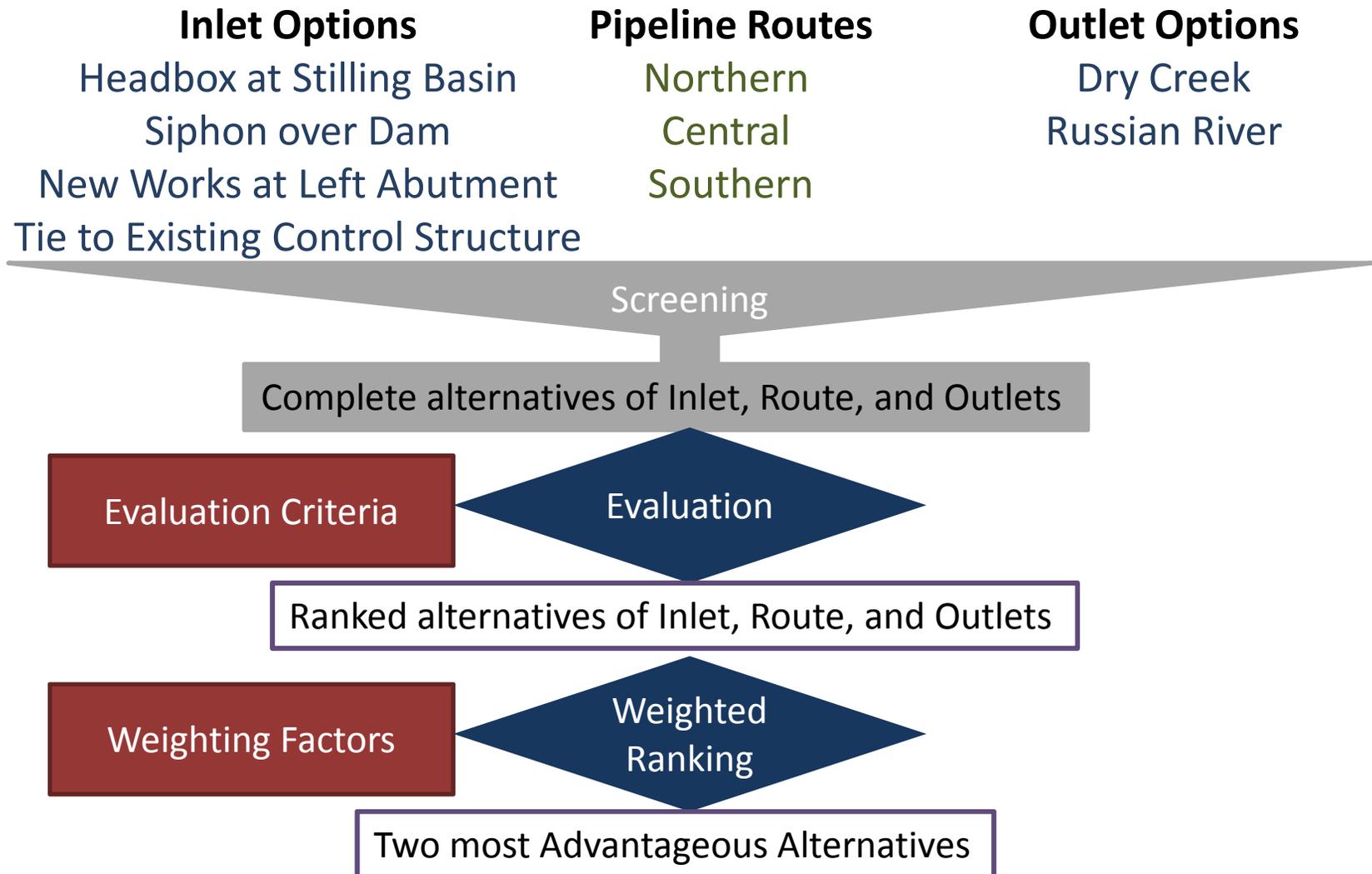


Elevation View of In-River Diffusers



Plan View of In-River Diffuser

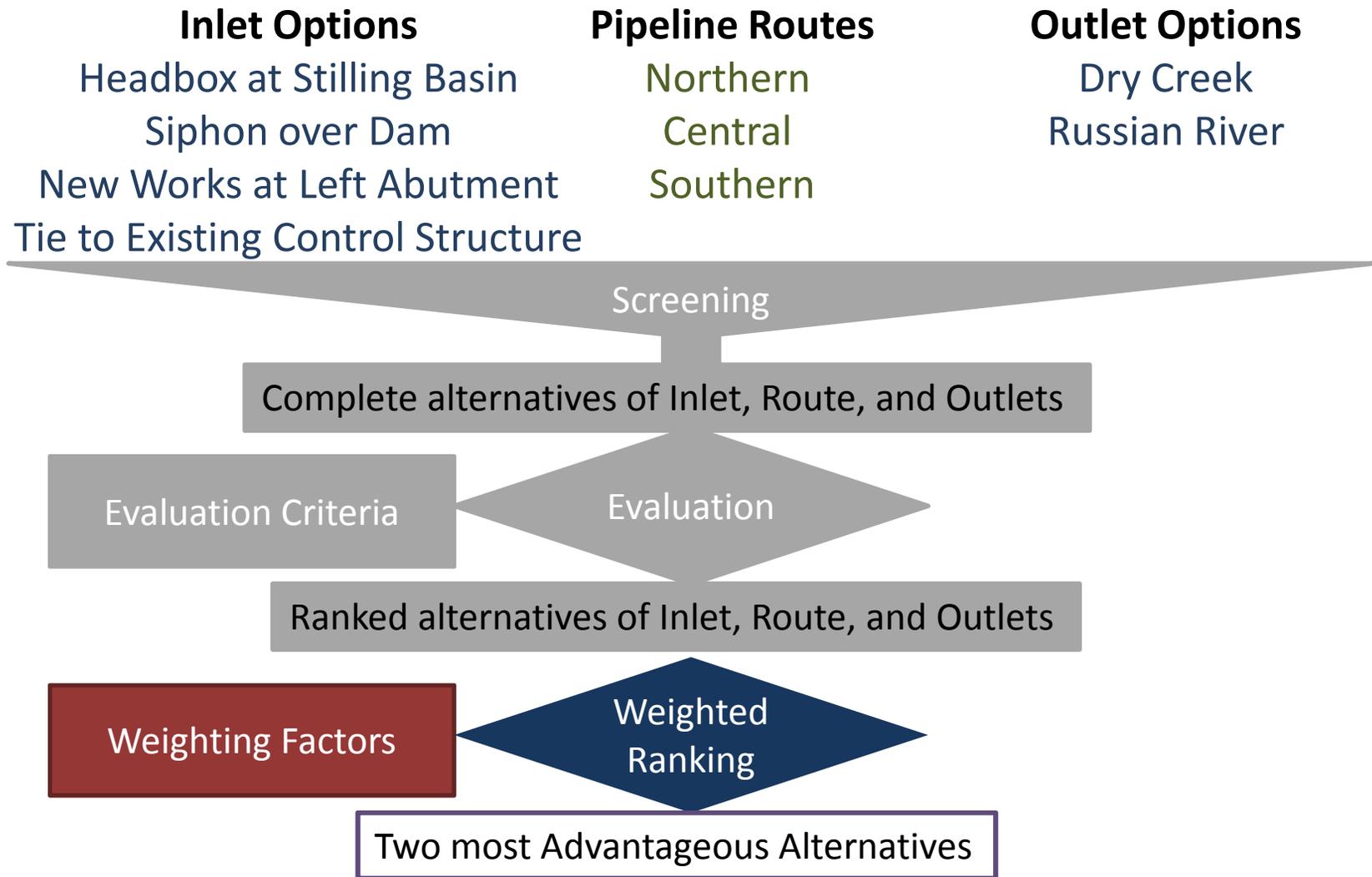
Screening and Evaluation Process



Evaluation Criteria

Inlet Facility	Pipeline Route	Outlet Facility
Engineering		
Reliability	Reliability	Reliability
Constructability	Constructability	Constructability
Permitting	Permitting	Permitting
Operations	Operations	Operations
Right of Way Acquisition	Right of Way Acquisition	Right of Way Acquisition
Liquefaction and Hazard Potential	Liquefaction and Hazard Potential	Liquefaction and Hazard Potential
	Hydropower Potential	River Channel Stability
	Special Crossings	Accessibility
Environmental		
Wetlands	Wetlands	Wetlands
Habitats and Sensitive Species	Habitats and Sensitive Species	Habitats and Sensitive Species
Hazardous materials	Hazardous materials	Hazardous materials
Cultural Resources	Cultural Resources	Cultural Resources
	Impact to trees (roots)	Water Quality/Fisheries

Screening and Evaluation Process

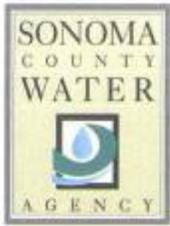


Weighting Factors

Please indicate the importance factor (1-5) for each individual criterion.

Engineering Criteria		
	Criteria	Weight (1-5)
1	Reliability	
2	Constructability	
3	Permitting	
4	Operations	
5	Right of Way Acquisition	
6	Liquefaction and Hazard Potential	
7	Hydropower Potential	
8	Special Crossings	
9	River Channel Stability	
10	Accessibility	

Environmental		
	Criteria	Weight (1-5)
1	Wetlands and Other Waters of US	
2	Sensitive Habitats and Species	
3	Hazardous materials	
4	Potential Loss of Trees (Removal or Root Damage)	
5	Cultural Resources	
6	Water Quality / Fisheries	



Project Status Update PRESENTATION



Feasibility Study for Dry Creek Bypass Pipeline Project

Sonoma County Water Agency

HDR

In collaboration with

Kennedy Jenks

PROJECT LOCATION MAP

February 2010