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# WATER RESILIENCY AT WHITE SANDS TEST FACILITY

WATER IN THE DESERT



# TOPICS

- WHITE SANDS TEST FACILITY POTABLE WATER SYSTEM
- CURRENT WATER RESILIENCY PROJECTS
  - POTABLE WATER SYSTEM LOOP UPGRADE
  - CAPTURE AND REUSE ALTITUDE SIMULATION SYSTEMS WATER
- QUESTIONS



# WHAT IS THE AVERAGE RAINFALL FOR NEW MEXICO?

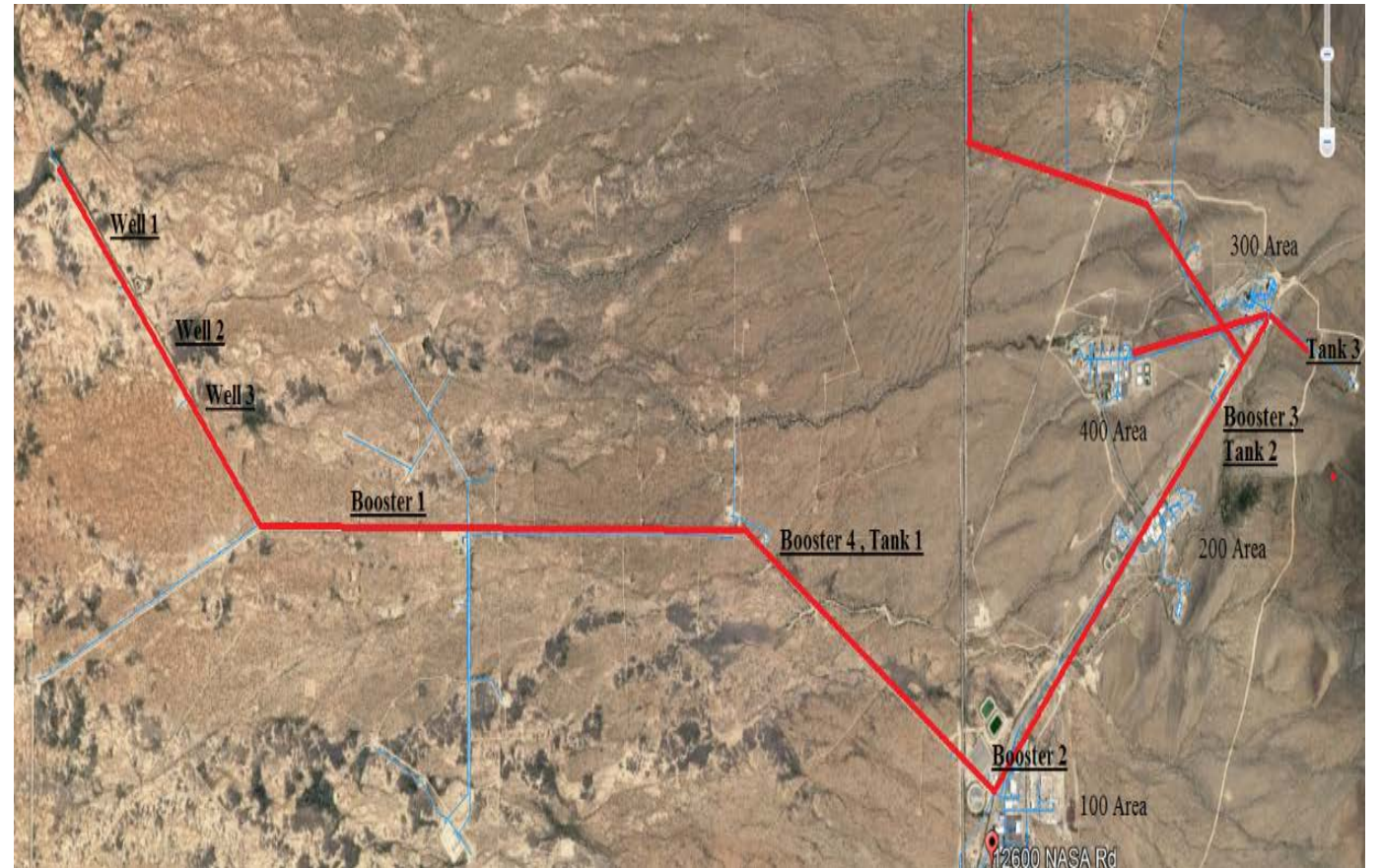
- A. 9 TO 10 INCHES PER YEAR
- B. 25 TO 30 INCHES PER YEAR
- C. 2 TO 5 INCHES PER YEAR
- D. LESS THAN 1 INCH PER YEAR

A



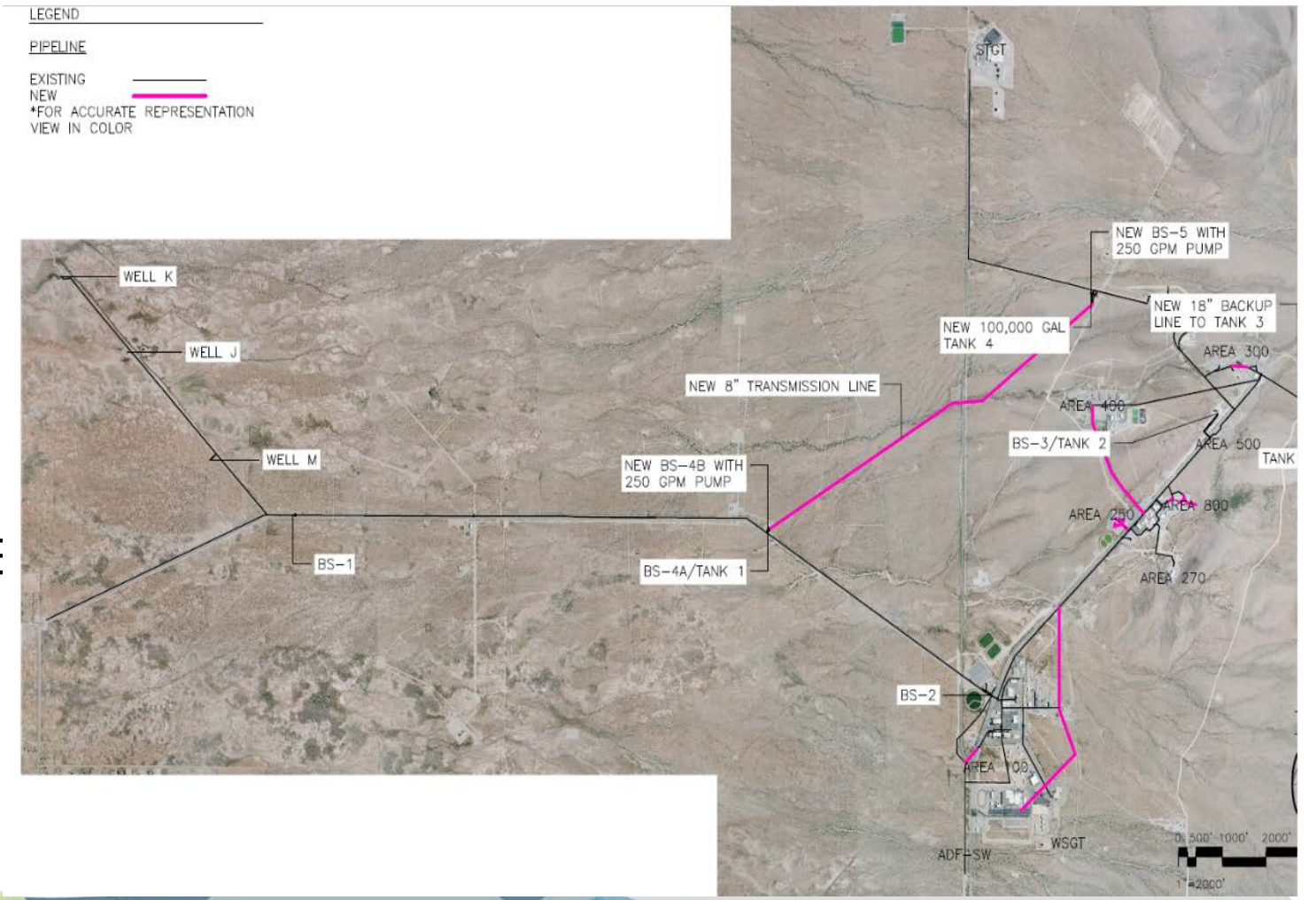
# WHITE SANDS TEST FACILITY POTABLE WATER SYSTEM

- 3 PRODUCTION WELLS
- ~7 MILES 8" MAIN WATER LINES
- 4 BOOSTER STATIONS
- 3 STORAGE TANKS
- 1 CHLORINATION SYSTEM

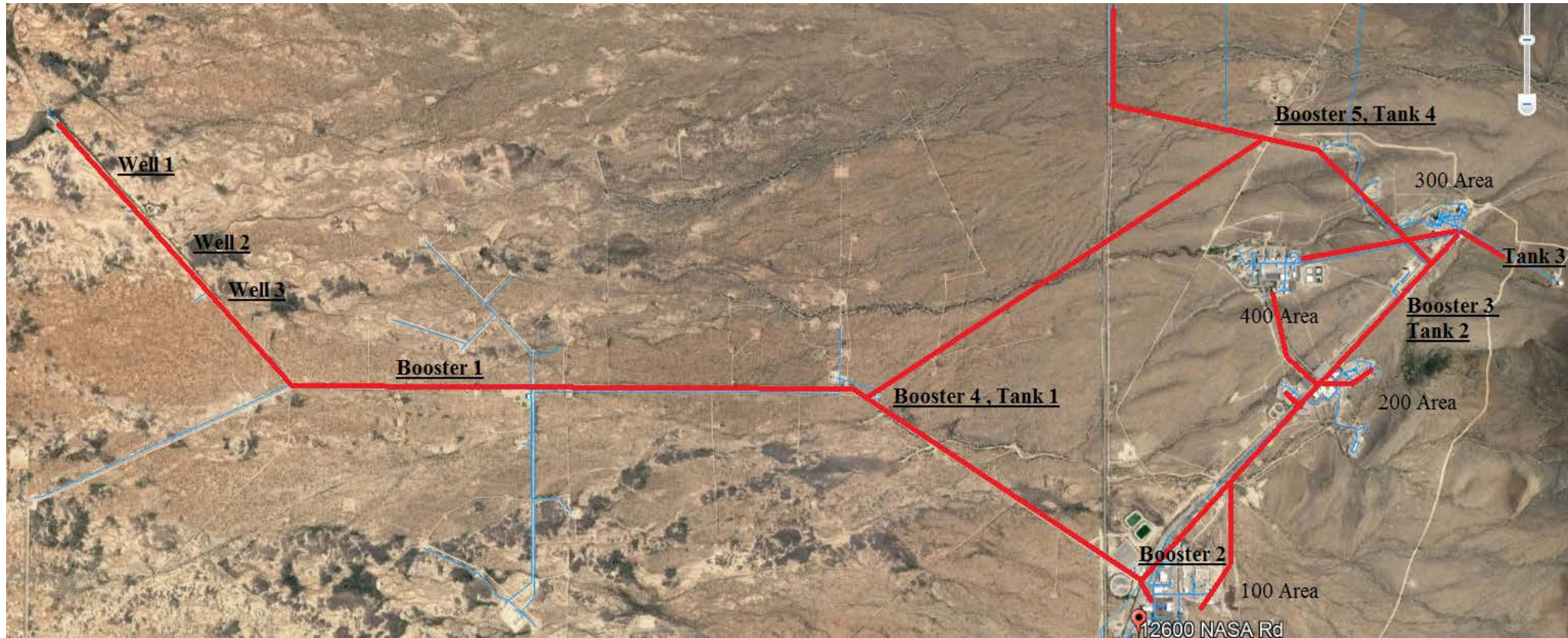


# POTABLE WATER SYSTEM LOOP UPGRADE

- 9,200 LF OF 8" PIPE
  - NEW 100,000 GALLON TANK
  - UPGRADED BOOSTER PUMPS
    - 1000 GPM B1
    - 250 GPM B4 & B5
- 2500 LF OF 18" PIPE
  - 1M GALLON TANK BACK-UP LINE
- 3280 LF OF 8" LINE
  - FIRE FLOW AND AREA LOOPS



# POTABLE WATER SYSTEM LOOP UPGRADE





# TRUE OR FALSE

- AT WHITE SANDS TEST FACILITY, THE MAJORITY OF WATER CONSUMED IS BY THE LABOR FORCE AND FACILITIES MAINTENANCE? (I.E. RESTROOMS, DRINKING FOUNTAINS, HVAC, LANDSCAPING)

# FALSE



# CAPTURE AND REUSE ALTITUDE SIMULATION SYSTEMS WATER

- USES ABOUT 20 MILLION GALLONS OF POTABLE ANNUALLY
  - TESTING LARGE ALTITUDE SIMULATION SYSTEM (LASS)
  - TESTING SMALL ALTITUDE SIMULATION SYSTEM (SASS)
  - COOLING WATER
    - DIFFUSER
    - INJECTOR
  - VACUUM PUMP COOLING
    - PUMP
    - FANS



# CAPTURE AND REUSE ALTITUDE SIMULATION SYSTEMS WATER

## ■ PLAN GOING FORWARD

- CURRENT PROJECT TO SEPARATE INDUSTRIAL WATER FROM POTABLE WATER FOR BACKFLOW PREVENTION WILL MAKE ALTITUDE WATER RECAPTURE MORE VIABLE AS THE RECAPTURED WATER ONLY NEEDS TO BE PUMPED BACK INTO THE INDUSTRIAL WATER LINE TO USE AT ANY LOCATION (ALTITUDE OR OTHER).
- THE 80K GALLON TANK BUILT IN THE 1960S TO SUPPORT AMBIENT TESTING AT TEST STAND 402 CAN BE REHABILITATED AND REUSED FOR ALTITUDE WATER CAPTURE.
- CAPTURE WATER AT THREE TEST STANDS, LASS AND THE VACUUM PUMPS. THIS WILL REQUIRE CAPITAL INVESTMENT FOR THE PIPING SYSTEMS.
- REHABILITATE THE 80K GALLON TANK FOR INDUSTRIAL WATER STORAGE WILL BE AN INVESTMENT.
- BUILD PUMP/INLET CONNECTION FROM 80K TANK TO INDUSTRIAL WATER LINE. THE PUMP WILL INTRODUCE WATER INTO THE INDUSTRIAL WATER LINE WHEN THERE IS DEMAND IN THE SYSTEM AND THE TANK WATER LEVEL IS HIGH ENOUGH.



# CAPTURE AND REUSE ALTITUDE SIMULATION SYSTEMS WATER

- WHAT WILL WE SEE?
  - INCREASE IN WATER RESILIENCY FOR TESTING CAPABILITIES
  - INCREASE IN WATER STORAGE CAPABILITY
  - DECREASE IN WATER DEMAND ON POTABLE WATER SYSTEM
- SIGNIFICANT WATER SAVING
  - WSTF FY18 WATER CONSUMPTION = ABOUT 31 MILLION GALLONS
  - CAPTURE AND REUSE WATER FROM ALL SOURCES = ABOUT 10 -16 MILLION GALLONS
  - ANNUAL SAVINGS 32% TO 51%



An aerial photograph of a coastline. On the left, a dense forest covers a hillside. Below the forest, a river with a complex, braided channel system flows through a sandy and rocky landscape. The ocean is on the right, with a large whale breaching the surface, its dark back and white blow visible. The water transitions from a shallow turquoise near the shore to a deep blue further out. The word "QUESTIONS" is overlaid in large, yellow, sans-serif capital letters across the center of the image.

QUESTIONS

# PHOTOS, CHARTS, TABLES

Extra



# 400 AREA ALTITUDE OPERATIONS WATER USAGE VS RECAPTURE

Altitude Water Capture Assumptions for 400 Test Area							
Location / item	Estimated water use	Water capture possible	Typical test day use	Estimated used water per run	Test per year	Estimated annual use	Estimated capture water
	GPM		Run time in minutes				
<b>LASS</b>							
cold flows							
1 module	1100	yes	15	16500	0	0	0
2 modules	2200	yes	15	33000	0	0	0
3 modules	3300	yes	15	49500	5	247500	247500
ignitor cooling	300	yes	15	4500	5	22500	22500
<b>overboard at csg stop</b>							
1 module	600	yes	5	3000	2	6000	6000
2 modules	600	yes	5	3000	0	0	0
3 modules	600	yes	5	3000	3	9000	9000
<b>CSG firings</b>							
1 module	1100	no	15	16500	2	33000	
2 modules	2200	no	15	33000	0	0	
3 modules	3300	no	15	49500	3	148500	
ignitor cooling	300	yes	15	4500	5	22500	22500
<b>SASS</b>							
assume 3 boilers large ejector	144	no	300	43200	82	3542400	
<b>Vacuum pumps</b>							
Vacuum pumps (one set on)	12	yes	300	3600	25	90000	90000
<b>TS 401</b>							
Diffuser cooling	1100	yes	240	264000	40	10560000	10560000
aux cooling (elbow, etc.)	250	yes	240	60000	40	2400000	2400000
Injection cooling	140	no					
<b>TS 403</b>							
center body cooling	1100	yes	120	132000	10	1320000	1320000
aux cooling (elbow, etc.)	0	yes					
Injection cooling	140	no	80	11200	10	112000	112000
<b>TS 406</b>							
HX	250	yes	240	60000	35	2100000	2100000
Percentage of reuse typical						81.93%	
<b>Totals</b>							
						20613400	16889500



# TEST STANDS 401 & 403





