STORMWATER UTILITY UPDATES

May 11, 2010

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Department of Public Works
Town of Oro Valley

CONGRATULATIONS
PAG SW WORKING GROUP

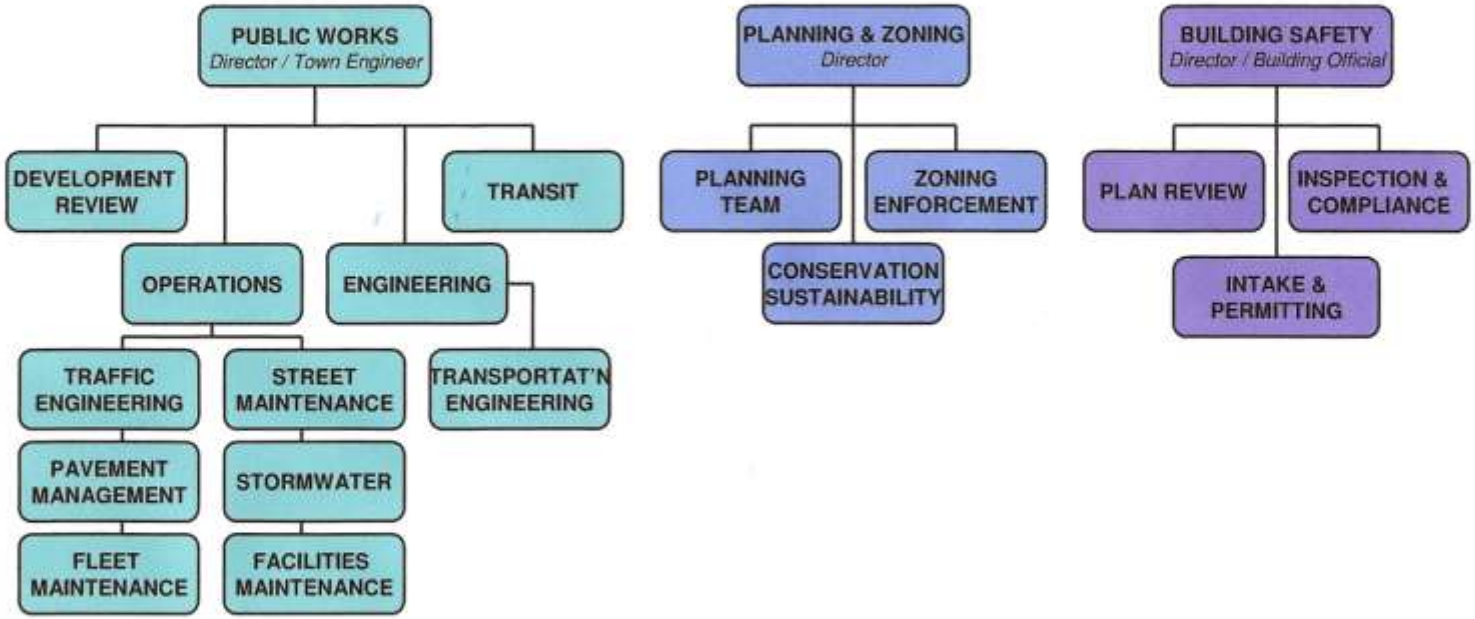
FIRST PLACE IN THE NAFSMA 2009
EXCELLENCE IN COMMUNICATION AWARD

OUTLINE

- Organization Structure
- Rainwater Harvesting
- Drainage Criteria Manual Update
- SWPPP Program

Attachment A

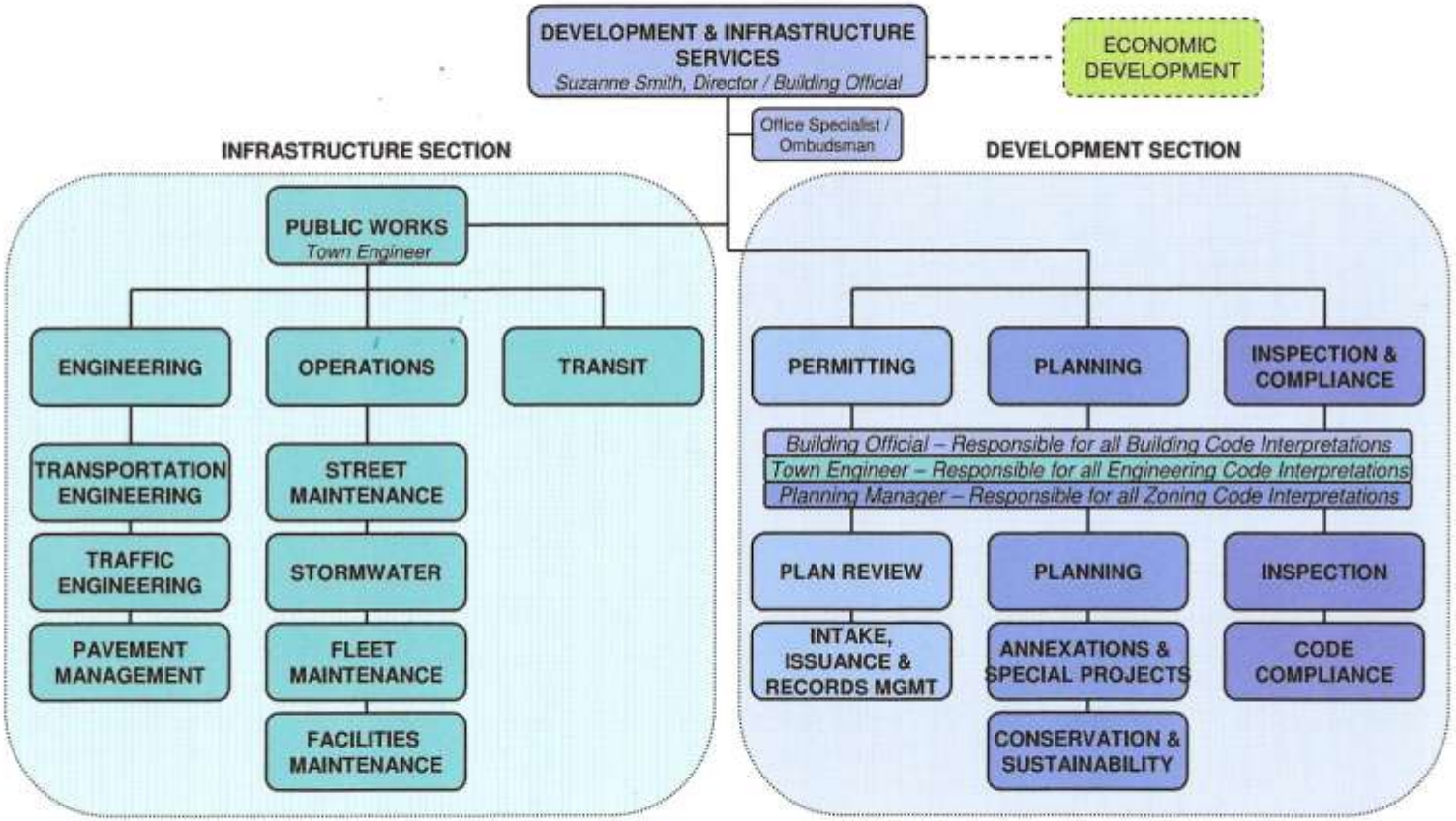
Organization Chart
for Existing Public Works, Planning & Zoning, and Building Safety Departments



Attachment B

Development & Infrastructure Services Department

Organization Chart



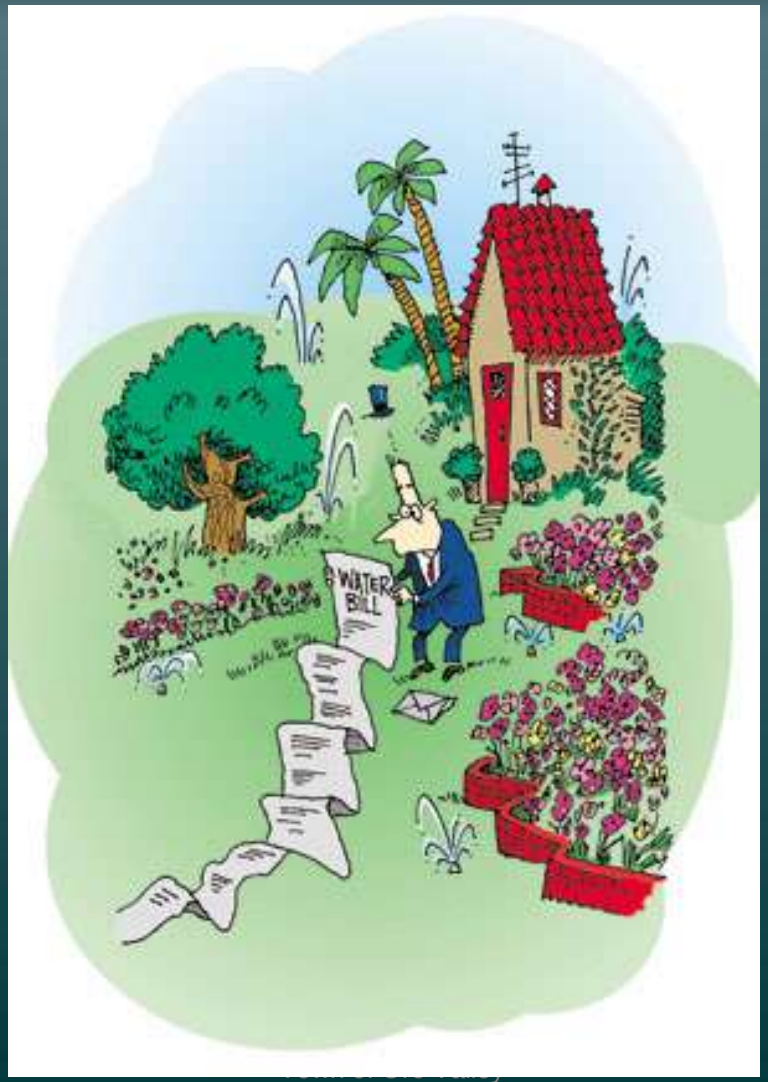
April 2010

Stormwater Utility Structure

Stormwater Utility

- David Parker, Utility Manager, 229-5059
  - Utility Administration
  - Stormwater Management, AZPDES
  - CIP Program
  - Regulatory Liaison
- Fernando Laos, Civil Engineer, 229-4818
  - Floodplain Management
  - New Construction Reviews
  - Minor Designs/H&H studies
- Robert Wilson, Civil Tech, 229-4879
  - Field Inspections
  - Vector Control
  - Blue Staking
  - Minor Maintenance and Repair Projects

Rainwater Harvesting



Rainwater Harvesting

- **Addressed in**
  - Drainage Criteria Manual
  - Landscape Ordinance of Zoning Code (beginning June 1st)
- **Goal**
  - Conserve Water while protecting downstream ecology
- **Criteria**
  - Use Passive or Active Systems (passive mandatory)
  - WH = Area impervious X 3,000 gal/acre
    - Based upon not taking more than 10% of pre developed flows plus delta
    - Assumes 60% of pre developed is runoff.
- **All new Houses must be plumbed for potential grey water reuse**

Rainwater Harvesting Criteria Justification

Hydrologic Analysis of Above Theory

The above methodology has been analyzed technically against Rational Equation Calculation of pre vs. post discharge flow volumes. Both the two (2) and ten (10) year events are calculated below to corroborate that the harvesting of 3000 gal/storm/acre is less than the standard statistical rain events analyzed for detention requirements.

1. Volume Produced for the two (2) year, 1 hour rainfall event:
Q = CiA where:
Qe = site discharge prior to development – Pre condition
Qp = site discharge of developed impervious surface
Qwh = available discharge that can be retained for water harvesting
A = 1ac (assumed acreage for this example for both Pre & Post)
Tc = 5min (assumed discharge time of concentration for both Pre and Post conditions)
i = 5in/hr (TOV IDF 2 year rainfall intensity)
Ce = 0.15 (calculated below using TOV/ADOT method and set as an average of NRCS soil types B and mixed b 50% & C 50%)
Use P2,1hr = 1.2" (rainfall depth for TOV 2 year event)
Ce,B soil = 0.12
Ce,B50/C50 = 0.50(0.12) + 0.50(0.23) = 0.18
Ce = 0.50(0.12) + 0.50(0.18) = 0.15
Cp = 0.91 (for rainfall event depth of 1.2" and total development of impervious surface – Buildings, hardscape and paving)
Qe = CeiA = 0.15(5in/hr)(1ac) = 0.75cfs
Qp = CpiA = 0.91(5in/hr)(1ac) = 4.55cfs
Qwh = Qp - Qe = 4.55cfs – 0.75cfs = 3.80cfs
Volume retained from PCHydro V5.3.1 model analysis = 0.0793af = 25840gal

2. Volume produced for the ten (10) year, 1 hour rainfall event:
Q = CiA where:
Qe = site discharge prior to development – Pre condition
Qp = site discharge of developed impervious surface
Qwh = available discharge that can be retained for water harvesting
A = 1ac (assumed acreage for this example for both Pre & Post)
Tc = 5min (assumed discharge time of concentration for both Pre and Post conditions)
i = 7in/hr (TOV IDF 10 year rainfall intensity)
Ce = 0.38 (calculated below using TOV/ADOT method and set as an average of NRCS soil types B and mixed b 50% & C 50%)
P10,1hr = 0.496(P2,1hr) + 0.449(P100,1hr)
P10,1hr = 0.496(1.19") + 0.449(2.69") = 1.79" – use 1.8"
Ce,B soil = 0.34
Ce,B50/C50 = 0.50(0.34) + 0.50(0.47) = 0.41
Ce = 0.50(0.34) + 0.50(0.41) = 0.38
Cp = 0.94 (for rainfall event depth of 1.8" and total development of impervious surface – Buildings, hardscape and paving)
The difference between the Cp and the Ce is the basis of logic in the theory presented above. Essentially 0.94 – 0.38 = 0.56, or rounded off as 40% of the flow remains on site while 60% runs off. This is important factor in maintaining the hydrologic balance of the desert.
Qe = CeiA = 0.38(7in/hr)(1ac) = 2.66cfs
Qp = CpiA = 0.94(7in/hr)(1ac) = 6.58cfs
Qwh = Qp - Qe = 6.58cfs – 2.66cfs = 3.92cfs
Volume retained from PCHydro V5.3.1 model analysis = 0.0957af = 31184 gal

Drainage Criteria Manual Update

- **Revised Manual approved Feb 2010**
- **Major Revisions include:**
  - Hydrologic Calculations
  - First Flush Requirements
  - Water Harvesting Requirements
  - Riparian Channel Design
  - All Weather/Dip Crossings
  - Detention Basins
  - SWPPP requirements for ALL Construction Projects

CGP Highlights

- New OV SWPPP template being coordinated
- Utility approves and inspects all SWPPPs in Town
- Monthly Inspections by Town
- Notification of Final Stablization 2 weeks prior to ADEQ NOT submittal

CGP Challenges

- **Working with contractor to ensure adequate level of BMPs are used**
- **BMP Maintenance**
  - Especially when developed is delayed
- **Final Stabilization when using vegetation/hydroseeding on slopes**

CGP Challenges

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SWPPP Conclusion

- Program works very well through construction start
- Area that need emphasis are maintenance and final stablization

QUESTIONS?