

May 15, 2015 Green Infrastructure Working Group Meeting Notes

Stormwater Options for Redevelopment and Infill

The following largely represents comments that are not reflected in the PowerPoint slides—please refer to the presentation as well (Presentation links: [One slide per page](#). [Six slide per page handout](#)).

Link to webinar recording: <https://attendee.gotowebinar.com/recording/6497123426035423234>
(Note: [Viewing the recording requires email registration with GotoWebinar](#)). Please note this new online option to attend and/or review our meetings! We know that not everyone can attend in person and we are very pleased to be able to offer this webinar format. Please let us know how it works for you. We're still in "beta" mode.

Stormwater Options for Redevelopment and Infill: Review of objectives

- Introduction to problem
- Current code
- National models
- Austin case studies

Introduction to Problem (Matt Hollon, WPD)

This meeting explores potential avenues to address local flooding (associated with storm drains and minor channels) and creek flooding (associated with major creeks and their tributaries) for redevelopment in Austin's central core. WPD has made a lot of progress in addressing these issues over the years, but many problems remain, and the price tag to fix them all is very high. At the same time, we want to encourage compact and connected development in accordance with the Imagine Austin Comprehensive Plan to be able to accommodate all the new residents that are expected by 2040. While we want to be able to redevelop our urban core, we also do not want to overwhelm our drainage infrastructure.

Right now we have a situation in which urban infill projects are being constructed in areas that are already experiencing local flooding problems due to undersized infrastructure that was built prior to our modern drainage criteria (See slides 3 – 8 for a visual representation of recent approved site plans and Identified Local Flood & Creek Flood Problem Areas). The South Lamar neighborhood is a classic example of this problem, where a lot of new development in the past few years has put pressure on the drainage infrastructure. City Council passed a resolution in 2014 directing the City Manager to address flooding in this area, and specifically to look for opportunities within the CodeNEXT process to "provide mitigation requirements to better manage density and its associated costs" ([link](#)). To help address flooding in South Lamar and other similar neighborhoods throughout Austin, today we are exploring some models that require redevelopment to mitigate a share of existing downstream problems.

Current Code (Matt Hollon, WPD)

New "greenfield" development (of raw land) in Austin is required to manage the peak flow from the site and ensure that peak flow is not increased from pre-development conditions. This is usually accomplished with flood

detention. Many older sites built before detention requirements were introduced in 1974 lack detention facilities of any kind, and the runoff from these sites frequently contributes to downstream flooding. Currently, however, flood detention is not required for redevelopment of these old existing sites if impervious cover is not increased and drainage patterns are not changed. As long as the project does not result in additional adverse flooding impact on another property, it does not have to add detention (§ 25-7-61(5a)). This is in contrast to our water quality codes, which require water quality controls for all redevelopment over 8,000 ft² (with payment-lieu-options in Urban watersheds).

National Models (Matt Hollon, WPD)

National models vary on applicability and requirements. In some jurisdictions detention requirements are triggered by the presence of downstream flooding problems or inadequate downstream conveyance, while other jurisdictions base applicability on the amount of impervious cover. Maryland requires the mitigation of 2- and 10-year storms, while Virginia requires sites to reduce the 1.5-, 2-, and 10-year storms to less-than-or-equal to the peak flow rate from pre-developed conditions (defined as “good forested condition”).

(See slides 14 – 17 for a summary of Virginia & Maryland’s requirement, but this review is not exhaustive).

Maryland Code: [26.17.02.05](#)

Virginia Code: [62.1-44.15:28](#) & [62.1-44.15:33](#)

Virginia Evaluation Protocol

If in the future redevelopment projects were required to mitigate some share of downstream flooding, we would need some predictable and reasonable system for evaluating a project’s downstream flood impact. Virginia uses the “1% Rule of Thumb” rule to determine how far downstream from the site the design engineer must evaluate the project’s impacts. This system dictates that a site must conduct the analysis for a drainage area greater than or equal to 100 times the site’s area, based on HEC-HMS basins and nodes. Once the drainage area reaches 100x the site’s area, the project must ensure conveyance to the next HEC-HMS node. This system is intended set up a standard system to identify adverse flood impacts, and in the case of adverse impacts, it also helps the design engineer recognize the appropriate mitigation approach. In the upper portions of the watershed, detention is very beneficial. At the bottom of the watershed, however, conveyance improvements may be of more benefit for downstream flooding. This evaluation system helps guide the developer toward the appropriate mitigation method exactly where it is needed and visually provides an image of where the development fits into the “big picture” of a watershed.

(See slides 30 – 31 for a graphic example)

Case Studies (Matt Hollon & José Guerrero, WPD)

We have a few case studies where the city has worked with developers and neighborhood groups to retrofit flood detention on a case-by-case basis. This process is, however, not incorporated into the code at this time, so

such retrofits are contingent on vocal neighborhood groups and the existence of some sort of leverage (such as a zoning change).

Maria's Taco Express (slides 20 – 23)

- 3 acre site along Lamar Blvd redeveloped from mobile home park to Walgreen's/Maria's Taco Express
- Overwhelmed stormdrain system & overland flow through yards, multiple local flood complaints
- Pressure from neighborhood groups during PUD rezoning for retrofit of flood control
- In response to these concerns, developer installed subsurface detention pond under parking lot to bring 100-year developed flow to 10-year undeveloped flow
- Because subsurface flood detention ponds are only active during the largest rain events and protect lives and property (as opposed to subsurface water quality controls), the benefits may outweigh the pitfalls associated with subsurface controls (difficult to inspect and maintain)

District at SoCo (slides 24 – 28)

- 4 acre site along E Oltorf St redeveloped from Sunnymeade Apartments to District at SoCo apartments
- Multiple local flooding complaints in area
- South River City neighborhood worked with developer's engineers to retrofit flood detention
- Originally designed to discharge straight onto Oltorf St, but WPD was able to extend storm drain system up to outfall

South Congress & Oltorf (slides 32 – 34)

- Project has not been redeveloped yet
- Euclid/Wilson Stormdrain Improvement Project provides downstream conveyance
- With this improved conveyance, property is now eligible for Regional Stormwater Management Program participation (payment-in-lieu would go towards another project within the watershed).

Langham & Brassie Cottages (slides 35 – 37)

- Urban infill project—subdivision of one 0.23 acre lot into three lots
- Site is on the downstream end of the 23 acre subwatershed, so it would pay or improve conveyance
- Sites on the upper end of the subwatershed (yellow area on slide 37) would detain on-site
- Where your site is in the watershed matters—no “one-size-fits-all” solution

Questions from Stakeholders (Full/Large Group)

1. What about building codes and roof drainage? The old codes let you discharge water onto your neighbor's lot, but new codes do not—it has to go to the right-of-way. Some of the flooding in the right-of-way is the result of this change. Even if the pipes were sized correctly and functioning as designed, as sites are redeveloped under this new code, more water is going to the right-of-way.

Response: That is exactly right. We also have site plans that are built with detention, but the building plans are far removed from the site plan process. A lot of the runoff from roofs aren't guttered and aren't directed to the detention ponds that have been designed. That has been a problem that I have seen from site to site. Basically, the bottom line issue with drainage is that the remote boundary areas of lots are the most troublesome areas. Engineers need to focus on the details of how water is handled and managed in those remote boundary areas.

2. Would Maria's Taco Express and the District at SoCo have moved forward without flood detention without intervention from neighborhood groups?

Response: The intervention was key. In both of those cases, the provisions for additional drainage on top of our drainage criteria manual requirements were done at the zoning stage. PUD developments must have superior requirements, and those zoning ordinances are passed by council and carried out. Both of these were negotiated settlements with an active and engaged community working with the developer. The discussion today is how we might hardwire this into our process so it is not up to a neighborhood group to pressure for these changes.

3. The flooding on the Del Curto example site is not really due to redevelopment of an existing site. The site across the street from that house was a vacant lot. What did you guys do to remedy that situation? Who paid for it?

Response: If the project starts as a greenfield site, it would have to follow the regular detention requirements. The site across the street from the sandbag picture (slide 11) did not add detention because there was a provision in the Drainage Criteria Manual for lots less than an acre to get an automatic detention waiver if the engineer certified that he/she had checked the downstream conditions. That site was subdivided into two sites less than an acre and then that waiver was granted. That loophole has since been closed, and the solution was very simple. The developer added a curb-and-gutter and prevented any further water from leaving the roadway to go into the yard/house. The City provided technical assistance and permitting on behalf of the citizens in the area. We need to coordinate what is happening in the roadway—we used to have roadside ditches on Del Curto, but as new developments are going in, we also have to add sidewalks.

4. Who paid for the offsite accommodations for the District at SoCo site?

Response: The upstream Longbow Project was a Capital Improvement Project paid for by the drainage utility fee, so it was paid for by the rate-payers. The extension of the stormdrain to the project's outfall was paid for with a flexible fund where we can participate with developers or public works to capitalize on potential efficiencies. We can have one contractor and one project—we don't want to have the road project finished and then we have to go in and dig it up again for a stormdrain line, so we took the opportunity to advance that with the public works roadway project.

5. For the District at SoCo site, did you guys examine the potential effect of the additional flow on downstream flooding? There are several houses that are very close to the creek.

Response: In the course of our standard design and engineering for stormdrain improvements, we are subject to the "no adverse [flood] impact" rule as well. Our projects cannot create any downstream adverse impacts, so we do have that check. We also look at it from an erosion standpoint—we run through our Mission Integration Process to run through the possible impacts to flooding, erosion, and water quality.

6. Is the city keeping enough data to conduct analyses of downstream impacts?

Response: We have floodplain models available through FloodPro, our web-based system (<http://www.austintexas.gov/FloodPro>). These flood models reflect ultimate conditions buildout, meaning

that the model assumes each parcel has maxed out its impervious cover [e.g., maximum permitted by zoning], even if that is not the case at this time. That gives us a conservative estimate. You can download those models, and that is the most current data available.

Regarding stormdrain systems, we are rapidly trying to model all systems in the City of Austin, but we are just not there yet. We still refer engineers to our Local Flood Hazard Mitigation team, because we very well could have a base model that could be used for analysis to make these kinds of determinations (whether systems have capacity or not). An additional benefit of this system is that, once a project that uses our base model is constructed, we can update the model as the site plan or subdivision design comes in.

7. Is the Virginia Protocol part of the City Code?

Response: No, at this point we are just looking at new approaches to see what might make sense for our procedures.

8. I see that Virginia only requires redevelopment to manage 2- and 10-year storms. Are you considering the same thing, or would we go all the way up to 100-year storms?

Response: We are just presenting options to you, the stakeholders, and trying to figure out together what we need to do. Virginia is focusing more in stream and bay health and water quality, which explains their focus on 2- and 10-year storms. Here in Central Texas we are prone to flash floods and very intense rainfall, so it might make sense to keep the full-range of options on the table. We are going to form breakout groups and discuss this—what do you all think? What would be appropriate? And this is not the final word—we aren't going to decide policy at this one meeting, but we want to get input.

9. Does our model, Virginia or Maryland, take the velocity of water into account? As in how fast the water is coming off the roof or extreme slopes?

Response: Yes, the velocity in the creeks and channels is important in the design against erosive flows. Also, the time of concentration calculation that is run based on the slope of the land around the development.

10. Are payment-in-lieu funds used in within the project's watershed, or does it go out of the area?

Response: Regional Stormwater Management Program funds must be spent within the watershed they are collected in.

11. Is there a map of regional detention facilities?

Response: Yes. *This map will be appended to these notes when it is available.*

12. Do our current hydrologic and hydraulic models include the stormwater detention ponds, and the rainwater capture systems that use internet-based release (telemetric ponds that have access to weather data)?

Response: There is currently only one of those telemetric rainwater capture systems in town of which we are aware, so they are not included at this time. In fact, only the largest flood detention ponds are specifically represented in the model, although we count on the site-level ponds to work as they were designed.

13. Has the city modeled the flood mitigation implications of citywide adoption of rainwater capture requirements? Telemetric systems could be a real benefit to recharge.

Response: That has not been modeled at this time. This is something to discuss in the breakout groups. We could perhaps see a scenario where these redevelopment projects, which have no flood detention at all right now, maybe they are putting in a combination rain tank/flood detention pond that mostly waters the landscape, but then empties before it rains. There is obviously an operational issue with that to make sure that those are actually working, that the release happens at the right time so it is not full of water when the flood hits.

14. What is the cumulative impact of these new transect zones with more impervious cover? Has the city modeled the implications of potential increases in impervious cover in these areas (45%, 55%, 65% impervious cover)? We need the data going into the fall charrettes to make informed decisions.

Response: Right now, our flood model would assume the maximum impervious cover allowed by current zoning (e.g., 45% for SF-3/single-family residential). If those limits were raised, the model would need to get revamped. As to the second part of that question, right now an individual building permit on a single-family home doesn't require any on-site flood detention. We have just been talking about subdivision and site plans. Building permits do not require water quality or flood, so if we gave entitlements to a single-family area to do, say, fourplexes, they would then have to do a site plan.

Comments from Stakeholders (Large Group)

15. I was hoping today would be a conversation about how to integrate our water quality, flood control, and conservation goals. For those of us that do affordable multifamily, that integration is one of the things we look at to keep our budgets lower. It seems some time that WPD and the Austin Water Utility don't realize the impediments they create to making that integration happen. Hopefully we won't lose that conversation. Right now, the systems we have in place in the City Code and staff interpretation means it is easier to walk away from those integrated systems than to implement them.
16. Agrees with above comment. We have been trying to do progressive water systems for years, but our civil engineers keep telling us that they can't get it permitted. We are basically giving up.
17. We are making headway on some projects, but there are TCEQ challenges as well.
18. Worried about potential upzoning of single-family areas of town with CodeNEXT. Single-family areas may become more dense and exceed the current impervious cover limits. Up until now, we have been only considering the code as it applies to site plans, but single-family may not have to submit a site plan.
19. Must work within the nexus between flood mitigation, rain water capture water, conservation, and reuse. There is a clear path forward in terms of code. We must eliminate barriers and incentivize the green stormwater infrastructure measures. There are huge mitigation benefits from widespread rainwater capture.
20. Should put flood mitigation and stormwater in the same context.
21. Impervious cover is the big elephant—can we look at how to change those limits?
22. Imagine Austin is encouraging development following a particular philosophy which does not match the stormwater philosophy. We need to ask if the infrastructure matches the code/vision. Those need to align. If we are developing in an already flooding area, where we want to encourage development and density, that may exacerbate known problems. Should structure our regulations to match our development philosophy.
23. Could perhaps simplify the Virginia protocol by breaking watersheds into thirds and having different solutions for each third. Same basic idea, but not as complex to administer.
24. Could also use neighborhoods as the planning area for mitigation—100x the site is too large. At the neighborhood scale, the neighbors already know the problem areas and opportunities for improvement. Instead of waiting for a lot of payment-in-lieu money to accumulate to complete a large project, can implement several smaller projects in small planning areas.
25. Sites don't always have onsite opportunities, so how can you collectively find a solution? Perhaps oversize on one site to mitigate several adjacent sites. And get extra entitlements for managing a solution onsite.

26. Redevelopment manages 2 & 10 year storms onsite, and then pays into RSMP for City to mitigate 25- and 100-year storms offsite.
27. Living building challenge: net zero water goal, net zero for a single property. This is a target/goal to reach for. We could find formulas that a lot/building could meet, and then find a code that could meet it.
28. City can purchase property that can make the conveyance easier; get into the market and find the areas that can be made into public parks, but can be stormwater infrastructure as well. Weave in parkland. City of Portland purchases land and makes parks that also serve to alleviate the flooding in the area.
29. If the area of planning is smaller, there much more visibility and understanding in the neighborhood. We can use local mini projects to slowly work out of the larger problems. This is being done in the S. Lamar area.
30. Developers are subsidized and not being held accountable for putting pressure on the infrastructure. This needs to be dealt with upfront.
31. Stormwater impact fees. Certain size properties need to pay for their impact on the existing infrastructure. Need to bring money into the area with fees from development.
32. Impervious cover incentives.
33. Remove water with cisterns/capture, but no follow up on the actual use and not have to inspect (very burdensome). Look at water usage to see if the system is being used; if the usage is high, that would indicate that the system is being neglected. That should trigger an inspection, but would not have to have regular inspections.
34. Paradigm shift: we are conditioned to move water away rather than keeping it on site. Drainage Criteria Manual and Environmental Criteria Manual need to walk hand in hand.
35. We need to model and have watershed data available ahead of time for the fall CodeNEXT charrettes. There are going to be four areas of town picked, and I hope that WPD collaborates with Planning to gather that data. The charrettes are going to examine the public and private cost implications. Some of the examples presented today have pushed those costs onto the general public. If growth doesn't pay for itself, all of us must pay for it. We need to have that information available so we can make an informed decision regarding zoning changes.

Comments from Breakout Groups

Questions Asked:

How might we achieve flood mitigation for redevelopment?

If so, under what conditions?

- *Only in areas with downstream problems?*
- *Only apply to larger projects? How large?*
- *Mitigation to pre-development conditions? Other?*

What are the public and private cost implications?

Other considerations?

Group 1 comments

36. Need integrated systems with adequate permitting avenues.

37. Should regulate things in different ways to allow innovative systems and respond to actual water management goals.
38. Create clear and easier paths for progressive water management (permitting). TCEQ also hinders capture/use of rainwater.
39. Need better understanding from staff about TCEQ & EPA rules for distributed infrastructure.
40. Review staff need to be able to do integrated reviews (“all reviewers in the same room”) for integrated systems.
41. Neighborhoods don’t have access to the full set of comments from different reviewers nor the responses to the comments from the developer.
42. Different reviewers from different disciplines have contradicting comments when assessing projects.
43. Poor regulation of single-family residential relative to stormwater detention. Some form of detention and water quality should be required for single-family.
44. Base the code on the goals. E.g., no flooding neighbors or the right-of-way.
45. See US Virgin Islands Code regarding water (no centralized potable water).
46. Easier and cheaper to comply with code as is than propose something better/progressive.
47. Create better rules to allow storage/use of water without all the AWU hurdles. There are too many institutional barriers to using rainwater.
48. Redevelopment needs to correct flooding contribution of existing sites. Should add both water quality and detention.
49. Consider using impervious cover credits rationale (LCRA) to negotiate impervious cover percentage allowed.
50. Inspections of rainwater harvesting systems can be triggered by monitoring water bill, instead of on a regular basis.

Group 2 comments

51. We need a “Watershed Growth Plan” instead of just a growth plan that is not based on data. Watersheds are the missing piece.
52. Response: Agree that watersheds should be included, but we can’t develop strictly on what is best for just the watersheds. There are other concerns, and we need to balance them all.
53. Need an analysis of capacity for development by watershed. It can’t just be a one-size-fits-all approach all over town (although this is what CodeNEXT is ostensibly trying to achieve).
54. There is nothing in the site plan review process to verify site performance. We should consider a system where a site has to prove it functions according to the design after construction. Could be 1 – 5 years post-construction.
 - a) Inspection could be carried out during the regular rain garden maintenance regime.
 - b) Could be periodic inspections or only after a trigger/threshold is exceeded (perhaps if the WQ metrics exceed a certain threshold or model expectation)
55. We are focused on accommodating growth in the urban core without all the information. It will be very expensive to continue to maximize density in the core. We should instead extend existing systems outside the core to accommodate growth.

56. Response to above comment: Even if the drainage infrastructure is not there, all of the other infrastructure is there (amenities, businesses, roads, water, etc.). Extending existing systems would involve extending all that other infrastructure as well, which may not be what we want.
57. We are functioning on a mythology that density is good, not data. We need to gather the data to determine where the economic break-point is between adding density in the core and expanding infrastructure out to outer areas. We need to be more systematic in deciding where to put growth.
58. What are the criteria for deciding whether a particular development is “worth” the increased infrastructure required/worth our CIP dollars? How do we create a system to make these judgements through zoning?
 - a) Need a list of criteria to trigger CIP investment
 - b) CIP project needs to add to greater good instead of just a vault
59. Need to add watershed impervious cover limits to the Urban watersheds.
60. Upzoning is obligating us to create infrastructure. This needs to change.
61. Infill is going to happen either way. We either need to take an affirmative step to stop it or find a way to accommodate it (with sufficient infrastructure).
62. Should have different options based on where the site is in the watershed. Like the Virginia Protocol.
63. The Virginia Protocol may be hard to implement because the development community wants a simpler code—different protocols for different parts of a watershed won’t be popular with them.
64. Consider use of density bonuses based on retention of water on-site. Flexibility is key.
65. Need a menu of choices (similar to GAR/Green Factor for flood detention). This could be supported with a map to show the drainage options for a particular parcel.
66. There also needs to be a web viewer with drainage problems [Staff note: one is forthcoming in 2015].
67. Developer must upgrade the systems, and the city cannot increase entitlements beyond the infrastructure’s capacity. This will impact affordability, but we will pay for it anyways via CIP projects.
68. Should benchmark development costs across other similar cities. Are our development costs really that high? Austin’s impact fees are lower than surrounding cities’.
69. We have been “giving it away” to developers. They need to pay their fair share.
70. Need to overlay our Watershed Protection Master Plan data with the fall workshop areas.

Group 3 comments

71. Have redevelopment sites manage 2- and 10-year storm events on-site and allow payment-in-lieu for 25- and 100-year events.
72. Could simplify the Virginia protocol by breaking watersheds into thirds and having different solutions for each third.
73. Could also use neighborhoods as the planning area for mitigation—100x the site is too large. At the neighborhood scale, the neighbors already know the problem areas and opportunities for improvement. Instead of waiting for a lot of payment-in-lieu money to accumulate to complete a large project, can implement several smaller projects in small planning areas.
74. Sites don’t always have onsite opportunities, so how can you collectively find a solution? Perhaps oversize on one site to mitigate several adjacent sites. And get extra entitlements for managing a solution onsite.