

Chapter/ Overall	Section/ Topic	Commentor(s)	Comment/Question	Comment Response 4/3/2024
2	2.1.2.1.C.a	Karen Rindge (Rooted in Nature)	add rain garden as an option for the 10' area	Rain Gardens have been added as an option in Section 2.
2	2.1.2.1.C.b	Karen Rindge (Rooted in Nature)	Add "and/or native plants appropriate for rain gardens" after "deep rooted grasses"	This language has been added.
3	3.4	Commissioner Dalton	Is the rainfall-intensity-duration data available for review? For all regulations that specify storm events, also include the storm duration (5-minute, 10-minute, etc.) where appropriate	The rainfall data will be reviewed while the Design Manual is going through the official process. Yes, the intensity information will be provided or referenced.
3	3.3.5	Travis Tyboroski (JAECO)	Specific exclusion on the modified rational method. I see the note in the comment responses about removal due to lack of reference in NCDOT, FHWA, and other North Carolina applicable reference material. NCDOT does not explicitly exclude the methodology nor to our knowledge, do other North Carolina reference materials. I'd be lying if I said I read every word of the FHWA guidance documents but I didn't see specific exclusion there either. I could go on about this but in the interest of keeping it high level I wont do that here. I plan on reaching out to Hunter as I see his comment agreeing with the removal but I would like to discuss with you as well if you're available.	Thank you for your comment.
4	4.5	Al Hogan (ACPA)	Strongly suggest COR include a requirement that all pipe supplied (RCP, PP, HDPE) shall be supplied by a manufacturer of the subject pipe material on the NCDOT Approved Producer/Supplier List. (NOTE: This is best and most cost effective way to ensure you are getting the best quality products available and the production facilities are following stringent QC policies and have had frequent Q/A audits by both NCDOT and third party auditors)	This language has been added. See section 4.4.1.
4	4.8	Al Hogan (ACPA)	As currently written it does not appear COR would receive a copy of the CCTV Video or Final Inspection report documentation. Seems like COR would want to have all final CCTV reports, videos, submitted so you all could complete some level of QA otherwise no video submitted, sign off by Engineer no repair needed...but in reality there are problems and they are not found until after warranty period is over....Engineer says must have happened after the inspection and project approved - everyone off hook EXCEPT COR.....????	It has always been the City's intent to receive the videos in addition to the PACP reports and the engineer's certification. We have clarified that language. See updated Section number 4.7.4.4.
4	4.3.1	Travis Tyboroski (JAECO)	Continued exception taken to HGL requirement on private infrastructure. This becomes a real point of concern with flow splitters. To be strictly compliant with the Manual as-is would require systems to either be artificially deep, or have an artificially deep larger footprint to account for potential outfall issues (exacerbated by Table 4.6) - There is heavy reference to NCDOT "Guidelines For Drainage Studies And Hydraulic Design" which notably has the following HGL constraint (10.5.2.2): It is desirable for the water surface elevation to be a minimum of 0.5 ft below this elevation. - Additionally, acknowledging Durham does not allow exceedance, our understanding is that Charlotte has a 12" min clearance and Chapel Hill does not specifically prohibit exceedance of the top of pipe on private infrastructure.	We understand your concern, but continue to reference this best practice.
4	4.3.4	Travis Tyboroski (JAECO)	Continued exception to inlet spacing requiring design to the 10-yr event. To our knowledge this well exceeds any "sister" jurisdiction requirements (and notably almost doubles the NCDOT requirement).	We intend to provide comparison data at the April 17, 2024 presentation.
4	4.5.2	Al Hogan (ACPA)	re: joints... For clarity to inspectors and installers - not all pipe supplied with single offset joint will have an extended Bell - it might be more clear to sayoffset joints - with Bell (Groove) and spigot (tongue) pipe using.... NOTE: some RCP larger than 36" may not have an extended bell when supplied from some of the producers that serve the Raleigh market.	This language has been updated. See Section 4.4.2.
4	4.5.2	Al Hogan (ACPA)	re: Conseal bullet... "Conseal" is a brand name and COR may want to utilize a more general and accepted terminology and call for "preformed flexible joint sealant (ASTM C990)" in this joint option for RCP. Also as noted previously NCDOT allows the use of preformed flexible joint sealant meeting ASTM C990 and only requires the additional filter fabric wrap for RCP pipe 42" and larger in their system.	This language has been updated. See Section 4.4.2.
4	4.5.2	Al Hogan (ACPA)	re: material changes bullet ... The geotextile coupler should include ASTM reference for clarity. This type of coupler should meet ASTM C877 Type II Band. This ASTM C877 reference should be included in each section where dissimilar material connections are noted and discussed.	This language has been updated. See Sections 4.4.2., 4.4.3, 4.4.4

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4	4.5.2	Kelly Hefner (ADS)	The statement "The City does not have restrictions on where RCP may be used." opens up the city to liability. City has requirements on backfill, cover height, pipe classes based on cover height and design method/specification types for structural reasons	This first sentence has been clarified. See Section 4.4.2.
4	4.5.2	Kelly Hefner (ADS)	Tongue & groove is not the same as single offset joint, T&G not water tight (response to comment from CCPPA)	This language has been updated. See Section 4.4.2.
4	4.5.2	Kelly Hefner (ADS)	The bell is intergral to the outside diameter if the thickness of the pipe will allow the bell.	This language has been updated. See Section 4.4.2.
4	4.5.2	Kelly Hefner (ADS)	spelling of addition in Conseal statement	This language has been updated. See Section 4.4.2.
4	4.5.2	Kelly Hefner (ADS)	May want to use Butyle Rubber Sealant since Conseal is a name brand	This language has been updated. See Section 4.4.2.
4	4.5.2	Kelly Hefner (ADS)	May want to review AASHTO R82	This language has been updated. See Section 4.4.2.
4	4.5.3	Al Hogan (ACPA)	re: PPI certification ... Unclear what you wish to be Certified by PPI. I am almost certain PPI has no way to certify a product made by any of its members. Any required certification would have to be provided by the Producer of the product not PPI.	We have referenced the NCDOT suppliers list instead. See section 4.4.1.
4	4.5.3	Al Hogan (ACPA)	re: PP backfill bullet ... It is critical that a granular backfill be placed to a minimum of 6" above the installed pipe. It is worth noting that NCDOT requires the placement of granular backfill to 12" above the pipe. (NOTE - 95% +/- of structural strength comes from the support provided by the backfill around these plastic products.)	This is being addressed in the proposed City Standard Detail.
4	4.5.3	Al Hogan (ACPA)	re: material changes bullet ... Include reference to ASTM C877 Type II Band (Note: see other comments above in section on RCP)	This language has been updated. See Sections 4.4.2., 4.4.3, 4.4.4
4	4.5.3	Kelly Hefner (ADS)	Bullet 3 - Bedding detail is Manufacturers recommendations for cover. This is what I thought we had discussed in our meeting since the backfill requirement in ROW is A1or A3 to 95% SPD – the lowest allowable cover is for 60" at 20'. This also conflicts with the install detail I am assuming you are still working this out, but I did want to make sure it is clarified. MFR recommended cover relieves the city from liability for specifying allowable cover.	This has been changed to 20' to match NCDOT.
4	4.5.3	Kelly Hefner (ADS)	Bullet 5 –Remove "O-ring" this is a generalized term. The type of gaskets are covered under F477. Using the spec below covers all watertight gaskets, i.e, ASTM D3212 represents water tight for storm or sanitary. Joints shall be watertight according to the requirements of ASTM D3212. Gaskets shall meet the requirements of ASTM F477. Gasket shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from	This language has been updated. See Section 4.4.3.
4	4.5.3	Kelly Hefner (ADS)	Bullet 6 In reference to trench detail I would consider adding a 467 as a backfill around pipe since it will fill more of the void space between the stone	This is being considered in the proposed City Standard Detail.
4	4.5.3	Kelly Hefner (ADS)	Bullet 9 – does not work in many scenarios i.e. off angle connections either horizontal or vertical or in round structures with large diameter pipe.	This has not been changed.
4	4.5.3	Kelly Hefner (ADS)	Consider adding in a grouted option with a fabric backer around pipe and adhered to structure this way there are options for the contractor similar to what is shown for rigid pipe	This has not been changed.
4	4.5.3	Kelly Hefner (ADS)	C1840 allows for poorer installation. Recommendation: Recommend measurement of defects to quantify for allowances.	This has not been changed.
4	4.5.3	Kelly Hefner (ADS)	Recommend reviewing this for pipe condition and evaluation: AASHTO Culvert and Storm Drain System Inspection Guide.	Thank you for your comment.
4	4.5.3	Kelly Hefner (ADS)	Our non-flexible pipe manufacturers are going to push "the Cracked pipe is ok and should be expected and offset joints will be ok" – on the flip side they push laser profiling of flexible pipe because it is extremely expensive – cost prohibitive – marketing ploy by other industries to inhibit use of flexible pipe. Mandrels are a better true test of alignment and deflection it is a simple go/ no go and not subjective to alignment of recording instrument and debris. Please take this into consideration when reviewing comments.	Thank you for your comment.

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4	4.5.3	Kelly Hefner (ADS)	Below are some definitions from the pipe inspection guide. Need to determine what is desired; what does COR want to take ownership of after completion of installation: Is it watertight joint or is it soiltight joint?	Thank you for your comment.
4	4.5.4	Al Hogan (ACPA)	re: PPI certification... See Note above in PP section regarding certification from PPI?	We have referenced the NCDOT suppliers list instead. See section 4.4.1.
4	4.5.4	Al Hogan (ACPA)	re: HDPE backfill bullet... 57 Stone backfill should extend up and over top of pipe to a minimum of 6"see comment above in PP section for more details.	This is being considered in the proposed City Standard Detail.
4	4.5.4	Al Hogan (ACPA)	re: material changes bullet ... Include reference to ASTM C877 Type II Band (Note: see other comments above in section on RCP)	This language has been updated. See Sections 4.4.2., 4.4.3, 4.4.4
4	4.7.1	Travis Tyboroski (JAECO)	Continued exception to table 4.6. While minimum drops and crown matching are advisable ("recommendations"), if the HGL works it works. Providing a design, which is then reviewed and confirmed by the City, that does not otherwise violate the HGL requirements (with the noted exceptions...) should be adequate. 2 Prescribing minimum drops and/or requiring additional approvals to prove a design that has already been proven is unnecessarily burdensome, does not provide public benefit, and is contrary to section 1.2; these (and the 4.3.1) requirements directly replace the need for professional judgement.	Thank you for your comment.
4	4.8.3.1.A.	Al Hogan (ACPA)	We support the use of NASSCO - PACP trained and certified teams to complete the PII inspections. However, the PACP program does not require measurement of defects and therefore, requires subjective decisions to be made by inspection team which may not be accurate with respect to the severity of the defect and application of the PACP severity codes. We do not support the use of PACP for the evaluation and making repair/remediation decisions.	Thank you for your comment.
4	4.8.3.2.A.	Al Hogan (ACPA)	We do not support the use of NASSCO PACP severity scores and allowing inspection companies to have a strong hand in the process/decision on what issues need to be repaired. Many times the inspection company operators are NOT qualified or have proper training to understand or determine the severity of small cracks and or even other PACP structural or O & M categorizes as these codes are related to RCP. As noted earlier the PACP defect code selection process in our opinion is subjective, requires no physical measurement and defects/issues are often mis-coded. Please note that most specialty PII Inspection contractors also have repair capabilities and equipment and this can lead to possible conflicts of interest issues with respect to PACP code selection.	Thank you for your comment.
4	4.8.3.2.B.	Al Hogan (ACPA)	The current draft wording with respect to pipe evaluation/acceptance/repair will lead to a significant amount of disagreement by installers, producers, engineers, and the COR on the amount of required remediation/repair that should be required due to the subjectivity of the PACP defect coding issue. Our experience over the past 20 years has verifies the IMPORTANCE of owners utilizing as an objective approach as	Thank you for your comment.
4	Table 4.1	Commissioner Dalton	What happens if downstream structures control HGL? Pipe sizes would get unnecessarily large just to keep HGL below crown. For example, connectng to a downstream 18" pipe system that has 4' of HGL would require a 48" pipe. Consider allowing designers to set the starting downstream HGL at 0.8 times the pipe size. Consider requiring pipes to be sized based on slope conveyance using K factors to set maximum pipe capacity. DOT also sets an absolute maximum pipe capacity based on a table (10.11.3).	The City does not require detailed study of the downstream pipe system.

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4	Table 4.4	Commissioner Dalton	<p>The 10-year storm requirement for gutter spread will result in significantly more inlets. Standard practice for NCDOT and most municipalities is to use the 4 inch per hour storm intensity. Consider using the 5-year, 5-minute storm intensity for inlet spacing. Reference HEC-21 Section 8.2.3 regarding Driver Visibility: The research supporting this estimate depicted a single car in rain on a test track. Note that cars in a travel corridor generate splash and spray that increase water droplet density over natural rainfall intensity. To compensate for splash and spray, a design intensity of 4 in/hr may be more realistic as a threshold value that will cause sight impairment. That is, design intensities, i, above 4 in/hr will probably obscure driver visibility in traffic and decrease sight distances to less than minimum AASHTO recommended stopping sight distances. Reference HEC-22 Table 4-1 Suggested Minimum Design Frequency and Spread:</p> <ul style="list-style-type: none"> o For Low ADT Local Streets, the manual recommends the 5-year event. o For High ADT, the 10-year event. 	We intend to provide comparison data at the April 17, 2024 presentation.
4	Table 4.5	Commissioner Dalton	<p>Requiring a minimum velocity is typically a requirement for sanitary sewer systems (self-cleaning), but I have not come across the requirement for storm drainage systems. - The manual does not specify which storm event, 10-year? - Larger pipes due to HGL requirements will create lower velocities. Pipes should be designed/sized for slope conveyance.</p> <ul style="list-style-type: none"> - Is velocity based on full flow (Q/A) or partial flow? - When designers have inlets with very small drainage areas, the velocity requirement will be tough to meet without making pipes steeper. For example, a 15-inch pipe on 0.5% slope with 0.5 cfs results in a partial flow velocity of 2.6 fps. 	Thank you. We have removed the minimum velocity requirement.
4	Approved Pipe	Al Hogan (ACPA)	<p>We request COR clarify that the pipe material selection is a function of the Engineer of Record and NOT the Installer. We request you consider labeling this section "Allowable Pipe Material Selections" (Note: see material selection restrictions below for each pipe material).</p> <p>All pipe material designed by the Engineer for all locations should be noted on the plans by the Engineer. It is our understanding based on subsequent information regarding each Approved pipe material type that COR has placed some application and or other restrictions on the approved pipe materials. We believe that limitations or approval of pipe materials is the owners prerogative. We appreciate the COR being clear as to the products that are approved for selection/design by the EOR, however, it is the Engineers decision and responsibility to select the product they wish to design and utilize as long as their selection is in keeping with you design guidance for each material type. (NOTE - We do not think it is your intention nor is it good policy to allow the Contractor to select from a set of possible alternatives, the Engineer within your design guidelines must make these design decisions on such an important part of the Raleigh storm water infrastructure system.)</p>	The Design Manual audience is designers not installers. We require a specific material to be stated. A plan revision is required when changing material.
4	Trench Detail	Al Hogan (ACPA)	<p>Seems premature and may cause confusion in field by installers and inspectors to publish a technical design guidance and written specification without a very important piece of information like the trench details. (NOTE - there will need to be two separate trench details if not three - 1 - RCP, 1 PP & 1 HDPE since they all require different installations according to this document. NCDOT has two main standard drawings to cover trench details for Rigid Pipe (RCP) 300.01 sheet 2 of 2 and one for Flexible Pipe 300.01 sheet 1 of 2.) These two documents would be best resource for items and information to include on the COR Trench Details.</p>	Thank you.
4		Al Hogan (ACPA)	<p>Imperative a COR Trench Detail be developed and delivered at same time as any changes you wish to make regarding the proper installation of the various pipe materials that are allowed for use. We recommended extensively on this matter in our chapter 4 markup, and we specifically requested that separate trench details should be developed for the three pipe materials (RCP, PP, HDPE).</p>	Yes, we are working on revisions to the City Standard Details that will become effective at the same time as the updated Design Manual.

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4		Al Hogan (ACPA)	The current draft of Chapter 4 requires the Evaluation/Acceptance/Repair requirements of installed pipe to be based upon NASSCO PACP program of inspection, defect coding, and severity criteria assignments based upon the PACP Defect codes. Our voluminous response and suggested remedies to the concern are generally around that our experience has proven the use of a visual only and subjective approach for the important acceptance/repair decisions for this important part of the COR assets will lead to much disagreement between all stakeholders, the repair of items that do not need repair, possibly overlook items that need repair, and increased installed cost for pipe products. The remedy is simple....use the evaluation & repair considerations found in the "NCDOT Guidelines for Post Installation, Evaluation, and Repair of Newly Installed Drainage Pipe" (link below) or some other objective National Guidance Objective Evaluation criteria (see attachment for appendix X5 of "AASHTO Guide Specifications for Highway Construction"). https://connect.ncdot.gov/resources/Materials/Pages/Materials-Tests-Search.aspx?k=pipe%20evaluation%20and%20repair#:~:text=https%3A//connect.ncdot.gov/resources/MaterialsResources/Guidelines%2%A0for%2%A0Post%2%A0Installation%2%A0Evaluation%2%A0and%2%A0Repair%2%A0of%2%A0Newly%2DInstalled%2%A0Drainage%2%A0Pipe.pdf	Thank you.
4		Kelly Hefner (ADS)	Need to make sure the camera utilized for inspection can measure joint gaps as well as crack width: Concrete joint gaps should be less than 1"	Lasers must be calibrated as part of PACP program.
4		Kelly Hefner (ADS)	Triassic soils / expansive soils – need to take this into account especially since these soils could cause problems expanding and contracting with moisture, concrete Butyl joints are not water tight	We are not specifying water tight v. soil tight. We are specifying a type of joint.
6		Travis Tyboroski (JAECO)	This chapter has a good "flow" and is clear on it's requirements. Well written and well thought out. - Little thing but thank you for clarifying that as-built photos must be taken within 7 days of the initial submittal. This was a little grey when requiring multiple rounds of review.	Thank you.
8		Karen Rindge (Rooted in Nature	Add, if discharge is onto a streambank, require dense planting of native plants in discharge area and below towards stream.	Thank you for your comment.