

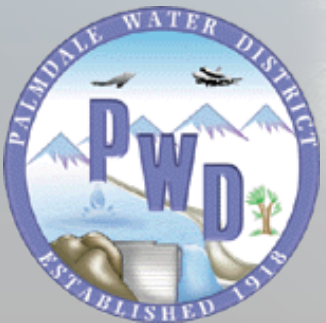
# PALMDALE WATER DISTRICT FLUSHING PROGRAM

AMANDA THOMPSON

WATER QUALITY SUPERVISOR

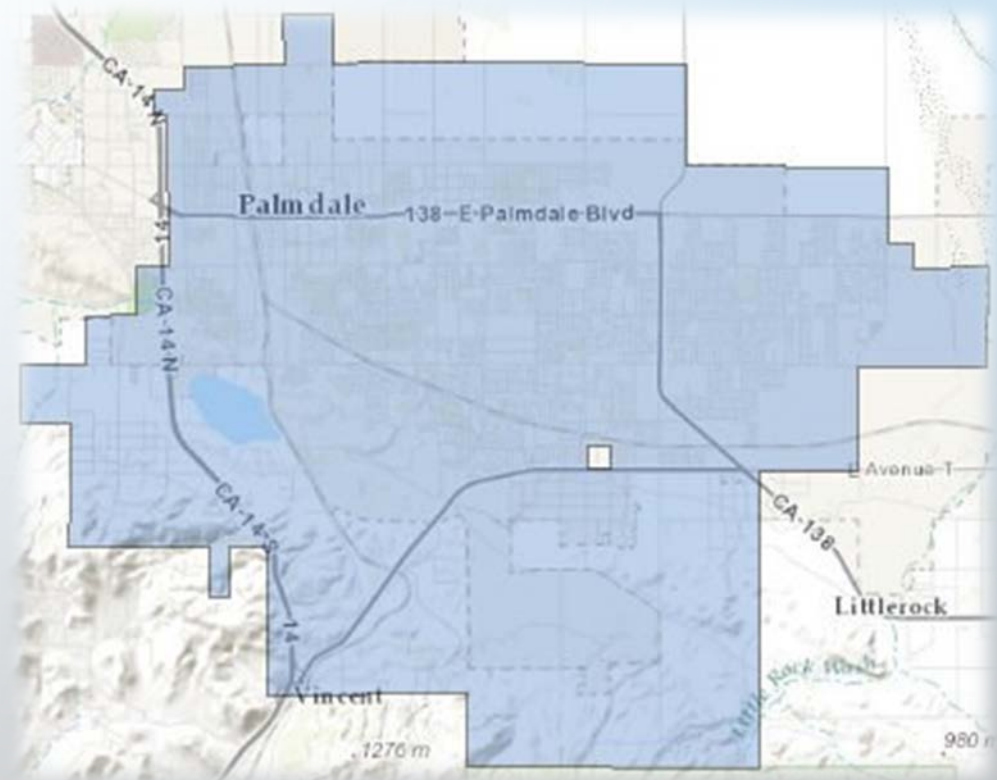
PALMDALE WATER DISTRICT

PALMDALE, CA 93550



# PWD – DISTRIBUTION SYSTEM

- OVER 414 MILES OF PIPELINE
- 7 DIFFERENT PRESSURE ZONES
- 18 STORAGE TANK LOCATIONS
  - CAPACITY ~ 50 MILLION GALLONS



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# WHY DOES FLUSHING WORK?

- WATER AGE IS A MAJOR FACTOR IN WATER QUALITY DETERIORATION WITHIN THE DISTRIBUTION SYSTEM.
- TWO MAIN MECHANISMS FOR WATER QUALITY DETERIORATION:
  - INTERACTIONS BETWEEN THE PIPE WALL AND THE WATER
  - REACTIONS WITHIN THE BULK WATER ITSELF





# FLUSHING REQUIREMENTS

- FLUSH PROBLEMATIC AREAS
- DESIGNATED LOCATIONS
- FLUSHING VELOCITY SHOULD BE BETWEEN 2.5 – 5 FT/S



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# FLUSHING OPERATION



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# FLUSHING PROGRAM – GOALS

## (IMPROVE WATER QUALITY & PROTECT PIPE INTEGRITY)

- **TURBIDITY** = THE CLOUDINESS OR HAZINESS OF A FLUID CAUSED BY LARGE NUMBERS OF INDIVIDUAL PARTICLES THAT ARE GENERALLY INVISIBLE TO THE NAKED EYE, SIMILAR TO SMOKE IN AIR.



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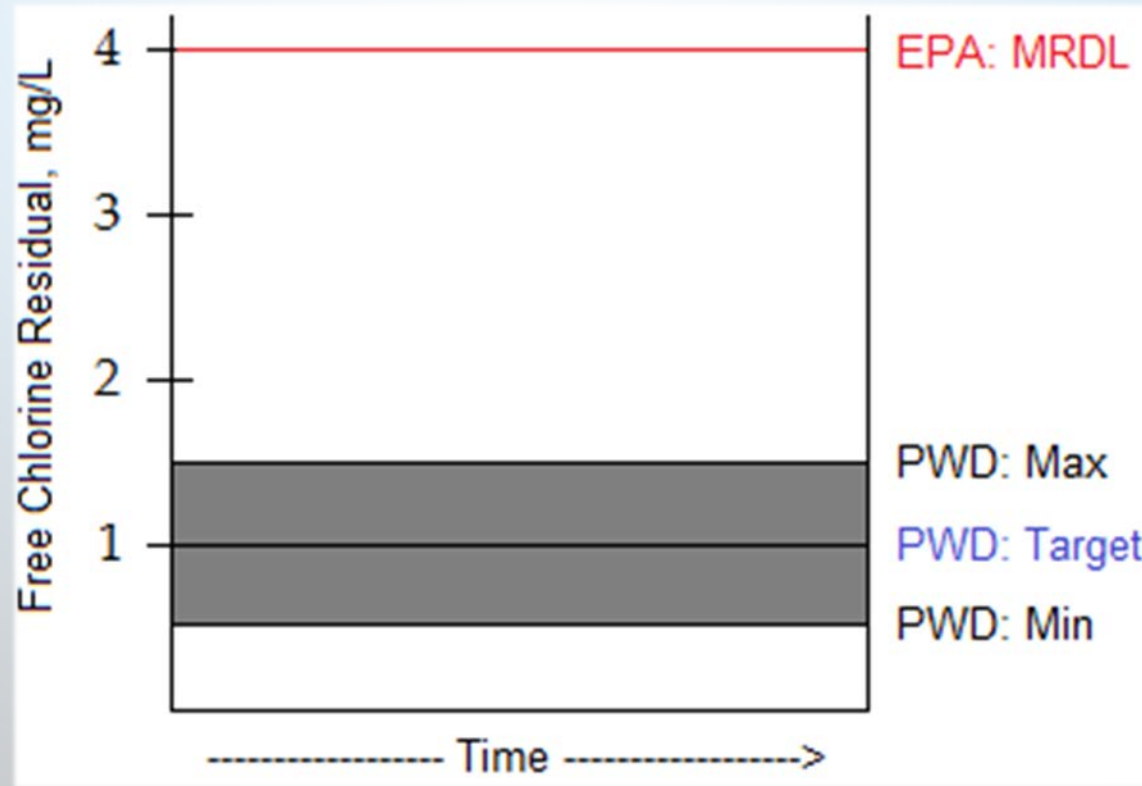
# FLUSHING PROGRAM – GOALS

(IMPROVE WATER QUALITY & PROTECT PIPE INTEGRITY)

- **CHLORINE RESIDUAL** = A LOW LEVEL OF CHLORINE REMAINING IN WATER AFTER ITS INITIAL APPLICATION.



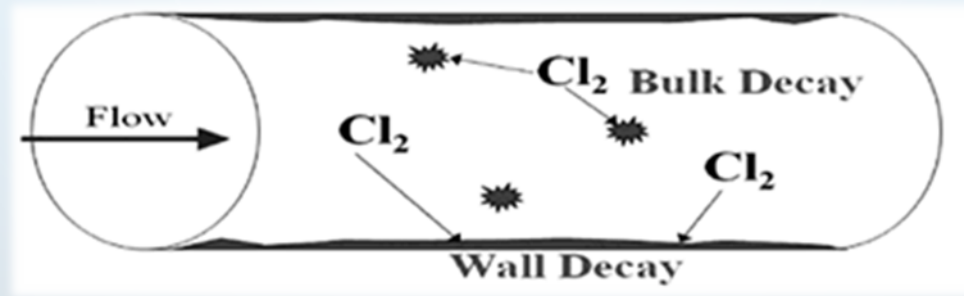
# WATER QUALITY – CHLORINE RESIDUAL



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# WATER QUALITY – CHLORINE RESIDUAL



- FLUSHING BRINGS FRESHER WATER INTO THE AREA & THEREFORE:
  - INCREASES CHLORINE RESIDUAL
  - REDUCES DEMAND
  - REDUCES WATER AGE



# FLUSHING PROGRAM – GOALS

## (IMPROVE WATER QUALITY & PROTECT PIPE INTEGRITY)

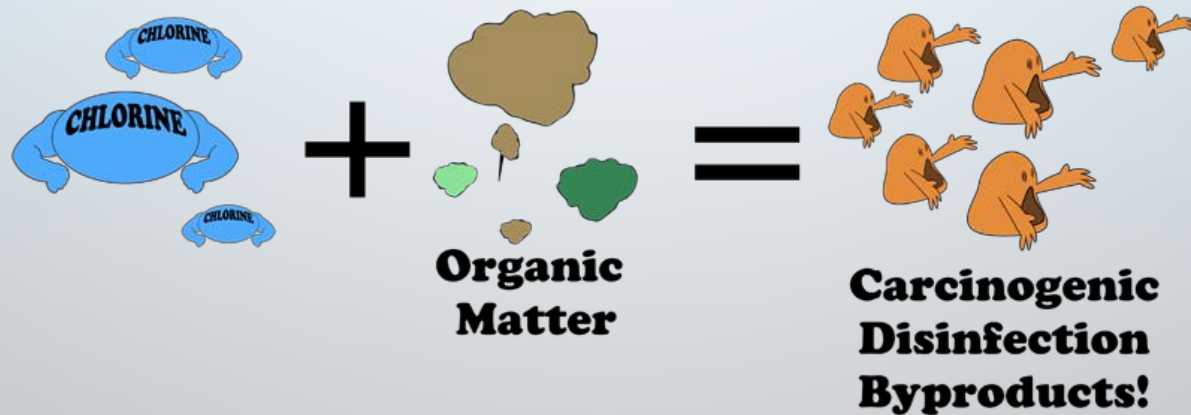
- **POOR TASTE AND ODOR** – AGED, STALE WATER PROVIDES AN ENVIRONMENT CONDUCIVE TO THE GROWTH AND FORMATION OF TASTE AND ODOR CAUSING MICROORGANISMS AND SUBSTANCES.
- FLUSHING BRINGS FRESHER WATER WITH HIGHER CHLORINE INTO THE AREA, THEREFORE REDUCING TASTE & ODOR CAUSING COMPOUNDS



# FLUSHING PROGRAM – GOALS

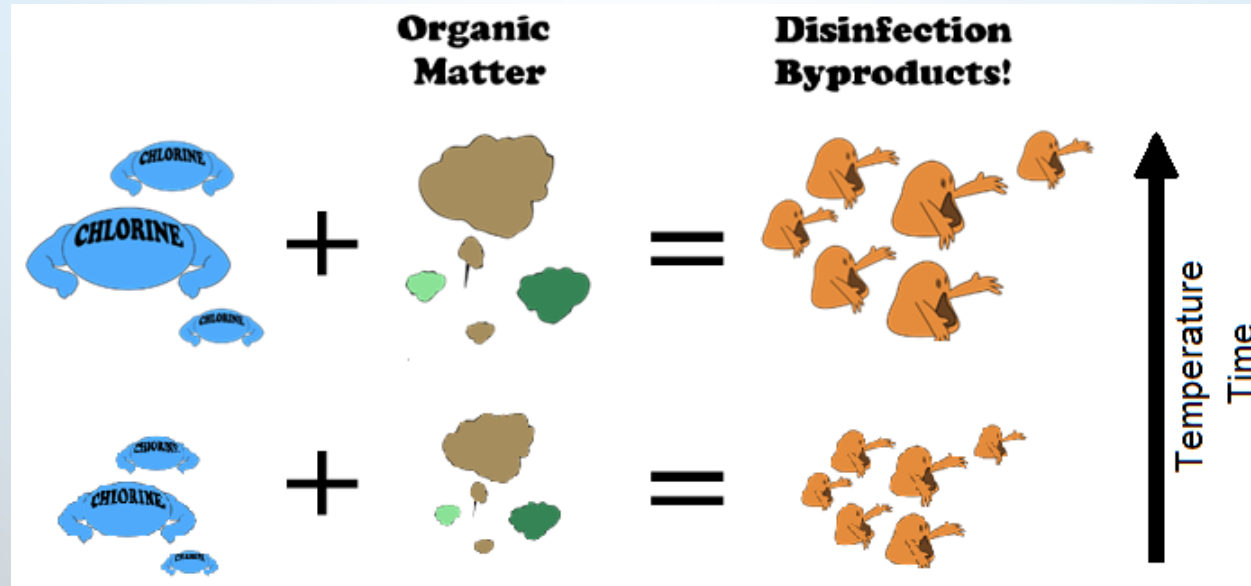
(IMPROVE WATER QUALITY & PROTECT PIPE INTEGRITY)

- **TRIHALOMETHANES (TTHMS)** - DISINFECTION BY-PRODUCTS THAT RESULT FROM CHLORINE AND BROMIDE REACTING WITH ORGANIC CARBON IN WATER





# WATER QUALITY – TTHMS

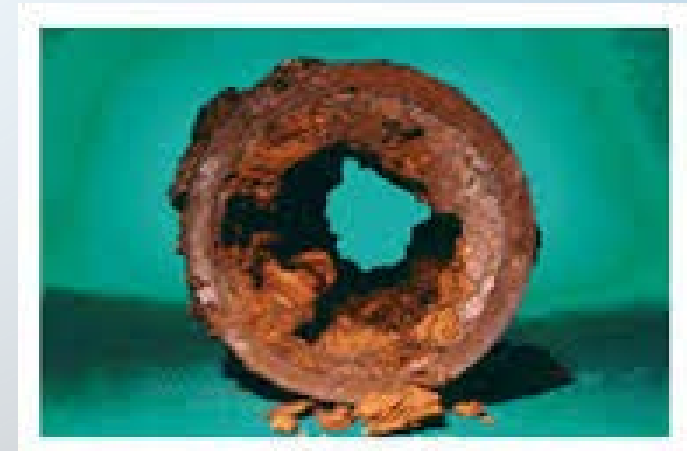
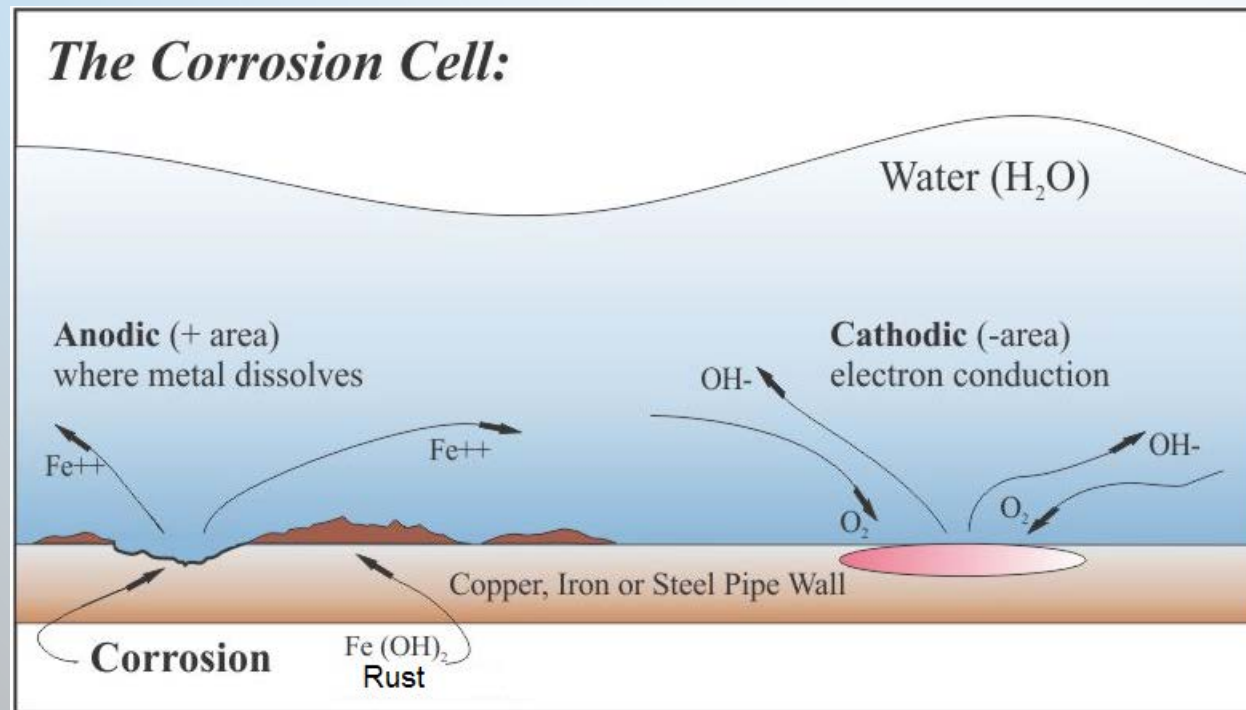


- FLUSHING REDUCES WATER AGE, AND THUS THE TIME FOR CHLORINE TO REACT WITH ORGANICS, AND FORM DISINFECTION BYPRODUCTS



# FLUSHING PROGRAM – GOALS

(IMPROVE WATER QUALITY & PROTECT PIPE INTEGRITY)



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# CORROSION CONTROL



- FLUSHING REDUCES THE TIME WATER IS IN CONTACT WITH THE PIPE, THUS REDUCING CORROSION



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# FLUSHING PROGRAM – GOALS

(MONITOR THE VOLUME OF WATER UTILIZED FOR FLUSHING)



**METERING USAGE**



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# DROUGHT CHALLENGES



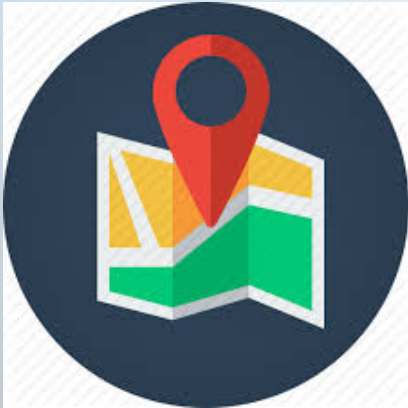
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# FLUSHING PROGRAM – GOALS

## (STANDARDIZE THE FLUSHING PROGRAM)

- BE IN THE KNOW



WHERE TO GO



WHAT TO DO



WHY WE DO IT



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# UTILIZING IPAD'S

- SAVE EXACT GPS LOCATION INTO GIS
- MAKE NOTES AND TAKE PICTURES FOR REFERENCE
- LOG WATER QUALITY DATA AT THE SITE



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# FLUSHING PROGRAM – GOALS

(COLLABORATION TO ESTABLISH COMPETENT SOLUTIONS)



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# ACHIEVEMENTS

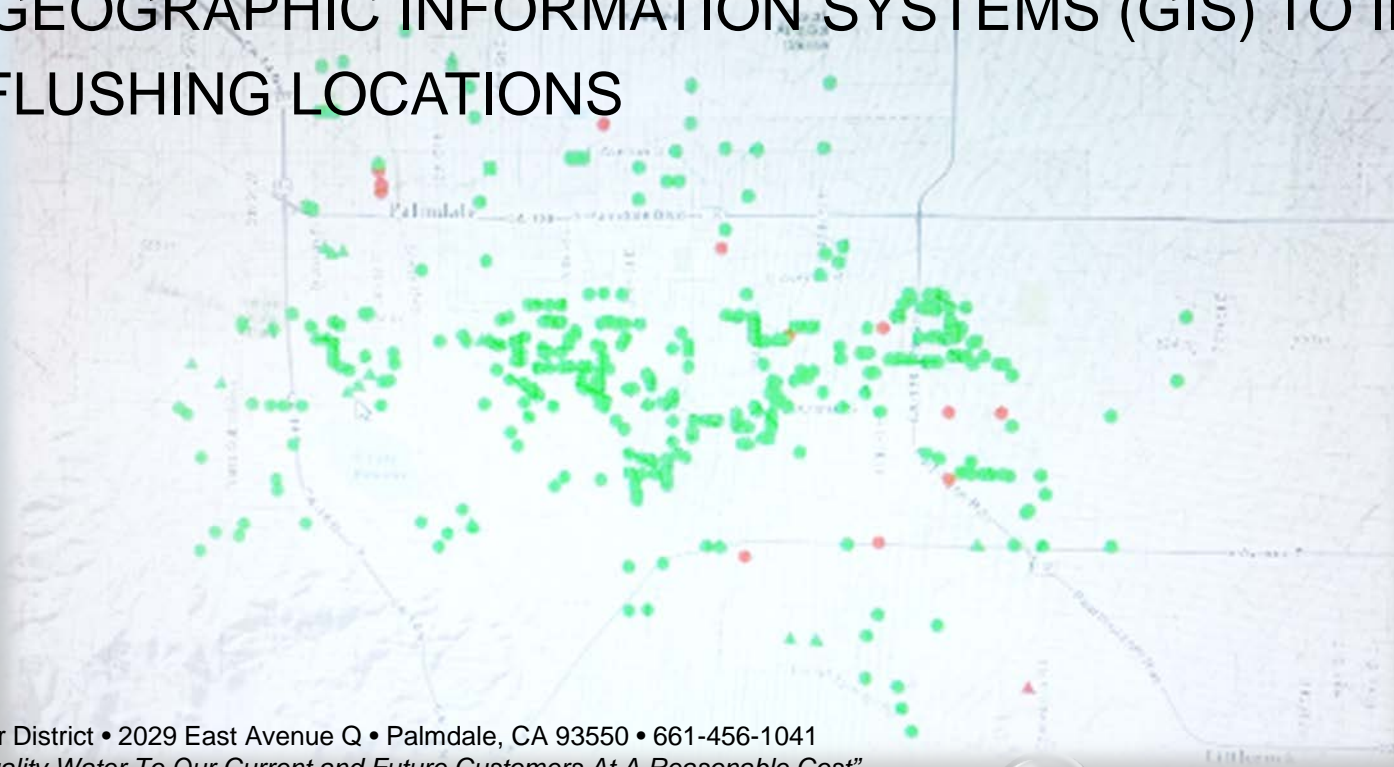
- EVALUATION OF WATER QUALITY
  - REDUCED FLUSHING AT 4 WEEKLY SITES TO BI-MONTHLY
  - REDUCED FLUSHING AT 2 BI-MONTHLY SITES TO YEARLY SCHEDULE
- EVALUATION OF DISTRIBUTION SYSTEM
  - ELIMINATED 90 SITES
- REDUCED WATER USAGE FROM 7.1 MG (2013) TO 6.3 MG (2014)





# ACHIEVEMENTS

- UTILIZING GEOGRAPHIC INFORMATION SYSTEMS (GIS) TO IDENTIFY AND MONITOR FLUSHING LOCATIONS



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# ACKNOWLEDGEMENTS



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# ANY QUESTIONS?



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