PNWS-AWWA ♦ 2013 Annual Conference
May 7-10, 2013 ♦ Spokane, Washington

BETWEEN A TANK AND A HARD PLACE

Squeezing in efficiency, reliability, and provisions for solar power generation at the City of Tigard's 10 MG Reservoir Improvements and Transfer Pump Station

Presented by:
Matt Hickey, P.E.

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

INTRODUCTION

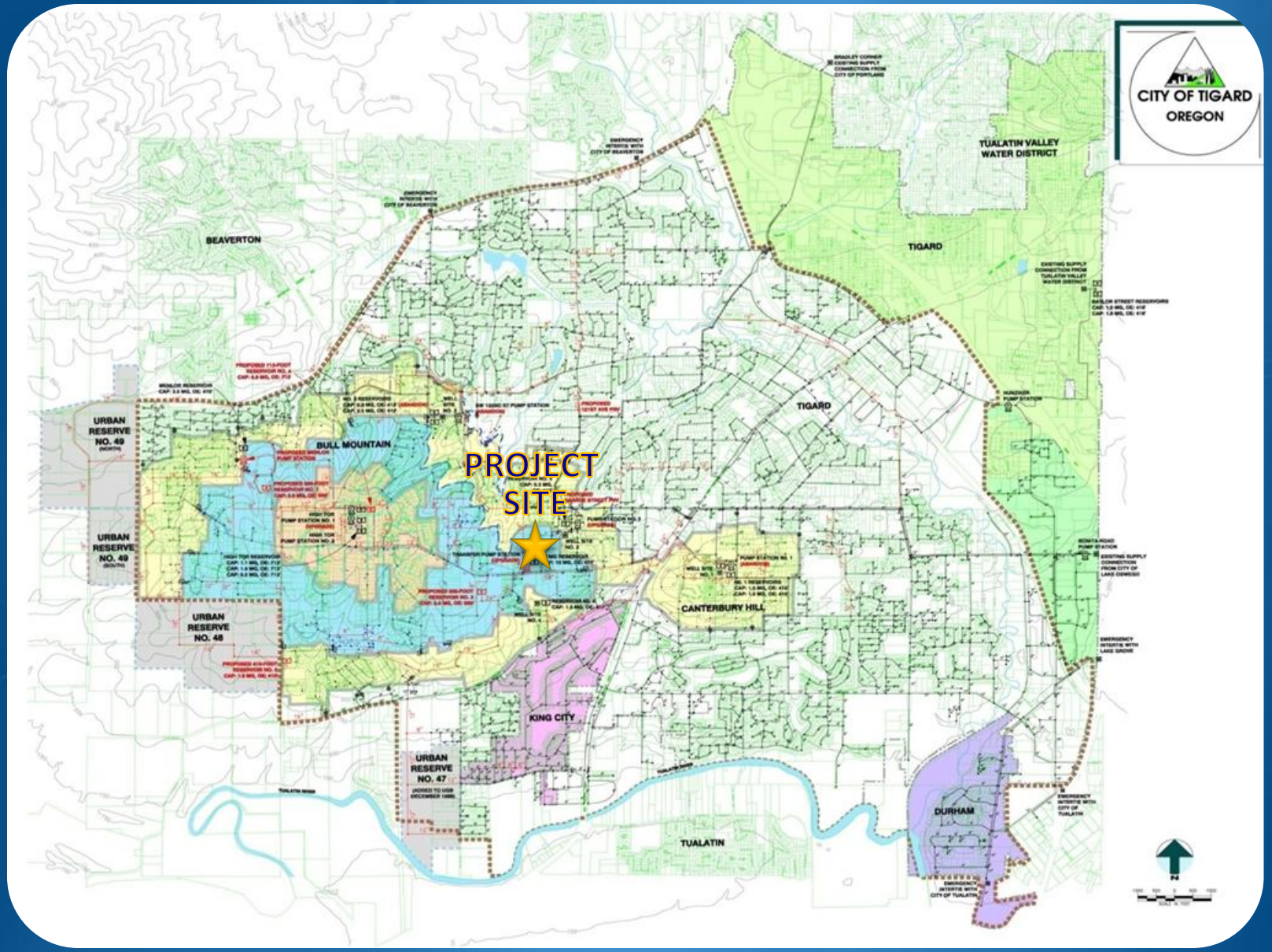
Background on Matt:

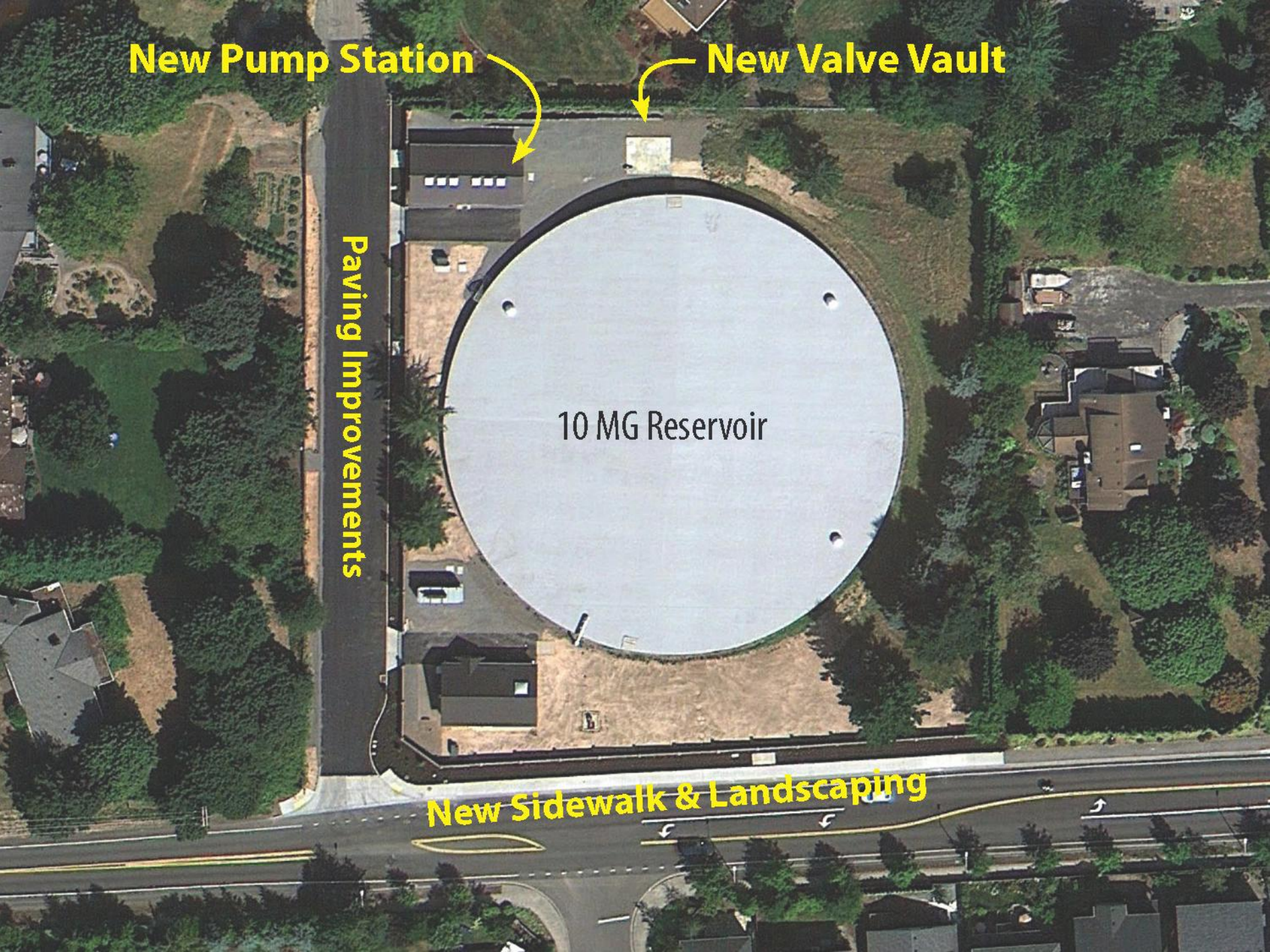
- Over 18 years at MSA
- Specializes in water system planning, design and construction
- Over 25 reservoir and pump station projects in last 19 years

PRESENTATION OUTLINE

- Project Background
- Design Challenges
- Construction Challenges
- Sustainable Solutions
- Public Outreach
- Critical Facility Improvements
- ARRA Funding
- Conclusion/Summary
- Questions & Answers

PROJECT BACKGROUND




New Pump Station
New Valve Vault
Paving Improvements
10 MG Reservoir
New Sidewalk & Landscaping


10 MG TERMINAL RESERVOIR BUILT IN MID-1970s


VENTS PRESENT SECURITY ISSUES

IMPROPER PIPING CONFIGURATION FOR MIXING

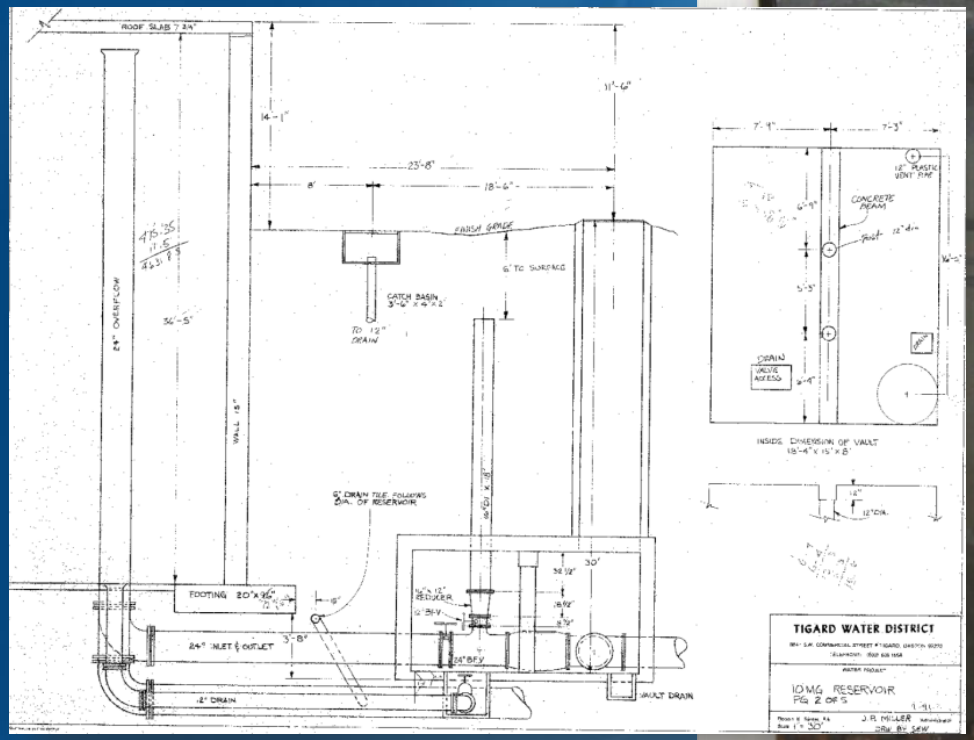

FLOOR CRACKS AND FAILING JOINTS

ROOF CRACKING AND SAGGING ALLOWED RAIN WATER TO ENTER RESERVOIR


EXISTING PUMP STATION – CHALLENGING ACCESS

EXISTING TRANSFER STATION
ONE PUMP INSTALLED EARLY 1990s

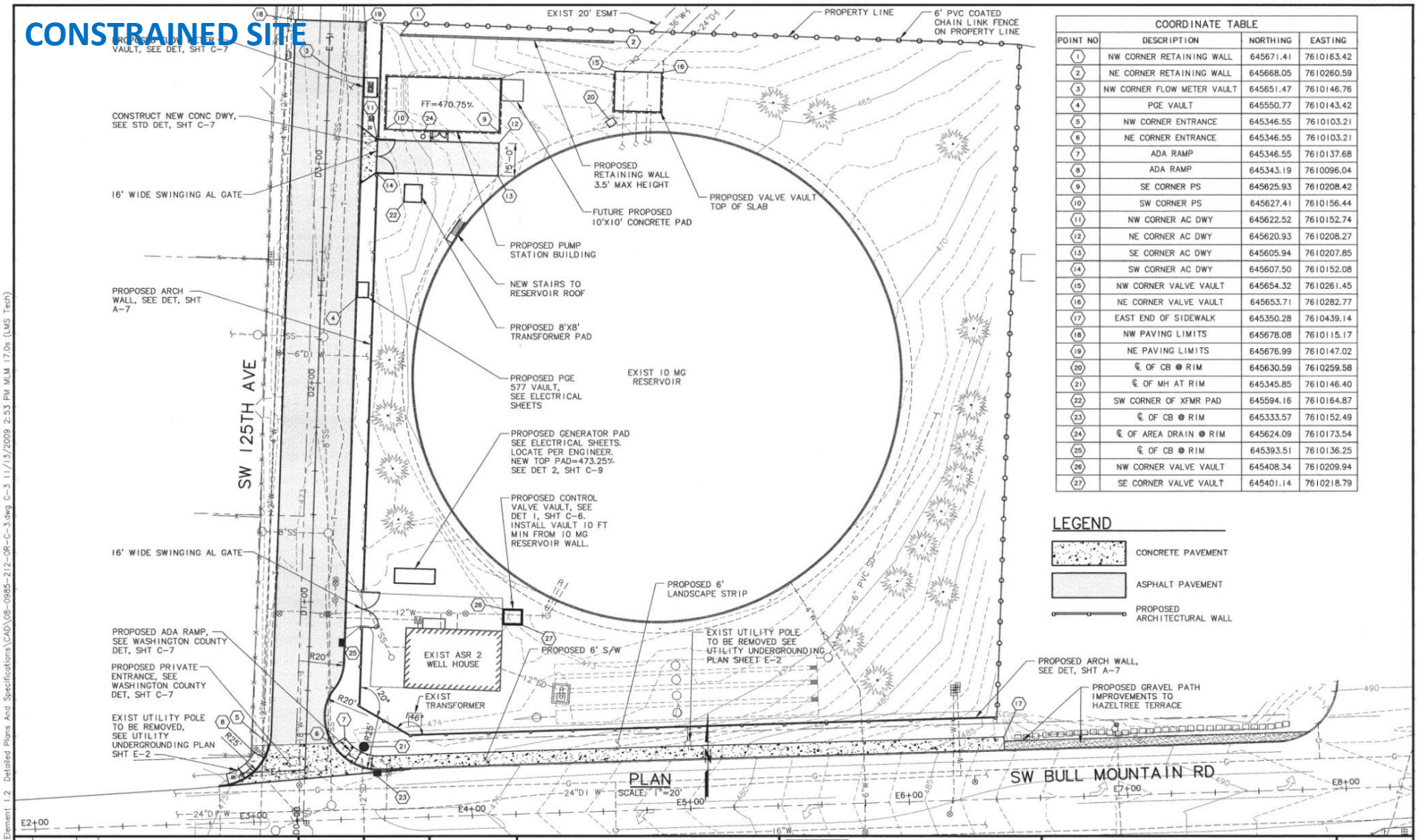
- INEFFICIENT
- LACKS REDUNDANCY
- LIMITED CAPACITY
- NO BACK-UP POWER



EXISTING PUMP STATION AND VALVE VAULT

DESIGN CHALLENGES

CONSTRAINED SITE



COORDINATE TABLE			
POINT NO	DESCRIPTION	NORTHING	EASTING
1	NW CORNER RETAINING WALL	645671.41	7610163.42
2	NE CORNER RETAINING WALL	645668.05	7610260.59
3	NW CORNER FLOW METER VAULT	645651.47	7610146.76
4	PGE VAULT	645550.77	7610143.42
5	NW CORNER ENTRANCE	645346.55	7610103.21
6	NE CORNER ENTRANCE	645346.55	7610103.21
7	ADA RAMP	645346.55	7610137.68
8	ADA RAMP	645343.19	7610096.04
9	SE CORNER PS	645625.93	7610208.42
10	SW CORNER PS	645627.41	7610156.44
11	NW CORNER AC DWY	645622.52	7610152.74
12	NE CORNER AC DWY	645620.93	7610208.27
13	SE CORNER AC DWY	645605.94	7610207.85
14	SW CORNER AC DWY	645607.50	7610152.08
15	NW CORNER VALVE VAULT	645654.32	7610261.45
16	NE CORNER VALVE VAULT	645653.71	7610282.77
17	EAST END OF SIDEWALK	645350.28	7610439.14
18	NW PAVING LIMITS	645678.08	7610115.17
19	NE PAVING LIMITS	645676.99	7610147.02
20	℄ OF CB @ RIM	645630.59	7610259.58
21	℄ OF MH AT RIM	645345.85	7610146.40
22	SW CORNER OF XFMR PAD	645594.16	7610164.87
23	℄ OF CB @ RIM	645333.57	7610152.49
24	℄ OF AREA DRAIN @ RIM	645624.09	7610173.54
25	℄ OF CB @ RIM	645393.51	7610136.25
26	NW CORNER VALVE VAULT	645408.34	7610209.94
27	SE CORNER VALVE VAULT	645401.14	7610218.79

LEGEND
- CONCRETE PAVEMENT
- ASPHALT PAVEMENT
- PROPOSED ARCHITECTURAL WALL

NO. | DATE | BY | REVISION

NOTICE: IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DAM DESIGNED | MLM DRAWN | MLH CHECKED

REGISTERED PROFESSIONAL ENGINEER OREGON JULY 10, 2001 DAPHNE A. MANCHA RENEWS 12-31-10

MSA Murray, Smith & Associates, Inc. Engineers/Planners
121 S.W. Salmon, Suite 900 Portland, Oregon 97204 PHONE 503-225-9010 FAX 503-225-9022

TIGARD

CITY OF TIGARD
10 MG RESERVOIR
IMPROVEMENTS AND
TRANSFER PUMP STATION

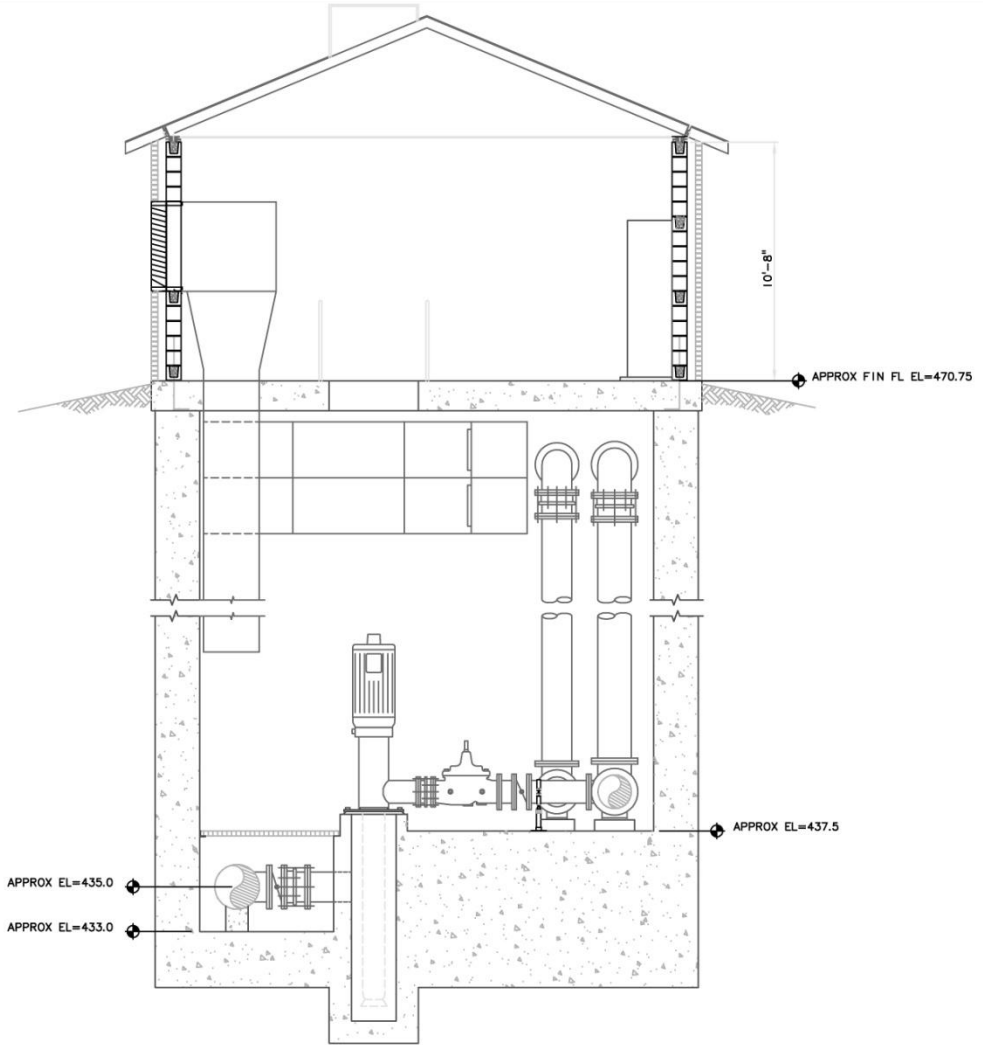
SITE PLAN
AND PAVING PLAN

C-3

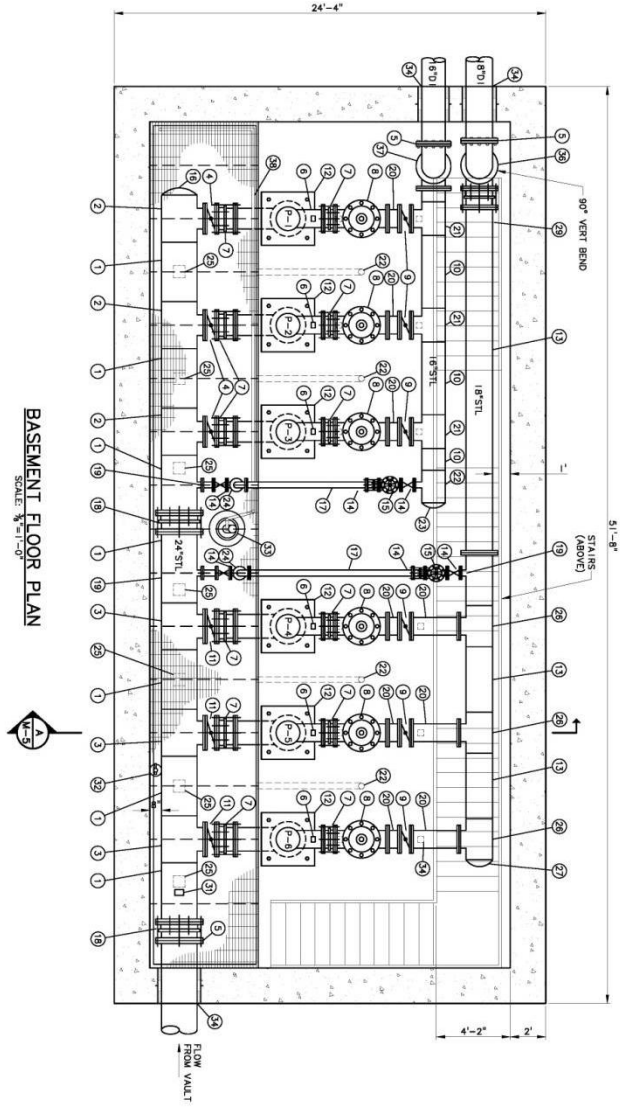
PROJECT NO.: 08-0985.212 | SCALE: 1"=20' | DATE: NOVEMBER 2009

7 OF 86

G:\08\0985\212 - Element 1.2 Detailed Plans And Specifications\CAD\08-0985-212-OR-C-3.dwg C-3 11/3/2009 2:53 PM MLM 17.0s (LMS Tech)



SECTION
SCALE: 3/8"=1'-0"
A
M-3



BASEMENT FLOOR PLAN
SCALE: 3/8"=1'-0"
A
M-5

NO.	DATE	BY	REVISION

NOTICE
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DAM DESIGNED
MBE DRAWN
MLH CHECKED

PRELIMINARY ONLY
APRIL 2009

MSA Murray, Smith & Associates, Inc. Engineers/Planners
131 S.W. Salmon, Suite 900 PHONE 503-225-9010
Portland, Oregon 97204 FAX 503-225-9022

TIGARD

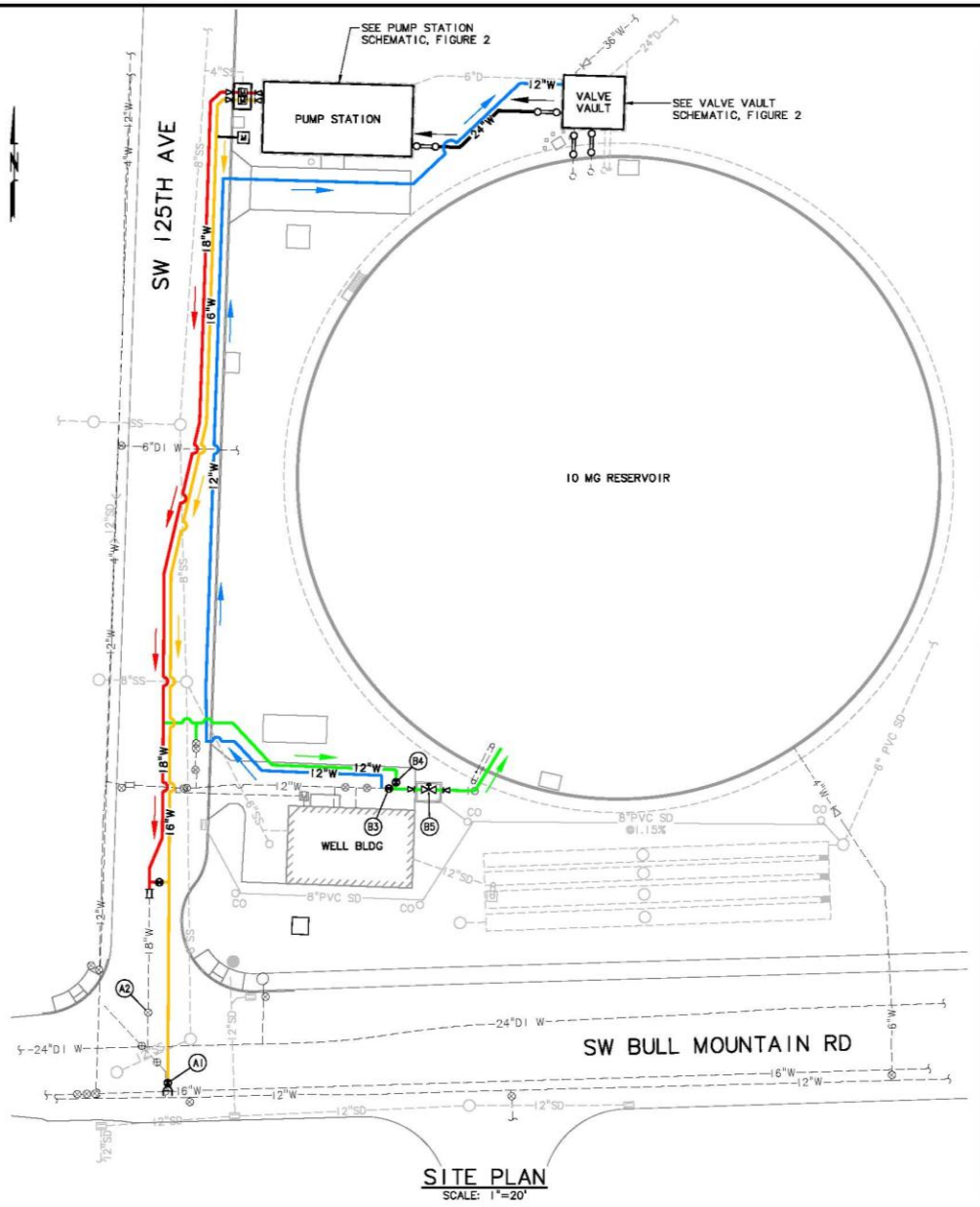
CITY OF TIGARD
10 MG RESERVOIR
IMPROVEMENTS AND
TRANSFER PUMP STATION

PUMP STATION SECTION VIEW

PROJECT NO.: 08-0985.212 | SCALE: AS SHOWN | DATE: APRIL 2009

SHEET
M-5

PUMP STATION CONFIGURATIONS



MODE 1B:
ASR-2 DISCHARGE PIPING TO SUPPLY 10 MG

PROJECT NO.: 08-0985.305 | SCALE: 1"=20' | DATE: SEPTEMBER 2011

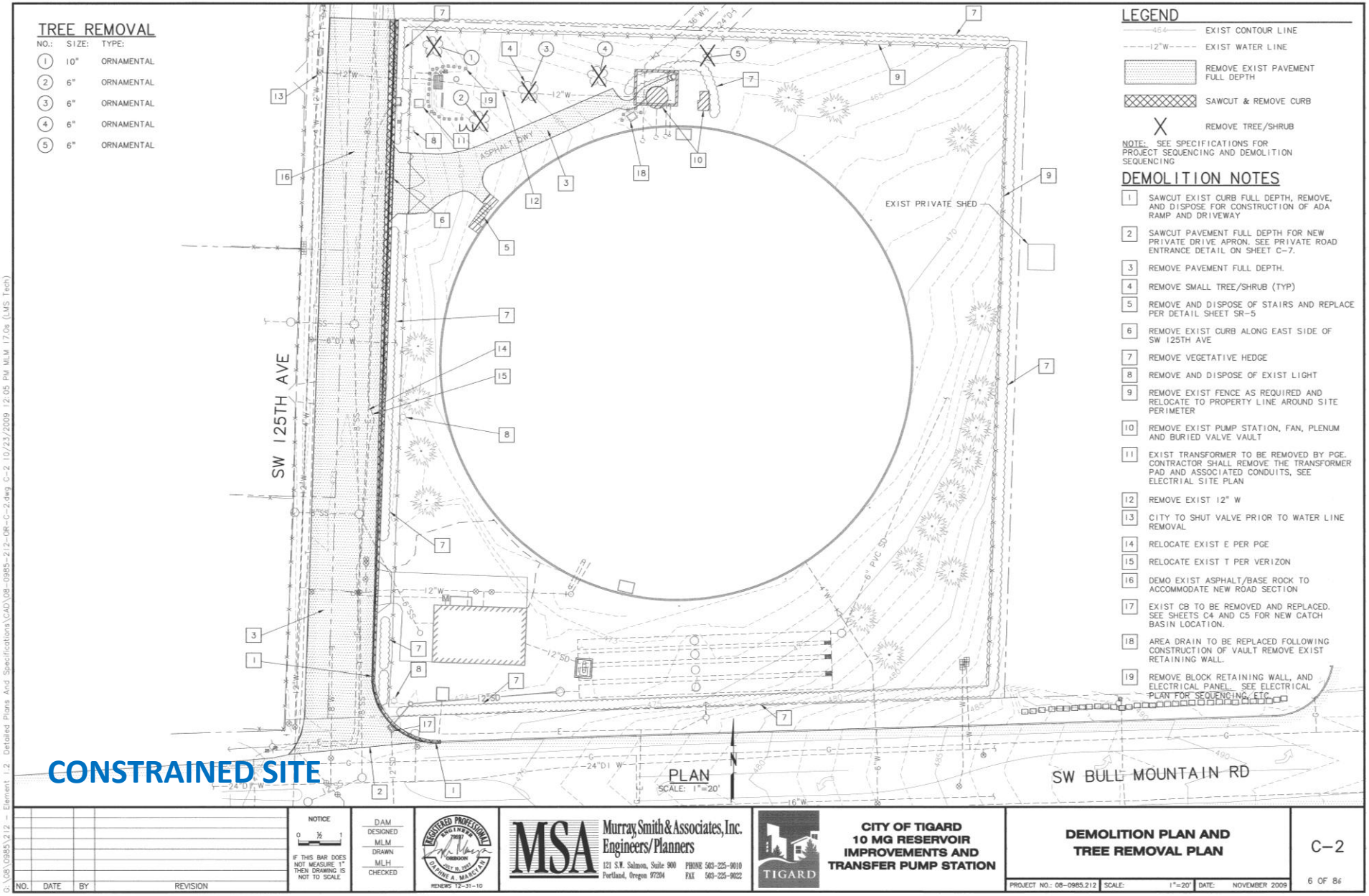
G:\PDX_Projects\08\0985\305 - Record Drawings And O&M Manuals\CAD\08-0985-305-OR-OPERATION MODES.dwg, FIGURE 1, 9/13/2011 2:55 PM, DAK, 18.1s (LMS Tech)

INTEGRATION WITH ASR FACILITIES AND OTHER SYSTEM OPERATIONS

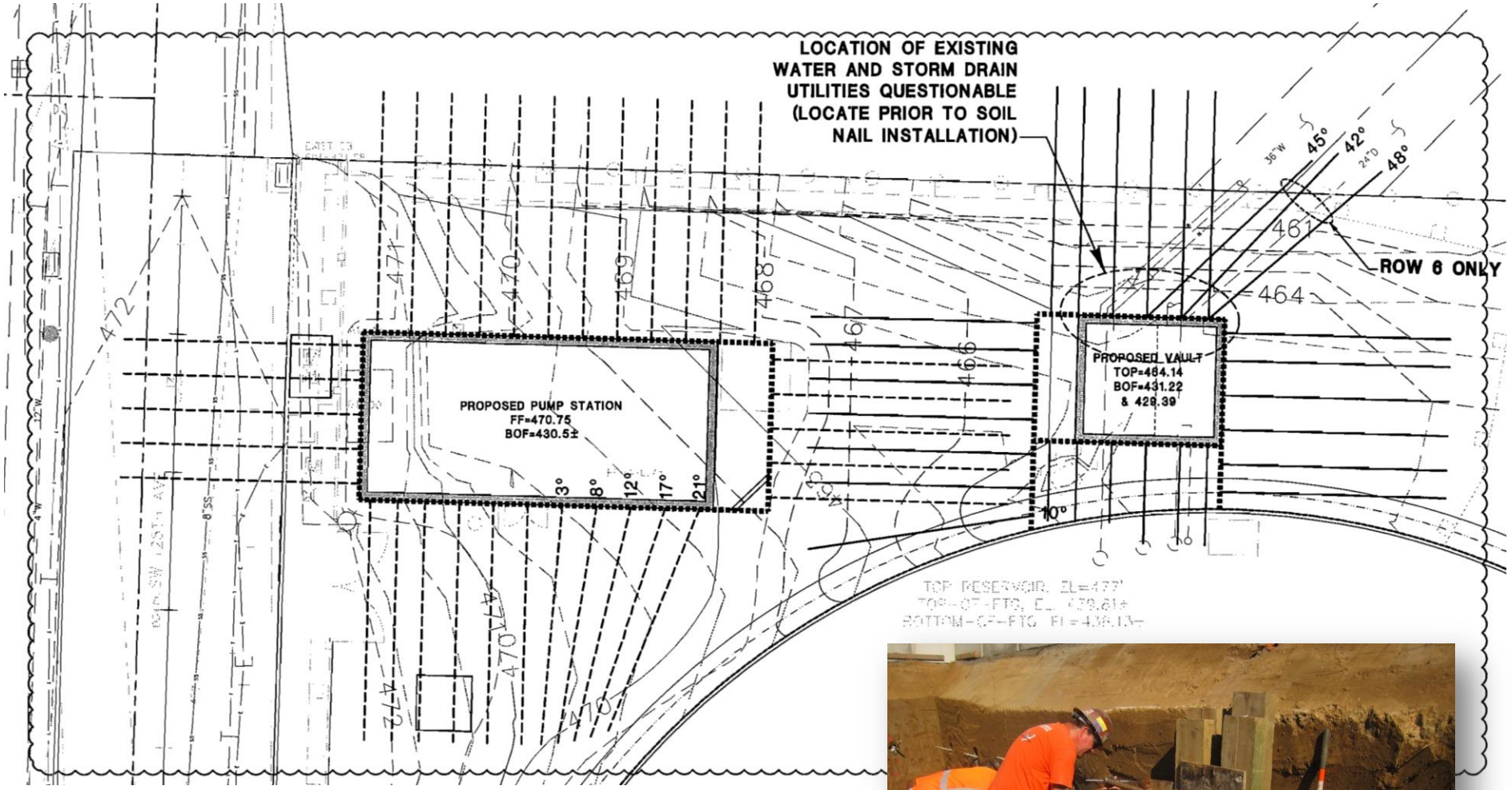
CONTRACTOR PREQUALIFICATIONS

- EXCAVATION
- SHORING
- PUMP STATION INSTALLER
- COATING APPLICATORS

CONSTRUCTION CHALLENGES



DEEP EXCAVATION AND SHORING ISSUES



SOIL NAIL PLAN

- POTENTIAL IMPACTS TO RESERVOIR
- POTENTIAL IMPACTS TO EXISTING PIPING
- RECEIVED AN EASEMENT


LACK OF SPACE FOR EQUIPMENT
GROVE

CONCRETE FORMING

- SHORING WALL USED AS OUTSIDE FORM
- SPECIAL FORM TIES
- RESTRICTED PLACEMENT RATE


WATERPROOFING


SUBSURFACE DRAINAGE


EXCAVATION CHALLENGES DUE TO SCHEDULE DELAY DUE TO FUNDING

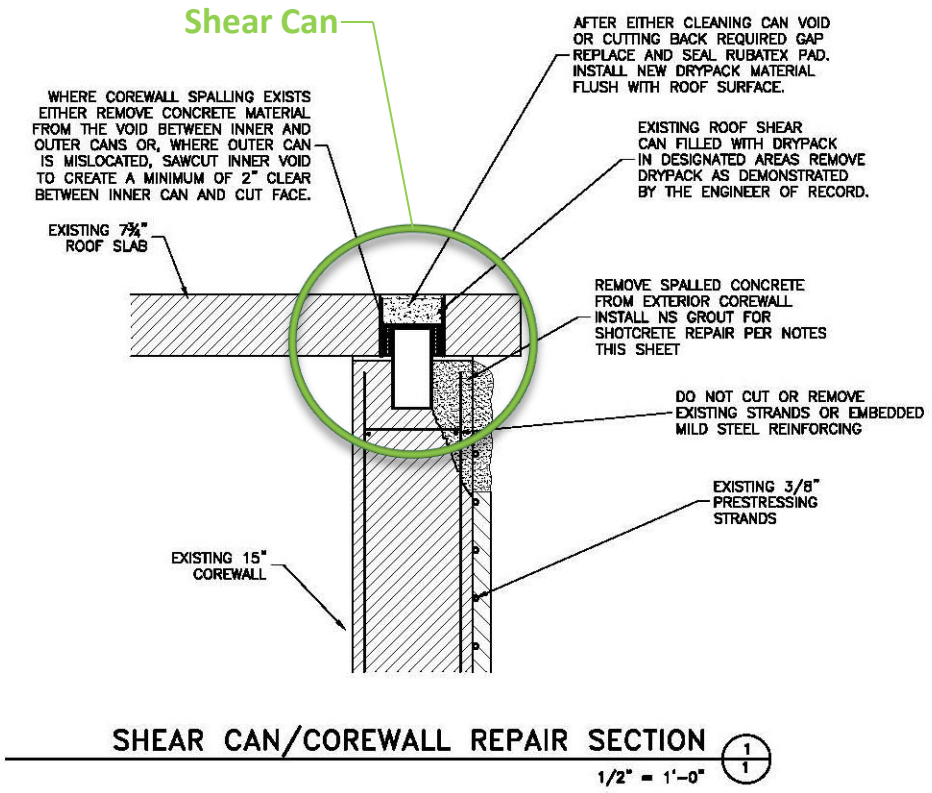
TEMPORARY PUMP STATION - MAINTAINING SERVICE DURING CONSTRUCTION

DELAMINATED SHOTCRETE AND DAMAGED CORE WALL

CORRODED PRESTRESSING WIRES

BEFORE

AFTER



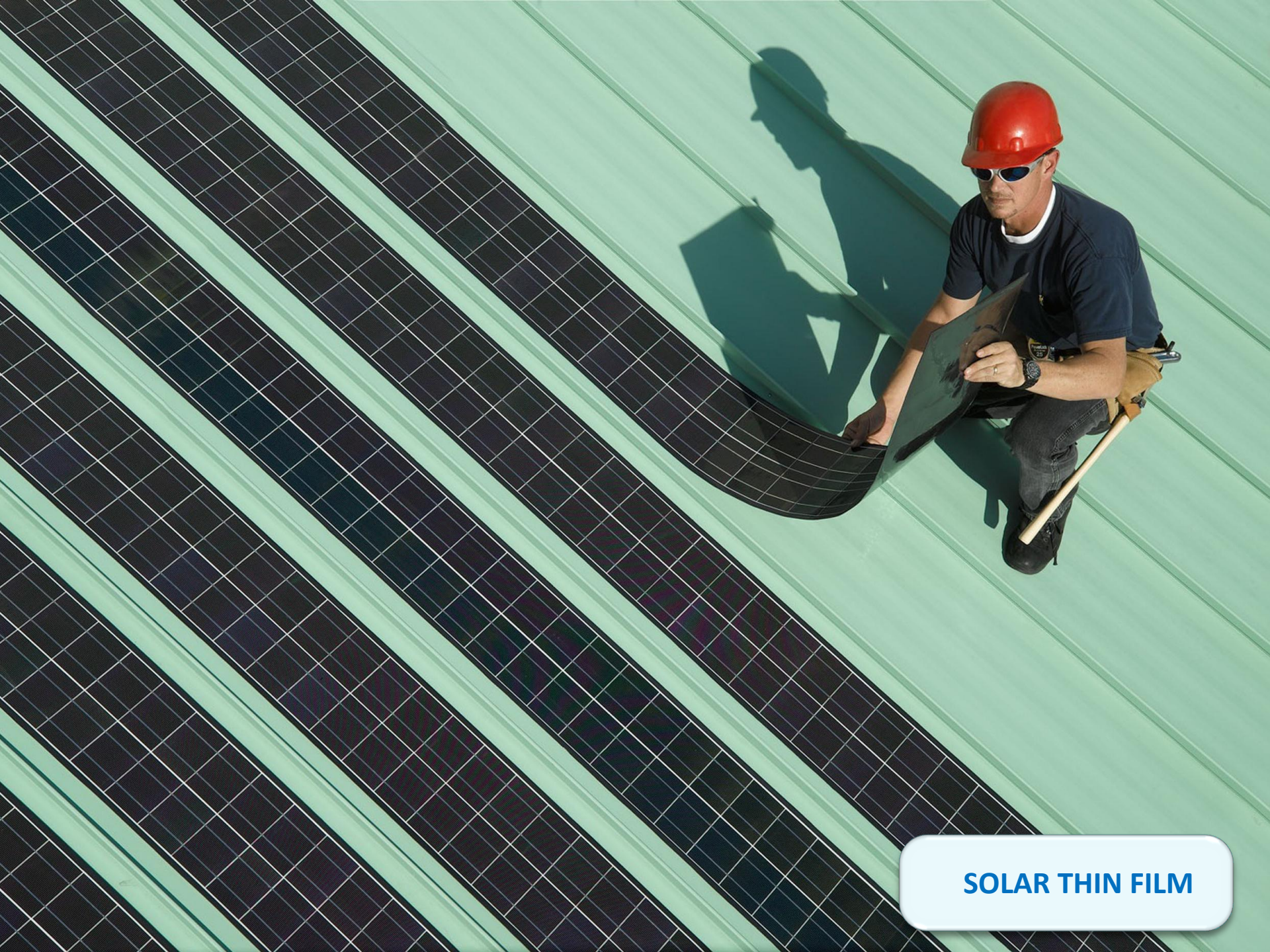
IMPROPERLY INSTALLED SHEAR CANS


off the mark.com
by Mark Parisi
I NEVER NOTICED THIS BEFORE...
"DANGER- KEEPING LID CLOSED IS WAY SERIOUS SAFETY VIOLATION."
offthemark.com

SAFETY CONCERNS

PUMP INSTALLATION - INSTALLING PUMPS, PIPING AND VALVES 40 FEET DOWN

SUSTAINABLE SOLUTIONS



SOLAR THIN FILM


IMPROVED EFFICIENCY

IMPROVED OPERATIONS - VARIABLE FREQUENCY DRIVES IMPROVE OPERATIONS & EFFICIENCY

REDUCE WATER LOSS AND IMPROVE WATER QUALITY

- FLOOR COATING REDUCED WATER LOSS
- MIXING UPGRADES IMPROVED WATER QUALITY

EXTEND FACILITY LIFE PROTECT WATER QUALITY

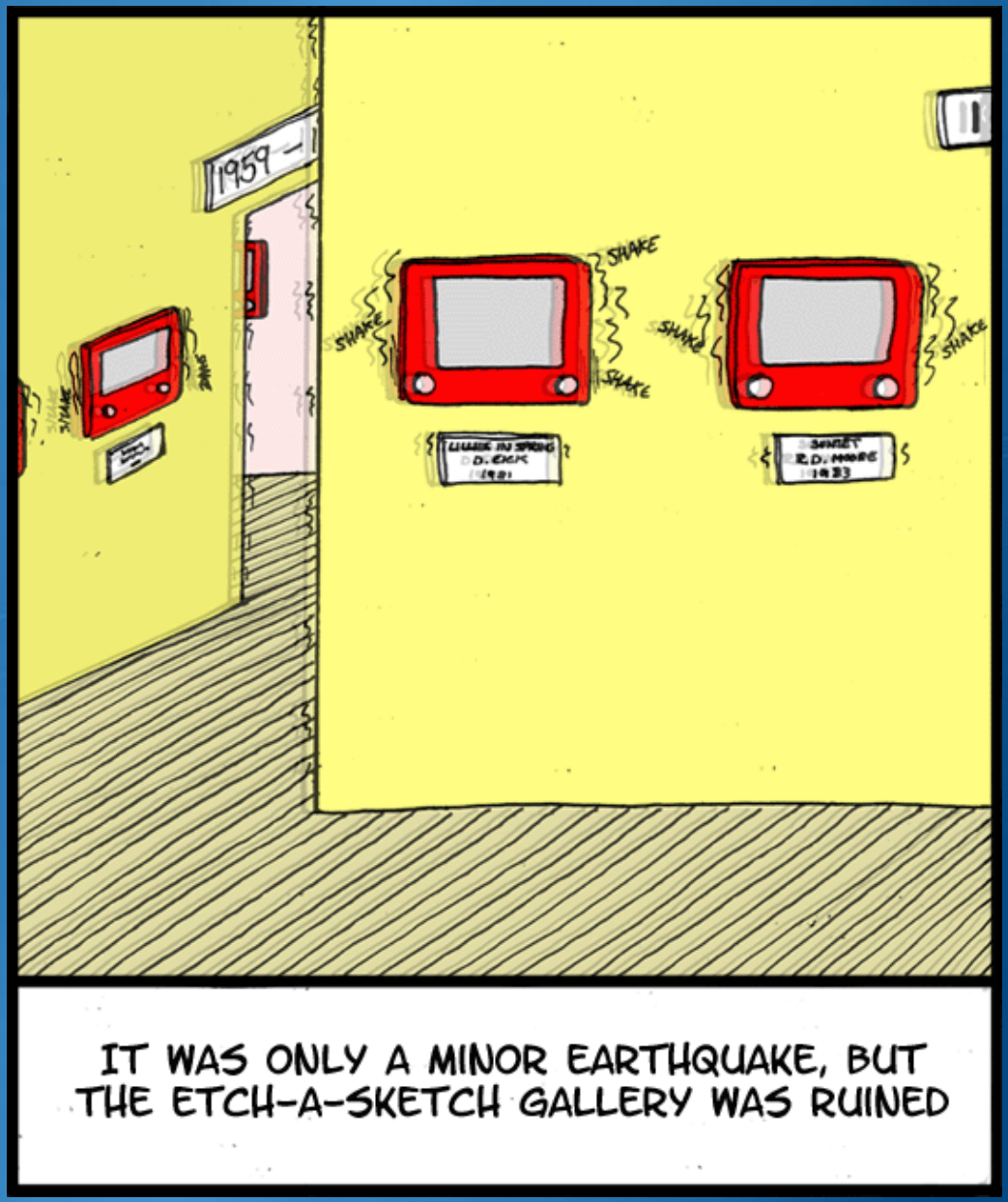
ROOF COATING:

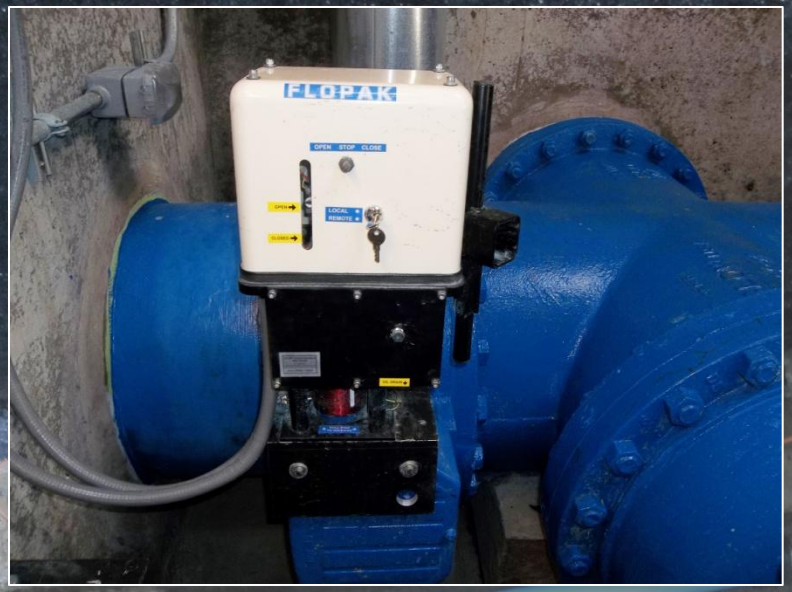
- PROTECTS CONCRETE
- PREVENTS WATER INTRUSION

IMPROVED SURFACE WATER AND STORMWATER MANAGEMENT

CRITICAL FACILITY IMPROVEMENTS

- SEISMIC UPGRADES
- RELIABILITY
- REDUNDANCY
- OPERATIONS





SEISMIC UPGRADES

IMPROVED RELIABILITY - POWER GENERATION FOR BOTH PUMP STATION AND ASR

IMPROVED OPERATIONS –
UPGRADED ACCESS AND ENVIRONMENTAL CONTROLS

PUBLIC OUTREACH

- NEIGHBORHOOD MEETINGS
- OPEN HOUSE
- COMMUNICATION DURING CONSTRUCTION

NEIGHBORHOOD FRIENDLY

- IMPROVED AESTHETICS
- HALF STREET IMPROVEMENTS
- UTILITY UNDERGROUNDING
- SOUND ATTENUATION
- INTEGRATED INTO NEIGHBORHOOD

ARRA FUNDING

CONCLUSION/SUMMARY

- CRITICAL FACILITIES UPGRADED
- TEAMWORK TO OVERCOME CHALLENGES
- COMMUNITY BENEFITS
- SUSTAINABLE APPROACH
- VERY SUCCESSFUL PROJECT

QUESTIONS & ANSWERS