Alluvial Fans and the Cost to Local Governments

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Development Issues

• Residential development in cities seek locations that provide amenities and features.
• Views are a desirable feature and development along foothills are prime areas for high end neighborhoods.
• Alluvial fans offer a broad expanse of land with multiple lots.
Alluvial Development Shouldn’t Create a Crisis for Local Public Works…

• In City and County Governments, Public Works agencies provide infrastructure maintenance support.

• In most local governments, funding for Public Works can be 5% to 10% of total General Fund.

• In contrast, Public Safety (Police and Fire) may take nearly 60% of General Fund.
Because Public Works Needs to Clean It UP!

• While Police and Fire are the “sexy” functions in government, they don’t generally stick around to clean up the mud, debris and boulders after the event is over.

• Bulldozers, skip loaders, dump trucks, sweepers and lots of hand shovelling and brooming.
Case Study of a Local Challenge

Harrison Canyon Basin
This basin just filled up…
And you have to clean it out!

770 Feet in Length
220 Feet wide
100 Feet deep
How much material is there?

- The Basin is 770 feet long, 220 feet wide and 100 feet deep at it’s deepest.
- It may contain 8.47 million cubic feet of material.
- 313,700 cubic yards of sand, gravel, boulders and organic materials.
What Equipment do I need?

Loaders

Dump Trucks

Bottom Dumps

End Dumps
Where can I take the materials?

- Depending on the type of material, it may be able to go to a sand and gravel processor, a landfill or an old quarry.
- Wherever you take it, it must be appropriately permitted for the material you haul.
What is the route from the basin to the disposal point?

The route is 7.6 miles long and will take approximately 18 minutes to travel. It includes surface streets and freeway.
What permits and approvals do I need?

- You **may** need to secure from either your jurisdiction or others jurisdictions or Federal, State or local agencies....
  - A mining or extraction permit.
  - A truck route permit.
  - Sign-offs from AQMD, Fish and Game, Regional Water, etc.
How much dirt can a dump truck dump if a dump truck could dump dirt?

- There is 313,700 cubic yards to move.
- A typical dump truck can haul 10- to 15-cubic yards.
- A typical end-dump can haul 18- to 30-cubic yards.
- Watch your over-weights....
And the answer is....

- Using 30-cubic yard end-dumps, we would need to move 10,500 loads.
HOW MANY LOADS???

• Given the example, one truck can make roughly 10 loads per day, or 300 cubic yards.
• We run a fleet of 30 trucks, we can move 9,000 cubic yards in a day or 300 truck-trips.
• It will take roughly 35 days to haul out the material.
Meanwhile, back at the basin...
IMPACT TO LOCAL GOVERNMENT

• In our example, hauling alone could cost $100K+.
• Neighborhoods affected by clean-out operation, including noise, dirt and traffic.
• May take several weeks before the basin is restored to 100% capacity.

• IF NOT A DECLARED DISASTER, WHERE DOES THE FUNDING COME FROM FOR THE CLEAN-OUT?
Design to Minimize Losses

• Need to recognize that after the developers have left, City / County is responsible for the facilities constructed and the impacts to local infrastructure (streets and catch basins).

• Designs for future developments should consider maintainability and loss prevention from debris flows.
Public Infrastructure Issues to Consider…

- What are best management practices for minimizing debris flows while balancing both site-specific and regional development.
- Funding for maintenance and restoration without counting on State and Federal agencies.
- Improve ability to quickly restore services and operations to pre-event condition for multiple storm events.
From the Public Works Point of View

• Designing flood/debris control features within a development needs to consider maintainability and logistics.

• Strike a balance between public safety and maintainability.
Do we really want to run a fleet of heavy trucks and equipment through residential neighborhoods?

RECOMMENDATION: Place service roads away from the residential areas that allow two-way truck traffic to move outside of the neighborhood.
TRAFFIC PATTERNS FOR CLEAN-OUT, INCLUDING ADEQUATE STAGING AND TURN-AROUND AREAS FOR TRUCKS

• Do you want a fleet of idling diesel trucks staged in front of your house?

• RECOMMENDATION: Design basin to allow staging, movement and turn-around of trucks and equipment.
HAUL ROUTES FOR MATERIAL DISPOSAL

• Where do we take the material and how far do we have to go to dispose of it?

• RECOMMENDATION: During design and review process, estimate annual quantities to be removed and identify potential disposal sites capable of taking those quantities..
HAUL ROUTES FOR MATERIAL DISPOSAL

• RECOMMENDATION: Identify haul routes and determine adequacy at time of design.

• RECOMMENDATION: As part of approval process, adopt recommended haul routes.
PUBLIC WORKS FUNDING

• Where do we get the money for Public Works for routine and extraordinary maintenance if not a disaster?

• RECOMMENDATION: Incorporate funding mechanisms into the projects when adopted, by establishing special districts.
IN CONCLUSION...

- Ability of local agency to restore a flood/debris basin back to full capacity is crucial in order to prevent future damage and protect residents from losses.
- By considering the logistics and costs of future maintenance during the design phases and planning them in, accomplishes this task.