Overall			
Section	**Comments on v1 and/or v2**	**Commenter**	**Response 9/5/2023**
NA	Written too much for the layman. Almost talking down to engineers and telling them how to do things they are trained to do as professionals.	HBA	The audience for this document is designers. Some of the language that seemed to target a lay-audience has been removed.
NA	The idea that this manual could be useful to anyone other than an engineer or design professional is ludicrous. For a citizen trying to get an idea of what stormwater control requirements in Raleigh are, it is useless.	Jeri Gray	The audience for this document is designers. We intend to improve our website to provide general information to interested citizens.
NA	Lots 1/2 acre or less, Grandfathered properties should not have anchors put around the Raleigh citizen's neck. Remember, we are the people that pay the taxes and vote. Grandfathered, should mean all properties before the new manual was approved. I can understand why this is needed for a new development with a huge budget. A citizen/homeowner should be allowed to expand their deck or add a fire pit without being pummeled by the city.	Cindy Morris	There are provisions that exempt many residential properties from the traditional stormwater requirements. There are less stringent requirements for the grandfathered lots addressed in UDO 9.2.2.A. and residential lots in subdivisions developed since 2001. The need to do stormwater management calculations or to build stormwater control measures applies when such properties exceed the established impervious thresholds.
NA	A house located on a lot adjacent to but uphill from my property was torn down and a larger new house constructed. Drainage from this new house was concentrated into what has become a dry stream bed that becomes very wet with heavy rains causing a creek to flow across my property ruining landscaping and causing erosion. Previously, water flowed down slope in a diffuse manner causing no problems. The developer assured me final landscaping would resolve this, but it did not. I feel that drainage design personnel felt no responsibility to impact on neighboring property. City inspectors visited several times but required no changes.	Ted Kunstling	Several changes are proposed with this manual that should address the concerns of neighbors to infill development such as yourself. For example, a "Lot Grading Plan" will now be required with infill development that will identify the proposed flow patterns after development. Additionally, any newly concentrated runoff will require a "Downstream Discharge Easement" from the adjacent property.
NA	There's a lot to go through, and I feel like this manual should be a guiding hand, but not prescriptive, however there are a number of instances where the language makes a certain item mandatory.	Hunter Freeman – WithersRavenel	The Design Manual is incorporated into the UDO by reference, so it is intended to establish mandatory requirements.
NA	Promoting the general concept of the importance of small-scale stormwater features that become assets that contribute to social/cultural quality and provide ecosystem services such as pollinator habitat and edible landscapes as part f the guidelines would be useful throughout the manual. Possible plant lists and proper soils and planting details should be part of the guidelines. These details are critical for the success is of creating high functioning landscapes.	Julieta Sherk – NCSU	Chapter 6, Section 6.3.5 now excludes invasive plants from SCMs. Additionally, this manual references the NCDEQ Stormwater Design Manual, which contains plant recommendations. Soil requirements for practices such as bioretention and wetlands are also included in the NCDEQ Manual.
NA	Here are my overall comments on the manual. I would like to see the City require development to include appropriate rain gardens when possible or they will not get built.Moreover, I would like to see plant species recommendations that include both native plants and/or plants to support pollinators and wildlife. We can do better.	Dr. Michelle Schroeder-Moreno - NCSU	For private development, the City can incentivize - but not require - the use of green stormwater infrastructure (GSI), including rain gardens. For City projects, the City is working on a policy that will require all City projects to evaluate the use of GSI. That is expected to become effective in Fall 2023. In terms of plantings, Chapter 6, Section 6.3.5 now excludes invasive plants from SCMs. Additionally, this manual references the NCDEQ Stormwater Design Manual, which contains plant

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NA	This manual is drastically different from previous versions, with subtle change that have huge repercussions. This does not help a project, and in fact is counter to this. Too many changes are more restrictive making this more difficult to develop on land left in Raleigh's ETJ. This is a very poor attempt at a design guideline update.	Ryan Akers - McAdams	Since this manual has not been updated in 20 years, substantial changes were made to the organization. Additionally, new requirements are being introduced to address on-going concerns of citizens and considerations for infrastructure maintained by the City. We welcome suggestions of you and your colleagues about what a better Manual would look like.
NA	This manual is over kill!!!	Travis Lam – Midtown Custom Homes	We welcome your comments about how the manual could be simplified.
NA	Additional information needed on new processes and when they apply.	Travis Tyboroski – JAECO	We have attempted to do this in Draft v3. We welcome your additional comments on items that still need clarification on applicability.
NA	Specific input like that which follows will always seem simply critical. Wanted to note that our office finds this manual as a major improvement, and views this as strides made in the right direction. Wanted to commend Staff on pulling this together and undertaking the effort to not only update a large, impactful, document but to involve the Design Community in this undertaking. Thank you.	Travis Tyboroski – JAECO	Thank you for your thoughtful comments throughout the document.
NA	What's the plan for the Guidelines for Land Disturbance? Don't see it incorporated by reference, and some of that guidance (grading adjacent to shared property lines, benching, etc) is not included in this manual.	Travis Tyboroski – JAECO	The new Manual will replace both the current Stormwater Design Manual and GLDA. We have been deliberate about what items from GLDA to include. For example, we have deliberately not included setbacks from property lines and buildings for grading.
NA	Will there be a second draft to review? A lot of discussion has centered around the SDA, and the Design Community hasn't really had a chance to review the final draft of that and the potential impacts.	Travis Tyboroski – JAECO	Draft v3 is available now. If you or a group would like to meet about your major comments on Draft v3, please contact Sally Hoyt during September 2023.
NA	There are a number of inconsistencies in the checklists relating back to the design manual.	Travis Tyboroski – JAECO	The checklists are no longer included in the Manual. Checklists will be provided on the website prior to Manual adoption, but they will be separate documents provided as tools.
NA	There are also a number of instances where requirements are *introduced* in the checklist, and not mentioned in the manual.	Travis Tyboroski – JAECO	We have attempted to incorporate all requirements into the Manual. Future checklists provided on the website will not introduce new requirements.
NA	Serious concerns relating to inlet sizing/spacing requirements.	Travis Tyboroski – JAECO	Understood. We expect this to be a disucssion item.
NA	Is the 25-yr design storm an intentional choice above the standard 10-yr for erosion control measures?	Travis Tyboroski – JAECO	This is a current requirement that has not changed with the draft manual.
NA	Various language, especially when it relates to suggestions regarding good "engineering practice", is too strong. Don't want to be locked in to requirements on items that really should be suggestions.	Travis Tyboroski – JAECO	We have attempted to balance this and welcome further comment on this topic.
NA	General note: additional guidance to Staff should be provided on the timing of bonds, fees, etc as the relate to permit issuance. Too often these items are required for plan approval when they really should be external to the plan and required for permit. Admittedly, this may be out of the scope of this document, however just a general suggestion.	Travis Tyboroski – JAECO	We have tried to leave specific process steps out of the Manual since processes change more frequently than the Manual will be updated. In general, we do need to tie sureties and nutrient offset payments to steps in the permitting process to ensure these items are paid.

Chapter 1 - Introduction			
Section	**Comments on v1 and/or v2**	**Commenter**	**Response 9/5/2023**
1.1 Introduction	Last paragraph - What about GLDA? Concerns with codified and subjectivity.	HBA	GLDA is being replaced by the new Design Manual, so content not covered in the UDO will be in the Manual. GLDA will no longer be referenced by the UDO after text changes to be made in conjunction with the Manual.
1.2 Limitations			
1.3 Stormwater Regulations	Page 2: Good to note what other standards are incorporated by reference. However, since the manual appears to be otherwise silent to nutrient regulations, it would be helpful to have a clarifying statement about referencing the outside documents for that guidance. Current manual offers guidance, and other jurisdictions offer guidance. Don't think that the manual needs to include that since it's ultimate a State requirement, just think it'll help with a specific note.	JAECO - Tyler Tyboroski	Nutrient requirements are detailed in Chapter 5 of the Draft Manual. They are also referenced in 1.3.3.
1.4 Chapter Summary			
1.5 Site Planning for Stormwater Management	Design professionals don't see need for this b/c they do this normally.	HBA	The site planning section (formerly 1.5) is no longer included.
1.5.2.1	Voluntary goals should not be in a codified document. Perhaps in an addendum.	HBA	
1.5.4	smallest area necessary in first bullet - Who determines what is "necessary"?	HBA	
1.5.5 & 1.5.6	These sections are particularly troublesome. Too subjective on how it is to be designed. Completely strike 1.5.5 and 1.5.6.	HBA	
1.5.5 & 1.5.6	Section 1.5.5. can come out completely - no engineer needs to review this. Same for 1.5.6	McAdams - Ryan Akers	
1.5.6	Page 7: Terminology is potentially confusing. Are the "final conceptual site plan" and "preliminary development" plans new processes, or do they relate to existing processes (sketch, SPR, etc)? If they're new processes then we assume guidance on those are forthcoming and the references make sense	JAECO - Tyler Tyboroski	
Figure 1.5.6.1	This is what the design professionals largely do, so walking the City through this process is unnecessary.	HBA	
1.6 Checklists	Having the checklists are good, but the format is bad. Alphabetical is not helpful. Need it provided in the order that you need them...stages.	HBA	Checklists have been removed from the Manual. Checklist will be provided on the City's website as a tool. They will be provided prior to Manual adoption.
1.6 Checklists	Section 1.6. can these be organized to a "these apply when" type format?	McAdams - Ryan Akers	
1.6 Checklists	conveyance check-list - CCTV on stormdrain. Who reviews? Cost? Schedule to development?	McAdams - Ryan Akers	Details on the Stormwater Conveyance System permitting and as-built requirements have been added to the draft in Section 4.8.
1.7 Definitions			
	definitions should not deviate from the UDO. Subjectivity would results in BOA hearings if this document is codified.	McAdams - Ryan Akers	Terms that are defined in the UDO now reference the UDO rather than having a separate definition in the Manual.

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
Green Stormwater Infrastructure	Page 11: GSI: 90th percentile storm. Background on what establishes this metric would be useful. Seems rather arbitrary otherwise, at least in relation to typical metrics (depth, intensity, etc). Also, understand the hesitancy in listing the value as I'm sure it's subject to change based on updated NOAA information, however the value the City references is difficult to ascertain; it's currently buried in the existing single-lot guidance (1.4").	JAECO - Tyler Tyboroski	The GSI definition now references the UDO definition. Note that the requirement for Volume Match compliance, as described in the Draft Chapter 5, requires the 90th percentile storm. This is based on NCDEQ requirements.
Built Area	that are greater than 0% impervious and include, but are not limited to, permeable and semi-permeable pavements and pavers, green roofs, and living roofs. - Having an extra definition for impervious muddies the water. Keep it in one place or the other - UDO or SWDM	HBA	Terms that are defined in the UDO now reference the UDO rather than having a separate definition in the Manual.
Limits of Disturbance	Limits of Disturbance - "include an additional 20-foot offset..." Why is this included? LOD by nature is the LOD...no need to add more buffer	HBA	The definitions chapter now referencees Chapter 8, where additional detail is provided. The 20 foot requirement has been changed to a 10 foot offset from structures. The purpose of this is to be clear with applicants that LODs that abut structures to be constructed or demolished will not be accepted. Establishing a minimum of 10 feet provides definitive guidance rather than leaving this to reviewer's judgement.
Limits of Disturbance	what is the additional 20' offset for? This seems like overreach and a buffer to a buffer. this appears to be a land taking.	McAdams - Ryan Akers	
Pre-Development	Pre-Development - This wording could be better to account for re-development.	HBA	The definition has been clarified and coordinated with the UDO.
Pre-Development	there needs to be a clearly definted baseline.	McAdams - Ryan Akers	
Post-Development	definition penalizes a site for dense upstream development. Seems inequitable.	McAdams - Ryan Akers	The definition has been updated to refer only to the site. Note that upstream build-out conditions must be considered in some calculations, as stated in Chapter 3. However, that does not affect most sites.
NA	Here are my overall comments on the manual. I would like to see the City require development to include appropriate rain gardens when possible or they will not get built.Moreover, I would like to see plant species recommendations that include both native plants and/or plants to support pollinators and wildlife. We can do better.	NCSU - Dr. Michelle Schroeder-Moreno	For private development, the City can incentivize - but not require - the use of green stormwater infrastructure (GSI), including rain gardens. For City projects, the City is working on a policy that will require all City projects to evaluate the use of GSI. That is expected to become effective in Fall 2023. In terms of plantings, Chapter 6, Section 6.3.5 now excludes invasive plants from SCMs.
NA	The definitions for the various storms don't convey what they are very well. Suggest trying to use layman's terms. For example, the average person won't know what the 90th percentile storm is. Need more explanation of what that is -90th percentile of what?	Mark Senior	As stated in the Summary of Changes document, the audience for this document is the design community. The document is not written for a layman audience. Also, in Chapter 5 where the 90th percentile storm is referenced, links have be added to the NCDEQ documents that established this criteria.

Chapter 2 - Site Development Requirements			
Section	**Comments on v1 and/or v2**	**Commenter**	**Response 9/5/2023**
General	Again, I would like new developments REQUIRED to include rain garden designs and implementation for both residential and commercial properties.	NCSU - Dr. Michelle Schroeder-Moreno	For private development, the City can incentivize - but not require - the use of green stormwater infrastructure (GSI), including rain gardens. For City projects, the City is working on a policy that will require all City projects to evaluate the use of GSI. That is expected to become effective in Fall 2023. In terms of plantings, Chapter 6, Section 6.3.5 now excludes invasive
2.1 Introduction	Introduction - "two categories" - Really there are three categories, exempt, small and large. See UDO 9.2.2.A.3	HBA	We have eliminated the language about small and large sites because it was confusing and not necessary.
2.2 Small Site Development			
2.3 Large Site Development	2.3 Large Site Development: "During the submittal process, Stormwater Development Review staff may require additional information from the applicant to determine compliance with applicable regulations." - This language should not be permitted. They have an extensive checklist already, why does it get to be a subjective process thereafter, as this last sentence allows staff to request for anything they want and if they do not like a project, they could ask for information that will guarantee to make the project fail or be time consuming/expensive, such as modeling huge areas outside of a project. Too subjective.	HBA	This language has been removed.
2.4 Required Reference Materials	Page 3: Understand the State constraints, however would like to register a complaint in regards to soil maps we're required to use. We're aware of the State interpretation, however utilizing a 40-year old map is antithetical to the stated goals of protecting watersheds (this view misses features that may have developed in the interim that are reflected on the updated, current, USGS maps).	JAECO - Tyler Tyboroski	Required reference materials have moved to Chapter 1. The requirement for use of the paper maps is a NCDEQ requirement. The City is not allowed to impose Neuse buffers on streams that fall outside the NCDEQ definition.
2.5 Lot Grading Plan	after "shall be enforced by the City" include - and designed by an appropriately licensed professional.	HBA	This subsection has been rewritten and the phrase "shall be enforced by the City" has been removed. There are cases where a licensed professional would not be required for a LGP.
2.5 Lot Grading Plan	Lot Grading Plan -- given the detail required on large sites, this will create a lot of extra $$ for engineering. Big developments at 20-scale will take MANY MANY sheets. This will result in more staff time and review time - not good.	McAdams - Ryan Akers	The language has been clarified to indicate this is not required on large subdivisions.
2.5 Lot Grading Plan	There needs to be a field change acknowledgment. a new LGP sounds like going through the SPR process and is very time consuming, expensive and cumbersome. reference process - ASR, plot plan, etc	McAdams - Ryan Akers	The language has been clarified to indicate this is not required on large subdivisions.
2.5 Lot Grading Plan	what about single-family home lots that have rear yards that drain to buffers? I feel that they should not be subject to an LGP, or if they are, it should be incorporated into the survey plot plan review at building permitting	McAdams - Ryan Akers	This requirement does apply to one-unit dwellings that are developed as part of a small project. In those cases, the LGP can be submitted with the building permit. The information is needed to verify that the Neuse riparian buffer rules are being
2.5 Lot Grading Plan	requiring developers (or individuals) to obtain easements from offsite property owners is excessive and unrealistic since there is no way for an individual to force an offsite owner to grant an easement. It may result in a legal challenge by depriving an owner from reasonable use of his/her property -same goes for the easement requirements in 2.5.1.3	Mark Senior	There are typically multiple options for discharging from a site. If an owner cannot obtain easements they will need to (a) discharge a different direction or (b) maintain existing flow conditions at the property line.

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
2.5 Lot Grading Plan	there is no criteria describing what constitutes “concentrated stormwater” a new downspout could trigger the need for offsite easements	Mark Senior	Downspouts have been specifically addressed. They do not count as concentrated if they are a minimum of 10 feet from the property line.
2.5.1	The third option of exemption should be noted in this section from 9.2.2.A.3 for LGP	HBA	We have eliminated the language about small and large sites because it was confusing and not necessary.
2.5.1	Page 3: Are Lot Grading Plans (LGP) required for every development? Part of ASR, SPR?	JAECO - Tyler Tyboroski	The language has been clarified to indicate this is not required on large subdivisions.
2.5.1.1	Take out "small" and just say "accessory structures".	HBA	This change was made.
2.5.1.1	Do you have a small allowance for overage? Like the extra 400 square feet?	HBA	There is an exclusion for decks and for substitution of impervious area. This is now in Section 2.1.1.
2.5.1.1	requiring an LGP for a single residential lot is excessive and unreasonable – essentially any new development or expansion will alter drainage patterns to some extent and trigger the need for an LGP. Need some criteria regarding a threshold for what constitutes “altered’	Mark Senior	The LGP has been instituted in response to citizen and Council concerns about the effects of infill development. The appliability has been furthered defined in Section 2.1.1.
2.5.1.3	"any changes to the proposed development that may impact the lot grading and/or stormwater flow patterns will require a new LGP submittal for review and approval" - Is there a threshold that triggers this or literally any changes? Big concern with requiring this for every single lot b/c it is a ton of additional detail and that translates into additional cost. Not good for housing affordability.	HBA	The thresholds are defined in Section 2.1.1. This requirement is now in 2.1.2. We have not required that the LGP be prepared by a licensed professional. We anticipate that in some cases it may be prepared by a homeowner or builder.
2.5.1.3	LGPs shall be submitted for site development projects unless the development falls within the exclusions listed in Sections 2.5.1.1 or 2.5.1.2. - Needs to reference process - plot plan, ASR, SPR, exempt, etc. (less than 12,000 sf) substitution of impervious	HBA	Applicability of the LGP is now in Section 2.1.1. It has been edited in an attempt to be clearer. Specific process steps such as SPR and ASR have not been included as process names change fairly frequently.
2.5.1.3	Where that is not possible and new concentrated flow discharge locations are created, the lot shall drain to an available drainage swale or system (with appropriate easement). -Do we have to have easements on every lot? Could be probematic for residential in particular.	HBA	Easements will be required when a stormwater conveyance system serves more than one lot. This reflects current practice.
2.5.1.3	If placing earthen fill on a lot in a multi-lot development changes the drainage pattern, and a retaining wall is not proposed, the lot shall drain to a swale/yard drain system (with appropriate easement) designed per Chapter 4 – Hydraulics. - Why is this a requirement. Could be sheet flow, why make a requirement?	HBA	This language is now in the second sentence of the first bullet of 2.1.3. The preceding sentence indicates that sheet flow should be maintained if possible.
2.5.1.3	No flooding or impounding of water against an insurable structure shall be permitted during the 100-year storm event, except for properly floodproofed non-residential structures. - Does structure include walls?	HBA	If a wall is part of a foundation, this applies. If a retaining wall is not structurally connected to an insurable structure, this requirement wouldn't apply.
2.5.1.3	Concentrated runoff shall not flow across or onto sidewalks. - What's a concentrated flow? Is downspout across lawn and then sidewalk ok?	HBA	This language is no longer in Chapter 2.
2.5.1.3	an inlet shall be installed to intercept flow - What type of inlet are we talking about? A drop inlet? over land?	HBA	This requirement is unchanged from the Current Manual. The type of inlet is to be determined by the project designer.

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2.5.1.3	need a definition or criteria for “concentrated flow discharge” at what threshold does that occur? .01cfs, .1 cfs, 1 cfs, 10 cfs? – a downspout? Runoff from a deck? a driveway? A dog house? – need to clarify “street” is that both public and private streets? Also may want to reword to say that no more than 3cfs may be discharged into a “street” at any one	Mark Senior	Downspouts have been specifically addressed. They do not count as concentrated if they are a minimum of 10 feet from the property line. The definitions for sheet flow versus concentrated flow will be based on existing technical references.
2.5.1.3	Regulating roof drains seems excessive – does the city really anticipate citing someone if they alter the discharge of their roof drain? Suggest using should rather than shall	Mark Senior	The regulation of this level of detail has become necessary on infill development.
2.5.1.3	Reverse slope driveways and other features that would likely fail to drain during major rainfall events should be avoided. - Implies reverse slope driveways are likely to fail and we don't agree with this.	HBA	The language in this bullet (now in 2.1.3) has been reworded.
2.5.1.3	Page 5: reverse slope driveway language is too strong. Historically Staff would interpret this as a *requirement*, rather than recommended good engineering practice.	JAECO - Tyler Tyboroski	The language in this bullet (now in 2.1.3) has been reworded.
2.5.1.3	Any downspouts or other concentrated discharge shall be offset from the property line by a minimum of 10 feet unless it discharges directly into a jurisdictional water body, a City right-of-way (ROW), or public/private drainage easement. Can't comply with this, lots being built with 5 foot setbacks. Whats the recourse? Going to BOA? Flow line or perpendicular offset?	HBA	This requirement is about the direction in which the flow is discharged. e.g. If the downpout is 5' from the side property line, but discharges to the front of the property rather than the side, this requirement would be meet.
2.5.1.3	If a structure is closer to the property line than 10 feet then they won’t be able to comply with the downspout requirement – will the city require the building to be moved in order to comply with a downspout requirement? Seems excessive	Mark Senior	
2.5.1.3	Page 5: conflicts with build-to provisions. If a lot has a 5' build-to the downspout would conflict with the "10-foot" rule with no apparent remedy. Needs clarification.	JAECO - Tyler Tyboroski	
2.5.1.3	Sheet flow can only occur for one lot, after which it is assumed to change to concentrated flow and a swale, channel or pipe conveyance system shall be provided. SF lot sheet flowing to open space...what happens here? This doesn't make sense, need to limit lot size.	HBA	This language has been removed.
2.5.1.3	Sheet flow for “one lot” is a poor reference – a single lot could be a tenth of an acre or 10 acres. Suggest using an area instead	Mark Senior	
2.6 Stormwater Development Analys	Intro - Process - where is this plugging in? Too much subjectivity. During the ASR?	HBA	We are not referencing the PlanDev process because that process changes more frequently than the Manual is updated. The SCR will be required at "preliminary or permitting (whichever comes first)" which is when stormwater calculations are currently submitted.
2.6.1	Exclusions to the SDA requirements - Clarify this section better with UDO. 9.2.2.A.3??	HBA	Section 2.2.1 now addresses SCR Applicability.

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2.6.1	Requiring an SDA for any change in drainage pattern is excessive – essentially any new development will change drainage patterns to some extent – need to define and establish realistic criteria for what constitutes a “change” warranting an SDA	Mark Senior	This is written as "changing how flow leaves the property." So changes within the site wouldn't require a SDA (now called SCR).
2.6.2	This section could require every single family home development to hire a PE or LA to prepare a drainage plan – that seems excessive	Mark Senior	The SDA (now called SCR) will only be required for one-unit dwelling developments when they propose to exceed the impervious limits in 9.2.2.A or need a flood study.
2.6.2.1	Page 7: land disturbance in both SF and ac. What is the rationale behind providing both units? Square footage is often unnecessarily cumbersome. Suggest direction to establish one unit measurement.	JAECO - Tyler Tyboroski	This specific language has been removed. In general, the LOD can be provided in hundreths of acres.
2.6.2.1.i	2.6.2.1.i "Any Total Maximum Daily Loads (TMDL) currently in effect for non-point sources" - add "if applicable"	HBA	We have removed the requirement for individual applicants to address whether TMDLs are in effect. If new TMDL requirements come into effect, these would be incorporated
2.6.2.3	Do you have to provide a breakdown of impervious?	HBA	This language has been changed. The breakdown of impervious is generally in the PDF of the City's Summary tables. If impervious area is being allocated by parcel, that summary must be in the narrative.
2.6.2.4	Why is land disturbance being defined in two places, here and in UDO?	HBA	Land disturbance is no longer defined in Chapter 2.
2.6.2.4	"and include an additional 20-foot offset or extend to the property line to allow for construction activities" - No need for additional buffer This will be a huge hardship. We disagree with the definition of land disturbance	HBA	Land disturbance is defined in detail in Chapter 8. The 20 foot requirement has been changed to a 10 foot offset from structures. The purpose of this is to be clear with applicants that LODs that abut structures to be constructed or demolished will not be accepted. Establishing a minimum of 10 feet provides definitive guidance rather than leaving this to reviewer's judgement.
2.6.2.4	Page 7: 20' offset is not a practical measurement, and unnecessarily encumbers development adjacent to buffers and other constraints. Work typically occurs within the erosion control measures. 2' offset is more typical to provide a buffer in the stated numbers, and good engineering practice suggests construction traffic routing be accounted for in sequencing, however a blanket 20' offset is impractical.	JAECO - Tyler Tyboroski	
2.6.2.4	Limits of Disturbance definition has errors - clearing is not LD. Staging and Storage/Parking? Huh...	McAdams - Ryan Akers	Land disturbance is no longer defined in Chapter 2.
2.6.2.4.a	"Demolition" - Can remove building w/o slab and not land disturbing	HBA	Demolition inherently requires land disturbance. The area where equipment is working and any stockpiling area would be in the LOD. See Chapter 8.
2.6.2.4.a	"Clearing" Just cutting trees, not pulling up stumps	HBA	It is unclear what the comment is here.
2.6.2.4.g	Under new WOTUS, non-jurisdictional - shouldn't be required	HBA	The requirement to include a drained pond is not related to wetland and waterways rules. It is related to ESC rules, as permanently draining a pond creates an area of bare earth.
2.6.2.4.g.	Change of land use (e.g. draining a pond, etc.) - this should be better defined, so as not to be confused with a change in use, which also applies to change in use of an existing developed property, whereas the building nor parking on a property may change, but by this terminology could require storm water measures be added. We do not believe that is the intent, but alternate wording should be used to clarify this	HBA	This list is now in Section 8.2.1. The language has been changed to "change of cover". We agree that change of land use was the incorrect terminology.
2.6.2.4.l and m	neither of these are "land disturbance"	HBA	Stockpiling is required to be included in the LOD by NCDEQ. Our experience has been that equipment storage is also included in the LOD by NCDEQ.

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
2.6.2.4	"Stormwater Development Review staff holds final authority to interpret the definition of what qualifies as new, and/or a change, in impervious area." - Too much staff discretion; needs to be more	HBA	This language has been removed.
2.6.2.4	'Stormwater Development Review staff holds final authority to interpret the definition of what qualifies as new, and/or a change, in built area. ' - - i disagree that staff should have the ability to interpret code if codified.	McAdams - Ryan Akers	This language has been removed.
2.6.2.4	Below m. it states..."If there is no land disturbing activity, as defined in UDO Section 12.2, state this in the narrative. Stormwater Development Review staff holds final authority to interpret the definition of land-disturbance areas." - This last sentence should be stricken, as it allows this to be subjective. Land Disturbing activities should be able to be a clearly defined term, and not up to staff's opinion. Cutting trees is typically not viewed as land disturbing, but a staff member could say the equipment used to cut the trees will disturb the ground and hence is land disturbance activities. One could argue geotechnical subsurface exploration of a site is land disturbance. This should be defined and not left up to staff. General Comment – The document should not provide specific requirements and guidelines, and then state staff may deviate from these requirements and guidelines to request more. Historically, staff stands on the fact they are not permitted to ever allow for less than what is in their ordinances and manuals, they should not be	HBA	The language that was below m. has been removed. The list of items to be included in the LOD (now found in Section 8.2.1) is provided so that it is clear to all parties and does not require interpretation by staff. Regarding cutting trees - if that is the only activity being performed, then the site might be regulated under Forestry rules rather than the City's development rules.
2.6.2.4	"Any streams on the property or within 150 feet of the property boundary" - Why 150 feet? What is that number connected to? Why not 50 feet? "If a stream is not buffered (with respect to Neuse Riparian Buffer regulations), a buffer determination by North Carolina Department of Environmental Quality Division of Water Resources (NC DEQ DWR) is required." Why?	HBA	This language has been changed to indicate that streams and riparian buffers on the property must be shown. The language has been reworded. This should indicate that if a stream shows up on the Soil Survey or USGS sources but the applicant thinks this is incorrect, the applicant will need to provide a buffer determination.
2.6.2.4	Under "Streams" – non USGS and county soils mapped streams are referenced. How is one to determine whats a "stream" otherwise? What constitutes a stream? Need a definition for these and criteria – also this section only references Wake soils and probably needs to reference Durham co soils mapping as well	Mark Senior	Durham County maps have been added to the definition. Streams definition under review.
2.6.2.5	They should specify distance, not just 4 vertical feet...that could be a long way when talking about floodway.	HBA	This language has been removed.
2.6.2.5	Page 9: SFHA needs to be defined prior to use.	JAECO - Tyler Tyboroski	SFHA is no longer referenced in Chapter 2. In general, abbreviated terms are spelled out for their first use.
2.6.2.10.e	prohibits all disturbance in a buffer without state approval however disturbance of the outer 20 feet is exempt provided vegetation is replaced – I don't think the state is going to want to provide approval for allowed buffer impacts	Mark Senior	Language has been clarified to match the State's Neuse Buffer requirements.
2.7 Designer's Letter	"cell tower and tower equipment" - Why calling out cell towers? Seems like there should be all types of exemptions.	HBA	There is no longer a Designer's Letter nor a cell tower exemption.
2.7 Designer's Letter	amended site plan - Not appropriate terminology for COR	HBA	There is no longer a Designer's Letter nor a reference to amende

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
2.8 Downstream Assessment	Like Zone of influence and 10% but needs to go further on point of analysis? 10% can be good or bad depending on where you are in the drainage basin. This needs to be expanded on more. Downstream assessment required for redevelopment? So would have to do this for downtown Raleigh?	HBA	The "Downstream Assessment" also referenced as the 10% Rule has been removed.
2.8 Downstream Assessment	this downstream analysis is draconian - who is expected to pay for all this design and analysis... every development? What about smaller engineering shops that don't have this capability? Seems exclusionary.	McAdams - Ryan Akers	
2.8.1	second bullet - remove "small"	HBA	
2.8.1	need to define outfalls – is that at the point a pipe discharges? At the property line? Off-site (if connecting to an existing drainage pipe)?	Mark Senior	
2.8.1.1	same comment on “concentrated flow” need to define and establish measurable criteria	Mark Senior	
2.8.1.2	same comment on “concentrated flow” need to define and establish measurable criteria	Mark Senior	
2.8.2	structural flooding needs to be defined – is that a house, garage, shed, dog house, fence, bridge across a creek? what if a downstream owner puts a structure in harms way, does that make the developer responsible for protecting it? – maybe say an insurable structure that was constructed in compliance with FHA requirements in place at the	Mark Senior	
2.8.3.1	"Stormwater Development Review staff, appropriate mitigation measures shall be identified." - such as but not limited to... too open for staff if not having something listed here.	HBA	
2.8.3.2	this section is confusing – While volume and peak runoff are related, impacts are typically associated with only routing the peaks since the duration of the peak takes into consideration the increased volume– suggest dropping the volume language unless there is a discussion about reducing volume of runoff	Mark Senior	
2.8.4	Page 15: NCDOT allows the use of the USGS StreamStats tool in conducting these downstream analyses (as does, in our experience the Town of Wake Forest). Will Raleigh similarly allow?	JAECO - Tyler Tyboroski	
2.8.4.1	"For a site that discharges directly into a local ditch, pipe system or roadway, it is appropriate to model other, smaller on-site SCMs, that are located on upstream and downstream properties within the analysis limits as significant detention measures. Best available information should be used to model these facilities such as aerial topography, field visits, survey or existing plans." - Now have to model upstream but a whole lot of effort...how would we even get this	HBA	

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
	downstream analysis is appropriate for larger sites but not for small sites – suggest trying to include an example for a ¼ acre single family home that creates concentrated runoff at one or more points to see how impractical that application would be (even though the rules may require the analysis) – how do you analyze half a cfs of runoff? Or maybe a 1/10 acre downtown business that increases its impervious by 16%. How would one analyze that?	Mark Senior	
2.8.4.2	Page 17: full buildout of subject development, or does this imply need to study full buildout of drainage area (based on zone, etc).	JAECO - Tyler Tyboroski	
2.8.4.2.3.a	"Erosion Protection Design Storm: 1-year, 24-hour" - Not mentioned anywhere else? Seems odd to add here.	HBA	
2.8.4.2.5.a	They don't specify which storms? 1, 10 and 100 again?	HBA	
2.8.4.2.5.c	"With City approval, participate in off-site projects to mitigate impact of the development." - explain this a little more? Perhaps remove this? Concerns with the off-site part.	HBA	
2.9 Easements	given the new widths of swales, this becomes quite the taking. This will get larger than currently enforced. THere seems to be no consideration for urban infill or unique circumstances... or shared pipe easements. This is true for the pipe and the swale easements. These results in further restrictions to already challenged land remaining in Raleigh's ETJ. Land taking. This is not good	McAdams - Ryan Akers	The easement width associated with swales has been revised to be smaller. See Section 7.3.
2.9.1	easements for buffers is inappropriate as buffer rules may change or go away completely – buffers and erosion hazard zones already exist so easements serve no purpose also, who would the easement be dedicated to?	Mark Senior	The erosion hazard setbank has been removed, as it is covered either by buffer rules or by swale easement requirements.
2.9.1	"If newly concentrated stormwater discharge locations are created by the proposed development, then stormwater flows from these new discharge locations shall be conveyed through an offsite drainage easement that has been secured and recorded between the developer and all downstream, impacted property owner(s). Such easements are required until the point where stormwater flow reaches a jurisdictional water body, a City right-of-way (ROW), or another public/private drainage easement." - This sounds pretty heavy like it could be rather impactful in a negative way...	HBA	Yes, this is a significant change. It is being made in response to input from citizens and Council.
2.9.1	Same comment on requiring offsite easements – can't require something that a developer may not be able to obtain	Mark Senior	There are typically multiple options for discharging from a site. If an owner cannot obtain easements they will need to (a) discharge a different direction or (b) maintain existing flow conditions at the property line.
2.9.1	"Channel and pipe conveyance systems carrying runoff from two or more lots shall be in an easement." - shouldn't there be a size limit? Sheet flow is ok though?	HBA	This reflects current requirements - it is not a change. Correct, sheet flow does not require an easement.
2.9.1	References runoff from "2 or more lots" – need to change to an area or flow rate as you can have one 10 acre lot or (2) 1/10 acre lots that are only 2/10 of an acre combined	Mark Senior	This reflects current requirements - it is not a change.

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
2.9.1	Requires an easement if receiving runoff from an easement – easements are only applicable if you have more than one lot – if only one owner, who is the easement dedicated to? Themselves? If so, they can remove the easement from their property anytime they want as they have complete control. Will these be public easements and the responsibility	Mark Senior	This reflects current requirements - it is not a change. These are private drainage easements. They are often tied to legal language in the SCM agreements, but are sometimes stand alone.
2.9.1	"Other locations deemed appropriate by Stormwater Development Review staff." - what about access?	HBA	This bullet has been removed.
2.9.2	The easement width requirement is overbearing. A 24" pipe only buried 6' deep requires a 22' wide easement. With every new manual the City comes out with (this includes utilities), they keep widening the requirements for their easements, which significantly impacts the developable area of the site. Ironically, as you know, we have had meetings about retaining walls and the City does not like them (either do developers), but as they make easements wider, they are forcing the developer to implement other measures, such as retaining walls.Much bigger than what's required now. Going to be huge and private...so big burden on private land owner or HOA and asking for them to be applied in more places.	HBA	The easement requirements for pipes are the same as the current Design Manual. In Draft v3 see Table 7.1. In the current Manual see Section 1.2.3 (page 17).
2.9.2	Table 2.9.2.a This is really large for a 15"	HBA	
2.9.2	the required easement widths do not take in consideration the ability to use trench boxes for deep installations – if a pipe is 10 feet in the ground, no contractor is going to dig a 40 foot wide trench to work on it – suggest checking with public utilities to see if all their sewer installations can meet this criteria. If not, then the city is asking others to do something the city does not follow	Mark Senior	
2.9.2	Page 18-19, easement widths: These easement requirements are huge. Why a 10' baseline in addition to diameter + depth? If attempting to define easement widths by layback requirements to install/maintain pipes then it should be based solely on that criteria. A 20' basic minimum is acceptable, but, in the extreme, a 3' deep, 6" pipe will not require a 17' easement to maintain, much less the minimum 20'. Smaller/shallower pipes can be repaired by hand and don't require heavy equipment access, so a 10' baseline is redundant. This criteria should be available to REDUCE widths below 20' (without the 10' penalty) from a purely construction/access standpoint.	JAECO - Tyler Tyboroski	
2.9.2	Page 18: additionally, pipe easement widths appear to be non-negotiable. These absolute criteria invariable lend themselves to future, avoidable, issues. If a design adjustment is available for open channel, why not for closed? Don't open channel flows in fact represent a higher public risk and simpler construction/maintenance access?	JAECO - Tyler Tyboroski	Design exceptions are still a possibility if an applicant feels their proposed easement width meets the intent of the Design Manual.
2.9.2	"Where other utilities are involved, such as water and sewer, additional width shall be provided according to guidelines in the Public Utilities Handbook, but in no case shall the easement widths be less than those listed above." Can these overlap some?	HBA	Yes, overlap is possible per the requirements in the City of Raleigh Public Utilities Handbook.

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
2.9.2	Page 19: again these widths are unnecessary. There doesn't appear to be any engineering justification for this great an encumbrance.	JAECO - Tyler Tyboroski	The easement requirements for pipes are the same as the current Design Manual. In Draft v3 see Table 7.1. In the current Manual see Section 1.2.3 (page 17).
2.9.2	while I support the idea of keeping folks away from streams, what is the science behind the easement width for channels? Need to be able to provide justification to those who's land the city will be imposing restrictions on.	Mark Senior	The easement widths for channels have been revised. See Table 7.2.
2.9.2	"Design exceptions for easement widths or off-center easement locations shall be reviewed by the City. In no circumstance will an easement width be approved that does not fully contain the limits of the 100-year storm event." - What's the process?	HBA	The existing Design Exception process will remain in effect. The Design Exception form is available on the City website. The form is submitted to the reviewer who evaluates the appllication and makes a recommendation. Final decisions are made by the Director of Engineering Services.
2.9.2	Page 19: Design exceptions: Administrative (by Staff) or do they require Board review?	JAECO - Tyler Tyboroski	

Chapter 3 - Hydrology			
Section	**Comments on v1 and/or v2**	**Commenter**	**Response 9/5/2023**
3.1 Introduction			
3.2 Hydrologic Design Policies			
Table 3.2.a	Page 3: table 3.2a: reference to erosion protection manual section is incorrect. Should be 6.1	JAECO - Tyler Tyboroski	The table has been updated.
Table 3.2.a	Page 3: table 3.2a: Need to include standard rational as an option for erosion control. State manual utilizes standard rational in sizing calculations (for sediment ponds, for example). Not sure modified rational is an appropriate method for erosion control as there is no target attenuation with these devices/methods.	JAECO - Tyler Tyboroski	The Rational Method is now included as an acceptable method for ESC.
Table 3.2.b	Page 3: table 3.2.b: add "peak for storage" to modified rational comments	JAECO - Tyler Tyboroski	NA - This table has been removed.
3.2.1	Page 3: If requiring land use plans, zoning maps, etc. City needs to assign appropriate C and/or CN values to zones for consistency in modelling between firms.	JAECO - Tyler Tyboroski	The C and CN values associated with the City's current zoning have been included in Draft v3.
3.2.2	"Other programs not listed above may be requested on a case-by-case basis at the discretion of Stormwater Development Review staff; however, the Chainsaw Routing Method is not an accepted method for hydrologic analysis." - Is it even necessary to say this?	HBA	This is a frequently asked question; therefore, the methods not allowed are included.
3.2.3	Page 4: "future rainfall data adopted by the City". Is this just a disclaimer note, or does the City maintain a rainfall database outside of NOAA?	JAECO - Tyler Tyboroski	When the Manual becomes effective, we anticipate referencing NOAA Atlas 14. We are aware of efforts to update rainfall data, such as NOAA Atlas 15. So, we may refer to something other than Atlas 14 in the
3.2.3	"HEC-HMS" - Storm and Sanitary Analysis by Autodesk…perhaps list as "Hydraflow by Autodesk"…more likely to incorporate the full package of programs offered through Autodesk.	HBA	Hydraflow is now included in the list.
3.3 Time of Concentration			
3.3.1.3 (Table 3.3.1.3.)	Page 6: n-values are restrictive. Engineering judgement should be allowable within the guidelines established (i.e. wood underbrush between 0.4 and 0.8)	JAECO - Tyler Tyboroski	The manual no longer sets n-values. Designers may use appropriate professional references when selecting the n-value.
3.3.2	Section 3.3.2, is there a specific reason why the Kirpich equation cannot be used with the SCS method?	Withers - Hunter Freeman	The decision was made to eliminate the Kirpich equation, in keeping with the NCDOT manual.
3.3.2	Is the minimum Tc still 5 minutes?	Withers - Hunter Freeman	Yes.
3.4 Rational Method			
3.4.3 (Table 3.4.3)	Table 3.4.3 Multi-family (R – 20) 0.65 Multi-family (R – 30) 0.85 Business: O & I (I, II, III) 0.85 I1 & I2 0.95 - Doesn't match current city zoning.	HBA	The C and CN values associated with the City's current zoning have been included in Draft v3.
3.4.3 (Table 3.4.3)	Page 11: Gravel has a C value of 0.50, but other places is considered impervious. Need consistency.	JAECO - Tyler Tyboroski	This has been corrected.
3.4.3 (Table 3.4.3)	Page 11: Additional guidance on zoning as they relate directly to Raleigh districts is required for model consistency.	JAECO - Tyler Tyboroski	The C and CN values associated with the City's current zoning have been included in Draft v3.
3.4.3 (Table 3.4.3)	Page 11: drives and walks different from asphalt and concrete? Shouldn't there really just be one value for impervious? NCDOT guidance (specifically section 7.4.3.1) utilizes a maximum pavement C value of 0.90 and the ranges established therein are based on slope and soil. The NCDOT values account for the (admittedly minimal) evapotranspiration that occurs even over impervious surfaces.	JAECO - Tyler Tyboroski	This has been updated to allow 0.95 for all impervious area.

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
3.5 Modified Rational Method			
3.5.1	Modified rational, as noted, is utilized to establish a *critical duration*. The guidance ending at step 6 could indicate this method is utilized to establish a critical/maximum *volume*. Need additional steps clarifying that once that volume is established the corresponding duration establishes the duration factor that's then utilized in the routing.	JAECO - Tyler Tyboroski	The Modified Rational method has been removed from the Manual.
3.6 SCS (NRCS) Unit Hydrograph Method			
3.6.3	Page 19: again, specific correlations to established City zoning districts are needed, not general "residential districts", etc.	JAECO - Tyler Tyboroski	The C and CN values associated with the City's current zoning have been included in Draft v3.
GENERAL	There is specific mention of the NCDOT and FHWA standards in chapter 4, why not also in chapter 3? Doesn't a lot of the same guidance apply to hydrology as well as hydraulics?	JAECO - Tyler Tyboroski	NCDOT and FHWA standards were referenced in developing this chapter.
GENERAL	I'm good with the hydrology chapter but if it's not covered elsewhere, the city may want to discuss what computer programs are acceptable and what output the city needs to see in order to accept program based hydrology and hydraulic simulations	Mark Senior	Computer programs are covered in Section 3.3. Submittal requirements are covered in Chapter 2.

Chapter 4 - Hydraulics			
Section	**Comments on v1 and/or v2**	**Commenter**	**Response 9/5/2023**
4.1 Introduction			
4.2 Closed Conveyance System Design Criteria			
4.2	"No pumping will be allowed for any stormwater system on public or private property." This should be taken out or further clarified. Ex. Lifetime Fitness…there should be consideration for the case-by-case	HBA	Pumping is only allowed in the context of distribution of harvested rainwater.
4.2	No Pumping? Example - Llifetime Fitness, Falls of Neuse -> There should be consideration for a case-by-case basis... Land is a limited resource and creative/innovation solutions need to be considered, not shunned...	McAdams - Ryan Akers	
4.2	Example - Llifetime Fitness -> There should be consideration for a case-by-case basis..	McAdams - Ryan Akers (HBA) v2	
4.2	4.2 is about pipes, not inlets --> refer to Section 4.3. This should be changed to say "pipes". "Inlets shall be sized based on the corresponding design year storm for which the pipe system is also designed." - Should be taken out.	HBA	This sentence has been removed.
4.2	4.2 is about pipes, not inlets -> refer to Section 4.3. This should be changed to say "pipes."	McAdams - Ryan Akers (HBA) v2	This sentence has been removed.
4.2	The manual states that gutter spread is to be calculated using the design storm, whereas NCDOT allows for a 4 in/hr intensity.	Withers - Hunter Freeman	The City currently requires gutter spread to be based on the 2-year storm, not the NCDOT requirement for 4 in/hr. This is being raised to the 10-year storm to provide a safer, more conservative design.
4.2	Page 3: 10- and 25-yr rainfall for inlet spacing design is excessive. 1- or 2-yr events are much more industry standard. Although the NCDOT guidance is ambiguous, it does note a 4"/hr rainfall which is much more in line with typical 1- and 2-yr events. If implemented this will result in an unnecessary number of catch basins lining streets with potential safety issues arising from excessive basins required to mitigate flows where they otherwise may not have been necessary (yard/drop inlets near pedestrian areas to prevent bypass flows, for example, with the potential to fail).	JAECO - Tyler Tyboroski	
Table 4.2	There should be an allowance for pressure pipe for certain cases in Table 4.2 "HGL for the entire system is to be at or below the crown of all pipes." Also, "Inundation does not exceed the limits of easement or right-of-way (ROW)" - This is an inlet calculation, not a pipe network calculation. This should be separated out from pipe capacity and put into an inlet capacity section (4.3). The two are separate types of calculations.	HBA	The requirement for the HGL not to exceed the crown of the pipe is common practice. Unique situations could apply for a Design Exception. We agree that the wording regarding inundation in what is now Table 4.3 should be updated for clarity. That will be done in the next version.
4.2	There should be an allowance for pressure pipe for certain cases	McAdams - Ryan Akers (HBA) v2	

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
4.2	10 yr and 25 yr requirements is a bid deviation than previous requirements, and not requires more work. When analyzing current systems in concern with this increase in regulation, most systems designed previously would fail. So this should be considered in the chapter 2 downstream assessment. This seems very inequitable for most	McAdams - Ryan Akers	Most systems submitted to us at this time meet the requirements for the 10-year HGL below the crown of the pipe and the 25-year within the pipe. These are common standards.
4.2	25-yr check is new, i think? Most other muni's require it... not a huge deal, but new...	McAdams - Ryan Akers (HBA) v2	
4.2	What is the justification for going to the 25 year storm for less than or = to 25 acres? This is new, right?	HBA	
4.2	This is an inlet calculation, not a pipe network calculation -- this shoudl be seprated out from pipe capacity and put into an inlet capacity section (4.3). The two are separate types of calculations.	McAdams - Ryan Akers (HBA) v2	We agree that the wording regarding inundation in what is now Table 4.3 should be updated for clarity. That will be done in the next version.
4.2	whichever is greater - Don't like this part, not written well.	HBA	We think this is clear. If it is unclear, please provide more information.
4.2	"Both 10- and 25-year HGL calculations, as well as 100-year inundation limits, shall be provided with the preliminary or permitting submittal," - Preliminary is a big deal. COR saving you from yourself. Lots of design upfront.	HBA	This requirement has been revised. These calculations are required at the time of permitting submittal.
4.2	OH @#%)!!! There is no way we can run hydraulic calculations as Preliminary Permitting SUbmittal (ASR)?! That is the dumbest thing I've ever heard of -- let's bring this up with the policy of requireing the 401/404 permitting with ASR.	McAdams - Ryan Akers (HBA) v2	This requirement has been revised. These calculations are required at the time of permitting submittal.
4.2	NO WAY SHOULD HGL CALCS BE REQUIRED AT PRELIM (ASR/SUB) STAGE. This is too early to ask for this level design only to have it change at SPR/final site...	McAdams - Ryan Akers	This requirement has been revised. These calculations are required at the time of permitting submittal.
4.2	If HGLs (i.e. "vertical" design) is required at a preliminary phase, why have a 2-step process? Is the intent to change to a one step process? HGL and vertical design should *not* be a "preliminary" requirement.	JAECO - Tyler Tyboroski	This requirement has been revised. These calculations are required at the time of permitting submittal.
4.2	Do these criteria apply to public, private, or both?	JAECO - Tyler Tyboroski	Both. We have attempted to clarify this. Please let us know if it is still unclear.
4.2	If properties proposed for development or redevelopment contain existing through-drainage systems, the systems shall be evaluated based on current design criteria. If the existing systems do not comply with the current drainage criteria, the existing systems shall be replaced or improved to meet the criteria. For 10-year discharges exceeding five cubic feet per seconds (cfs), stormwater conveyance systems are required, if not already existing. - If developer is "fixing" a site through re-dev. shouldn't have to fix all the problems of the past...and pay for it.	HBA	Full redevelopment requires bringing the site up to current code. This is required in other disciplines.

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
4.2	Page 3: upgrades of existing systems, especially if no known (i.e. flooding reports) issues exist, has the potential to be a huge burden and limit development. Potential for cost-sharing with the City and/or an "engineering" report demonstrating compliance/capacity of the existing system? Existing language is too strong; inflexible.	JAECO - Tyler Tyboroski	
4.2	this section requires a stormwater conveyance for flows that exceed 5cfs which seems reasonable. This criteria conflicts with the requirements for conveyances and easements for any concentrated flow or flow from 2 or more lots required in earlier chapters –	Mark Senior	The referene to 5 cfs has been removed.
4.2	If any existing system is replaced or supplemented, or if any new system is proposed to meet the criteria outlined in Table 4.2, a Stormwater Development Analysis (SDA) shall be prepared in accordance with Chapter 2 – Site Development Requirements. Any increase in flow or velocity on downstream properties may require on-site mitigation, off-site improvements and/or easements. - Shouldn't have to detain for an up-sized system.	HBA	Full redevelopment requires bringing the site up to current code. This is required in other disciplines.
4.2	If not touching this system, this should not be the burden of the development. Failing should be defined (e.g. if the HGL is just outside of the pipe under current design criteria, then would this need to be replaced?)	McAdams - Ryan Akers (HBA) v2	
4.2	Does this then mean that any increase of flow due to upgrades, would then require a detention model? This seems like a double whammy...	McAdams - Ryan Akers (HBA) v2	This sentence has been removed.
4.2	Above two paragraphs need to be fixed, far too drastic in their requirements.	HBA	
4.3 Inlet and Spread Design Criteria			
4.3	"with the preliminary or permitting submittal" - still should be required at site permit review, not preliminary. This is not good…cannot run these calculations at prelim.	HBA	This language has been changed. The calculations are required at permitting review.
4.3	DAMMIT!! This is not good. We cannot run these calculatiosn at prelim	McAdams - Ryan Akers (HBA) v2	
4.3	DITTO - NOT AT PRELIM... sizing should occur at SPR	McAdams - Ryan Akers	
4.3	"Inlets shall be provided at sags, upgrade of intersections, upgrade of superelevation crossovers and at any location where more than three cfs will be discharged into a street for the 10-year storm." - So does every inlet have to be a sag? Can they also be on grade?	HBA	Yes, inlets may always be used at other locations. These are locations where inlets must be provided.
4.3	"Verify spread is not exceeded upstream of sags (at the 0.5% slope point)." - Remove part on 0.5% slope point.	HBA	The specified slope point has been removed.

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
4.3	Gutter spread calculations shall include the following, along with Table 4.3: - Much of this should be engineers preference, not codified.	HBA	The table has been removed.
4.3	Suggestion: some jurisdictions restrict the location of basins in curb return radii. Suggest the same here. Straight basins on these smaller radii are a construction nightmare.	JAECO - Tyler Tyboroski	We appreciate the suggestion, but have decided to leave this to engineer discretion.
4.3	Suggestion: additional curb inlet types. Our understanding is that Maryland (specifically MDE) is a comparison agency. Maryland has 5' and 10' variants on the basins, with additional "pass through" options that have increased ability to capture flow (in lieu of just double or triple	JAECO - Tyler Tyboroski	We have given minimum criteria for storm structures. We intend to allow details that meet these criteria.
4.3	Double catch basins shall be provided at all sag locations - unnecessary and unwarranted expense Very unnecessary in residential streets and adds a good amount of cost. Empirically, the open throat inlets should not warrant double inlets. We oppose this requirement.	HBA	We have removed the requirement for double catch basins at sags.
4.3	This is very unnecessary in resdiential streets and adds a good amount of cost. Empirically the open throat inlets should not warrant double inlets. I oppose this requirement.	McAdams - Ryan Akers (HBA) v2	
4.3	double CB's at sags is unnecessary	McAdams - Ryan Akers	
4.3	Page 3: the sag criteria listed in this document appears to be much more restrictive than NCDOT. (entire dry lanes rather than "encroachment" criteria, design events, etc)	JAECO - Tyler Tyboroski	The dry lanes requirements are for sags without an overflow - that is a fairly rare circumstance.
4.3	Page 4: 50% blockage of all inlets (in addition to the required design storms) is unreasonable. The number of inlets that will be required to meet these criteria is completely unreasonable. The Town of Wake Forest has good guidance on blockage assumptions.	JAECO - Tyler Tyboroski	We are keeping the 50% blockage requirement but removing the requirement for double ctach basins in sags.
4.3	Suggest utilizing inlet efficiency (as a function of captured flow v. flow to inlet) as a criteria for spacing. This will ensure that bypass problems don't just get pushed further and further downstream. I believe 80% is a typical value.	JAECO - Tyler Tyboroski	Thank you for the suggestion. We have kept this criteria as is.
4.3	for some reason, COR is enforcing 0.2' currently. 0.1' matches industry .	McAdams - Ryan Akers (HBA) v2	This language has been changed.
4.3	In a redevelopment project is developer going to have to replace existing COR inlets with NCDOT standard inlets? This is huge added expense.	HBA	Existing inlets that do not otherwise need to be removed do not have to be replaced.
4.3	Page 4: while matching crowns is good engineering practice at change in size, requirement above 0.1' minimum drop is unnecessarily stringent. May have a situation where minimum cover is needed upstream, but due to intermediate flows pipe sizes increase to a point where you can't outfall by matching crowns but could via minimum drops. Matching crowns should be a suggestion, not a requirement.	JAECO - Tyler Tyboroski	We will be keeping this requirement. The possibility for a Design Exception will remain for specific situations.

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
4.3	Where the public and private drainage systems connect to delineate the separation of publicly and privately maintained infrastructure. - Are you going to have to add a structure anywhere you go from public to private?	HBA	This has been further discussed with internal stakeholders and the requirement for a structure at the ROW line has been removed.
4.3	This needs further vetting. All storm drain easements outside of public ROW are to be "private" as currently enforced. Is this to infer that a box must be included at each ROW point -- Apex does this currently and it adds a tremendous amount of infrastructure... not a good policy.	McAdams - Ryan Akers (HBA) v2	
4.3	This needs further vetting. All storm drain easements outside of public ROW are to be "private" as currently enforced. Is this to infer that a box must be included at each ROW point -- Apex does this currently and it adds a tremendous amount of infrastructure... not a good policy.	McAdams - Ryan Akers	
4.4 Pipe Material and Cover Criteria			
4.4	Need to add polypropylene N-12 as an acceptable material at least for private side of things. Suggestion would be to follow NCDOT Pipe Material Selection Guide.	HBA	Polypropylene pipe has been added.
4.4	smaller (8"/10" and 12") pipes on multi-family and other commercial sites need to be discussed and allude to what limits of the network analyzed? The sillience to this leaves to subjectivity	McAdams - Ryan Akers (HBA) v2	We do not allow pipes smaller than 15" as part of the storm drain system. Smaller pipes used for roof drainage or landscape drainage are not considered part of the regulatory/analyzed storm drain system.
4.4	need HPPP (poly propylene) allowances, also smaller (8"/10" and 12") pipes on multi-family and other commercial sites need to be discussed and allude to what limits of the network analyzed? The silence to this leaves to subjectivity. HDPE is old fashioned, most muni's are moving toward the readily accepted HPPP (poly propylene) due to it's inherently superior structural properties. Contractors and muni's prefer this to less install issues and peformance. We need to get this allowed as similar to	McAdams - Ryan Akers	
4.4	HDPE is old fashioned, most muni's are moving toward the readily accepted HPPP (polypropylene) due to it's inherently superior structural properties. Contractors and muni's prefer this to less install issues and peformance. We need to get this allowed as similar to RCP. HPPP should be allowed in any situation where RCP is allowed	McAdams - Ryan Akers (HBA) v2	Polypropylene pipe has been added.
4.4	HPPP should be allowed in any situation where RCP is allowed	McAdams - Ryan Akers	Polypropylene pipe has been added. It is accepted on local roads and private property.

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
4.4	Why is HDPE only allowed on small residential streets? NCDOT has approved many HDPE products for wider use.	Withers - Hunter Freeman	For infrastructure that will be transferred to the City for operation and maintenance, we have worked with our O&M teams to determine where certain pipe types are acceptable. This differs from NCDOT in some aspects.
4.4	first paragraph - Too restrictive unless you take "outside the City ROW" out. See pdf comments.	HBA	This will be further clarified in Draft v4.
4.4	Cover for HDPE exposed to heavy traffic during construction shall be a minimum of 48 inches. - This needs to be stricken.	HBA	The cover requirements have been updated.
4.4	Page 5: Cover requirements: does the 2.4' include in grassed areas? Suggest additional clarification on paved v. unpaved areas. Suggest clarification on measure of cover in paved areas. To subgrade? To surface? to base course? Suggest detailing variable cover requirements based on RCP class (less cover for higher classes)	JAECO - Tyler Tyboroski	The cover requirements have been updated.
4.4	Page 5: Has any thought been given to providing guidance on elliptical pipe? Understand it's uncommon, and published equivalent cross-sectional areas are available. Mention of these options for especially shallow sites would be useful.	JAECO - Tyler Tyboroski	We allow elliptical pipe.
4.5 Open Channel Design Criteria			
4.5	A yard swale will require an easement when it drains one or more upstream properties. Easement requirements can be found in Chapter 2 – Site Development Requirements. - Less developable land on the lot. Problematic.	HBA	This is in line with requirements in the current manual.
4.5	define what "one or more" properties include? Does this mean that any swale that discharge and upstream single-family lot shall include an easement... which by the sizing criteria would be at a minimum 20'...? Very bad policy in development adn land use restriction.	McAdams - Ryan Akers (HBA) v2	The width of swale easements has been adjusted and now starts at 10 feet total.
4.5	define what "one or more" properties include? Does this mean that any swale that discharge and upstream single-family lot shall include an easement... which by the sizing criteria would be at a minimum 20'...? Very bad policy in development adn land use restriction..	McAdams - Ryan Akers	
4.5	refers to “one or more upstream properties” suggest using a drainage area or peak flow criteria as the size and flow from a property can vary	Mark Senior	This is in line with requirements in the current manual.
4.5	Page 6: same questions on preliminary v. permitting submittal	JAECO - Tyler Tyboroski	The language about the preliminary submittal has been removed.

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
4.5	these design criteria may be excessive – natural channels typically only carry the 2 year storm with remaining flows leaving the banks and inundating a floodplain – in flat areas, the 100 year may envelop an entire lot and making that an easement would be impractical – also, channels may be excessively deep in order to contain a 25 year storm – this requirement will often conflict with riparian buffer rules – need to consider how those conflicts will be resolved	Mark Senior	Neuse buffer rules will take precedence. Additional analysis will be performed prior to Draft v4.
4.5.1	Strike this entire section! Land use restriction. A big reach with how it's written right now.	HBA	We are eliminating the Erosion Hazard Setback.
4.5.1	WTF is this??? 4:1 slopes and then 15' either side for an easement?! Uh... what? This is another land use restriction... where would this apply? Bad land use policy. THis can be better suited through proper erosion control techniques while not restricting land use otherwise.	McAdams - Ryan Akers (HBA) v2	We are eliminating the Erosion Hazard Setback.
4.5.1	I support the idea of keeping folks away from channels but the erosion hazard setback needs more thought. What about small channels maybe a foot or two deep, do they require an additional 15' on each side? – if the channel is concrete, does it still need a setback? – also the requirement for a non-erosive design may conflict with riparian buffer and jurisdictional stream requirements	Mark Senior	We are eliminating the Erosion Hazard Setback.
4.5.1	Sod?? Really. Wow => $$	McAdams - Ryan Akers (HBA) v2	We are eliminating the Erosion Hazard Setback.
4.5.1	strike this. What is this other than a new land taking/restriction? THis can be better suited through proper erosion control techniques while not restricting land use otherwise. To require sod on a channel is not realistic from budget standpoint.	McAdams - Ryan Akers	We are eliminating the Erosion Hazard Setback.
4.5.1	Page 7: note made of level spreaders and scour holes; if specifics are added it should include rip-rap pads. Suggest removing specifics and leave to designer (subject to NCDEQ guidance)	JAECO - Tyler Tyboroski	We are eliminating the Erosion Hazard Setback.
4.5.1	Page 7: No allowance for reinforced liners? Sod only lining is overly stringent. Specially engineered linings (with supporting calculations in regards to shear stress, velocity, factors of safety, etc) should be allowed.	JAECO - Tyler Tyboroski	We are eliminating the Erosion Hazard Setback.
4.6 Bridge and Culvert Design Criteria			
4.6.1	Page 8: culvert tailwater assumed at the crown at a minimum is unrealistic and inconsistent with similar State and County guidance. Calculated normal depth is preferred or (critical depth + diameter)/2.	JAECO - Tyler Tyboroski	We are now requiring that NCDOT standards be followed for the calculations.
4.6.1 and 4.6.2	General: again relating to the preliminary requirements. Especially as they relate to culverts and bridges, preliminary calculations are expected, but will be "preliminary" in nature and it should be understood as such. Concerns that the language throughout the chapter suggests construction level detail will be required at preliminary stages.	JAECO - Tyler Tyboroski	Because this impacts the feasibility of the design, calculations for major. culverts required at preliminary.

Section	Comments on v1 and/or v2	Commenter	Response 9/5/2023
4.6.3	Page 8-9: no mention of backwater requirements. Notes made regarding increases in 100-yr inundations related to esmts and ROW, but nothing as it would impact an upstream property. (whereas there is a large amount of downstream impact guidance in earlier chapters).	JAECO - Tyler Tyboroski	Flood storage easements remain a requirement.
4.6.3	containing the 100 year storm inundation area in an easement seems excessive and may be impractical in flat areas	Mark Senior	This is a current requirement.
4.6.3	Limiting culvert crossings to boxes or RCP ignores the options of pipe arches and other accepted practices so the list should be expanded	Mark Senior	This language has been changed to allow all concrete structures.
4.6.4	Suggest consider gravity block (stone strong or similar)for endwall/headwall on smaller culvert crossings, and above the 100-yr floodplain for large storms.	HBA	We are not allowing segmental block walls.
4.6.4	suggest consider gravity block (stone strong or similar) for endwall/headwall on smaller culvert crossings, adn above the 100-yr floodplain for larger storms	McAdams - Ryan Akers (HBA) v2	We are not allowing segmental block walls.
	requiring headwalls/endwalls on all outfalls is excessive – many small pipe installations do not require headwalls to function successfully	Mark Senior	We have modified this to allow FES for smaller pipes.
4.7 Outlet Design			
4.7.2	Page 10: My understanding is that the State no longer allows perforated risers as all dewatering devices are required to surface drawdown. Does the City have the ability to supersede that requirement/exclusion?	JAECO - Tyler Tyboroski	Agreed, we do not allow preforated risers for erosion and sediment control.
4.8 Certifications and As-Builts			
4.8.1	additional cost associated with this. Camera all the drainage pipe. City wants all this information but then responsibility is soley on the property owner. Additional as-built and camering likely add another 10K to a small subdivision.	HBA	This information is needed to ensure infrastructure is in good condition. This practice is not unique to Raleigh.
4.8.1	private storm drainage systems are required to be as-built in profile... interesting. We do not profile outside of ROW; this needs to be	McAdams - Ryan Akers (HBA) v2	
4.8.1	private storm drainage systems are required to be as-built in profile? ... interesting. We do not profile outside of ROW; this needs to be discussed as it's a lot more work without merit/benefit and adds $ to the plan production	McAdams - Ryan Akers	
4.8.1	is there any threshold of development size for surveyed as-built? Will a single family or duplex be required to hire a surveyor if they put in a single 15” pipe or driveway pipe or a small swale between 2 lots? Please consider the cost to homebuilders/buyers when considering new requirements	Mark Senior	Yes, a table of items that are exempt from all or some of the requirements will be added to the web instructions.

Chapter 5 - Stormwater Management Design (Chapter 5 and Chapter 6 in Draft v3)			
Section	**Comments on v1 and/or v2**	**Commenter**	**Response 9/8/2023**
5.1 Introduction			
	5.1 "Since SCMs often provide runoff control for larger events in addition to water quality treatment, the applicant shall perform an analysis downstream to the 10% point for the 1-, 10- and 100-year storm events as part of any SCM design calculations. The downstream analysis is further detailed in Chapter 2 – Site Development Requirements." - What's the threshold/trigger for requiring this? Will all other SCM's in the drainage basin be required to be included? This is just a hoop to jump through and problematic. Needs to be removed. The UDO already has part in it requiring a flood study for known areas of flooding.	HBA	The Downstream Assessment has been removed from the Manual.
	Page 4: UDO says 2- and 10-yr design storms; manual notes 1- and 10-yr. Please reconcile.	JAECO - Tyler Tyboroski	Draft v1 and v2 proposed a change from the 2-yr storm to the 1-yr storm and would have triggered an accompanying UDO change. In Draft v3, we are reverting to the 2-yr storm.
5.2 Rate of Runoff Control Requirements			
5.3 Water Quality Requirements			
5.3.1	"Protect riparian buffers to maintain their existing nitrogen removal capabilities; and" - Need to have section on exceptions b/c state allows youto have some impacts so long as they are mitigated.	HBA	Language has been changed to reference State rules to make this clearer. There is no intent to disallow activities allowed in the buffer under State rules.
5.3.1	Page 4: one of our general comments notes a lack of guidance on nutrient requirements. 5.3.1 would be a good place to mention the specific requirements (3.6, 6, and 10 lb/ac/yr targets) - or at least a reference to the specific NCAC section in the event those targets ever change.	JAECO - Tyler Tyboroski	The specific comment re: the targets is moot since the update of the Neuse Rules on 5/1/23. Chapter 5 now provided guidance on meeting the updated nutrient requirements.
5.3.2	"and the incorporation of green stormwater infrastructure (GSI) for volume control." Need to change "and" to "or". Need to follow what the UDO says.	HBA	This section has been rewritten.
5.3.3	"For new development, the pre-development land cover must be assumed to be forested for the entire development site. For redevelopment of sites with existing impervious area, a modified calculation may be performed. For the purposes of this calculation, any impervious area added as part of the redevelopment must be assumed to be forested in the predevelopment condition." - Does this apply to GSI only?	HBA	This section has been rewritten.

Section	Comments on v1 and/or v2	Commenter	Response 9/8/2023
5.3.3	Section 5.3.3 should be revisited. The language here mimic NCDENR's language for volume matching, which is a good goal. However the use of GSI should not be limited to sites that aim to acheive this standard. GSI devices should be encouraged on all projects.	Withers - Hunter Freeman	This section has been rewritten.
5.4 SCM Design Criteria			
5.4.1	"No pumping of stormwater shall be allowed as a necessary component of any SCM." - Should remove this. Rare, but need option.	HBA	Pumping is only allowed in the context of distribution of harvested rainwater.
5.4.1	Page 11: still allowing design adjustment for 10' clearance. Otherwise this requirement is overly stringent. There are myriad examples of sand filters and/or detention structures under parking structures with columns or other impediments within the 10' easement area. Additional flexibility is needed for urban applications of these structural facilities, even if that takes an additional step such as the design adjustment, design exception, etc.	JAECO - Tyler Tyboroski	Options for siting a SCM within 10 feet of a building are now given in Section 6.3.3.
5.4.1	Page 12: define "adjacent"	JAECO - Tyler Tyboroski	The phase "adjacent to structures" has been removed. See Section 6.3.5.
5.4.1	Page 12: "structure" here refers to outlet structure, or entire treatment facility?	JAECO - Tyler Tyboroski	The phase "adjacent to structures" has been removed. See Section 6.3.5.
5.5 SCM Design Requirements			
5.5.1	Page 13: can infiltration systems be placed in fill? It would seem that a geotechnical analysis supporting a target infiltration rate should sufficiently address the ET&I element of this device.	JAECO - Tyler Tyboroski	We are not prohibiting fill. The in-situ soil language is distinguishes between media that is added as part of the SCM and the surrounding soils.
5.5.3	Page 15: suggest removing reference to TSS. This measure/criteria has since been deemed extraneous by DEQ.	JAECO - Tyler Tyboroski	The reference to TSS has been removed.
5.5.3	Are bullets 2 and 3 speaking specifically to risers?	HBA	Bullet 2 "Measures shall be provided along the principal spillway to prevent piping" is speaking about the barrel through the embankment. This has been clarified. Bullet 3 that begins "Durable materials..." is in reference to the barrel. That has also been clarified.
5.5.3	"The engineered design shall incorporate safety components (e.g. fencing, trash racks, shallow safety benches around the wet pond, etc.)." - Trash racks and safety benches already required. Bullet not needed.	HBA	Items required by the MDC are not longer shown as requirements.

Section	Comments on v1 and/or v2	Commenter	Response 9/8/2023
5.5.3	"Maximum drainage area of 10 acres." - Needs to be removed. Can be sized for any drainage area.	HBA	This was intended to be a minimum size. In Draft v3 the minimum size has been changed to 25 acres unless the permanent pool is within 6" of the SHWT. See 6.5.3. We are continuing to research this drainage area limit during the public review.
5.5.3	Section 5.5.3 - why do wet ponds have a maximum drainage area of 10 acres?	Withers - Hunter Freeman	
5.5.3	Wetponds should not be limited to the lower acreage.	McAdams - Ryan Akers	
5.5.3	"The rate of drawdown for maintenance shall be non-erosive and no more than one foot per week." - remove "no more than one foot per week."	HBA	This requirement has changed to read "no more than the design flow out of the pond for the 10-year storm." This is to prevent downstream flooding in the cause of pond maintenance that requires draw down.
5.5.3	Again, questions on "large" v. "small" site definitions. Unclear.	JAECO - Tyler Tyboroski	We agree that this is confusing and have removed references to Large v Small.
5.5.6	Page 18: "pervious areas *shall* be graded to drain away from sand filters". Language is too strong. Good engineering practice dictates an attempt be made to *minimize* this scenario, but requirement is infeasible and will result in unrealistic expectations from Staff.	JAECO - Tyler Tyboroski	This bullet has been removed.
5.5.6	"Maximum drainage area of five acres." - Take this out. Could be sized for any size.	HBA	An option to exceed this drainage area has been provided. We are working on this alternate definition and may update it with Draft v4.
5.5.6	Page 18: note that the image shown is not of an "offline" system. Previously, "online" systems have not been allowed. Please clarify online v. offline requirements and/or replace image as appropriate.	JAECO - Tyler Tyboroski	The photos have been removed with Draft v3. We expect to add different photos in Draft v4.
5.5.7	Page 19: State allows pumping from RWH.	JAECO - Tyler Tyboroski	Yes, we allow pumpming in this context.
5.5.7	Page 19: By requiring passive drawdown, underground RWH systems are infeasible. Is this the intent?	JAECO - Tyler Tyboroski	The requirements for passive drawdown have been clarified.
5.5.9	Page 21: Where is depth to water table measured from? Bottom of LS? Top of lip?	JAECO - Tyler Tyboroski	This shall be measured from the lowest ground elevation within the LS-FS.
5.5.9	Page 21: Suggestion to add fencing/railing requirements for pedestrian safety. This is especially true within stormwater easements on single family lots.	JAECO - Tyler Tyboroski	We will not be adding fencing or railing requirements specific to SCMs.
5.5.9	Page 21: "water table" means "seasonal high water table"?	JAECO - Tyler Tyboroski	This language has been updated.

Section	Comments on v1 and/or v2	Commenter	Response 9/8/2023
5.5.9	Page 21: For clarification: forebay's are only required on a level spreader when being used as a creditable device, correct? Forebay isn't a requirement for diffuse flow level spreaders.	JAECO - Tyler Tyboroski	Agree that this is only for creditable devices, not diffuse flow devices.
5.5.10	"The outfall distance must be a minimum of 10 feet from the property line." - Going to be VERY problematic on smaller lots with only 5 ft. setback. Need to strike.	HBA	Distance requirements are covered in the MDC, so are removed from the DIS Section (now Section 6.5.11)
5.5.11	Page 23: where is depth to SHWT measured?	JAECO - Tyler Tyboroski	This shall be measured from the lowest ground elevation within the LS
5.5.13	"The City may impose additional regulations on future or current approved proprietary measures." - Too ambiguous and open ended.	HBA	This language has been removed.
5.6 Additional SCM Options			
	I am grateful that some additional options have been added for small site development. However, the options added are impractical and incredibly expensive. I do not understand why rain gardens, downspout disconnects, or other established options that are practical for homeowners are not included. The proposed options combined with easement requirements will make even small additions almost impossible. I realize that it is desirable to prevent infill projects and support restrictions to these types of developments, but these standards are preventing people from very reasonable additions to older homes. I would be happy to share case studies and review how the existing rules are prohibitive and how the new rules will be even worse.	Kris Bass	Downspout disconnection is allowed under the Disconnected Impervious Surface measure. Rain gardens are allowed when they meet bioretention requirements - other rain gardens don't have established nutrient removal values for comliance with the Neuse. Additionally, we have seen a variety of infiltration practices used on small site development.
5.6.1	Page 26: Is there an associated nutrient removal rate? Sizing guidance? Is this considered a "primary" device (as it relates to previous TSS definitions)?	JAECO - Tyler Tyboroski	The soakage trench is a type of infiltration practice. Therefore, we have combined it with Infiltration.
5.6.1	Page 27: the filter fabric guidance implies that it be placed at the bottom which contradicts guidance provided by this manual on permeable pavers and MDC for bioretentions.	JAECO - Tyler Tyboroski	
5.6.2	pictures - would this still need to be in an easement even if up against a building?	HBA	Yes, an easement would be required.
5.6.2	"Water shall drain through a planter within three to four hours after the storm event. Soils underneath an infiltration planter shall be soil type A or B." - potentially very problematic.	HBA	Because Planter Boxes are a subset of bioretention, they have been combined with the bioretention section.
5.6.2	Page 30: infiltration testing/rates make more sense in these applications than soil type. If these facilities have waterproof liners, what is the impact of the underlying soil? What if the facility is designed to drain to a storm drainage system? Soil type seems redundant/unimportant.	JAECO - Tyler Tyboroski	

Section	Comments on v1 and/or v2	Commenter	Response 9/8/2023
5.6.3	"The minimum pipe diameter for underground detention tanks is 36 inches." - Strike "tanks" and replace with "pipes". Need flexibility to build a smaller structure if less detention is required.	HBA	This language has been changed. See 6.5.15.C.
5.6.3	Page 35: Does the sediment sump count toward the storage volume?	JAECO - Tyler Tyboroski	The sump is permanently filled with water, and therefore does not count towards the detention storage volume.
5.6.3	"erosion protection volume" - Further clarity needed. Terminology not familiar.	HBA	This terminology has been eliminated.
5.6.3	Page 36: Assume the low area in section A-A is the sediment sump. Additional clarity would be appreciated.	JAECO - Tyler Tyboroski	We have removed this detail.
5.6.4	Page 37: this answers my earlier question about level spreaders and forebays.	JAECO - Tyler Tyboroski	Thanks.
5.7 Certifications and As-built Surveys			
5.7.2	where will as-built surveys be required – need to consider the cost if this applies to single family homes, additions, outbuildings, and other minor projects – consider a threshold or criteria to limit application to where really needed	Mark Senior	We are continuing to evaluate a theshold while balancing cost and compliance.
5.8 SCM O&M and Easement Requirements			
	the requirement for infiltration devices to be tested for infiltration rate at 75% of their intended lifespan seems like it will be very difficult to enforce. Does the City have a way of reminding owners when this date is approaching?	Withers - Hunter Freeman	This is the current practice and is tied into the City's SCM Maintenance program.
5.8.1	5.8.1 states that "one O&M manual shall be provided per device", but I believe that this should be one manual per project.	Withers - Hunter Freeman	This has been updated to be one per project or phase, addressing each SCM.
5.8.2	"If heavy equipment will be necessary to perform maintenance tasks, such as for devices with a forebay that will require sediment clean-out, appropriate access shall be available (recommended 25 feet rather than 10 feet)." - Strike out parenthesis. Manuals shouldn't be for "recommendations".	HBA	This has been changed to a requirement rather than a recommendation. It is now in Section 7.4.
5.8.2	for single lot/owner developments, who will the easement be dedicated to? If the owner, they can dissolve the easement anytime they want as they are the only party involved. And if a single owner, what purpose does the easement serve? The owner can impact any portion of his property anytime he wants or can grant or deny access to others anytime they want unless the easement is dedicated to the city	Mark Senior	The legal language is being discussed with the City Attorney's Office.
5.8.2	Page 15: Easement recordation after installation and part of CO?	JAECO - Tyler Tyboroski	Because of timing issues related to the CO, we require that the easement be recorded earlier in the process.
GENERAL			

Section	Comments on v1 and/or v2	Commenter	Response 9/8/2023
GENERAL	As a water quality professional that has spent 35 years managing all types of pollutants in water, I think that you have an excellent manual with some additions that I would like to suggest. These include the following: 1) More emphasis on plants, their function, installation and management. Wetland plants have very specific planting requirements, functions, and maintenance requirements based on species selection. A table of plant species described based on their needs and functions will be very useful.	Dr. Halford House	Thank you for the comment. We have not included a specific section on plants because that is well handled in the NCDEQ Stormwater Design Manual, whose requirements are incorporated into this manual by reference. https://www.deq.nc.gov/about/divisions/energy-mineral-and-land-resources/stormwater/stormwater-program/stormwater-design-manual
GENERAL	From the engineering perspective, wetland plants provide the following functions: 1) Activated Treatment Process: The plants pump air into the treatment media through their roots in addition to leaking sugars. This provides increased microbial growth on the roots which transform pollutants such as ammonia, organic compounds measured ass biological oxygen demand.; 2) Attached Growth Process: The attachment and increased microbial populations of 3-4 logs over the sand/gravel adjacent encourages this process.; 3) Evapo-transpiration: This function is noted in the text of your manual. Its significance varies with plant species and season.; 4) Infiltration: Plants may be selected with root structures that facilitate vertical movement of water into the media.; 5) Sedimentation: Wetland Plants slow the movement of water thus increasing detention time and sedimentation.; 6) Complexing of Heavy Metals and Other Recalcitrant Chemicals: decomposing plant tissue provides a high cation exchange capacity (CEC) that facilitates adsorption and complexing of many pollutants.; and 7) Plant Uptake of Heavy Metals: Several species of non-persistent wetland plants uptake and store these pollutants.	Dr. Halford House	
GENERAL	One huge oversight by your proposed Chapter 5, as well as by my "green" stormwater engineer, City of Raleigh stormwater engineers, and probably most developers, is the lack of understanding of the connection being GSI's water quality improvement benefits and the larger public health benefits of restoring wildlife habitat by the use of appropriate native bird and pollinator friendly plants. Decades and decades worth of biodiversity has been lost due to previously inconsiderate development. But in this chapter, including it's links to other resources, is an affordable, repeatable chance to fix the problem, in a way that would scale up regionally for lasting healthy human and environmental benefits (the purpose of the new SWMDM).	Timothy William Martin	We agree that GSI has a wide range of benefits. We are considering adding language to Chapter 2 of the document to better capture GSI importance and how to incorporate it into sites.

Section	Comments on v1 and/or v2	Commenter	Response 9/8/2023
GENERAL	For example, Figure 5.6.2.a (from Oregon's Manual) makes no annotation to the main character of the section drawing, that is the hard working plant and it's root community of micro-organisms which actually clean stormwater. Why not go ahead and call out the plant? Give it some credit. At least Vegetation Note 9 refers developers and engineers to a plant list. Likewise, the City of Raleigh could and should redraw this figure with bird and pollinator friendly plant list appropriate to our ecological context. I am happy to help with this effort, and have colleagues at NCSU's Urban Wildlife Management, Horticulture, Bio & Ag Engineering, and Landscape Architecture departments who would also be glad to volunteer to help realize the total health benefits of this Chapter, or upgrade an informational video on the City of Raleigh Stormwater webpages. You have a community behind you, if you should choose to flex your muscle. We public can help sway City Council votes, if needed? Including appropriate plant list in the manual would remove barriers to help developers and stormwater engineers do the right thing, which they want to do, but just need scaffolding by the UDO.	Timothy William Martin	We have not included a specific section on plants because that is well handled in the NCDEQ Stormwater Design Manual, whose requirements are incorporated into this manual by reference. That document was developed with assistance from the NCSU Bio and Ag experts. https://www.deq.nc.gov/about/divisions/energy-mineral-and-land-resources/stormwater/stormwater-program/stormwater-design-manual
GENERAL	Another example is Chapter 5's link to City of Raleigh Stormwater Engineer, Blair's presentation of City of Raleigh GSI's. He makes a strong, authentic, and passionate presentation, however, he outlines only 2 GSI benefits, when everyone knows, if you're going to make a list or summarize anything, you need 3 points. And the missing third benefit of Blair's beautiful (public health education) video is the most important, next to decreasing (downstream water) pollution. Point 3 should be GSI's use of plants helps maintain biodiversity (which is otherwise lost due to development in the first place), IF the plants are bird and pollinator friendly native species. Remember (to educate) that water equals life. Restoring downstream water quality AND wildlife habitat is an easy, affordable, and concrete action to take on each and ever site, which would have huge impacts on human and environmental health through out the watershed. And who doesn't enjoy birds and butterflies in their garden? Every third bite of food is due to honey bees. Thank you for listening.	Timothy William Martin	We agree with all these benefits. We will continue to work on our education resources for the public and designers regarding the benefits of SCMs and GSI.

Chapter 6 - Erosion and Sediment Control (Chapter 8 in Draft v3)			
Section	**Comments on v1 and/or v2**	**Commenter**	**Response 9/8/2023**
6.1 Introduction			
6.2 Design Criteria and Guidelines			
6.2.1	"alters the natural structure of the land mass" - too vague	HBA	We eliminated this statedment from the manual and referenced the definition of land disturbing activity whcih is defined in UDO Sec. 12.2.
6.2.1	clearing & grubbing, staging & storage, demolition, construction, equipment parking - all these are not land disturbing activities	HBA	We rewrote the first paragaph of this section to clarify that a the limits of disturbance shall include a land disturbing activity which coupd encompass any one of these constsruction
6.2.1	"regardless of whether a Land Disturbance Permit is required for the activity." - Shouldn't have to do an erosion control permit if we don't have to do a land disturbance permit.	HBA	This paragraph has been eliminated from this secction and clarified further into the document.
6.2.1	Page 2: A lot of 6.2.1 simply restates 6.1	JAECO - Tyler Tyboroski	We rewrote and eliminated some areas in these two sections to try to reduce redundancy.
6.2.2	"Adequate E&SC measures shall be planned, designed, installed and maintained throughout all phases of construction for the 25-year storm event." - What's the science behind going from 10 yr. to 25 yr.?	HBA	This section has been eliminated and just refers to the standards in the NCDEQ “Erosion and Sediment Control Planning and Design Manual” , the City’s Standard Detail Drawings, the City’s UDO, or this manual, whichever is more
6.2.2	Page 3: 25-yr design storm is inconsistent with State guidance. Is this intentionally additionally stringent?	JAECO - Tyler Tyboroski	This section has been eliminated and just refers to the standards in the NCDEQ “Erosion and Sediment Control Planning and Design Manual” , the City’s Standard Detail Drawings, the City’s UDO, or this manual, whichever is more
6.2.2	"Any site or project which is subject to post-construction detention requirements shall also provide detention during construction." - Could be very costly and difficult to implement for smaller sites.	HBA	We eliminated this requirement.
6.2.2	Page 3: concerns that the new runoff requirements will result in the need for basins even on the smallest of sites to mitigate rates, where there isn't physically room on-site to have a basin much less then	JAECO - Tyler Tyboroski	We eliminated this requirement.
6.2.2	Page 3: UDO says size limits. Also notes 10-yr storms. Need to resolve inconsistencies.	JAECO - Tyler Tyboroski	We eliminated this requirement.
6.2.2.1	"shall...conform to the natural characteristics of the site" - Too ambiguous and takes away professional design of site.	HBA	We eliminated this sentence.
6.2.2.1	Section 1.2.2.1 - omit. PE's don't need to be explained this.	McAdams - Ryan Akers	We eliminated this sentence.
6.2.2.2	"Major land clearing and land-disturbing operations should be scheduled during seasons of low potential runoff." - This is unacceptable to limit construction window.	HBA	We eliminated this section.
6.2.2.3	Section 1.2.2.3 - needs actual metrics, not subjective terminology, FYI.	McAdams - Ryan Akers	We eliminated this section.

Section	Comments on v1 and/or v2	Commenter	Response 9/8/2023
6.2.2.6	"preliminary approval to the impact or permitting the impact, whichever comes first in the development approval process." - This could result in delay with time to get the Corp permit. Shouldn't have to get permit prior to preliminary approval...otherwise, what 's the point of a "preliminary" approval	HBA	We eliminated this section.
6.3 Practice Standards			
6.4 Application Requirements			
6.4.1	"Effort should be made to uncover no more than 20 acres at any one time." - For a larger project this could be challenging. Recommendations shouldn't be codified...either it's required or not. Recommendations could be included in supplemental document?	HBA	We eliminated this sentence.
6.4.1	"Cut/fill analysis that shows where soil will be moved from one area of the tract to another as ground elevations are changed, including pre- and post-construction contours and proposed slopes" - This is not easily done by the engineer at this stage in the planning requirement. All requirements for temporary ground cover protect against sedimentation and erosion control.	HBA	We have altered the language in this sentence to acccount for pre- vs. post-development conditions.
6.4.1	Wake County utilizes a C factor of 0.60 for exposed ground (i.e. during construction) Will the City provide similar guidance?	JAECO - Tyler Tyboroski	Yes, this is provided in Table 3.2
Table 6.4.1.c	Table 6.4.1.c "Calculated Velocity – Permanent Design (fps) Allowable Velocity – Permanent Design (fps)" - Table is for "temporary"...so why permanent calculations?	HBA	This is no longer applicable. The table has been removed.
Table 6.4.1.d	Table 6.4.1.d. If not using one of the options, just leave it blank?	HBA	This is no longer applicable. The table has been removed.
6.5 Construction Phasing and Sequencing			
6.5	More for the lay man, less for the engineer.	HBA	Through the adopiton process of this manual we are also proposing to remove the Guidelines for Land Distrurbing Activities (GLDA) as a document enforceable through the UDO. Therefore, we are taking components of GLDA and placing them in the manual when applicable. This is a section that has been modified from GLDA and is definitely more focused on contractor requirements. However, we have added required Constuction Sequence components to this section that will be required by engineer or landscape architect to incorporate into
6.5.1	"Upon approval of the initial inspection, land-disturbing activities, including clearing and grubbing or demolition, may commence, as per the approved E&SC plan." - cut out "clearing" and "demolition" - You can clear and demo a blg w/o any erosion control measures, you just bring it down to the slab.	HBA	This section has been eliminated.

Section	Comments on v1 and/or v2	Commenter	Response 9/8/2023
6.5.3.1	REALLY like what is stated in section 6.5.3.1 having the opportunity to operate single family construction under the existing permit for the development as lot as the lot grading mirrors the ESC grading. In our business model we do not do lot development and only purchase finished lots, so its very burdensome to resubmit ESC plans and get permits for a site that already has one in place through the developer.	?	This comment is no longer applicable. We eliminated this section.
6.6 Groundcover vs Stabilization			
6.6.1	Page 12: if the City supports the use of rolled erosion control products (i.e. matting) as a temporary measure, the same should be allowed (assuming of course the specific liner is intended as a permanent treatment) for channels, not just sod.	JAECO - Tyler Tyboroski	We do allow rolled erosion control products in channels in some instances. It just depends on how quickly the channel needs to be stabilized and/or whether the erosion control product is sufficient to restrain erosion based on velocities.
6.7 Single Family Residential Construction			
	Page 13: is there a time limit on common plans? Concern especially as it relates to infill development.	JAECO - Tyler Tyboroski	Common plan of development, with regards to sediment and erosion control regulations, is based on the NCG01000 permit which is implemented/enforced by the State. We are not authorized to place time limit on commons plans unless the State adopts a more defined time frame.
6.8 Compacted Pervious Areas	where does the compaction rule apply? It says “shall” so it’s a requirement – will all development have to till compacted areas as part of their S&E plan or only areas designated as pervious as part of their water quality calculations – this is a totally new requirement and needs more thought (may be better as a recommendation for now)	Mark Senior	This section has been eliminated.
6.9 Post Construction SCM			
GENERAL			
*Comment likely meant to be entered for Ch 5	It is too onerous for a single family home on a 1/2 acre lot. Ask for rain barrels or a gravel pit if the homeowner wants to expand their deck. We should not have to spend thousands of dollars to enjoy our property.	Cindy Morris	In general, stormwater control measures are not required for development at single family homes. The exception is the overlay districts which are more stringent to protect our drinking water. Also, in some cases homeowners choose to intstall a storwmater control measure so that they can build
NA	NOte: I cannot find where there is reference to the policy of 401/404 State/Corps permits are required at time of Preliminary Plan approval for projects other than those with transportation elements shown on the FLUM/Transpo plan. This policy is bad, and needs to be revisited.	McAdams - Ryan Akers	This existing procedure is not being changed. Typically stream crossings are necessary to allow for the proposed development to occur. Therefore, they City cannot approve them without knowing the State/Federal approvals could be obtained. If the stream crossings aren't necessary, feel free to exclude them from your preliminary plans.

Chapter 7 - Floodplain Management (Chapter 9 in Draft v3)			
Section	**Comment**	**Commenter**	**Response 9/8/2023**
7.1 Introduction			
7.1	"For purposes of floodplain management, “development” means any man-made change to improved and unimproved real estate, including but not limited to, buildings or other structures, mining, dredging, filling, grading, paving or excavating or drilling operations." - Problem with drilling operation b/c can be done without disturbance (bore and jack).	HBA	Checked against UDO Definition of "Development (in a Special Flood Hazard Area)" and made to match.
7.2 Types of Special Flood Hazard Areas			
7.2.3	"a North Carolina licensed surveyor may survey and seal the extent of flood hazard soils," - How are they going to be able to survey the demarcating line of the FHS? New requirements for soil scientist work will significantly increase cost, should still use USGS Soil Survey Map.	HBA	All three options for delineation have been clarified
7.2.3	need to specify what version of the soils maps as the soil designations change with time	Mark Senior	Changed to state the version
7.3 Floodplain Development Requirements			
7.4 Permit Application			
7.4	Even greenway items such as benches and bridges impede flow.	HBA	"Light duty" is a FEMA term and referenced in the Model Ordinance as well as the Federal

Section	Comment	Commenter	Response 9/8/2023
7.4	Page 4: some vague language. What constitutes a "light duty" fence? Or for that matter a "heavy duty" fence? What is considered to "impede flow"? Is this intentionally subjective?	JAECO - Tyler Tyboroski	Regulations 44 CFR 60.3 (d)(3). The following federal guidance will provide staff with the ability to make the determination: ""Minor projects: Some projects are too small to warrant an engineering study and the certification. Many of these can be determined using logic and common sense: a sign post or telephone pole will not block flood flows. Barbed wire farm fences that will be pushed over or ripped out early in the flood may also be permitted without a certification; however, larger more massive fences could be an obstruction to flood flows and may require an engineering study and certification. A driveway, road or parking lot at grade (without any filling) won't cause an obstruction, either."
Table 7.4	Is the option still available to floodproof instead of raising 2 feet.	HBA	Updated to match UDO 11.4.6.B.4, Commercial projects are allowed to floodproof to 2 feet above the 100 year storm elevation.
7.4	No flood level increase anywhere is overly stringent. This language should be reworked to, in keeping with the character of earlier chapters, eliminate the impact on up- and downstream properties. If a designer can achieve a layout that increases onsite BFE, has no impact on the up- and downstream properties, and can locate all insurable structures 2' above the onsite BFE, that should be an allowable development; all concerned parties are compliant and/or relevant constraints are met.	JAECO - Tyler Tyboroski	Bullet has been removed, issue is covered in UDO 9.3.6.A
7.4	states that the SFHA must be delineated – what does that mean? Is a flood study required if its flood hazard soils? Need to clarify the intent	Mark Senior	This is language has been removed as it is covered in UDO 9.3.7

Section	Comment	Commenter	Response 9/8/2023
7.4	10th bullet - Parking lots have been designed in the past to flood and have just provided passage around them.	HBA	This is a new requirement intended to protect parked vehicles/equipment from flooding during large storm events. A code change for UDO 9.3 will accompany this manual update, so this bullet has been removed
7.4	Section 7.4 puts a new requirement on parking lots. What constitutes "redevelopment" of a parking lot? If this requirement moves forward, it should be accomplished with a text change to the UDO, not buried in the design manual. A parking lot at grade is and should be considered an allowable practice in the floodway fringe.	Withers - Hunter Freeman	This bullet been removed since it is in UDO 9.3
7.4	11th bullet - Lots of current developments would not have been built if this requirement was in place. Has a study of this impact been done?	HBA	This bullet been removed since it is in UDO 9.3
7.4	Section 7.4 - the requirement for Dry Access is a new requirement and should be incorporated into the UDO via text change.	Withers - Hunter Freeman	This bullet been removed since it is in UDO 9.3
7.4	the concept of “dry land access” is great but may not be practicable – I live along a river and my house is on pilings to bring it above the RFPE – the road to the house is 6’ below the RFPE – there’s no practical way to provide dry access	Mark Senior	This bullet been removed since it is in UDO 9.3
7.4	Page 5: similar to site access, the City should not require a design adjustments here. The City cannot deny access (dry or otherwise) to a property. Requiring a design adjustment, design exception, etc for an Owner to access their property is redundant; the application has to be approved since access cannot be denied. Suggest removing this requirement.	JAECO - Tyler Tyboroski	This bullet been removed since it is in UDO 9.3
7.4.1.1.2	"Note that review of a flood study submittal is 30 days, regardless of the overall benchmark review date for the overall project submittal." - Should be in-line with the project submitals.	HBA	Flood studies are on a separate review track (SPR Minor) and timeline will remain 30 days.
7.5 Flood Study Requirements			
7.6 Elevation Certificate Process			
7.7 Floodproofing Certificate			
7.8 Substantial Improvement or Substantial Damage			

Section	Comment	Commenter	Response 9/8/2023
7.8	Where does this 50% threshold come from?	HBA	50% as a threshold for substantial improvement or substantial damage comes directly from FEMA. The City of Raleigh is more stringent than FEMA regulations in that we track the costs of these improvement/damages over a 5 year rolling period to determine whether a structure must be brought into compliance with current floodplain regulations (if they meet the 50% threshold over that time period). Added some
GENERAL			
GENERAL	Noting that floodplain development should be difficult and heavily regulated due to the risk to both safety and property, this process does seem a little cumbersome. Again, understand the need for these requirements, but maybe a little less regulation would be beneficial. It shouldn't be *impossible* to develop in the FP if an Owner, with proper notification and safety procedures in place, is willing to accept the risk and/or pay the increased costs/premiums associated with this type of development. This is especially true as "ideal" sites become less available, and infill development is increasingly regulated.	JAECO - Tyler Tyboroski	Language has been modified and portions removed