



# Gas Facility Replacement Program Keyhole Technology

Aldyl A Main Pipe Replacement Program &  
*Service Tee Transition Rebuilds Program (STTR)*

GTI FALL KEYHOLE MEETING & DEMOS  
PG&E Training Facility  
Winters, CA

November 8, 2017

# PROGRAM OVERVIEW & KEYHOLE TECHNOLOGY

WHAT	WHY/WHERE	APPROACH	METHODS	GREEN	WRAP-UP
CONTEXT & MANAGING THE ASSETS	PRIORITIZATION LOCATION SCOPE & TIMING	WORK PLANNING/GIS STATISTICS	CONSTRUCTION METHODS & <u>KEYHOLE</u>	CARBON FOOTPRINT	VIDEO & Q & A
					



# CONTEXT

## OUR FOCUS

### Our Vision

Delivering reliable energy service and the choices that matter most to our customers.

### Our Purpose

To improve life's quality with energy.

Safely – Reliably – Responsibly

### Our Lasting Principles

#### TRUSTWORTHY

Our word is reliable, we do what is right

#### INNOVATIVE

We continuously improve and find better ways to get things done

#### COLLABORATIVE


We are respectful and are at our best when working together



GFRP

Safe & Reliable Infrastructure

Invest in our infrastructure to achieve optimum life-cycle performance – safely, reliably and at a fair price



Customer Engagement & Value

Deliver more value to more customers and strengthen engagement

People & Performance

Reinforce a values-driven culture of employees who do the right thing to help us succeed

Financial Performance

Strengthen financial performance to remain a healthy company and an attractive investment

Community Vitality


Act through partnerships, financial resources and service to enhance community vitality and prosperity in the communities we serve

Responsible Resources

Control a portfolio of resources that responsibly meet our long term energy needs


Effective Public Policy Outcomes

Drive positive outcomes at the local, state, regional and federal level




2016 Focus Areas

Customer Engagement




Products & services  
Digital strategy  
Customer choice

Financial Performance




Alaska opportunities  
System modernization  
Investments for growth

Community Vitality



Economic development  
Avista partnership  
Smart City

People & Performance



Safety  
Innovation  
Alignment



# MANAGING THE ASSETS

## MAIN PIPE

- ❑ 1 ¼" TO 4" DIAMETER PIPE
- ❑ INSTALLED 1964 TO 1987  
(PRE 1984 ALDYL A PIPE)



## SERVICE TEE

### TRANSITION REBUILD (STTR)

- ❑ ALDYL A SERVICE PIPE AT STEEL TEE  
LOCATED ON STEEL MAIN

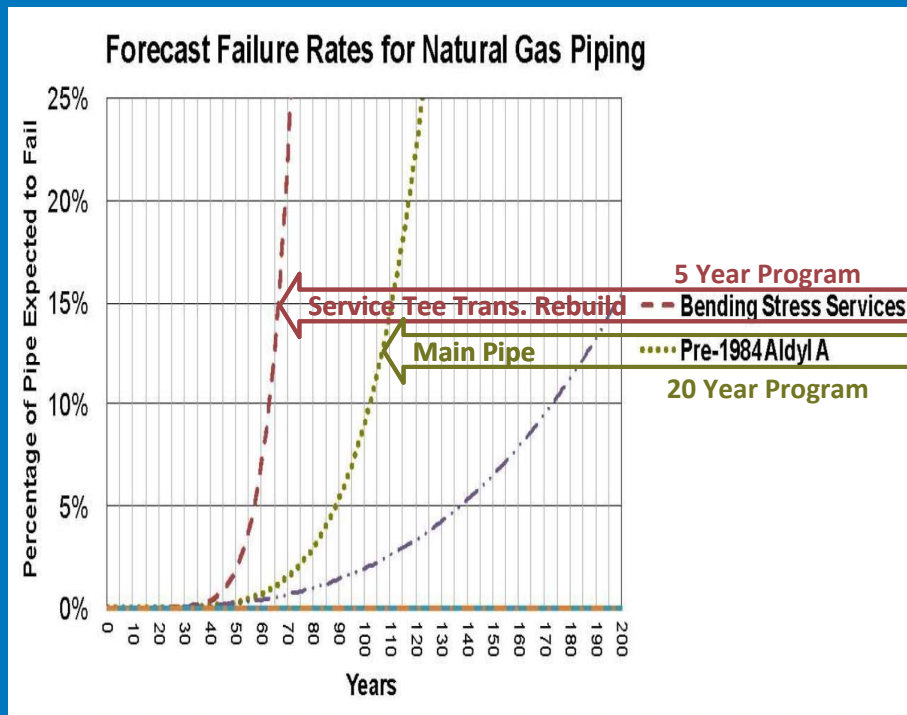


# PRIORITIZATION

## PROTOCOL FOR MANAGING ALDYL 'A' PIPE

AVISTA ASSET MANAGEMENT  
(FEBRUARY 2012)

**20 YEAR TIME FRAME IS OPTIMUM**



## DISTRIBUTION INTEGRITY MANAGEMENT PLAN (DIMP)

KNOW WHAT IS IN YOUR SYSTEM

IDENTIFY THREATS

EVALUATE & RANK RISKS

IDENTIFY & IMPLEMENT MEASURES TO  
REDUCE RISK

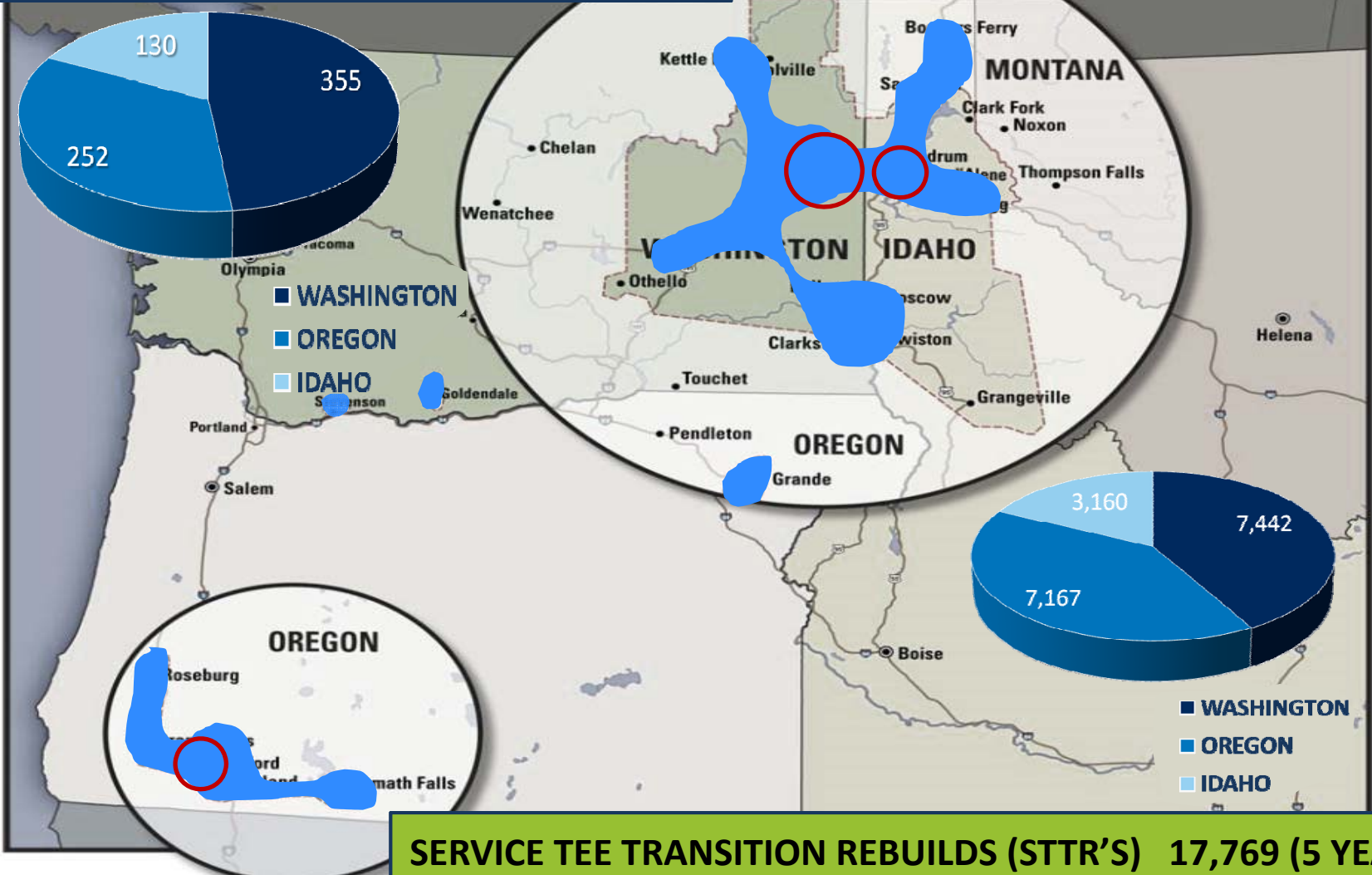
MEASURE / MONITOR & EVALUATE  
EFFECTIVENESS

REPORT RESULTS

LEAK SURVEYS CONTINUE TO  
CAPTURE NEW DATA & IDENTIFY  
THREATS

# LOCATION & SCOPE

**737 MILES OF MAIN PIPE (20 YEARS)**

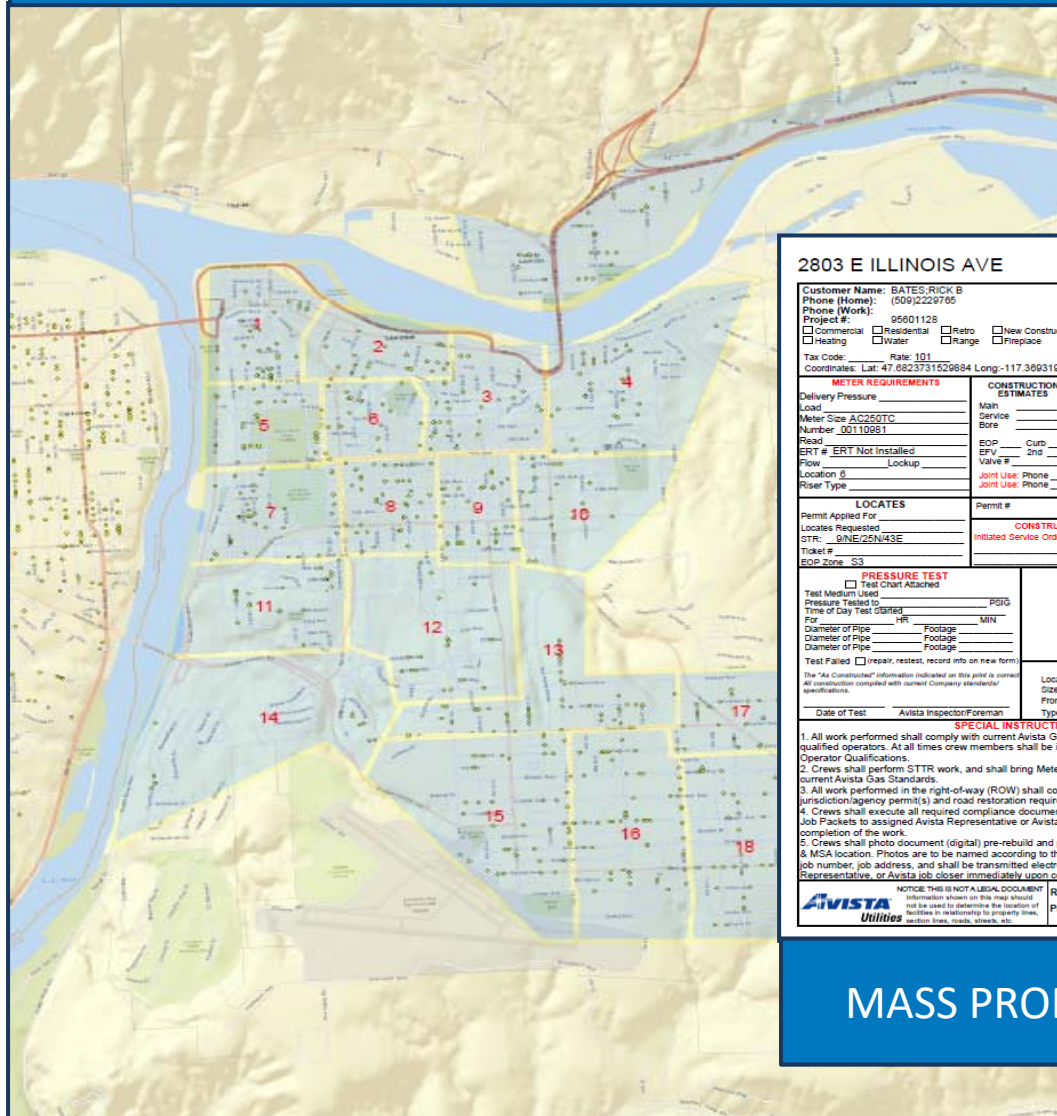


- = HIGHEST CONCENTRATIONS
- = SERVICE TERRITORY

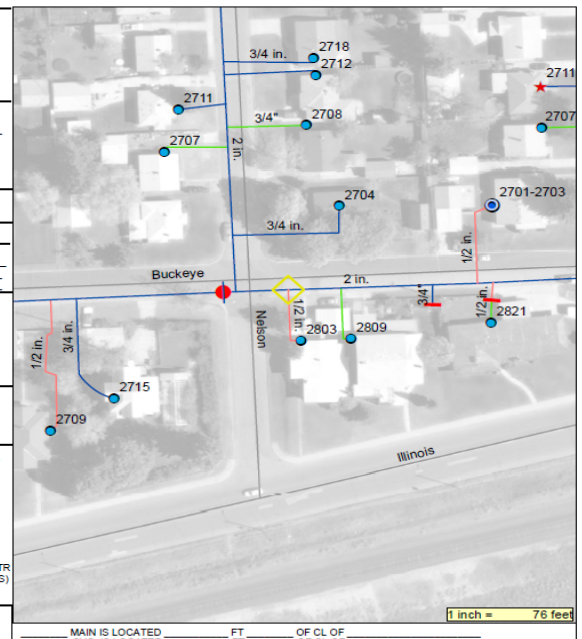
# APPROACH - LEVERAGING GIS & WORK PLANNING

## GEOGRAPHIC WORK PACKAGING

- PROJECT AREAS DEFINED
- PROJECT PHASES CREATED
- JOB LOCATIONS IDENTIFIED



2803 E ILLINOIS AVE		SPOKANE STTR ALDYL REPLACEMENT		Job # 491352576
<b>Customer Name:</b> BATES, RICK B <b>Phone (Home):</b> (509)2229765 <b>Phone (Work):</b> _____ <b>Project #:</b> 95801128 <input type="checkbox"/> Commercial <input type="checkbox"/> Residential <input type="checkbox"/> Retro <input type="checkbox"/> New Construction <input type="checkbox"/> In City <input type="checkbox"/> Heating <input type="checkbox"/> Water <input type="checkbox"/> Range <input type="checkbox"/> Fireplace <input type="checkbox"/> Other <input type="checkbox"/> Out of City <b>Tax Code:</b> _____ <b>Rate:</b> 101 <b>Coordinates:</b> Lat: 47.6823731526884 Long: -117.389319585477		<b>Tee Id:</b> 15573 <b>Phase:</b> 19 <b>Service Zip:</b> 99207		
<b>METER REQUIREMENTS</b> <b>Delivery Pressure:</b> _____ <b>Load:</b> _____ <b>Meter Size:</b> AC250TC <b>Number:</b> 00110981 <b>ERT #:</b> ERT Not Installed <b>Location #:</b> _____ <b>Riser Type:</b> _____		<b>CONSTRUCTION ESTIMATES</b> <b>Main:</b> _____" <b>Service:</b> _____" <b>Bore:</b> _____" <b>EGP:</b> _____" <b>Curb:</b> _____" <b>Valve #:</b> _____ <b>Joint Use:</b> Phone _____ TV _____ FT Installed _____ <b>Joint Use:</b> Phone _____ TV _____ FT Installed _____		<b>EFV INFO</b> <b>EFV MFG:</b> _____ <b>Model:</b> _____ <b>Capacity:</b> _____ <b>CFH Size:</b> _____ <b>Type:</b> <input type="checkbox"/> TEE <input type="checkbox"/> STICK
<b>LOCATES</b> <b>Permit Applied For:</b> _____ <b>Locates Requested:</b> _____ <b>STR:</b> 9INE/25N43E <b>Track #:</b> _____ <b>EGP Zone:</b> S3		<b>Permit #:</b> _____ <b>Dwg #:</b> _____ <b>CONSTRUCTION CREW REMARKS</b> <b>Initiated Service Order Number:</b> _____		
<b>PRESSURE TEST</b> <input type="checkbox"/> TEST CHART ATTACHED <b>Test Medium Used:</b> _____ <b>Pressure Tested to:</b> _____ PSIG <b>Time of Day Test Started:</b> _____ <b>For:</b> _____ HR _____ MIN <b>Diameter of Pipe:</b> _____ Footage _____ <b>Diameter of Pipe:</b> _____ Footage _____ <b>Diameter of Pipe:</b> _____ Footage _____ <input type="checkbox"/> Test Failed (repair, reset, record info on new form) <small>The "As Constructed" information indicated on this print is correct. All construction complied with current Company standards/ specifications.</small>		<b>CREW PRN COMMENTS</b>    		
<b>Date of Test:</b> _____ <b>Avista Inspector/Foreman:</b> _____		<b>TAP INFORMATION</b> <b>Location:</b> _____ <b>Size:</b> _____ <b>From:</b> _____		
<b>SPECIAL INSTRUCTIONS</b> 1. All work performed shall comply with current Avista Gas Standards, and be performed by qualified operators. At all times crew members shall be identified by Avista ID badge & Operator Qualifications. 2. Crews shall perform STTR work, and shall bring Meter Set Assembly MSA up to current Avista Gas Standards. 3. All work performed in the right-of-way (ROW) shall comply with local jurisdiction/agency permit(s) and road restoration requirements. 4. Crews shall execute all required compliance documents during the work, and return Job Packets to assigned Avista Representative or Avista job closer immediately upon completion of the work. 5. Crews shall photo document (digital) pre-rebuild and post-rebuild conditions at each STTR & MSA location. Photos are to be named according to the Work Management System (WMS) job number, job address, and shall be transmitted electronically to the assigned Avista Representative, or Avista job closer immediately upon completion of the work.				
<b>AVISTA Utilities</b> <small>Information shown on this map should not be used to determine the location of facilities in relationship to property lines, section lines, roads, streams, etc.</small>		<b>Route To:</b> Avista Representative <b>Print Date:</b> 02-19-2014		<b>1 inch = 76 feet</b>

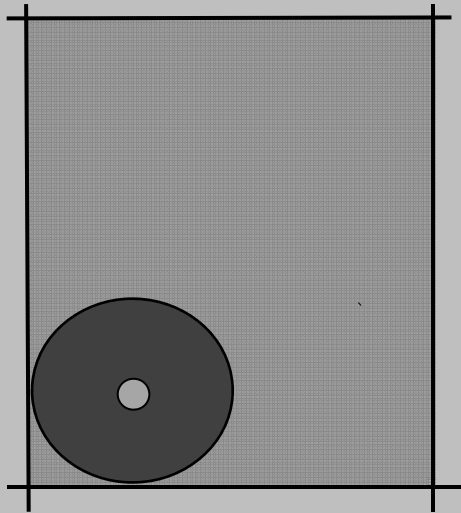


## MASS PRODUCED JOB CARDS (SINGLE DESIGN)

# KEYHOLE REINSTATEMENT VS. CONVENTIONAL CUT

CONVENTIONAL 4' X 5'  
PAVEMENT CUT & PATCH

AVG. CUT  $\approx$  365 LBS. CO<sub>2</sub>



24" DIAMETER CORE  
 $\approx$  84 % SMALLER THAN  
CONVENTIONAL CUT

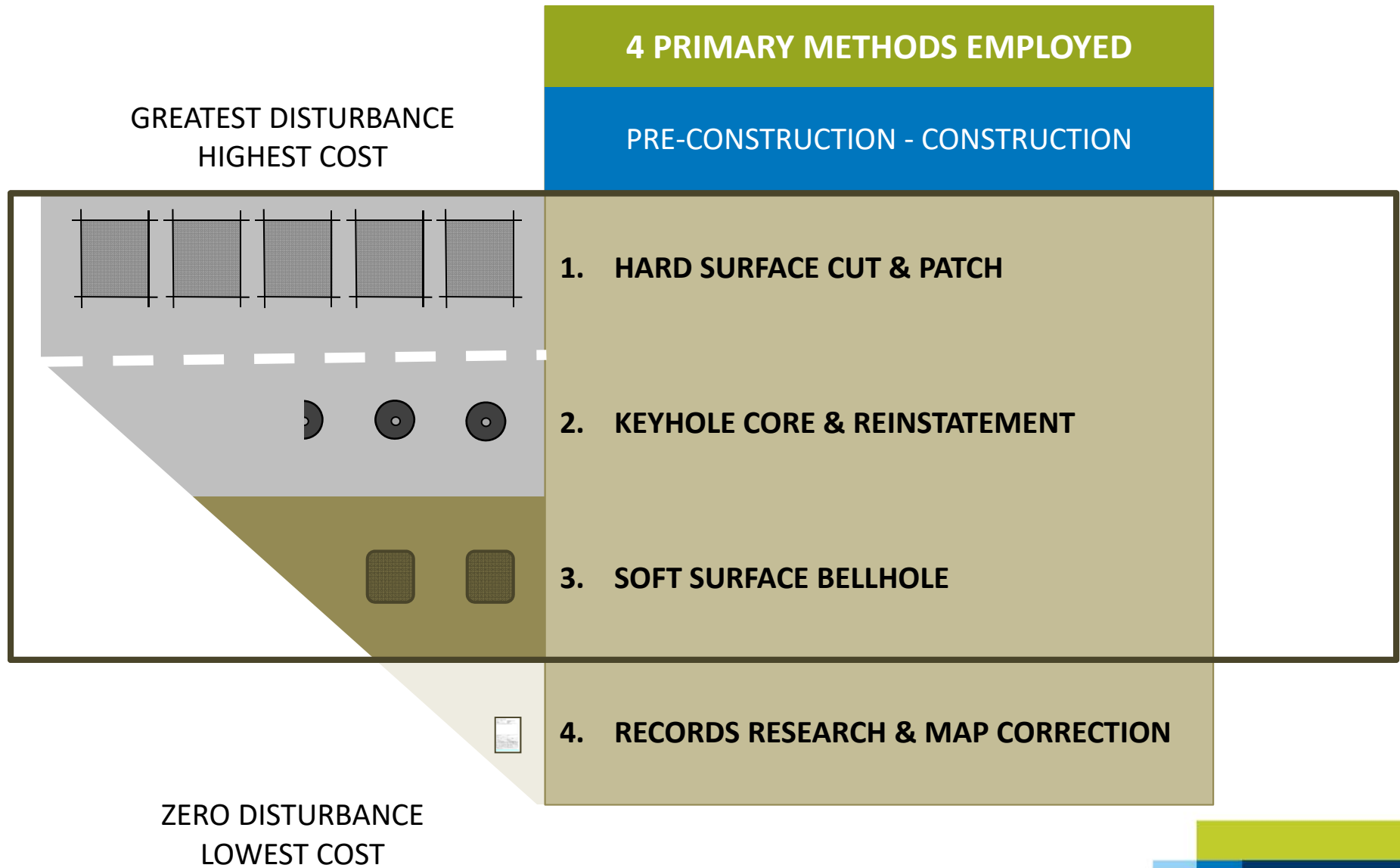
$\approx$  60 LBS. CO<sub>2</sub>

## KEYHOLE TECHNOLOGY BENEFITS

- ELIMINATES SAW CUTS & OVERCUTS
- PERMANENT WATER TIGHT BOND
- REDUCES RESTORATION FOOTPRINT
- MINIMIZES ROAD IMPACTS & CLOSURES
- REQUIRES FEWER PIECES OF EXCAVATION EQUIPMENT & HAUL TRUCKS AND TRIPS
- ATMOSPHERIC EMISSIONS OF GREEN HOUSE GASES REDUCED SIGNIFICANTLY
- IS 1/6<sup>TH</sup> THE CARBON FOOTPRINT THAN CONVENTIONAL OPEN CUT
- ASPHALT COUPON/CORE IS REUSED
- REDUCES CONSUMPTION OF ASPHALT
- REDUCES ASPHALT WASTE DISPOSAL & IMPACT TO LANDFILLS
- MINIMAL IMPACT TO CUSTOMERS



# ROAD DISTURBANCE



# LEVERAGING TECHNOLOGY FOR STTR PROJECTS

## KEYHOLE TECHNOLOGY

### URBAN MICRO-SURGERY



### RE-INSTATED CORE



## VACUUM EXCAVATION

### SAFE EXCAVATION



### REBUILD ASSEMBLY



## HARD SURFACE CUT & PATCH

### GREATEST DISTURBANCE

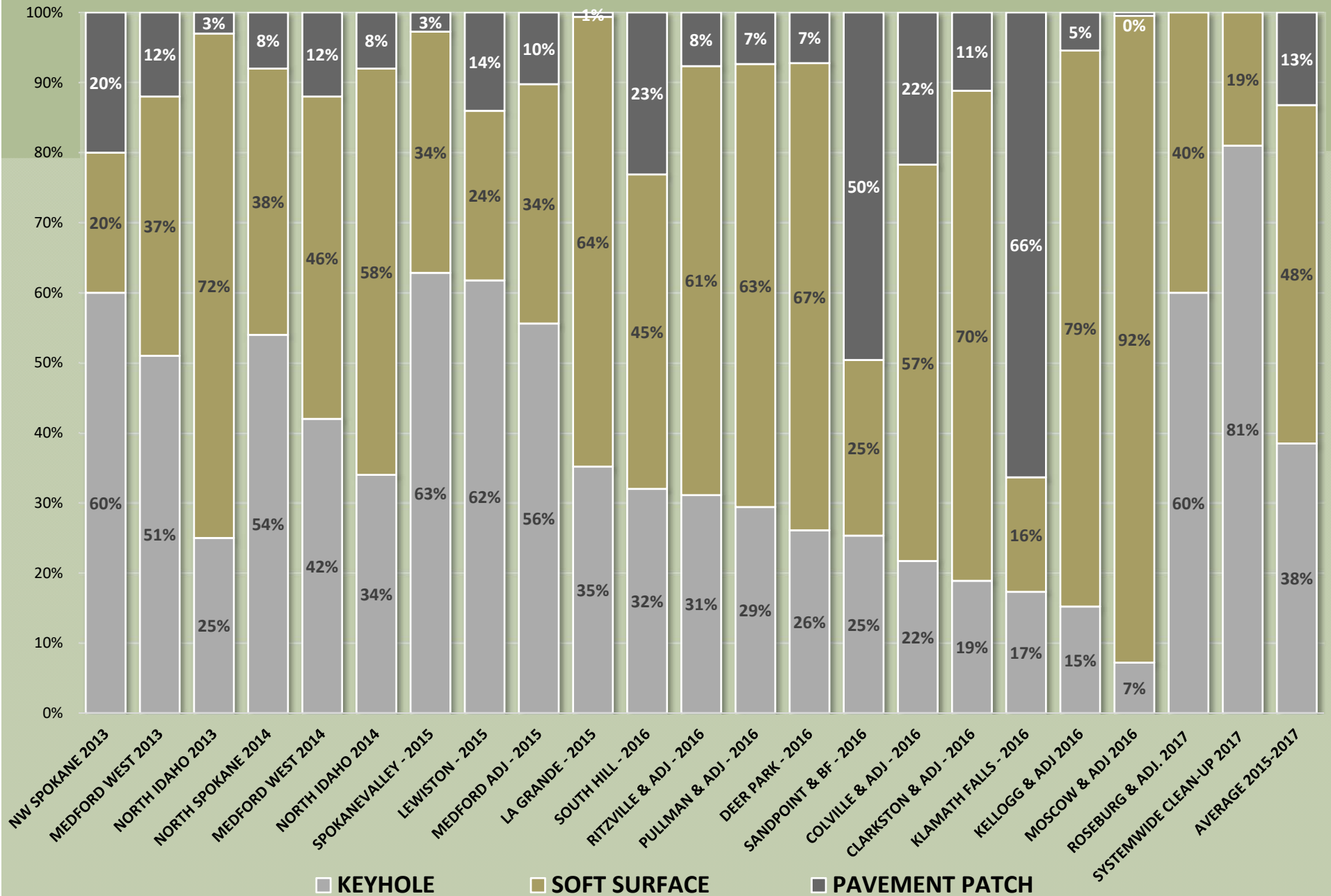


### SOFT SURFACE BELL HOLE



# STTR - ALL PROJECTS BY METHOD

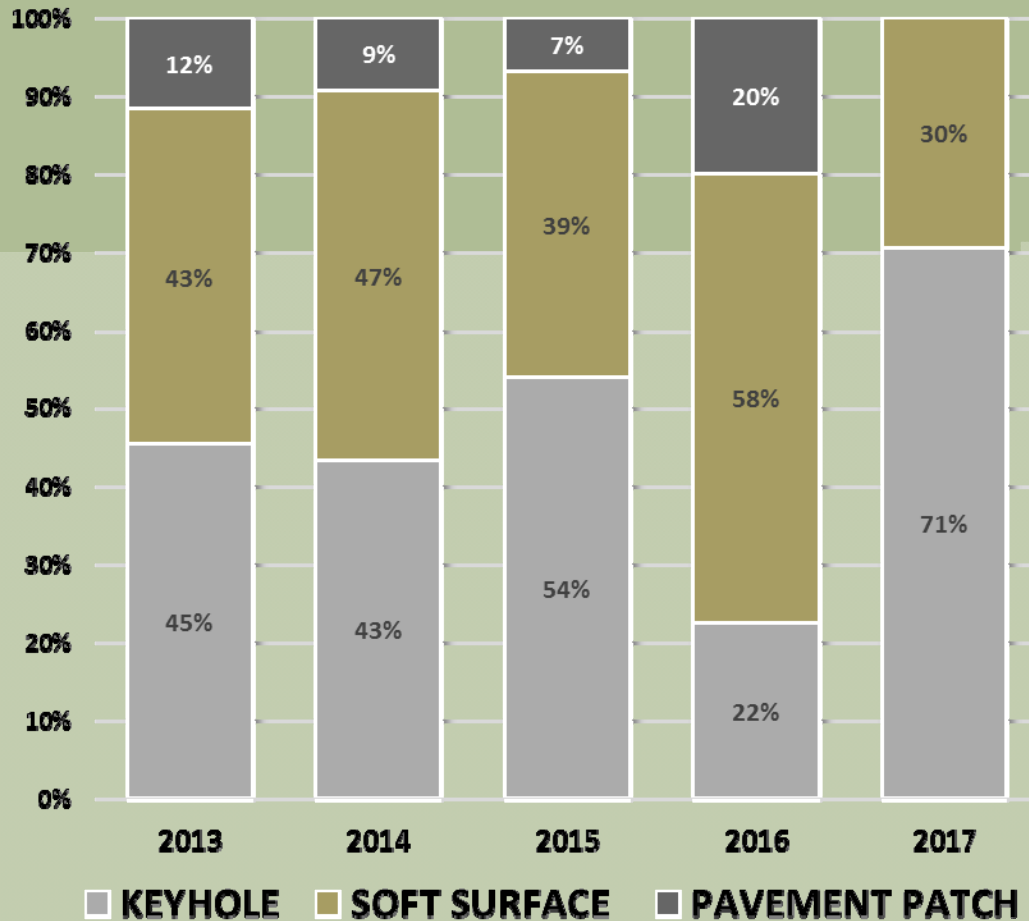
22 STTR PROJECTS 2013 - 2017



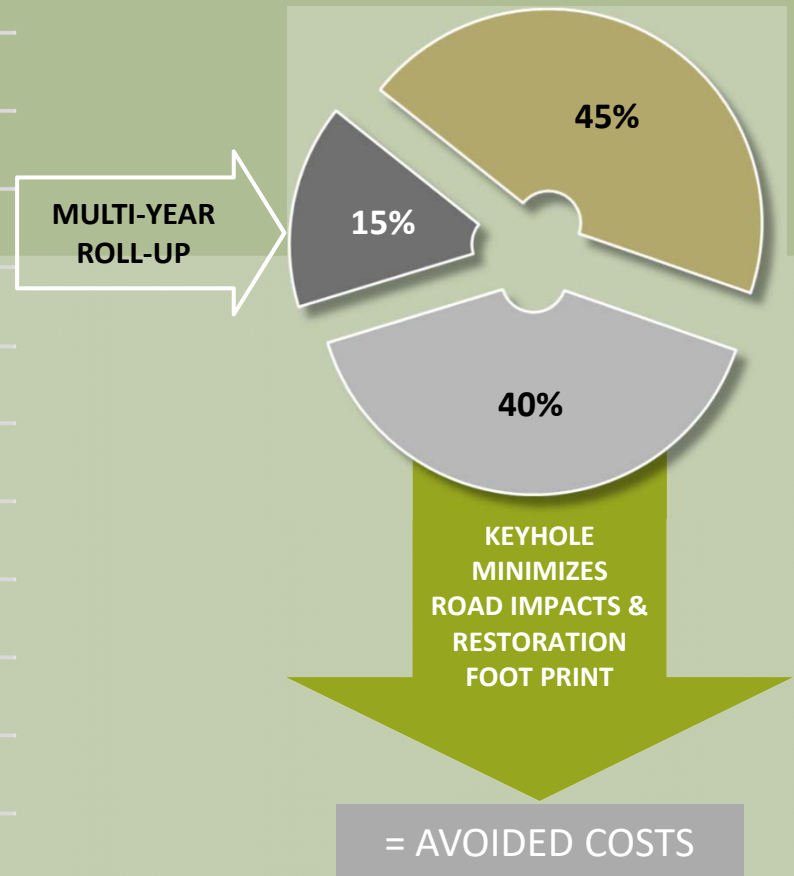
# STTR PROGRAM STATISTICS

## LEVERAGING KEYHOLE TECHNOLOGY TO AVOID RESTORATION COSTS

STTR METHOD (%) BY YEAR



PERCENT BY METHOD

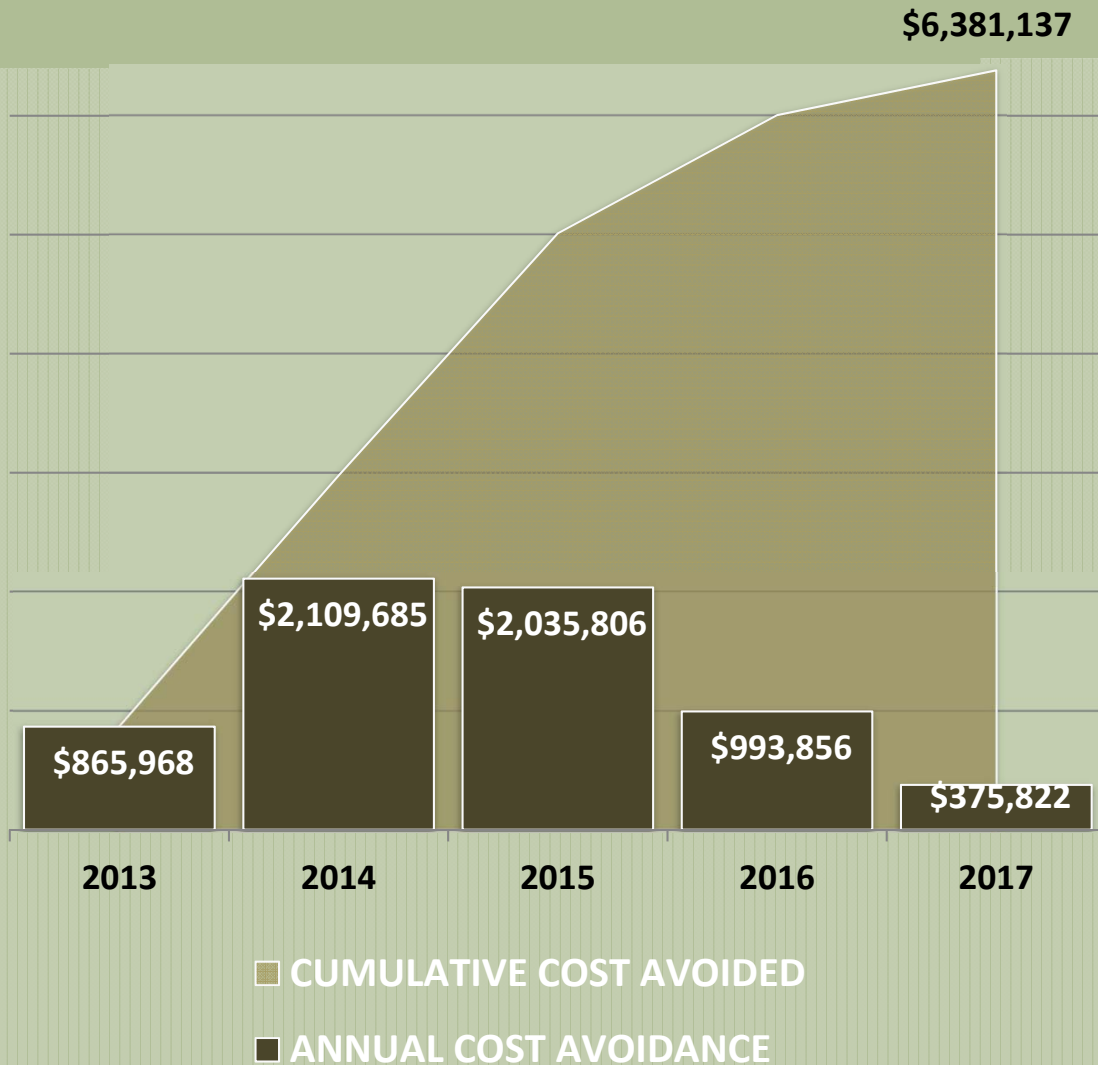


MULTI-YEAR ROLL-UP

2013 -2017 STTR PROFILE

# STTR PROGRAM COST AVOIDANCE

## AVOIDED COSTS



## PROGRESS

98% COMPLETE  
>17.3 K UNITS



## CUSTOMER CARE

POSITIVE RESULTS



COMPLAINTS < 1%

# LEVERAGING TECHNOLOGY FOR MAIN PIPE PROJECTS

OPEN TRENCH EXCAVATION

GREATEST FOOTPRINT



HORIZONTAL DIRECTIONAL DRILL (HDD)

MINIMAL FOOTPRINT



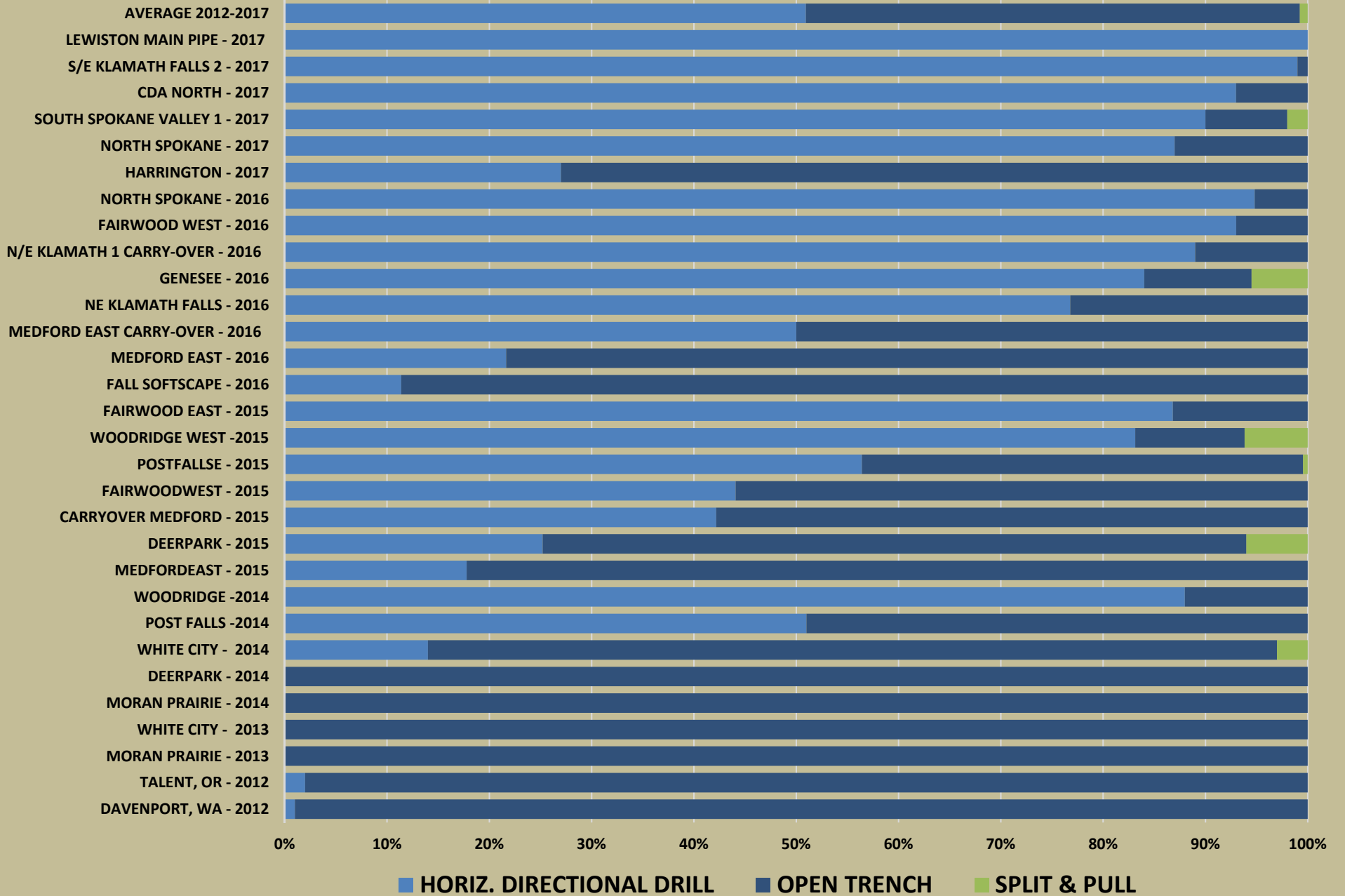
SPLIT & PULL

MINIMAL FOOTPRINT

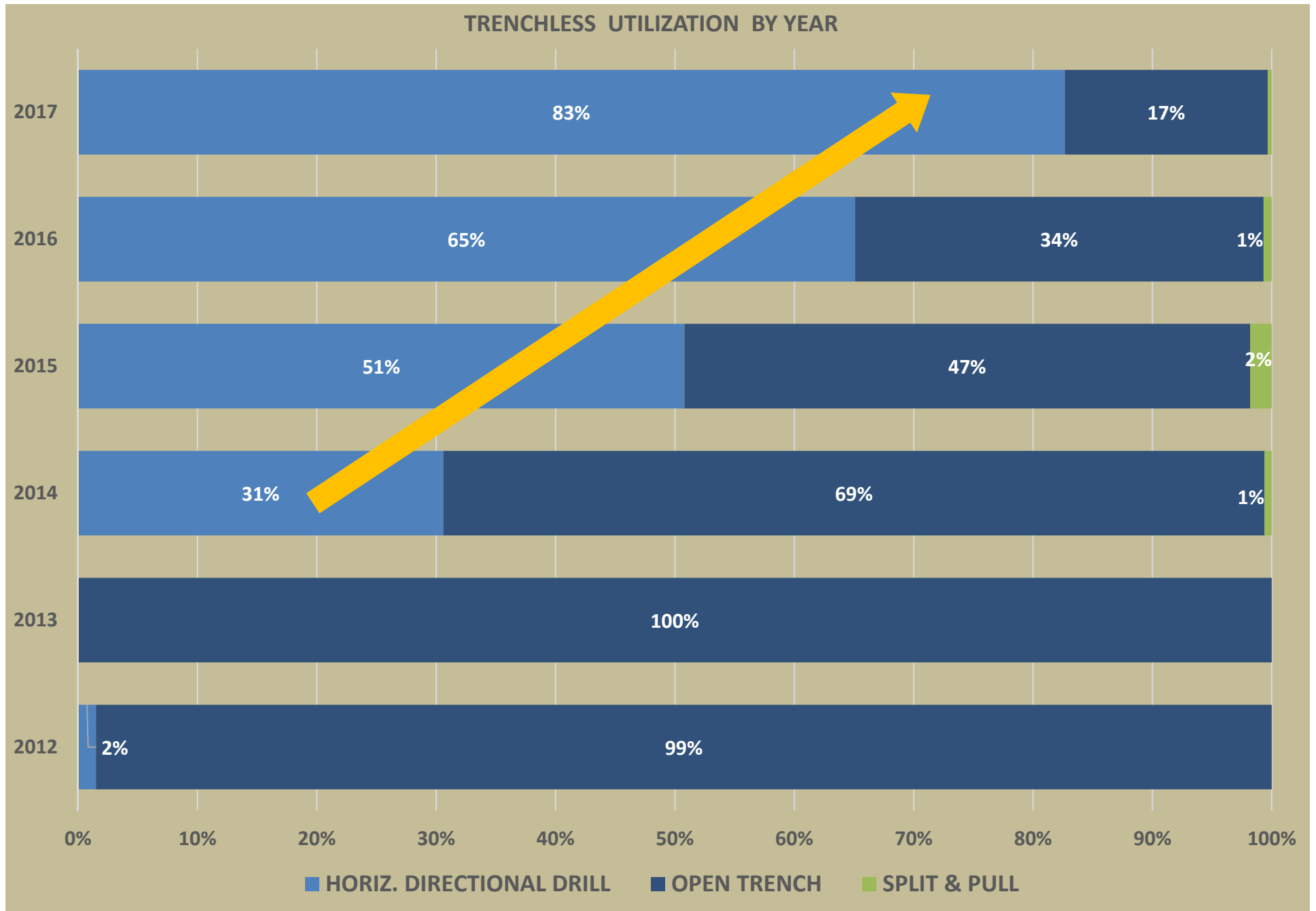


# TRENCHLESS TECHNOLOGY UTILIZATION (MAIN PIPE)

30 MAIN PIPE PROJECTS 2012-2017



# TRENCHLESS TECHNOLOGY UTILIZATION (MAIN PIPE)





# KEYHOLE TECHNOLOGY USED ON MAIN PIPE PROJECTS

## KEYHOLE TECHNOLOGY

SUPPORTS MAIN PIPE HDD/BORE OPERATIONS

## SOFT EXCAVATION

SPOTTING CROSSING UTILITIES SAFELY

APPROXIMATE AVOIDED COSTS 2014 -2017

\$375,946

\$917,144

\$653,775

\$756,024

\$ 2.7 M



# GREEN TECHNOLOGY

BY LEVERAGING KEYHOLE TECHNOLOGY  
AVISTA'S ALDYL A PIPE REPLACEMENT PROGRAM HAS ELIMINATED



≈ 254 10 YARD DUMP TRUCKS, OR NEARLY 10 MILLION POUNDS  
OF ASPHALT WASTE & NEW ASPHALT

≈ 1.5 MILLION POUNDS OF CO<sub>2</sub> AVOIDED

# THE KEYHOLE PROCESS VIDEO



# Q & A



# SERVICE TEE REBUILD PROCESS

- ❑ JOB IS LOCATED, PAVEMENT IS CORED, CORE IS REMOVED



- ❑ VACUUM / SOFT EXCAVATION EXPOSES MAIN & TEE ASSEMBLY
- ❑ SERVICE PIPE REMOVED FROM SERVICE TEE AT MAIN PIPE
- ❑ EXCESS FLOW VALVE INSTALLED
- ❑ EXISTING SERVICE PIPE TESTED
- ❑ SERVICE PIPE IS RECONNECTED TO MAIN PIPE

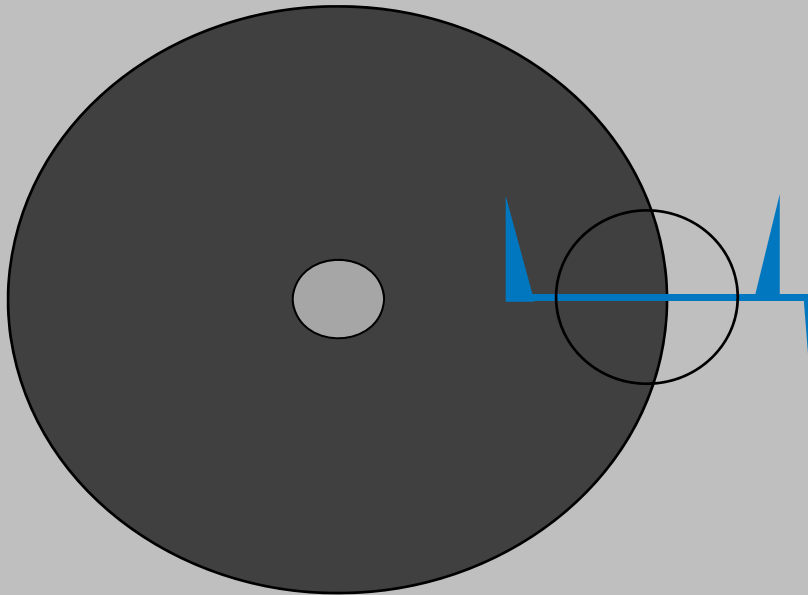


- ❑ ASSEMBLY IS PROTECTED BY A COMPLETION SLEEVE
- ❑ ASSEMBLY BEDDED IN SAND
- ❑ BACKFILL PER MUNICIPAL REQUIREMENTS



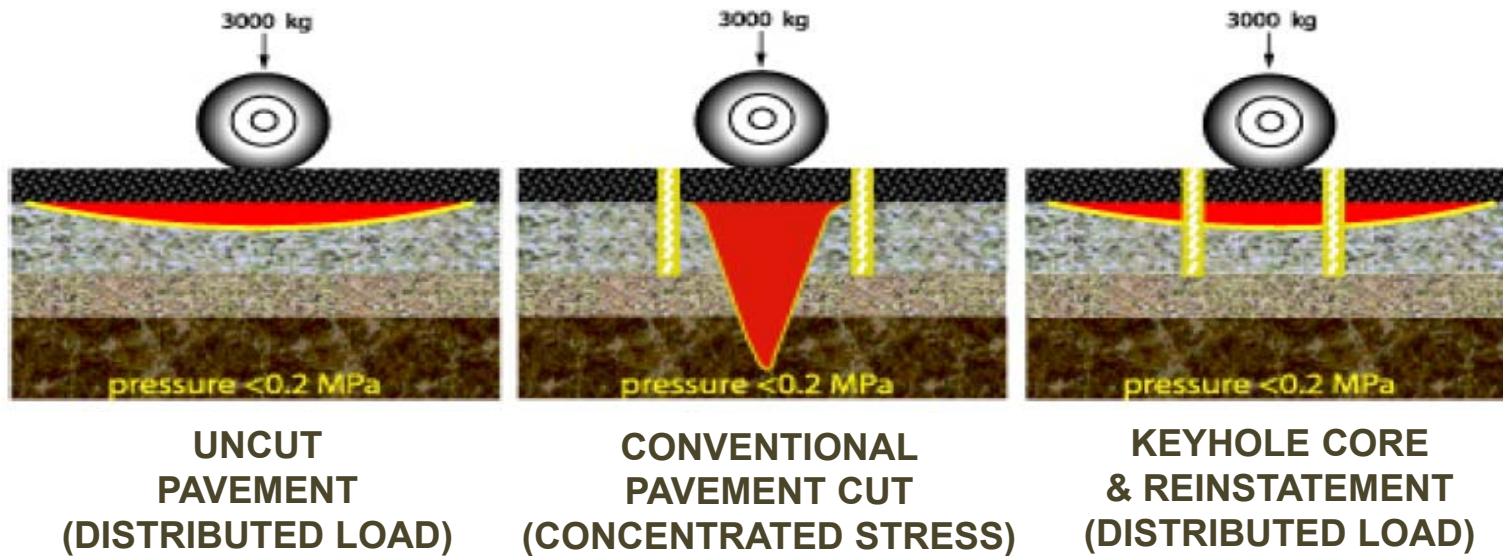
- ❑ STEEL ROAD PLATE CAN BE USED PRIOR TO CORE REINSTATEMENT

# KEYHOLE SATELLITE CORE



CROSS SECTION

# KEYHOLE REINSTATEMENT VS. CONVENTIONAL CUT



***REINSTATED CORES RESTORE THE ABILITY OF THE ROAD TO PERFORM AS ORIGINALLY DESIGNED, ARE WATER TIGHT, AND MINIMIZE POTENTIAL DAMAGE TO SUB-GRADE.***

# RESULTS (2012 - 2017)

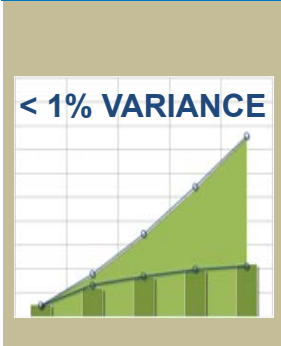
## SCHEDULE

**5** OF 20 YEARS COMPLETE



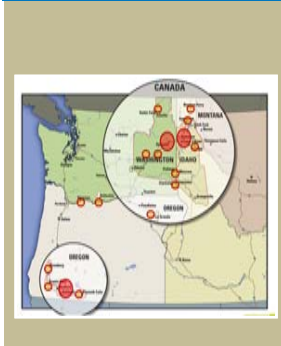
## BUDGET

**\$75M** INVESTED



## SCOPE

**39 PROJECTS**  
**3 STATES**



## SCOPE (M)

**14% MAIN PIPE**  
**> 107 MILES**



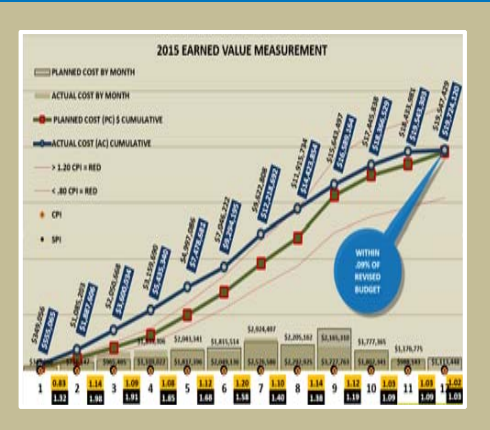
## SCOPE (T)

**92% STTR**  
**>16.2K UNITS**



## PROJECT MANAGEMENT

EARNED VALUE REPORTING & MANAGING THE INVESTMENT



## CUSTOMER CARE

POSITIVE RESULTS

