



ENGINEERS

SURVEYORS

PLANNERS

November 19, 2014

M&C 02735-0007 (40)

Ron Satterfield, Planning Division Manager
Jim Diepenbrock, Associate Planner
City of Wilmington
Development Services
305 Chestnut Street, 4th Floor
Wilmington, North Carolina 28401

RE: River Road Realignment Traffic Engineering Comments

Dear Ron / Jim:

In response to the Traffic Engineering comments (by Don Bennett, PE; Bill McDow; Dave Brent) received in regards to the River Road Re-Alignment project, we offer the following responses:

Transportation Engineering – Don Bennett, PE, Traffic Engineer-11/14/2014

Sheet by sheet, assuming that all work by Newland starts at the southern bridge slab and proceeds south to the tie in just north of Motts Creek Bridge.

General Comments:

1. All pedestrian and bicycle signs should be specified as high intensity fluorescent yellow-green.

We have added a note to the detail on sheet PM-9 to reflect high intensity fluorescent yellow-green for pedestrian and bicycle signs.

2. All DO NOT ENTER and WRONG WAY Signs should be angled approximately 45 deg. toward the intended drivers. Otherwise confusion may occur with left mounted sign in median shown to driver in correct lane.

We have included a note on the sign detail on sheet PM-9 to indicate the 45-degree orientation toward the driver. At the scale of the plans it would be hard to depict the sign angle.

243 North Front Street

Wilmington, NC 28401

910.343.1048

Fax 910.251.8282

www.mckimcreed.com

3. Where turn lanes exist as bays less than 500' my preference is to omit the RIGHT/LEFT Lane Must Turn RIGHT/LEFT signs.

All of the Right / Left Turn Lanes are less than 500-feet within the River Road Realignment. As such we have removed the "Lane Must Turn LEFT/RIGHT" signs and labels from the project.

4. The ONLY pavement markings should only be applied if an existing through lane is being terminated as a mandatory turn lane at an intersection, including roundabouts.

We have updated the plans to comply with the above comment.

5. While the icons for the signs are helpful, we need to have the appropriate MUTCD designation either with each icon, or listed in a central legend.

We have added all sign designations per MUTCD 2009 within the detail of the sign icon. We have also placed the MUTCD sign designation under each sign icon on the PM 1-11 Sheets.

6. R4-4 (Begin Right Turn lane – Yield to Bikes) are needed in ALL cases where a right turn lane taper begins and right turning vehicles have to cross the bike lane to exit the through lane.

We have updated the plan sheets PM 1-9 as appropriate to meet the above referenced situation.

7. With a median lane of less than 30' the ONE WAY signs are optional, KEEP RIGHT (R4-7) signs on the median nose can serve the same purpose. If the KEEP RIGHT is used, OM1-3 under it.

We have removed the ONE WAY signs, and added KEEP RIGHT (R4-7) Signs with KEEP RIGHT (OM1-3) installed underneath. These have been added to the nose of all median ends located 10-feet from the end.

8. Signs should all be appropriately sized for the speeds on the roadway.

This was verified with the current editions of the MUTCD and AASHTO.

9. Mini-skips throughout the project should be labeled to ensure the correct skip/space pattern is applied for the correct location. There are three

patterns, 2/13, 2/6 and 3/9.

We removed the detail included on previous versions of the Pavement Marking Plans (PM 1-8) and replaced it with the appropriate NCDOT Standard Drawing to reflect the correct skip/space patterns on sheet PM-9.

10. All stubbed driveways should have OM4-3 end of road markers placed across the stub to prevent unintentional access.

These are now included at all Driveway Stubs along with Mounted, Type III Barricades. See details on sheet PM-9.

11. No preference to which symbol is placed in the bike lanes to denote such, just as long as it is consistent. NCDOT has used the BIKE LANE words north and south of this location.

We are using BIKE LANE and have verified that this is consistent throughout the PM 1-8 plan sheets and PM 9-11 detail sheets.

12. Where multiuse trails cross roundabout (RAB) approaches, consider use of W11-15 signs to denote that both bikes and peds should be expected.

The W11-15 sign was added to the RAB approaches on each traffic circle.

PM1

13. It appears by plan that the bike lane tapers out prior to the bridge. The new bike lane should tie into existing both north and southbound.

The bike lanes beginning after Barnard's Creek Bridge and ending at Motts Creek Bridge will connect the bike lane striping to the existing striping on the bridges. From field visit and Google Earth Review, bike lane striping and symbols do not appear from Independence Boulevard thru Saunders Road. There is a 4-foot paved shoulder outside the lane edge stripe. We will connect our bike lane striping to the existing edge of lane striping at each bridge.

14. Not sure, but the existing EOP lines may still be showing on the plan, this could lead to confusion in construction.

On the Pavement Marking plans (PM 1-11) we have eliminated the existing edge of pavement layer to reduce confusion. The existing edge of pavement layer will remain on our plan and profile sheets (CU Sheets) and geometry sheets (CR Sheets) as the edge lines depict the area of existing pavement overlay, widening and pavement removal.

PM2

15. Intersection of driveway 1B. – north bound through lane drop – appropriate signage and ONLY pavement markings required.

Based upon our meeting of November 14, 2014 we are modifying the right-lane through Intersection 1B and providing an appropriate taper based on 50 MPH design speed to transition the right-lane drop down to one-lane north bound.

16. Northbound through lane drop as right turn crosses the bike lane, this creates a dangerous right turn hook condition. This violates 9C.04(06) of the MUTCD. Bike lane should be transitioned across right turn lane prior to intersection and pass between right and through lane.

Please see response to #15. With this lane transition modification we are no longer in violation of 9C.04(06) of the MUTCD. This was confirmed at our November 14, 2014 meeting.

17. The taper on far side of intersection implies that right turn drop is not mandatory, and may cause confusion. For this speed, that taper is too short for a lane ends taper. With bike lane issue above this may lead to car overtaking bike hazards. If it is intended as a merge lane it should be marked appropriately and the taper extended for a 45 MPH lane drop.

See response to #15. The additional taper length resolves this item.

PM2-PM3 transition

18. PM3 – Lane approaching roundabout (RAB) for the intended through lane movement on River Road (right slip at the RAB) appears to feed into the right exiting lane of the RAB that drops on PM2 at the first intersection. This requires the through movement to switch lanes on exit and possibly collide with traffic exiting the RAB from the circulating roadway.

To address this item we are extending the south bound right-through lane across Driveway 3A (~Station 63+00) and then providing an appropriate taper length based on 50 MPH Design Speed to transition the right-lane down into a single south bound through lane. This will eliminate the possible collision of vehicles between circulating vehicles and transitioning vehicles.

19. PM3 note- it will be difficult to articulate this design issues with this RAB in words. We may want to sit down and hash out the design details as the development agreement allows. We may be able to allow a partial release to allow mainline roadway construction while these details are resolved. The construction of the tie in and the details associated with it were significant items of discussion in the last meeting.

This item was discussed and resolved in our November 14, 2014 meeting and responses are indicated in several of the following item responses.

20. Northbound to westbound movement is required to change lanes within the RAB. This creates a significant safety issue.

We have revised the north bound to west bound movement through the Driveway 2 Roundabout as agreed upon during our meeting. We have adjusted the striping within the circle to move the north bound to west bound vehicle into the right (outside) west bound circular lane. If required we are modifying the south bound entry island to reflect the movements described above.

21. Bypass lanes should be physically separated from the RAB. In this design it appears that dual rights are possible and create a safety issue with the mandatory downstream lane drop.

The north bound by-pass lane is now depicted as a continuous lane. With the revision discussed in #15 above and the continuous by-pass north bound traffic will smoothly move through the Roundabout. Further, the inside lane of the Roundabout striping was modified to maintain traffic on the inside north bound lane exiting the Roundabout.

22. Pedestrian crossing signs need the downward pointing arrow sub-plate at the crossing.

The additional sign (Diagonal Arrow) has been added below all Bike / Pedestrian Crossing Signs. These are shown throughout the PM 1-8 plans and on the detail sheets PM 9-11. Further, all pedestrian and bicycle signs will be fluorescent

yellow-green, see details and description on sheet PM-9.

23. On the bypass lane, Bike Lanes should not be continued through the RAB, R3-17/R3-17bP signs required.

Based on previous discussions and our recent meeting, we will leave the Bike Exit lanes as shown on each Roundabout. We agree that the speed of the road bicycles will be similar to that of the motorist at and through the Roundabouts. As such, the bicycles will have the option to exit as provided or remain within the proposed lanes to traverse each Roundabout whether travelling south bound or north bound. We have added the R3-17 series signs to sheet PM-9.

24. Until the public on this side of the county becomes accustomed to RAB traffic patterns, lane-use signs (Mandatory Movement Lane Control Signs (R3-5, R3-5a, R3-7, and R3-20) are advised at this RAB.

Our original pavement marking and signage provided R3-5, R3-5a, and R3-7 signs in their appropriate locations. Per our response to comment #6 (above) we have revised PM 1-11 to include R4-4, which is located at the start of each right turn lane.

25. The southbound "through" movement is required in the left lane entering the RAB, this will be counterintuitive, but necessary since putting them in the outside approach lane exits them into the drop lane at driveway 3A.

Based upon the revision noted in response to #18 this item will be satisfied.

26. No ONLY pavement marking is needed exiting the Commercial Village Driveway. A ONE WAY may be advisable in the median.

For all driveway locations shown along River Road (Driveways 1 – 9) we have removed proposed signage, striping and any indication of future medians. The original design premise was to construct the intersections for future connection by adjacent development parcels, and to secure the full-movement intersections and right-in/right-out intersection locations. The signs and striping were un-necessary and un-required, so we have removed them from the plan set. We have incorporated appropriate Type III Barricades and OM4-3 signs at the stub end of each driveway.

27. Driveway 3A – bike lane should be between through and mandatory drop lane prior to intersection. MUTCD 9C.04(06).

See response to #18 above. Extension of the transition lane through driveway 3A addresses this item.

28. Design needs to be examined to ensure path overlap on entry condition is not present.

Discussed during our meeting and revisions within the revised plans address any potential overlap.

PM4

29. Insufficient detail regarding bridge structure is provided to determine signs and markings requirements, based on lateral offsets, guardrails, object markers, or overtopping rails may be required to ensure safety.

The plans reflect a "future bridge location" from Station 74+00 to Station 77+00. Wetherill Engineering is designing the roadway bridges for River Road. These will be submitted for review and approval at a later date to include all pavement marking and appropriate signage.

PM5

30. If physically connected to Wilderness, stop bar required for Wilderness Drive connection.

Ultimately this will connect with existing Wilderness Drive. We will install a stop bar at this intersection when the Wilderness Trail Extension is completed.

31. Driveway 5 – If island constructed as shown, R4-7 required on end of island.

Please see the response to #26 above that addresses future driveway stub-outs.

PM6

32. Speed Limit sign shown exiting the Lorraine RAB heading north indicates 55, everything else on the project is 45.

We have revised the speed limit sign on PM-6 to be 45 MPH. The icon detail sign on PM-9 also now reflects 45 MPH.

33. Need to look at the entry angle on the NB movement to the Lorraine RAB, the bike lane can be placed between the approach lanes with appropriate transition markings as have been installed at the non-RAB intersections. The MUTCD indicates that bike lanes shall not be in the circulating lanes, but most applications note that bike speeds are consistent with car speeds in the circulating roadway; therefore taking them around the perimeter is not required.

Based on previous discussions and our recent meeting, we will leave the Bike Exit lanes as shown on each Roundabout. We agree that the speed of the road bicycles will be similar to that of the motorist at and through the Roundabouts. As such, the bicycles will have the option to exit as provided or remain within the proposed lanes to traverse each Roundabout whether travelling south bound or north bound.

34. If bike lanes are terminated taken outside the RAB then reinstated, they need to be signed as such.

Appropriate signs have been provided at each Roundabout.

PM7

35. R4-7 required on islands in Driveways 7A/7B if islands are installed and on the nose of the island in Driveway 8.

Please see the response to #26 above that addresses future driveway stub-outs.

PM8

36. R4-7 required on islands in Driveways 9A/9B if islands are installed.

Please see the response to #26 above that addresses future driveway stub-outs.

37. Northbound turn lane markings omitted.

The appropriate north bound turn lane striping and arrows have been added to PM-8.

38. Details needed for the approach to the Motts Creek Bridge, if nothing is changing on alignment, then what is out there is OK.

We will overlay pavement up to the Motts Creek Bridge, and will replicate the striping and bike lane. The existing signage will remain or be reset.

PM-9 Roadway Details

39. Sign sizes as noted by chart in MUTCD.

The sign sizes have been added to PM-9 details and verified based on Design Speed with MUTCD.

40. Prefer symbol R4-7 sign.

R4-7 sign with KEEP RIGHT symbol was added to sheets PM 1-8 and on detail sheets PM 9-11 as appropriate.

41. ONLY Detail would be better served moved to PM-10, confusing when nested amongst the signs.

The ONLY detail was moved to sheet PM-10.

42. W13-1P should be noted as mounted under W2-6 or shown as an assembly in the same box.

This note was added to the detail and shown graphically on the appropriate plan and detail sheets PM 1-11.

43. R2-1 Legend would better be shown as 45 to eliminate confusion. (45 shown on a majority of the plan).

We have updated the legend on sheets PM 1-8 to be shown as 45 throughout.

44. If R3-17 series signs need to be shown in legend.

We have included the R3-17 series sign within the legend sign details on PM-9.

PM-10 Roadway Details

45. Add NCDOT Roadway Standard Drawings sheets 1205.08 sheets 2 & 3 of 8, 1250.01 2 of 3, 1264.01 and 1264.02.

These NCDOT Details were added to PM-11 based upon the 2012 NCDOT Standard Drawings.

46. Crosswalk marking details needed.

Crosswalk detail in accordance with the City of Wilmington and NCDOT was added to the detail sheet PM-11.

47. Depending on bridge abutment protection, 1261.01, 1261.02 and 1262.01 may be needed. (Sheet PM-4).

Please refer to item #29 above for response related to proposed roadway bridges.

City of Wilmington – Bill McDow / Dave Brent, Staff Engineer-11/17/2014

BASE INFORMATION:

NCDOT:

1. I was unable to locate the June 17th River Road abandonment letter.

This letter was provided in the previous comment responses, and included in the two CD sets provided to Jim Diepenbrock.

TECHNICAL STANDARDS – NEW ROADS:

2. For the Roundabout Details, sheet CT-101 Drawing 2B, the cross walks for the Northern River Road connections do not appear to be aligned.

We have updated the crosswalk locations to align properly on drawing 2B, and this location is included on all drawings depicting the northern Roundabout.

3. The detail for Splitter Island 2B/2 appears to be driveway 6, please clarify how the detail is labeled on the plan.

The splitter island shown as 2B/2 is for driveway 6. We labeled it poorly on the original plans, but have modified its label to be 6B.

4. The Wilderness Rd and Driveway 8 intersections drain to the center median; however, there does not appear to be any basins near these intersections. Please verify the design for water flow near these intersections.

The Wilderness Trail Extension Driveway will drain toward the median and into the catch basin shown as existing on the plan/profile sheets, previously provided. The proposed grade of River Road in this area is a high point and most of the

runoff drains north and south from the proposed intersection.

5. Elevations [sheet CT-101A, drawing 2C]:
- a. The elevations and drainage profiles at the major intersections for the project appear to have changed significantly from the last submission to this submission.

In response to 5a – 5i we offer the following: We modified the super elevation throughout the River Road corridor to an Urban Collector Road. The super elevation was lowered from maximum 6% down to a maximum 4.8%. These changes in super elevation and associated transition zones modified the proposed grades on all intersection locations. The previously provided plan set that these comments address were updated to reflect these modified elevations.

- b. The project must ensure these intersection changes will not result in places along the roadway that will create inadequate drainage areas that will cover the travel lane during heavy rain events.
- c. Driveway 1A/1B: The elevations in the vicinity of Driveway 1A (curb line and edge of pavement) were raised by 2-3' and the elevations for driveway 1B were lowered by 3-4'.
- d. Driveway 3A/3B: The elevations in the vicinity of Driveway 3A (curb line and edge of pavement) were lowered by 2.38' and the elevations for driveway 1B were raised by 2.4'.
- e. Driveway 4A/4B: The elevations in the vicinity of Driveway 4A (curb line and edge of pavement) were raised by 4.7'-5.6' and the elevations for driveway 4B were lowered by 2.0'-2.55'.
- f. Wilderness Rd pavement in the roadway was lowered by over 1.5'.
- g. Driveway 7A/7B: The elevations in the vicinity of Driveway 7A (curb line and edge of pavement) were lowered by 2' and the elevations for driveway 7B were raised by 2.64'-3.55'.
- h. Driveway 8: The elevations in the vicinity of Driveway 8 (curb line and edge of pavement) were raised by 5.35' at the edge of pavement and the elevations for centerline were lowered by 1.0'-1.5'.
- i. Driveway 9A/9B: The elevations in the vicinity of Driveway 9A (curb line and edge of pavement) were raised by 2.4-3.37' and the elevations for driveway 9B were lowered by 3.3'.

- j. Ensure the locations of the catch basins and cross slopes are sufficient to allow proper flow across the roadway.

We are working with Rob Gordon to complete stormwater management design and permitting on River Road. The roadway drainage plans were reviewed and approved by NCDOT prior to construction release in 2007-2008.

6. Sign R4-4 (Begin Right Turn lane – Yield to Bikes) are needed in ALL cases where a right turn lane taper begins and right turning vehicles have to cross the bike lane to exit the through lane.

These signs have been added on PM 1-8 as necessary, and the detail is updated on PM-9.

7. Sheet CR-102 Drawing 3B, pavement markings adjacent to Driveway 1A are improperly shown beyond the median ending and within the center of the intersection.

We have removed the pavement markings on the CR sheets and the CU sheets to eliminate conflict. All pavement markings and signage is shown on the Pavement Markings Plans (PM 1-11).

8. The lane drop condition at Driveway 1B for North Bound River Road is unsafe (STA. 39+00). Lane drop must adhere to MUTCD Section 3B.09, and compute minimum taper length in accordance with $L=WS$ formula for a 45 mph facility and 12' lane shift.

Based upon our meeting of November 14, 2014 we are modifying the right-lane through Intersection 1B and providing an appropriate taper based on 50 MPH design speed for the 12-foot right-lane transition down to one-lane north bound.

9. Provide dimensions for the Wooden Walkways near Roundabout at Driveway 2. Ensure they are greater than 4' in width.

We have added a detail for the proposed wooden walkways shown near Driveway 2 and other crossing locations. The detail is located on sheet CT-302 and PM-11.

10. With a median lane of less than 30' the ONE WAY signs are optional; KEEP RIGHT (R4-7) signs on the median nose can serve the same purpose. If the KEEP RIGHT is used, install sign OM1-3 under it. Keep Right Signs should be at the end of the concrete medians at DW#1A/1B, DW #3A/3B, DW #4A/4B, DW #5, DW #7A/7B and DW #9A/9B.

The ONE WAY signs have been removed, and we have included Keep Right (R4-7) signs at the end of all median noses – located 10-feet behind the median nose to avoid site line obstructions. We provided a detail including the OM1-3 installed below the Keep Right sign on sheet PM-9.

11. Please show/ detail the plan to get the Multi-use Trail from the Northern side of River Road to the Southern Side of River Road near STA. 75+00. If the path comes back to the Roadway and crosses at grade, a Crosswalk may be required.

The multi-use trail transition from the north side of River Road to the south side of River Road will be detailed with the submission of the proposed roadway bridge plans to be submitted by others. The general intent is to have the multi-use trail on the northern side of River Road extending down to the edge / top of the North Lake, then is incorporated on the west lake bank under the proposed bridges to the southern side of River Road. When the multi-use trail reaches the southern side it will extend along the South Lake bank and cross the South Lake outside the right-of-way on a new wooden walkway bridge that is designed for ADA accessibility and to allow public use of the lake under the walkway bridge. Once the trail crosses the bridge to the east bank it will continue back to the alignment proposed in this plan set.

12. Sheet CR-107 Drawing 3G shows a series of left turn markings leading up to Driveway #8, which are inside the median for the roadway. Also the median opening for Driveway #8 is not shown on the plans.

We have removed the pavement markings on the CR sheets and the CU sheets to eliminate conflict. All pavement markings and signage is shown on the Pavement Markings Plans (PM 1-11).

13. As previously stated, verify the location of the Stop Signs and Yield Signs for the full movement access driveways. Many of the stop signs are behind the lane markings and behind the location for a vehicle to stop prior to entering the intersection. DW #3A/3B has them 40' from the intersection, DW #4A/4B has them over 30' from the intersection.

We have removed the pavement markings on the CR sheets and the CU sheets to eliminate conflict. All pavement markings and signage is shown on the Pavement Markings Plans (PM 1-11).

14. Verify location for the Keep right signs. For example, DW# 4A/4B has the signs 12-15' from the end of the median.

The ONE WAY signs have been removed, and we have included Keep Right (R4-7) signs at the end of all median noses – located 10-feet behind the median nose to avoid site line obstructions. We provided a detail including the OM1-3 installed below the Keep Right sign on sheet PM-9.

15. The Lorraine Dr Roundabout has 2 roundabout signs on the SB approach, the first located near STA. 120+00 (PM-5) and the second at STA. 125+00 (PM-6). The sign at STA. 120+00 can be removed.

We have removed the Roundabout Sign at Station 120+00.

16. Due to the Speed change from 55 mph to 45 mph in the project area, speed limit signs will be required at the start and end of the project, to alert motorists of the change in speed limit from 55 mph to 45 mph within the project area.

"Speed Limit" signs and "Reduce Speed Ahead" signs are now included at the beginning and ending of the project. The NCDOT Speed Limit is 55 MPH along the tie in sections of existing River Road.

TECHNICAL STANDARDS – PAVEMENT MARKINGS:

17. Driveway 1A and 1B is missing the traffic control signs, (Yield Sign or Stop Sign) for the Eastbound and Westbound approaches on sheet PM-2.

These have been included in the revised plan sheet PM-2.

18. The SB Roundabout (circular intersection) signs appear to be too far from the intersection. This sign is located at DW #1 and it is over 800' from the intersection. The NB sign is within 500' of the intersection.

The northern traffic circle sign has been located 500-feet before the Roundabout begins.

19. The 'RE' designation for the second fishhook symbol at the Roundabouts, right turn only does not appear in the table of pavement markings.

We have added the "RE" designation within our legend on sheets PM 1-11.

20. Please address the lack of median opening and access change for the proposed Driveway #8. The TIA and September 2014 Newland Communities River Lights Project Status Summary both require a median opening and ingress and egress lanes at this location.

The original TIA did provide that Driveway #8 include full-access movement. During construction plan review with NCDOT it was discovered that the distance between Driveway #7 and #8 and between Driveway #8 and #9 were less than the full-access median opening preferred by NCDOT of 1,200-feet. We determined that closing this intersection and providing Driveway #8 as a right-in/right-out to serve the limited traffic assigned to this driveway.

If you have any questions, please do not hesitate to contact me, Richard Collier, or Nick Lauretta at our office 910-343-1048.

Sincerely,

McKIM & CREED, INC.



Kathryn Espinoza, PE
Project Engineer

Cc: Doug Brown, Newland Communities, RiverLights
M&C File 02735-0126 (41)