



INTERMEDIATE OPTIMIZATION RESULTS BEND OPTIMIZED COLLECTION SYSTEM MASTER PLAN

January 16th, 2014

DRAFT RESULTS – SUBJECT TO CHANGE

MSA Murray, Smith & Associates, Inc.
Engineers/Planners

AGENDA

- ◆ Welcome/Introduction
- ◆ Headlines (10 min)
- ◆ Intermediate Optimization Results (40 min)
- ◆ Discussion (40 min)
- ◆ Public Outreach (10 min)
- ◆ Next Steps (5 min)
- ◆ Public Comment (5 min)

























PRESENTATION CONTENTS

- ◆ Headlines!
- ◆ New Alternatives, Revisions and Phasing
- ◆ Intermediate Optimization Solutions
- ◆ Detailed Phasing Discussion
- ◆ Summary
- ◆ Next Steps
- ◆ Schedule and Area Specific Projects Update

THE HEADLINES

1. The Intermediate Solution is generally consistent with the Initial Solution
2. Optimization eliminated more north area lift stations, adding some capital costs, however, reducing overall life cycle costs
3. The SE Interceptor, Colorado Lift Station and Riverhouse Diversion selected as high priority projects
4. Optimized solutions for existing, 10-year, 20-year and 20-year plus 25% loading, provide insight for project phasing
5. Costs have increased due to inclusion of some condition based improvements

INTERMEDIATE SOLUTION – ADDITIONAL COSTS INCLUDED

	Hydraulic-Based Pipe and Pump Capital Costs	Pump Condition Improvements	Pipe Condition Improvements	Local-Area Costs
2007 CSMP				
Initial Optimization				
Intermediate Optimization				
Final Optimization				
Total CIP				
Rate Calculation				

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INTERMEDIATE OPTIMIZATION SCENARIOS

Primary Scenarios and Sensitivity Analyses	20-Year Mid R
	20-Year High R
	10-Year Mid R
	10-Year High R
Additional Scenario	Existing High R
Additional Sensitivity Analyses	20-Y High R with 10% Water Conservation
	20-Y High R with 25% Loading Increase
	SEI without 15% discount
	... and more
Project Phasing	Immediate, 0 to 10 years, 10 to 20 years, 20+

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**City of Bend
Collection System Master Plan**

**Overall 2033
Optimization Alternatives**

January 2014



Legend

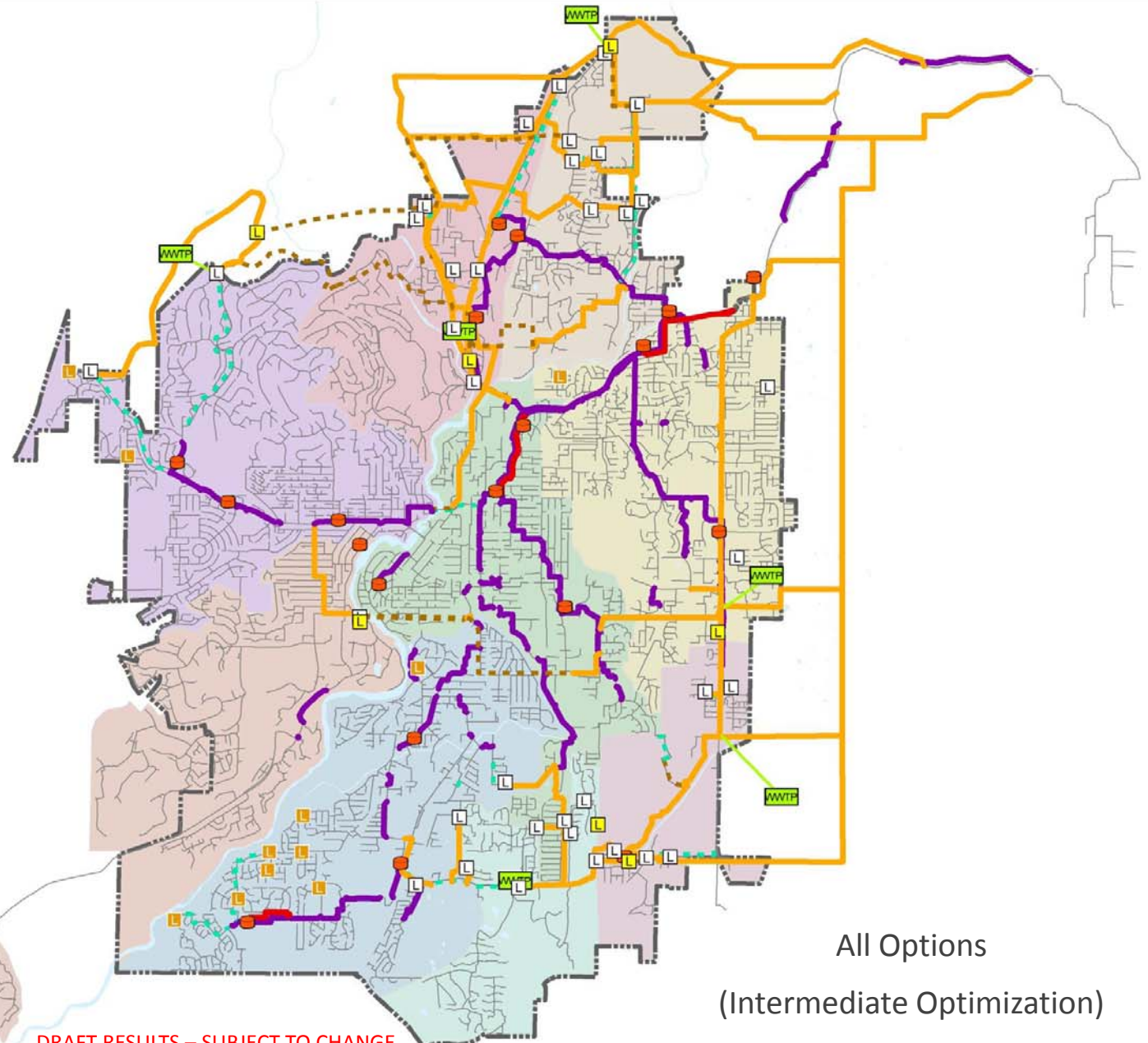
- New Lift Station
- Lift Station Upgrade
- Lift Station Decommission
- Satellite Treatment
- Offline Storage
- Existing Sewer Pipe

Alternatives

- Gravity Upgrade Along Existing Alignment
- Gravity Diversion
- Force Main Upgrade Along Existing Alignment
- Force Main Diversion
- New Pump Station Force Main
- Gravity or Force Main
- In-Line Linear Storage
- Flow Control Piping
- Planning Boundary

Sewer Basin

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9



All Options
(Intermediate Optimization)

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INTERMEDIATE SOLUTION (20-Year, Mid R)

Initial Solution Cost of \$68 M increased to \$88 M due to...

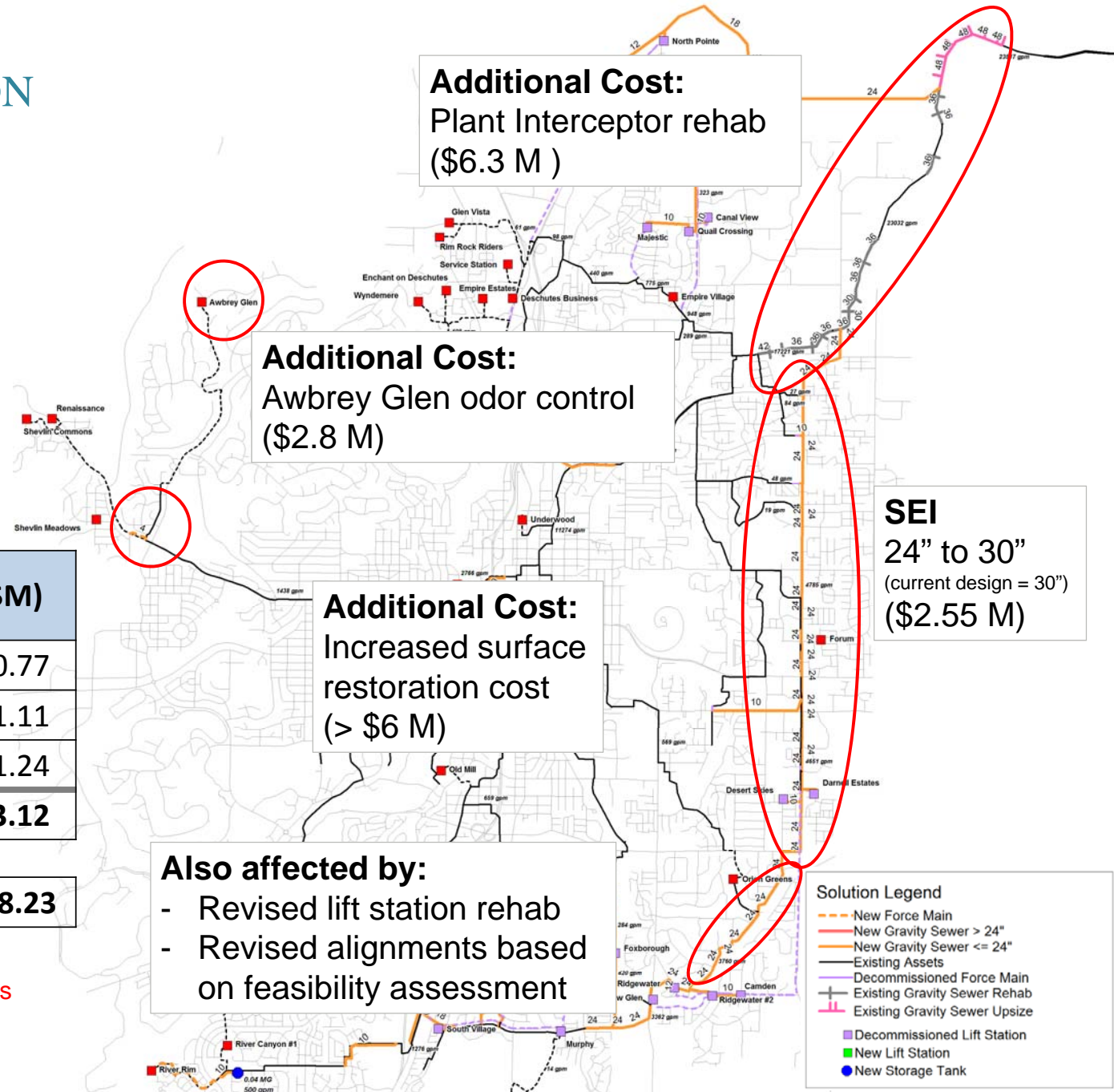
... additional costs not included in previous CSMP

Cost Item	Cost (\$M)
40-Y Life Cycle O&M Cost	40.77
40-Y Life Cycle Elect. Cost	1.11
40-Y Life Cycle Capital Cost	91.24
40-Y Total Life Cycle Cost	133.12

Initial Capital Cost	88.23
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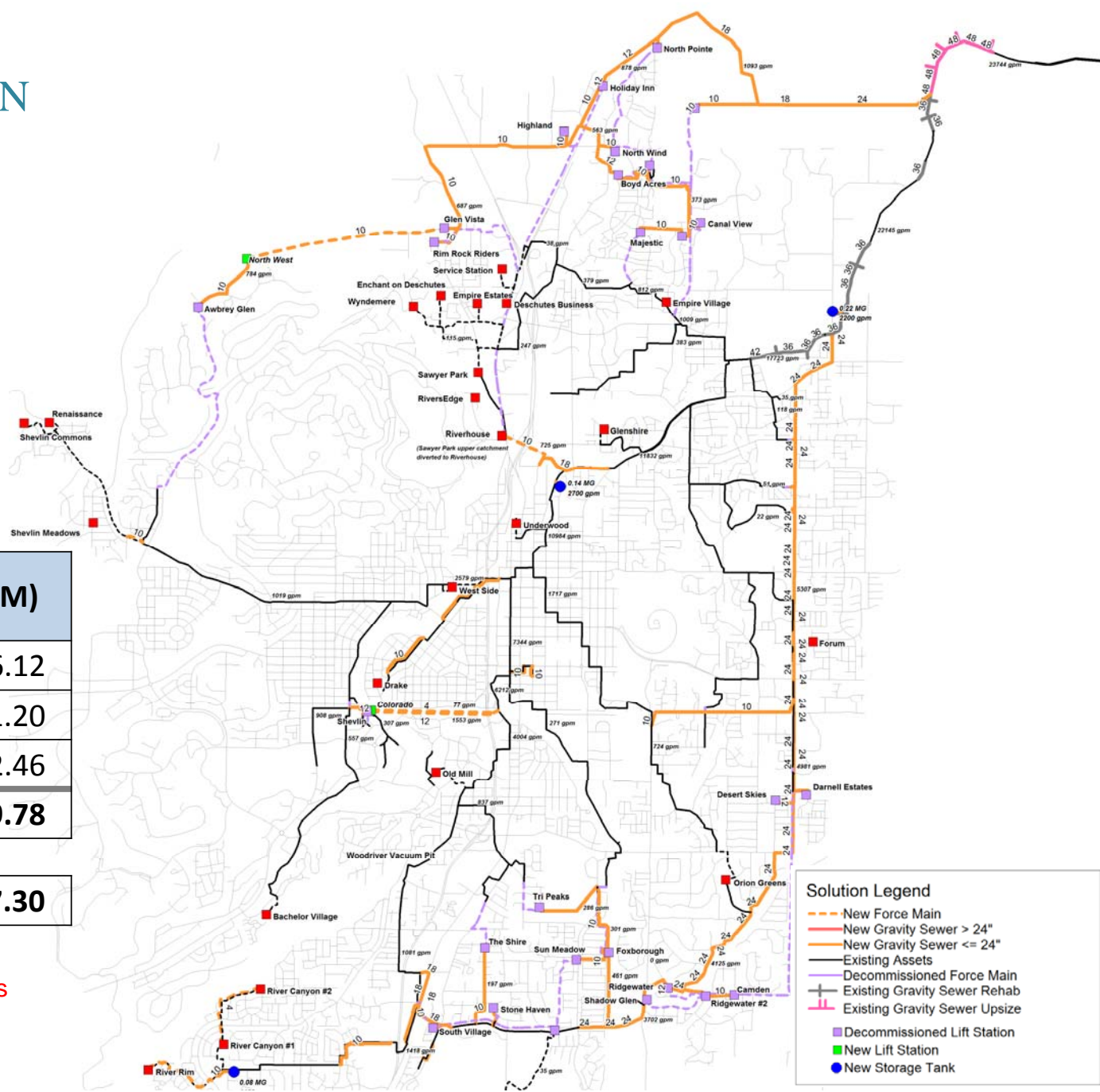
NOTE: Cost summary does not include all condition-based and local area improvements

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INTERMEDIATE SOLUTION

(20-Year, High R)



Cost Item	Cost (\$M)
40-Y Life Cycle O&M Cost	46.12
40-Y Life Cycle Elect. Cost	1.20
40-Y Life Cycle Capital Cost	112.46
40-Y Total Life Cycle Cost	159.78

Initial Capital Cost	107.30
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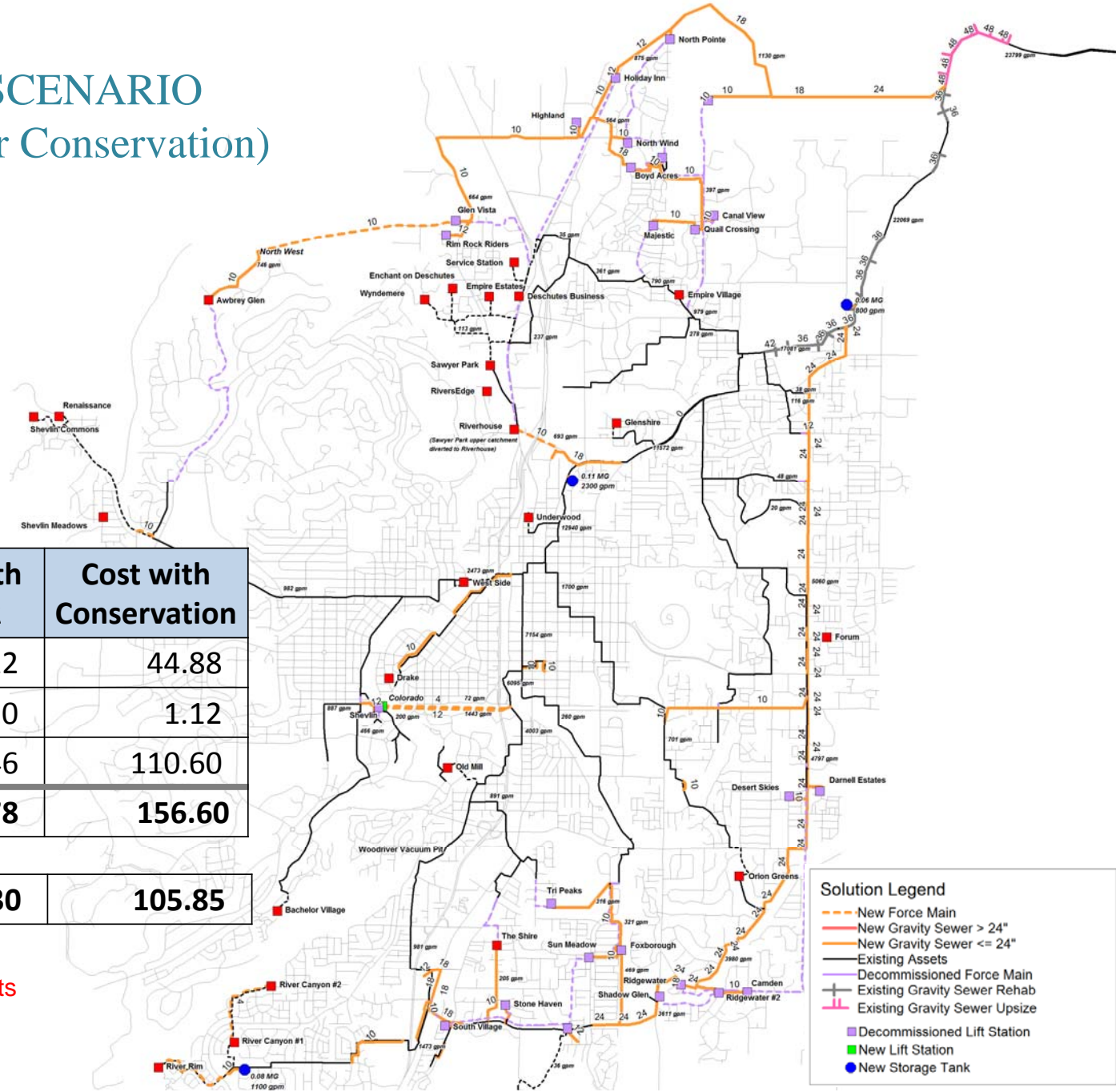
NOTE: Cost summary does not include all condition-based and local area improvements

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Solution Legend

- New Force Main
- New Gravity Sewer > 24"
- New Gravity Sewer <= 24"
- Existing Assets
- Decommissioned Force Main
- Existing Gravity Sewer Rehab
- Existing Gravity Sewer Upsize
- Decommissioned Lift Station
- New Lift Station
- New Storage Tank

WATER CONSERVATION SCENARIO (20-Year, High R -10% Water Conservation)



Cost Item	Cost with High R	Cost with Conservation
40-Y Life Cycle O&M Cost	46.12	44.88
40-Y Life Cycle Elect. Cost	1.20	1.12
40-Y Life Cycle Capital Cost	112.46	110.60
40-Y Total Life Cycle Cost	159.78	156.60

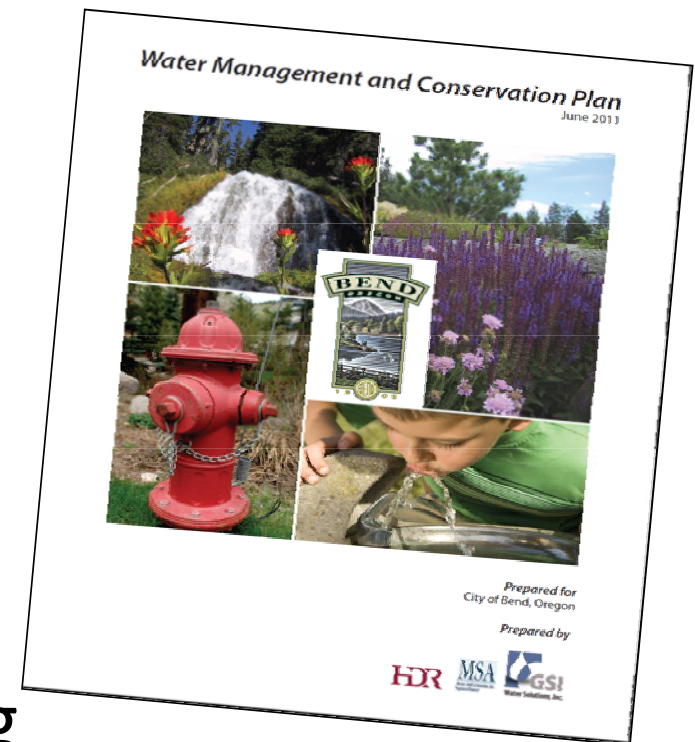
Initial Capital Cost	107.30	105.85
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NOTE: Cost summary does not include all condition-based and local area improvements

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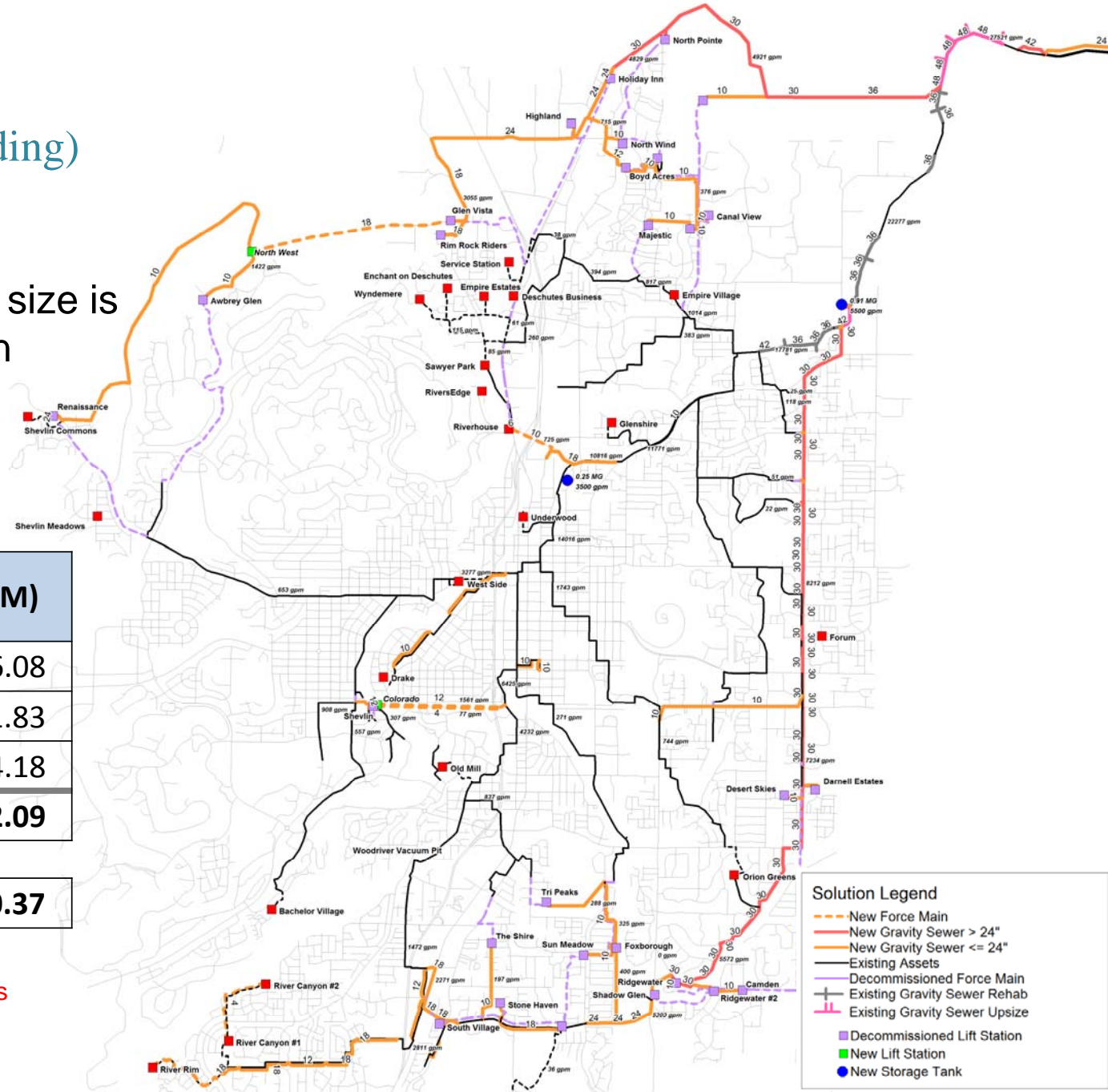
WATER CONSERVATION PACKAGE #4 “INDOOR MEASURES” 2011 WMCP

- ◆ 0.215 mgd water savings
(3.5% reduction)
- ◆ \$1.485 million direct program
costs
- ◆ ~\$0.3 million indirect program
costs
- ◆ ~\$0.15 million (annual) staffing
costs



STRESS-TEST SCENARIO (20-Year, High R + 25% Loading)

Good News! - SE Interceptor size is consistent with current design



Cost Item	Cost (\$M)
40-Y Life Cycle O&M Cost	56.08
40-Y Life Cycle Elect. Cost	1.83
40-Y Life Cycle Capital Cost	134.18
40-Y Total Life Cycle Cost	192.09

Initial Capital Cost	150.37
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NOTE: Cost summary does not include all condition-based and local area improvements

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INTERMEDIATE SOLUTION – PHASING SUMMARY

Phase	Planning Scenario	Major Projects	Capital Cost (\$M)	Total Capital Cost (\$M)
Phase 1 – Immediate	Existing High R	SEI A, Riverhouse/Sawyer Park diversion, Colorado LS diversion, Awbrey Glen odor control, Plant Interceptor rehab, storage	53.85*	88.23
Phase 2 – 5 to 10 years	10-Y Mid R	SEI-B, Plant Interceptor rehab, minor GS upgrades	11.23	
Phase 3 – 10 to 20 years	20-Y Mid R	Northeast Interceptor, Bear Creek diversion	23.15	
> 20-Y Mid R (A)	20-Y High R	Northwest Interceptor, additional Storage, GS upgrades		
> 20-Y Mid R (B)	+ 25% Growth			

- Opportunities for additional deferral once Existing Mid R is evaluated

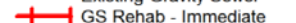
NOTE: Cost summary does not include all condition-based and local area improvements

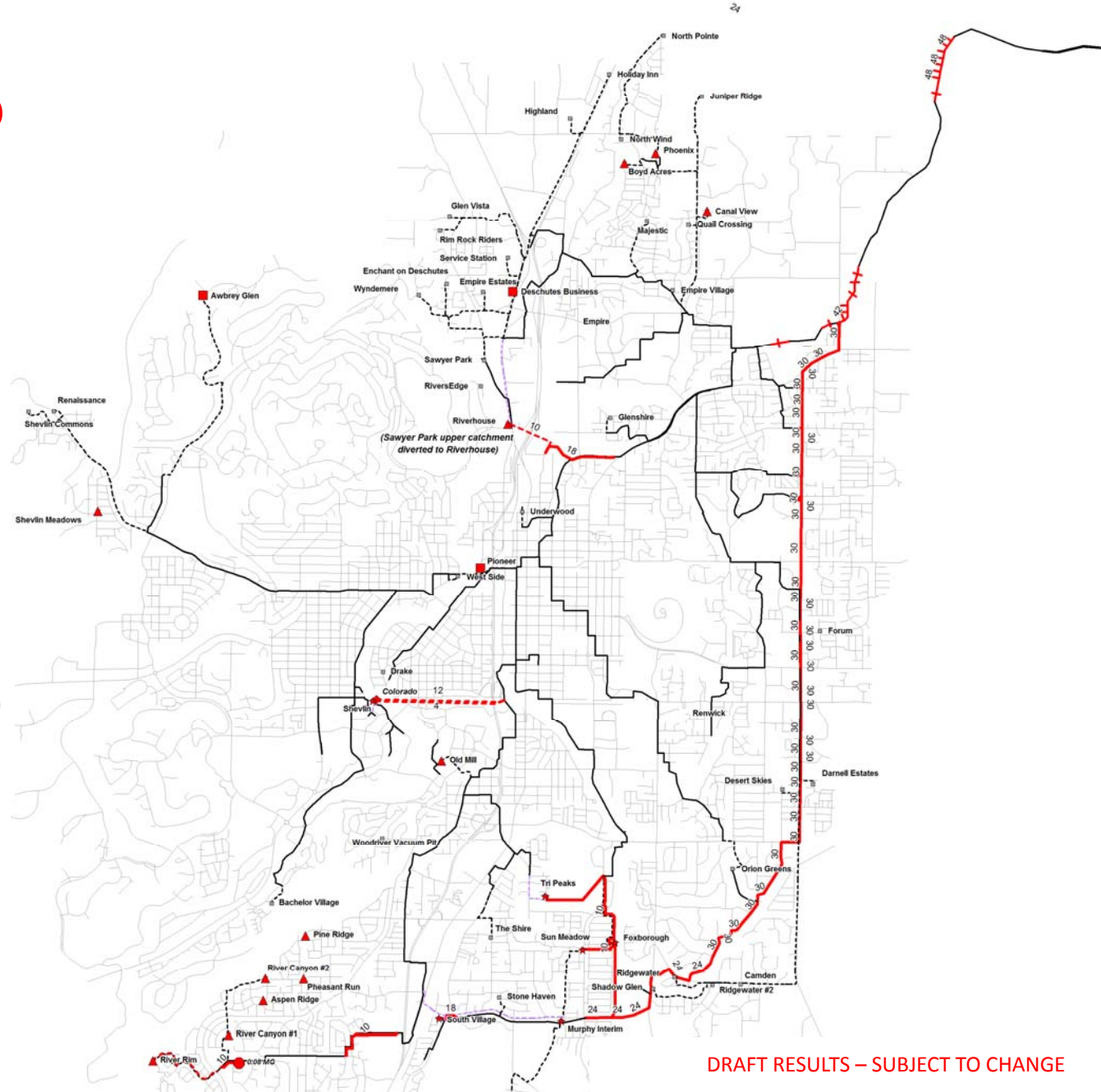
PROJECT PHASING

Phase 1 – Immediate (\$53.85 M)

- SEI (not including u/s section)
- Colorado diversion
- Riverhouse diversion
- Plant Interceptor Grade 5 rehab
- Awbrey Glen Odor Control
- Southern Storage and GS upgrade
- River Rim force main

Legend

- | | |
|--|---|
|  Decommissioned Force Main |  Replace Lift Station - Immediate |
|  New Force Main - Immediate |  Upgrade Lift Station - Immediate |
|  Existing Force Main |  Decommission Lift Station - Immediate |
|  New Gravity Sewer - Immediate |  New Lift Station - Immediate |
|  Existing Gravity Sewer |  New Storage Tank - Immediate |
|  GS Rehab - Immediate | |
|  GS Upsize - Immediate | |



Note: Cost includes SEI at 30" design size

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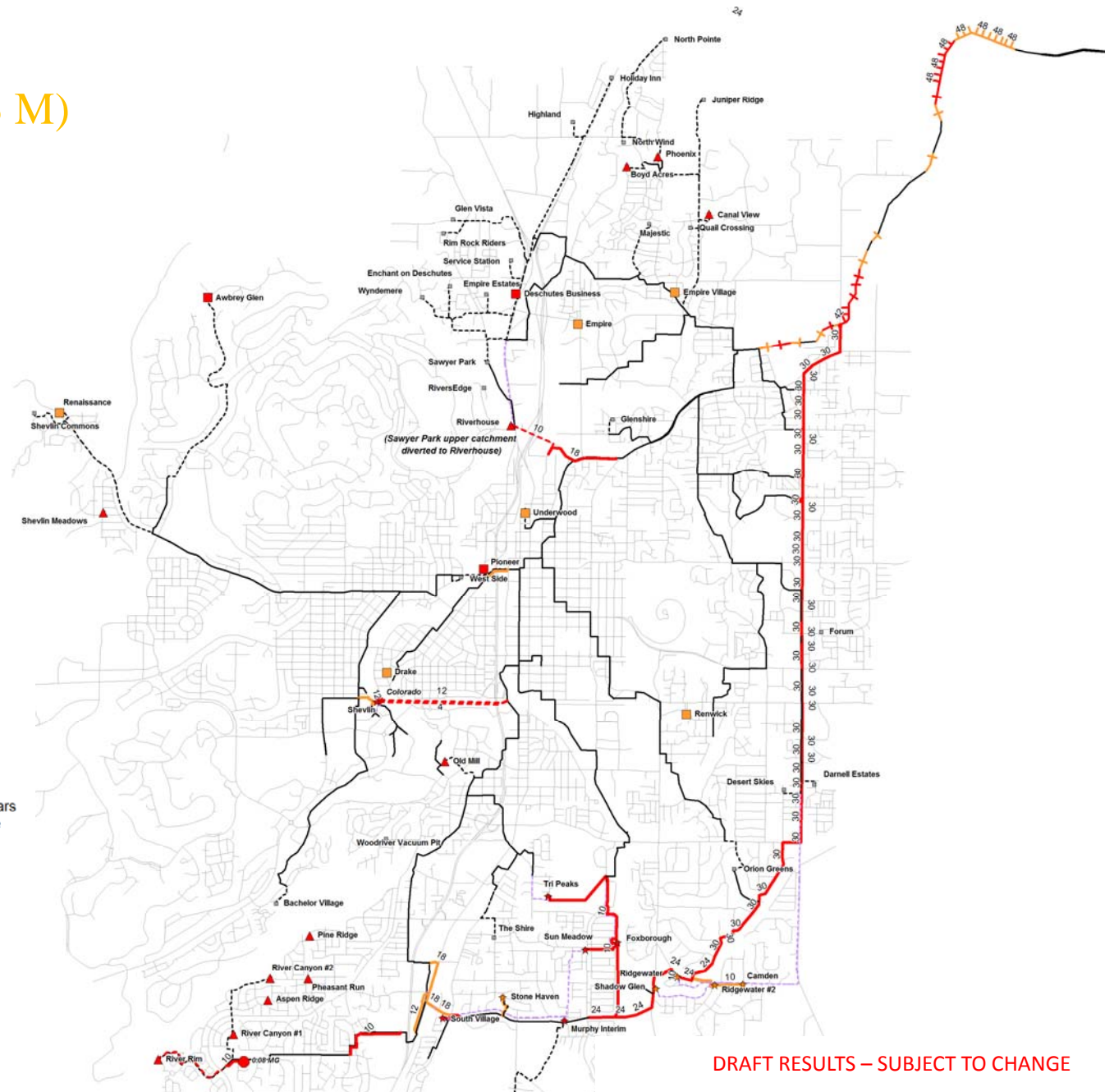
PROJECT PHASING

Phase 2 – 5 to 10 Years (\$11.23 M)

- SEI (u/s Section)
- Plant Interceptor Grade 4 rehab
- GS upgrade d/s Drake
- GS upgrade d/s River Rim

Legend

- | | | | |
|--|-----------------------------------|--|---|
| | Decommissioned Force Main | | Replace Lift Station - 5 years |
| | New Force Main - 5 to 10 years | | Replace Lift Station - Immediate |
| | New Force Main - Immediate | | Upgrade Lift Station - 5 to 10 years |
| | Existing Force Main | | Upgrade Lift Station - Immediate |
| | New Gravity Sewer - 5 to 10 years | | Decommission Lift Station - 5 to 10 years |
| | New Gravity Sewer - Immediate | | Decommission Lift Station - Immediate |
| | Existing Gravity Sewer | | New Lift Station - 5 to 10 years |
| | GS Rehab - Immediate | | New Lift Station - Immediate |
| | GS Upsize - Immediate | | Existing Lift Station |
| | GS Rehab - 5 to 10 years | | |
| | GS Upsize - 5 to 10 years | | |
| | New Storage Tank - 5 to 10 years | | |
| | New Storage Tank - Immediate | | |



Note: Cost includes SEI at 30" design size

DRAFT RESULTS – SUBJECT TO CHANGE

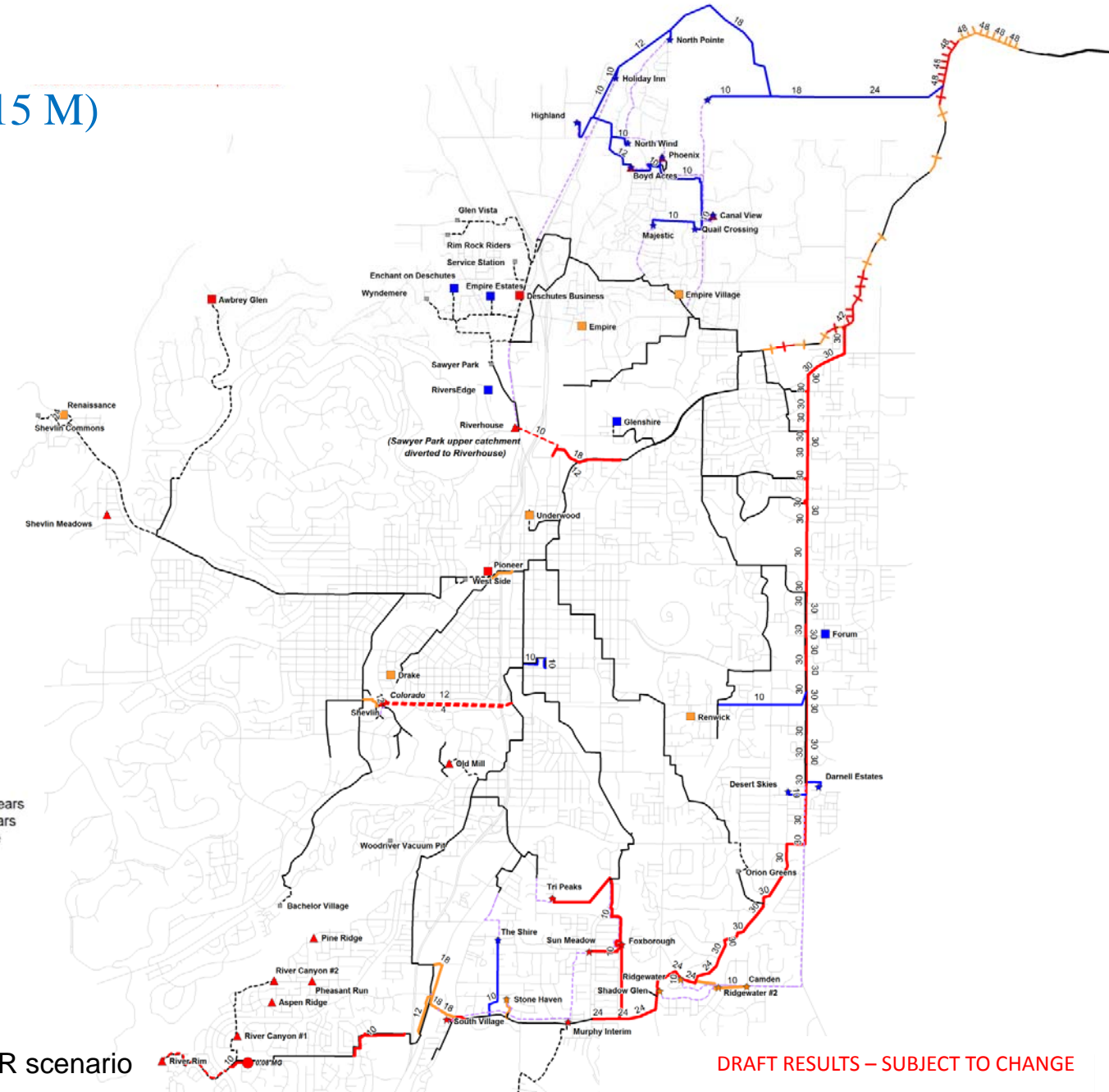
PROJECT PHASING

Phase 3 – 10 to 20 Years (\$23.15 M)

- Northeast Interceptor (NEI)
- Bear Creek GS diversion

Legend

- Decommissioned Force Main
- New Force Main - 5 to 10 years
- New Force Main - Immediate
- Existing Force Main
- New Gravity Sewer - 10 to 20 years
- New Gravity Sewer - 5 to 10 years
- New Gravity Sewer - Immediate
- Existing Gravity Sewer
- GS Rehab - Immediate
- GS Upsize - Immediate
- GS Rehab - 5 to 10 years
- GS Upsize - 5 to 10 years
- New Storage Tank - 10 to 20 years
- New Storage Tank - 5 to 10 years
- New Storage Tank - Immediate
- Replace Lift Station - 10 years
- Replace Lift Station - 5 years
- Replace Lift Station - Immediate
- Upgrade Lift Station - 10 to 20 years
- Upgrade Lift Station - 5 to 10 years
- Upgrade Lift Station - Immediate
- Decommission Lift Station - 10 to 20 years
- Decommission Lift Station - 5 to 10 years
- Decommission Lift Station - Immediate
- New Lift Station - 10 to 20 years
- New Lift Station - 5 to 10 years
- New Lift Station - Immediate
- Existing Lift Station



Note: Cost includes SEI at 30" design size
 Cost also includes NEI at 18"/24" size per Mid R scenario

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PROJECT PHASING

Flows Above 20-Y Mid R (\$60.96 M)

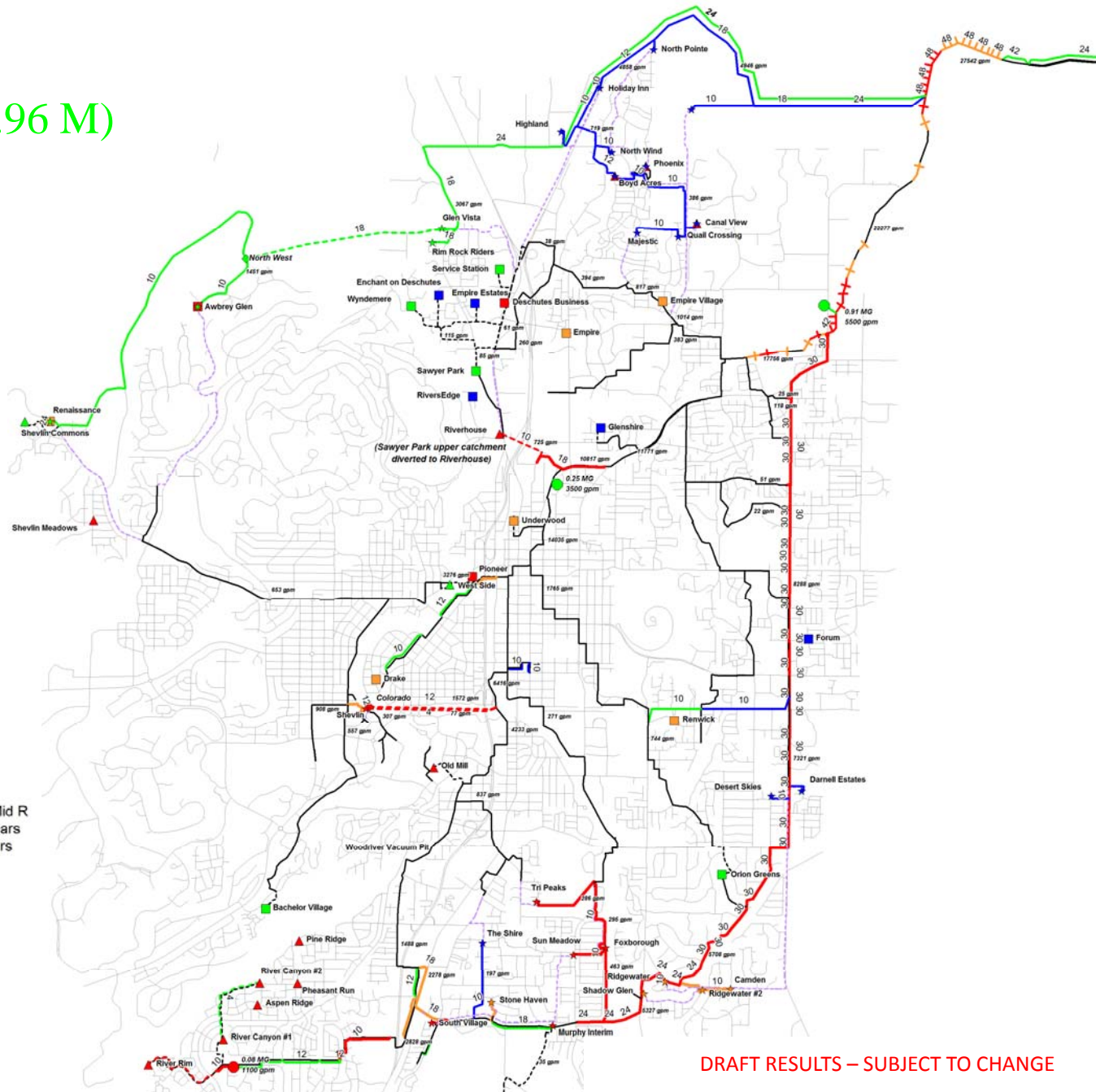
Projects only required in 20-Y High R and 20-Y High R + 25% Loading:

- Northwest Interceptor
- Plant Interceptor storage
- GS upgrades

Legend

- - - Decommissioned Force Main
- - - New Force Main - >20-year Mid R
- - - New Force Main - 10 to 20 years
- - - New Force Main - 5 to 10 years
- - - New Force Main - Immediate
- - - Existing Force Main
- - - New Gravity Sewer - >20-year Mid R
- - - New Gravity Sewer - 10 to 20 years
- - - New Gravity Sewer - 5 to 10 years
- - - New Gravity Sewer - Immediate
- - - Existing Gravity Sewer
- - - GS Rehab - Immediate
- - - GS Upsize - Immediate
- - - GS Rehab - 5 to 10 years
- - - GS Upsize - 5 to 10 years
- New Storage Tank - >20-year Mid R
- New Storage Tank - 10 to 20 years
- New Storage Tank - 5 to 10 years
- New Storage Tank - Immediate

- Replace Lift Station - 20 years
- Replace Lift Station - 10 years
- Replace Lift Station - 5 years
- Replace Lift Station - Immediate
- ▲ Upgrade Lift Station - >20-year Mid R
- ▲ Upgrade Lift Station - 10 to 20 years
- ▲ Upgrade Lift Station - 5 to 10 years
- ▲ Upgrade Lift Station - Immediate
- ★ Decommission Lift Station - >20-year Mid R
- ★ Decommission Lift Station - 10 to 20 years
- ★ Decommission Lift Station - 5 to 10 years
- ★ Decommission Lift Station - Immediate
- ◆ New Lift Station - >20-year Mid R
- ◆ New Lift Station - 10 to 20 years
- ◆ New Lift Station - 5 to 10 years
- ◆ New Lift Station - Immediate



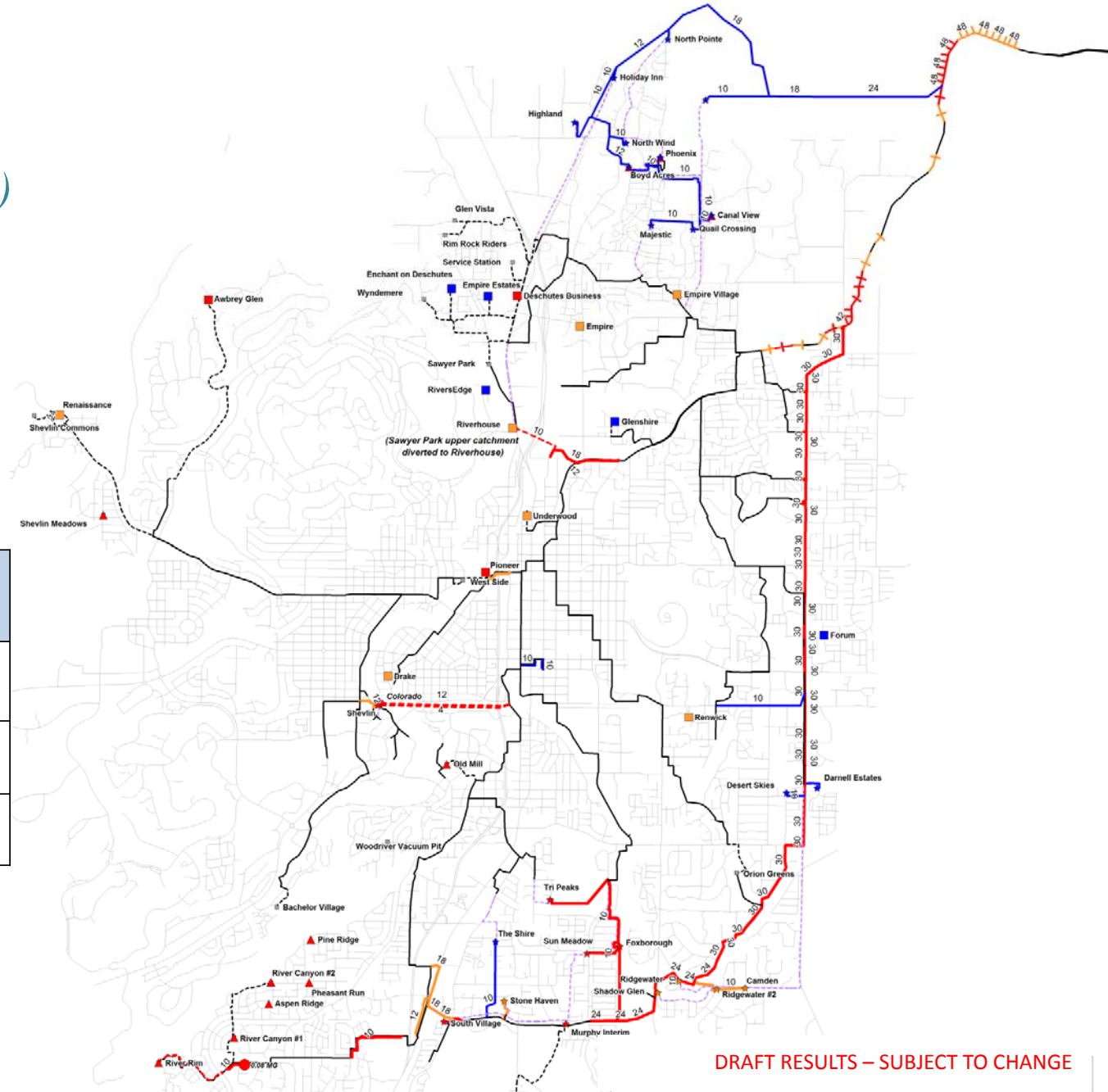
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20-YEAR MID R PROJECT PHASING (INTERMEDIATE SOLUTION)

Phase	Capital Cost (\$M)
Phase 1 – Immediate	53.85
Phase 2 – 5 to 10 years	11.23
Phase 3 – 10 to 20 years	23.15

NOTE: Cost summary does not include all condition-based and local area improvements

Note: Cost includes SEI at 30" design size and includes NEI at 18"/24" size per Mid R scenario



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REQUIRED CAPITAL AND RATES

- ◆ Current sewer rate is \$44.37/month
- ◆ Adequate to fund construction of water treatment plant project + an additional \$20M over next 5 years
- ◆ Rates will need to go up
 - Further analysis required by City/FCSG/MSA to determine how much

FINAL STEPS

- Evaluate additional alternatives and refine solutions
 - Northern storage option
 - Colorado discharge to CBD gravity sewer
 - Plant Interceptor upsize Vs parallel line at time of NEI
 - Mid R Conservation analysis and 20-Y Mid R + 25% Growth
- Practical scheduling of Phase 1 improvements
 - Run Existing Mid R scenario
 - Connecting Riverhouse diversion to Plant Interceptor prior to SEI
 - Connect SEI to existing gravity sewer to delay construction of northern portion
 - Will the Southern Storage facility substantially reduce existing deficiencies
- Develop preliminary local area solutions
 - Romaine Village
 - Wood River Village
 - Juniper Utility
 - Kings Forest
- Quantify additional condition-based improvement costs
- Questions or comments?

CITY AND SIAG INPUT

- ◆ Should final analysis and subsequent CIP utilize Mid R loading?
- ◆ Are there questions or concerns about proposed phasing?

SIAG COMMUNITY BRIEFINGS

Trainings held December 16

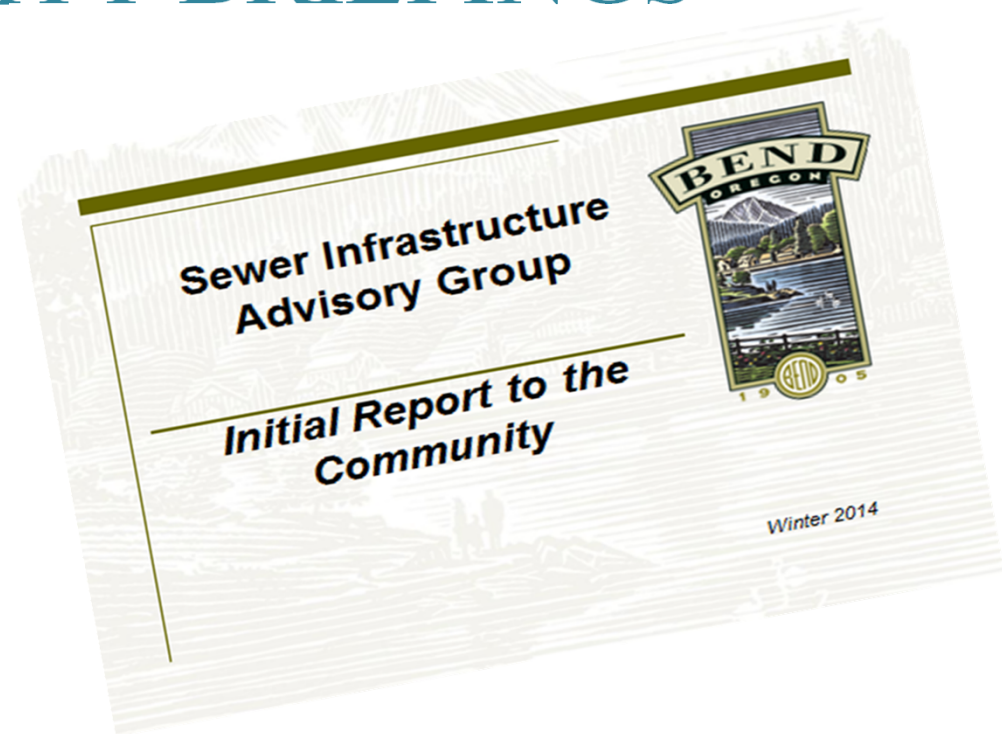
Materials:

- ◆ SIAG Briefing PowerPoint
- ◆ Tell Us What You Think
- ◆ Talking Points
- ◆ Presentation Boards

Scheduled presentations:

- | | |
|------------|-----------------------------|
| January 13 | River West NA |
| January 21 | COAR |
| January 28 | Rotary Club of Greater Bend |
| February 4 | BEDAB |
| March 13 | EDCO Board Meeting |

More to come!

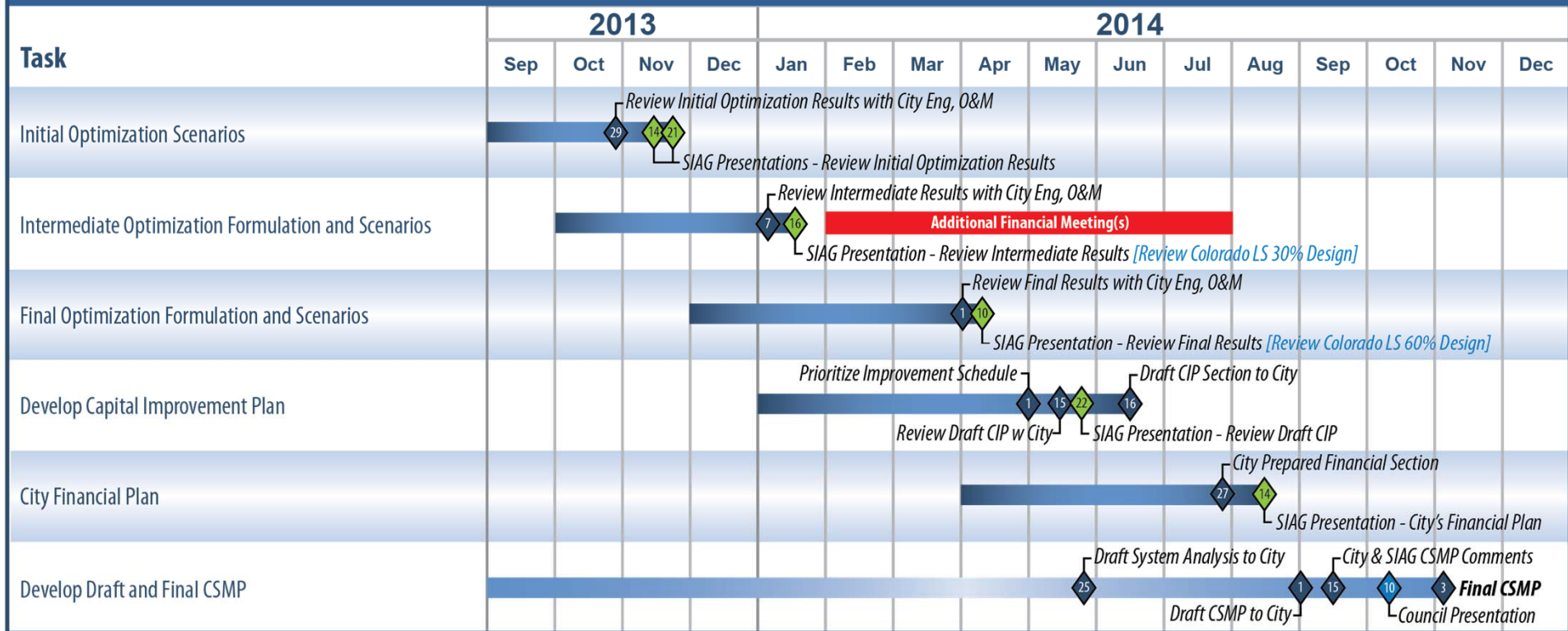


SCHEDULE REVIEW



DRAFT CONDENSED PROJECT SCHEDULE (AS OF JANUARY 6, 2014)

CITY OF BEND OPTIMIZED SEWER COLLECTION SYSTEM MASTER PLAN



DRAFT RESULTS – SUBJECT TO CHANGE

COLORADO LIFT STATION

- ◆ Colorado LS consistently selected
- ◆ 30% design complete
- ◆ 60% design complete in March
- ◆ Current capacity 2,300 gpm
- ◆ Dual 12-inch force mains
- ◆ Begin construction in Sep 2014
- ◆ Operational Oct 2015

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NORTH AREA SOLUTIONS

- ◆ Riverhouse diversion immediate solution
- ◆ NE Interceptor selected after 10 years
- ◆ North Area design team selected
- ◆ Additional North Area options being evaluated
- ◆ Design team will work with CSMP team to identify final solutions over next few months

SE INTERCEPTOR

- ◆ SEI selected
 - Regardless of credit for design costs
- ◆ Current design serves build-out of current UGB + 25% growth
- ◆ Key for growth/improvements in other areas
 - SEI creates capacity in central int. allowing city-wide growth
 - Colorado Lift Station
 - Riverhouse Diversion