



PAT McCrory
Governor

NICHOLAS J. TENNYSON
Secretary

October 8, 2016

ORANGE COUNTY

Mr. Travis Fluitt, PE
3001 Weston Parkway
Cary, NC 27513

Subject: Proposed Lloyd Farm Mixed Use Development Located on NC 54 and
SR 1007, Old Fayetteville Road-
Review of Revised Traffic Impact Analysis Received October 4, 2016

Dear Mr. Fluitt,

Per your request, District staff has reviewed the revised traffic impact analysis (TIA) with enclosed site plan received October 4, 2016. Based on the submitted materials, we offer the following comments relative to the State maintained routes.

General:

This office has previously reviewed the original TIA and site plan and a subsequent revised TIA and site plan for this development and provided correspondence on October 17, 2013 and August 8, 2016. The current submittal reflects additional revisions. Specifically:

- The previously proposed roundabout at the Old Fayetteville Road site access has been removed and replaced with a traditional unsignalized intersection.
- The background traffic annual growth rate has been adjusted from 1.5% to 1.0% based on further evaluation of recent traffic volume data.
- Updated traffic counts for certain movements were conducted and applied in the analysis.
- Adjustments to trip distribution were applied.
- The previously proposed directional left-over median crossing at the NC 54 site access is retained.



- The previously proposed right in-right out access at NC 54 and the Post Office Driveway is retained.

Proposed New Site Access and NC 54 Intersection:

We have previously indicated our concurrence with the TIA findings that the directional left-over configuration does provide for beneficial trip distribution resulting in improved operation at the adjacent NC 54 and Old Fayetteville Road intersection. We are amenable to construction of this configuration subject to the following geometry meeting NCDOT standards.

- Construct a median break with appropriate channelization and an exclusive eastbound left turn lane with 200' of full storage and appropriate deceleration and taper distances on NC 54.
- Construct an exclusive westbound right turn lane with 100' of full storage and appropriate deceleration and taper distances on NC 54.
- Provide a two lane access consisting of a single ingress lane and a single egress lane with minimum internal protected stem length of 200' and appropriate channelization.
- Provide geometric changes to the NC 54 and Old Fayetteville Road intersection to accommodate anticipated westbound U-turn movements.

NC 54 and Old Fayetteville Road Intersection:

Distribution of site trips has been adjusted to assign 7% of site traffic to and from the south via Old Fayetteville Road in response to our previous comments.

- We concur with the TIA recommendation to extend the existing southbound left turn lane and construct an additional southbound left turn lane to provide 325' of storage each on Old Fayetteville Road.
- We concur with the TIA recommendation to construct an exclusive right turn lane with 100' of full storage and appropriate deceleration and transition taper lengths on Old Fayetteville Road.
- Based on the SimTraffic queuing reports, the westbound left turn queue is expected to exceed the current 300' storage length. Extend the westbound left turn lane to provide 400' of full storage with appropriate transition and taper lengths on NC 54.
- Construct appropriate traffic signal modifications to accommodate the revised geometry.

Proposed Site Access and Old Fayetteville Road Intersection:

As previously noted, this access has been revised to a traditional unsignalized intersection.

- We concur with the TIA recommendation to construct an exclusive southbound left turn lane with 100' of full storage and appropriate transition and deceleration taper lengths on Old Fayetteville Road
- We concur with the TIA recommendation to construct an exclusive northbound right turn lane with 100' of full storage and appropriate deceleration taper on Old Fayetteville Road.
- Provide a three lane access consisting of a single ingress lane and two egress lanes consisting of an exclusive left turn lane and an exclusive right turn lane with 200' of full storage. Provide a minimum 200' of protected internal stem length.

Multi-modal and Streetscape Enhancements:

Any stipulated multi-modal enhancements including but not limited to sidewalk, bike lanes, bus pull offs, lighting, landscaping etc. on State maintained routes are subject to NCDOT requirements

General Requirements:

All work within the NCDOT right of way shall meet current NCDOT design and construction standards.

The applicant shall dedicate any additional right of way necessary to accommodate the required road improvements or future improvements as stipulated.

Intersection radii and geometry shall be designed to accommodate turning movements of the largest anticipated vehicle.

All pavement markings shall be long life thermoplastic. Pavement markers shall be installed if they previously existed on the roadway.

The permittee shall be responsible for the installation and relocation of any additional highway signs that may be necessary due to these improvements and shall comply with the requirements of the MUTCD.

It is necessary to obtain an approved driveway permit and/or encroachment agreement prior to performing work on the NCDOT right of way. An approved permit will be issued upon receipt of approved roadway and signal construction plans, inspection fee, and any necessary performance and indemnity bonds.

Feel free to contact me if you have any questions.

Sincerely,



C. N. Edwards Jr., PE
District Engineer

Cc: J. M. Mills, PE, Division Engineer
D. M. Mcpherson, Division Traffic Engineer
Patricia McGuire, AICP, Planning Director, Town of Carrboro



Revised Traffic Impact Analysis

Lloyd Farm Carrboro, NC

Prepared for:

Argus Development Group, LLC

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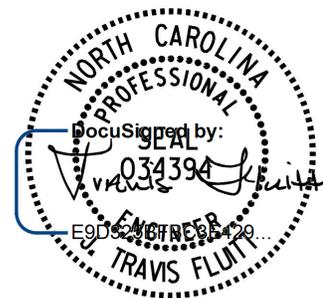
Kimley»»Horn

**Revised Traffic Impact Analysis
for
Lloyd Farm
Carrboro, North Carolina**

**Prepared for:
Argus Development Group, LLC
Charlotte, NC**

**Prepared By:
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421 Fayetteville Street, Suite 600
Raleigh, North Carolina 27601
(919) 677-2000**

**012455010
October 2016**



10/2/2016

Executive Summary

Kimley-Horn and Associates, Inc. has performed an update to the Traffic Impact Analysis for the proposed Lloyd Farm development located north of NC 54 between Old Fayetteville Road and James Street in Carrboro, North Carolina (originally dated April 29, 2013 and revised May 20, 2016). This revision includes new traffic counts and growth rates, adjustments to the site traffic distribution, and removes the previously proposed roundabout on Old Fayetteville Road.

The majority of this 40+ acre site remains undeveloped, with one single family residence and several barns, as well as an irrigation pond, on the west side of the property. A post office and Duke Power substation, which will remain, adjoin the east side of the site along James Street. As currently proposed, the site will include approximately 220 senior living apartments, a 60,292 square foot (SF) supermarket, 37,210 SF of retail space, and two outparcels which were assumed to be a bank and a pharmacy. The site is proposed to be accessed by the existing right-in/right-out Post Office Driveway on NC 54, a full-movement driveway on Old Fayetteville Road, and a directional crossover (left-in/right-in/right-out) driveway on NC 54. The build-out of the project is anticipated for the year 2020.

This report presents trip generation, distribution, traffic analyses, and recommendations for transportation improvements required to meet anticipated traffic demands. The traffic conditions studied include the existing traffic, projected (2020) background traffic, and projected (2020) build-out traffic conditions. As shown in Table ES-1, the proposed development has the potential to generate 218 new trips in and 162 new trips out during the AM peak hour and 311 new trips in and 305 new trips out during the PM peak hour.

Land Use Code	Land Use	Intensity		Daily		AM Peak Hour		PM Peak Hour	
				In	Out	In	Out	In	Out
252	Senior Adult Housing – Attached	220	d.u.	339	339	15	29	29	25
820	Shopping Center	37,210	s.f.	1,786	1,786	52	34	151	158
850	Supermarket	60,292	s.f.	2,714	2,714	132	84	273	263
881	Pharmacy/Drugstore w/ Drive Thru	14,550	s.f.	705	705	22	17	72	72
912	Drive-In Bank	4,200	s.f.	311	311	29	23	51	51
Subtotal				5,855	5,855	250	187	576	569
<i>Internal Capture</i>				<i>1,014</i>	<i>1,014</i>	<i>0</i>	<i>0</i>	<i>76</i>	<i>76</i>
<i>Pass-by Capture</i>				<i>1,365</i>	<i>1,365</i>	<i>8</i>	<i>7</i>	<i>154</i>	<i>154</i>
<i>Bik/Ped/Transit Capture (10%)</i>				<i>348</i>	<i>348</i>	<i>24</i>	<i>18</i>	<i>35</i>	<i>34</i>
Net New External Trips				3,128	3,128	218	162	311	305

Capacity analyses were performed using Synchro Version 9.1 software. Table ES-2 summarizes the operation of the study intersections for the AM and PM peak hour traffic conditions.

Table ES-2 Level-of-Service Summary		
Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
NC 54 at Old Fayetteville Road (Signalized)		
Existing (2016) Traffic	C (27.5)	C (25.7)
Projected (2020) Background Traffic	C (30.1)	C (26.6)
Projected (2020) Build-out Traffic	C (31.8)	C (33.6)
NC 54 at Post Office Drive (Unsignalized)		
Existing (2016) Traffic	SB – B (10.4)	SB – B (14.3)
Projected (2020) Background Traffic	SB – B (10.5)	SB – B (14.7)
Projected (2020) Build-out Traffic	SB – B (10.9)	SB – C (16.2)
NC 54 at Main Street/Carrboro Plaza Driveway (Signalized)		
Existing (2016) Traffic	B (18.3)	C (27.9)
Projected (2020) Background Traffic	B (19.4)	C (28.8)
Projected (2020) Build-out Traffic	B (18.7)	C (28.6)
Main Street – James Street (Unsignalized)		
Existing (2016) Traffic	NB – C (16.3)	NB – C (16.8)
	SB – B (12.2)	SB – B (13.9)
	EBL – A (7.9)	EBL – A (8.4)
	WBL – A (7.9)	WBL – A (7.8)
Projected (2020) Background Traffic	NB – C (16.9)	NB – C (17.5)
	SB – B (12.5)	SB – B (14.4)
	EBL – A (7.9)	EBL – A (8.4)
	WBL – A (7.9)	WBL – A (7.8)
Projected (2020) Build-out Traffic	NB – C (17.6)	NB – C (18.5)
	SB – B (13.8)	SB – C (17.5)
	EBL – A (8.0)	EBL – A (8.5)
	WBL – A (8.0)	WBL – A (7.8)

Table ES-2 (cont.) Level-of-Service Summary		
Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
James Street – Lorraine Street/Post Office Drive (Unsignalized)		
Existing (2016) Traffic	A (7.4)	A (7.6)
Projected (2020) Background Traffic	A (7.4)	A (7.6)
Projected (2020) Build-out Traffic	A (7.5)	A (7.8)
James Street – Carol Street (Unsignalized)		
Existing (2016) Traffic	A (7.4)	A (7.3)
Projected (2020) Background Traffic	A (7.4)	A (7.3)
Projected (2020) Build-out Traffic	A (7.5)	A (7.5)
Carol Street – Lisa Drive (Unsignalized)		
Existing (2016) Traffic	A (7.2)	A (7.1)
Projected (2020) Background Traffic	A (7.2)	A (7.1)
Projected (2020) Build-out Traffic	A (7.2)	A (7.2)
Carol Street – Old Fayetteville Road (Unsignalized)		
Existing (2016) Traffic	WB – C (16.4) SBL – A (9.1)	WB – C (17.3) SBL – A (8.6)
Projected (2020) Background Traffic	WB – C (17.1) SBL – A (9.2)	WB – C (18.2) SBL – A (8.7)
Projected (2020) Build-out Traffic	WB – D (26.2) SBL – A (9.4)	WB – C (24.1) SBL – A (8.9)
NC 54 – Left-Over Site Drive (Unsignalized)		
Projected (2020) Build-out Traffic	SB – B (11.0) EBL – A (9.3)	SB – C (19.8) EBL – B (14.8)
Old Fayetteville Road – Site Drive (Unsignalized)		
Projected (2020) Build-out Traffic	WB – D (34.5) SBL – A (9.2)	WB – E (79.6) SBL – A (9.0)

The following roadway improvements are recommended to be performed to accommodate existing traffic and the projected Lloyd Farm site traffic based on the capacity analysis presented herein:

NC 54 at Old Fayetteville Road:

- Extend the storage of the existing southbound left-turn lane on Old Fayetteville Road and construct an additional southbound left-turn lane to provide dual left-turn lanes with an average of 325' of storage each on that approach
- Construct an exclusive southbound right-turn lane on Old Fayetteville Road with 100 feet of storage and appropriate tapers

NC 54 at Site Drive:

- Construct an exclusive eastbound left-turn lane on NC 54 with 200 feet of storage and appropriate tapers
- Construct an exclusive westbound right-turn lane on NC 54 with 100 feet of storage and appropriate tapers

Old Fayetteville Road at Site Drive:

- Construct an exclusive southbound left-turn lane on Old Fayetteville Road with 100 feet of storage and appropriate tapers
- Construct an exclusive northbound right-turn lane on Old Fayetteville Road with 100 feet of storage and appropriate tapers
- Provide separate westbound left and right-turn lanes exiting the Site Driveway

Analysis indicates that, with the proposed improvements in place, all of the intersections are expected to operate at an acceptable level-of-service (LOS) in the build-out traffic condition. SimTraffic simulations indicate that queues from the intersection of NC 54 at Old Fayetteville Road are not expected to spill back to the proposed site driveways. Analysis also indicates significantly shorter delays and queues exiting the proposed full-movement site driveway on Old Fayetteville Road than previously reported in the April 2013 report.

Based on discussions with the Town of Carrboro and NCDOT staff, the actual storage length of the southbound right-turn lane at the intersection of NC 54 at Old Fayetteville Road will be determined based on and subject to existing ROW availability. It is intended that no additional ROW will be obtained to accommodate this improvement.

The recommended roadway laneage is shown on Figure ES-1.

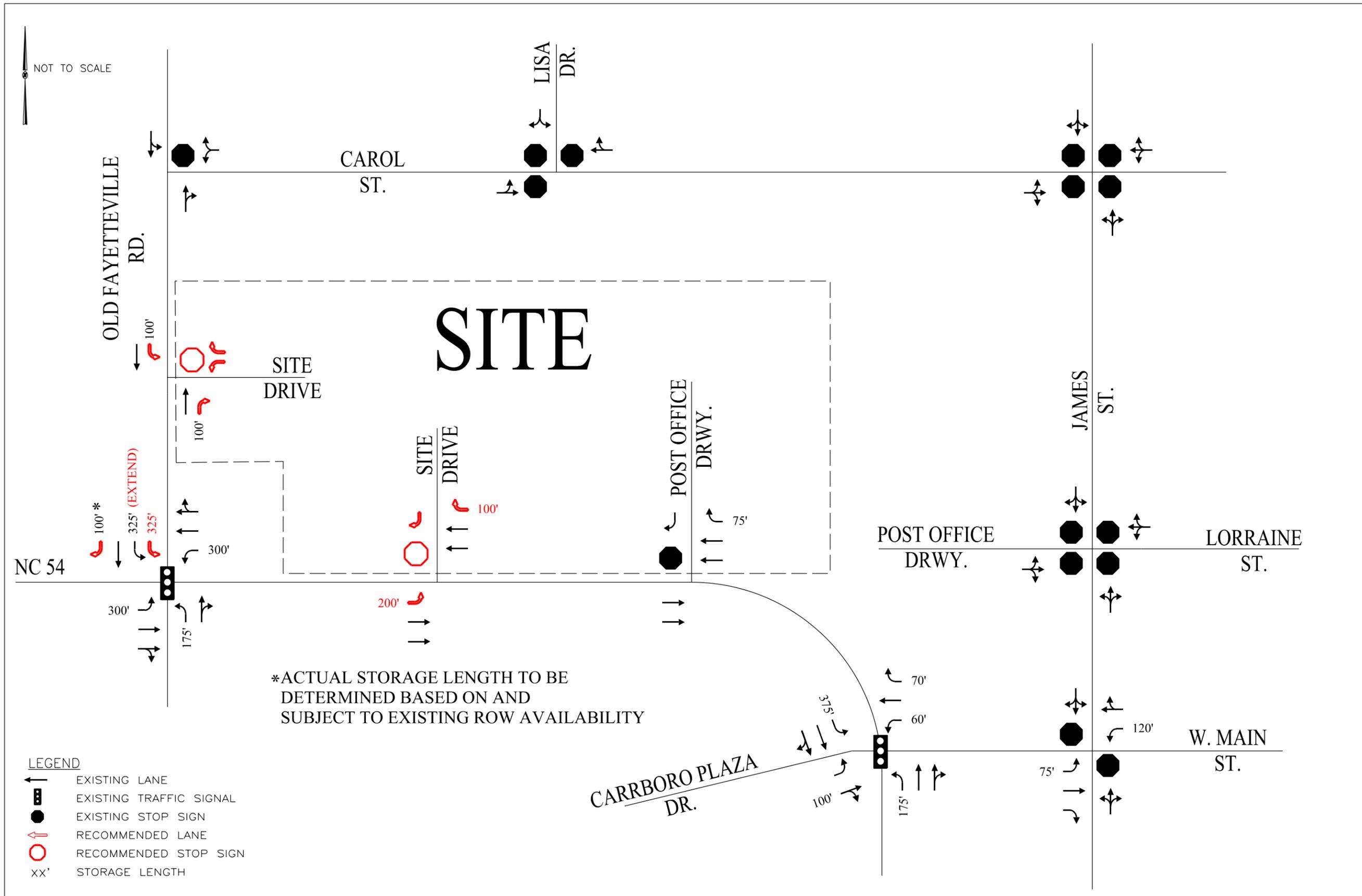


FIGURE ES-1

RECOMMENDED ROADWAY LANEAGE

LLOYD FARM CARRBORO, NC TRAFFIC IMPACT ANALYSIS



THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.



Sungate Design Group, P. A.

CIVIL ENGINEERING - ENVIRONMENTAL

915 Jones Franklin Road – Raleigh, NC 27606 – Phone 919.859.2243 – www.sungatedesign.com

October 12, 2016

Ms. Trish McGuire
 Planning Department
 Town of Carrboro
 301 West Main Street
 Carrboro, NC 27510

Re: Tom's Creek – Lloyd Farm – Truth in Drainage Statement from Sungate Design Group

Ms. McGuire,

Town Staff has directed Sungate Design Group (SDG) to investigate potential effects on the water surface elevations in Tom's Creek as a result of the proposed Lloyd Farm development.

For this analysis, SDG used the hydrologic and hydraulic models that were created by SDG for the Tom's Creek Flood Study dated 05/16/16 and modified for the Addendum to Tom's Creek Flood Study for Lloyd Farm and the McDougal Schools dated 08/17/16. These models were further modified using hydrologic and hydraulic data obtained from the Lloyd Farm development Project Engineer for the proposed stormwater ponds which would provide detention for the project. This information was developed by the Project Engineer for the original Lloyd Farm site plan and is the best information available at this time. The current site plan for Lloyd Farm has changed since the original site plan was submitted. However, the hydrologic and hydraulic data for the stormwater detention has not been updated. The 2-year, 5-year, 10-year, 25-year and 100-year storms were used for this analysis. Based on the hydrologic analysis, there are both increases and decreases in the peak discharge in Tom's Creek as a result of the proposed Lloyd Farm development starting at a point 130 feet upstream of Lorraine Street to the West Main Street crossing. These discharges were then placed into the hydraulic model with results showing both increases and decreases in the water surface elevation for each of the analyzed storms starting at a point 270 feet downstream of Carol Street. For each of the storms, the maximum increase in the water surface elevation occurs upstream (US) of Lorraine Street and the maximum decrease occurs downstream (DS) of Lorraine Street. Following is a table with the maximum increase and decrease for each storm.

Storm (Year)	Max. Increase (ft.)		Max. Decrease (ft.)
2	0.1	US of Lorraine St.	N/A
5	0.2	US of Lorraine St.	<0.1 DS of Lorraine St.
10	0.4	US of Lorraine St.	0.1 DS of Lorraine St.
25	<0.1	US of Lorraine St.	0.2 DS of Lorraine St.
100	0.2	DS of Lorraine St.	N/A

If you have any questions or need further information, please contact Will Hines at 919-859-2243 x205.

Sincerely,



W. Henry Wells, Jr., PE



10/12/16



ADDENDUM
TO TOM'S CREEK
FLOOD STUDY

LLOYD FARM AND McDOUGLE SCHOOLS

CARRBORO
NORTH CAROLINA



SUNGATE DESIGN GROUP, PA
915 Jones Franklin Road
Raleigh, N. C.



ADDENDUM TO TOM'S CREEK FLOOD STUDY
FOR
LLOYD FARM AND THE McDOUGLE SCHOOLS

August 17, 2016

The Town of Carrboro Staff has asked Sungate Design (SDG) to investigate further the impacts to Tom's Creek from Lloyd Farm and the McDougle Elementary and Middle Schools. Specifically, SDG was asked to investigate the impact on the Flood elevations that the development of Lloyd Farm would have if no detention were provided and what impact the McDougle Schools have had on the Flood elevations.

For this analysis, SDG used the HydroCAD model and Hec-Ras model that was created for the Tom's Creek Flood Study dated 05/16/16 and presented to the Board of Aldermen.

Hydrologic Study

In the hydrologic model used in the above referenced Tom's Creek Flood Study, SDG calibrated the model based on the June 30, 2013 flood which was found to be equivalent to a storm with an intensity of 4.4 inches per hour. Based on interviews with local residents this was the highest documented event in the past 30-years which included Hurricane Fran, Hurricane Floyd and Tropical Storm Jerry. When analyzing Tom's Creek for the 05/16/16 Report, SDG had used the Carrboro Zoning Map and the proposed Lloyd Farm site plan to build the model and did not include any possible detention from this site.

Using the hydrologic model from the Tom's Creek Flood Study, SDG created four scenarios.

- 1) **Lloyd Farm Proposed Condition (No Detention):** Tom's Creek Drainage Basin fully developed per the Carrboro Zoning Map. This includes the Lloyd Farm proposed development without detention. This scenario had been included in the 05/15/16 Tom's Creek Flood Study Report.
- 2) **Lloyd Farm Existing Condition:** Tom's Creek Drainage Basin fully developed per the Carrboro Zoning Map with the exception of Lloyds Farm which is shown in its current condition.
- 3) **Lloyd Farm – Eckel Property Detention:** Same as #2, except that the drainage that flows from the eastern half of Lloyd Farm through the Eckel property (106 James Street) has been completely detained. The purpose of this scenario is to determine the maximum effect detention of the eastern half of Lloyd Farm would have on Tom's Creek. The



detention could be located either on the Eckel property or on the Lloyd property just before entering the Eckel property.

- 4) **McDougle Original Condition:** Both the Lloyd Farm property and the McDougle School property in their original condition prior to the construction of the schools. The information for the school property was obtained from the USGS Quad Map for this area, which was created prior to the schools construction.

In each of these scenarios, the calibrated historical flood from June 30, 2013 was used to determine the discharges that would be used in the hydraulic analysis.

Hydraulic Study

Using the hydraulic model from the 05/16/16 Tom's Creek Flood Study, SDG modeled the flood elevations using the peak discharges found from the revised hydrologic model for each of the above scenarios.

RESULTS

All of the scenarios impact the same structures within the Tom's Creek floodplain; however, the degree of impact varies. Scenario #1 impacts two additional structures located at 403 Lorraine Street and 102 James Street. See Appendix A for a list of properties impacted.

In comparing the water surface elevations of the Lloyd Farm existing condition (Scenario #2) and the Lloyd Farm proposed condition without detention (Scenario #1), the elevations show that if there is no detention on the proposed Lloyd Farm, then there will be a maximum increase of 0.3 feet between Lorraine Street and W. Main Street. There is no change in water surface elevations upstream of Carol Street. See Appendix B for a more detailed comparison of the water surface elevations.

In comparing the water surface elevations of the Lloyd Farm existing condition (Scenario #2) and the Lloyd Farm proposed condition with detention (Scenario #3), the elevations show that if the drainage from the eastern half of Lloyd Farm is completely detained prior to flowing through the Eckel property (106 James Street), then there will be a maximum decrease of 0.7 feet between Lorraine Street and W. Main Street. There is no change in water surface elevations upstream of Lorraine Street. Both scenarios impact the same structures; however the degree of impact varies. See Appendix C for a more detailed comparison of the water surface elevations.

In comparing the water surface elevations of the Lloyd Farm existing condition (Scenario #2 – Post McDougle School) and the McDougle School original condition (Scenario #4 – Pre McDougle School), the elevations show that if the McDougle School had not been constructed and the McDougle School site had been left in its original condition, then there would be a maximum decrease of 0.3 feet between Rainbow Drive and Carol Street. In other locations, the



decrease is less than 0.1 feet. See Appendix D for a more detailed comparison of the water surface elevations.

All of the water surface elevations were found using the calibrated historical storm (4.4 inches per hour) which occurred on June 30, 2013.

DESCRIPTION OF APPENDICES

Appendix A: Shows the impact that each scenario has on existing structures within the Tom's Creek Floodplain

Appendix B: Compares the water surface elevations of the Lloyd Farm Existing Condition (Scenario #2) and Lloyd Farm Proposed Condition (Scenario #1). In Scenario #1, there is no detention for the proposed Lloyd Farm.

Appendix C: Compares the water surface elevations of the Lloyd Farm Existing Condition (Scenario #2) and the Lloyd Farm – Eckel Property Detention (Scenario #3). In Scenario #3, the drainage that flows from the eastern half of Lloyd Farm through the Eckel property has been completely detained.

Appendix D: Compares the water surface elevations of the Lloyd Farm Existing Condition (Scenario #2) and the McDougale School Original Condition prior to construction of the schools (Scenario #4).



Appendix A**Tom's Creek**

Impact to foundation, but below Finished Floor Elevation
 Impact above the Finished Floor Elevation
 Impact to Finished Basement, but below Finished Floor Elevation
 Impact to Garage, but below Finished Floor Elevation

<u>Dwelling</u>	#1 Lloyd Farm Proposed <u>Condition</u>	#2 Lloyd Farm Existing <u>Condition</u>	#3 Lloyd Farm Eckel Property <u>Detention</u>	#4 McDougle Original <u>Condition</u>
101 Dove St	Impact	Impact	Impact	Impact
200 Rainbow Dr	Impact	Impact	Impact	Impact
Rainbow Dr	2-30" RCP	2-30" RCP	2-30" RCP	2-30" RCP
201 Rainbow Dr	---	---	---	---
300 James St	---	---	---	---
118 Carol St	---	---	---	---
116 Carol St	Impact	Impact	Impact	Impact
Carol St	2-36" RCP	2-36" RCP	2-36" RCP	2-36" RCP
115 Carol St	---	---	---	---
107 Melba Cir	---	---	---	---
105 Melba Cir	---	---	---	---
208 James St	---	---	---	---
206 James St	Impact	Impact	Impact	Impact
204 James St	Impact	Impact	Impact	Impact
400 Lorraine St	Impact	Impact	Impact	Impact
202 James St	---	---	---	---
200 James St	Impact	Impact	Impact	Impact
Lorraine St	1-66" CMP	1-66" CMP	1-66" CMP	1-66" CMP
401 Lorraine St	---	---	---	---
109 Mary St	---	---	---	---
107 Mary St	---	---	---	---
403 Lorraine St	Impact	---	---	---
106 James St	---	---	---	---
104 James St	---	---	---	---
102 James St	Impact	---	---	---
100 James St	Impact	Impact	Impact	Impact
302 Simpson St	---	---	---	---

Appendix B

NG	Indicates that flood water is up on the foundation, but below the Finished Floor Elevation.
FFE	Indicates that flood water is up above the finished floor elevation.
FFB	Indicates that flood water is above the Finished Basement Elevation, but below the Finished Floor Elevation.
Garage	Indicates that flood water is above the Garage Floor Elevation.

Decrease
Increase

		River Sta	Profile	Lloyd Farm Existing Condition W.S. Elev (ft)	Lloyd Farm Proposed Condition W.S. Elev (ft)	Diff. (ft)
		14111	4.4" Storm	475.88	475.88	0.0
		13876	4.4" Storm	473.44	473.44	0.0
		13827	4.4" Storm	473.40	473.40	0.0
	James St	13796				
		13761	4.4" Storm	471.12	471.12	0.0
		13622	4.4" Storm	469.19	469.19	0.0
	Driveway	13597				
		13579	4.4" Storm	468.03	468.03	0.0
House - 1 101 Dove St	NG 464.52 FFE 467.65	13236	4.4" Storm	464.86	464.86	0.0
House - 2 200 Rainbow Dr	NG 463.11 FFE 468.09 Garage 464.96	13121	4.4" Storm	464.83	464.83	0.0
		13057	4.4" Storm	464.82 OT	464.82 OT	0.0
	Rainbow Dr OT Elev = 464.45	13029		2 @ 30" RCP	2 @ 30" RCP	
		12998	4.4" Storm	460.78	460.78	0.0
House - 3 201 Rainbow Dr	NG 461.16 FFE 470.96					
House - 4 300 James St	NG 463.43 FFE 466.93 Garage 461.93	12824	4.4" Storm	460.72	460.72	0.0
House - 5 118 Carol St	NG 460.93 FFE 464.99	12635	4.4" Storm	460.66	460.66	0.0
House - 6 116 Carol St	NG 458.02 FFE 458.64	12607	4.4" Storm	460.69	460.69	0.0
		12576	4.4" Storm	460.68 OT	460.68 OT	0.0
	Carol St OT Elev = 460.53	12544		2 @ 36" RCP	2 @ 36" RCP	
		12513	4.4" Storm	455.18	455.18	0.0

Appendix B

NG	Indicates that flood water is up on the foundation, but below the Finished Floor Elevation.
FFE	Indicates that flood water is up above the finished floor elevation.
FFB	Indicates that flood water is above the Finished Basement Elevation, but below the Finished Floor Elevation.
Garage	Indicates that flood water is above the Garage Floor Elevation.

Decrease
Increase

		River Sta	Profile	Lloyd Farm Existing Condition W.S. Elev (ft)	Lloyd Farm Proposed Condtion W.S. Elev (ft)	Diff. (ft)
House - 7 115 Carol St	NG 454.97 FFE 455.80	12442	4.4" Storm	453.85	453.85	0.0
		12377	4.4" Storm	451.41	451.41	0.0
		12170	4.4" Storm	450.15	450.23	0.1
House - 8 208 James St	NG 450.88 FFE 455.84	11753	4.4" Storm	450.18	450.26	0.1
House - 9 206 James St	NG 447.40 FFE 456.56 FFB 447.88		4.4" Storm	450.18	450.26	0.1
House - 10 204 James St	NG 447.40 FFE 456.97 Garage 448.32		4.4" Storm	450.18	450.25	0.1
House - 11 400 Lorraine St	NG 446.76 FFE 450.54	11457	4.4" Storm	450.18	450.25	0.1
House - 12 202 James St	NG 450.59 FFE 451.86	11382	4.4" Storm	450.17	450.25	0.1
House - 13 200 James St	NG 449.92 FFE 454.82 Garage 451.32	11382	4.4" Storm	450.17	450.25	0.1
		11368	4.4" Storm	450.17 OT	450.25 OT	0.1
	Lorraine St OT Elev = 450.01	11329		1 @ 66" CMP	1 @ 66" CMP	
House - 14 401 Lorraine St	NG 445.43 FFE 449.70	11294	4.4" Storm	443.12	443.22	0.1
House - 15 109 Mary St	NG 446.86 FFE 450.62		4.4" Storm	442.92	443.22	0.3
House - 16 107 Mary St	NG 446.82 FFE 451.74		4.4" Storm	442.71	443.02	0.3
House - 17 403 Lorraine St	NG 442.98 FFE 445.84 Garage 442.67	11012	4.4" Storm	442.51	442.83	0.3

Appendix B

NG	Indicates that flood water is up on the foundation, but below the Finished Floor Elevation.
FFE	Indicates that flood water is up above the finished floor elevation.
FFB	Indicates that flood water is above the Finished Basement Elevation, but below the Finished Floor Elevation.
Garage	Indicates that flood water is above the Garage Floor Elevation.

Decrease
Increase

		River Sta	Profile	Lloyd Farm Existing Condition W.S. Elev (ft)	Lloyd Farm Proposed Condition W.S. Elev (ft)	Diff. (ft)
House - 18 106 James St	NG 444.26 FFE 446.70		4.4" Storm	442.49	442.83	0.3
House - 19 104 James St	NG 442.89 FFE 446.52		4.4" Storm	442.47	442.80	0.3
House - 20 102 James St	NG 442.50 FFE 443.51		4.4" Storm	442.45	442.76	0.3
House - 21 100 James St	NG 440.72 FFE 448.33 FFB 439.83	10605	4.4" Storm	442.43	442.74	0.3
House - 22 302 Simpson St	NG 446.05 FFE 449.62	10439	4.4" Storm	442.25	442.55	0.3
	W. Main St OT Elev = 444.54	10395		1 @ 6' x 6' RCBC	1 @ 6' x 6' RCBC	
		10346	4.4" Storm	440.57	440.65	0.1

Appendix C

NG	Indicates that flood water is up on the foundation, but below the Finished Floor Elevation.
FFE	Indicates that flood water is up above the finished floor elevation.
FFB	Indicates that flood water is above the Finished Basement Elevation, but below the Finished Floor Elevation.
Garage	Indicates that flood water is above the Garage Floor Elevation.

Decrease
Increase

		River Sta	Profile	Lloyd Farm Existing Condition W.S. Elev (ft)	Lloyd Farm Eckel Detention W.S. Elev (ft)	Diff. (ft)
		14111	4.4" Storm	475.88	475.88	0.0
		13876	4.4" Storm	473.44	473.44	0.0
		13827	4.4" Storm	473.40	473.40	0.0
	James St	13796				
		13761	4.4" Storm	471.12	471.12	0.0
		13622	4.4" Storm	469.19	469.19	0.0
	Driveway	13597				
		13579	4.4" Storm	468.03	468.03	0.0
House - 1	NG 464.52	13236	4.4" Storm	464.86	464.86	0.0
101 Dove St	FFE 467.65					
House - 2	NG 463.11	13121	4.4" Storm	464.83	464.83	0.0
200 Rainbow Dr	FFE 468.09					
	Garage 464.96					
		13057	4.4" Storm	464.82 OT	464.82 OT	0.0
	Rainbow Dr	13029		2 @ 30" RCP	2 @ 30" RCP	
	OT Elev = 464.45					
		12998	4.4" Storm	460.78	460.78	0.0
House - 3	NG 461.16					
201 Rainbow Dr	FFE 470.96					
House - 4	NG 463.43					
300 James St	FFE 466.93	12824	4.4" Storm	460.72	460.72	0.0
	Garage 461.93					
House - 5	NG 460.93					
118 Carol St	FFE 464.99	12635	4.4" Storm	460.66	460.66	0.0
House - 6	NG 458.02					
116 Carol St	FFE 458.64	12607	4.4" Storm	460.69	460.69	0.0
		12576	4.4" Storm	460.68 OT	460.68 OT	0.0
	Carol St	12544		2 @ 36" RCP	2 @ 36" RCP	
	OT Elev = 460.53					
		12513	4.4" Storm	455.18	455.18	0.0

Appendix C

NG Indicates that flood water is up on the foundation, but below the Finished Floor Elevation.
FFE Indicates that flood water is up above the finished floor elevation.
FFB Indicates that flood water is above the Finished Basement Elevation, but below the Finished Floor Elevation.
Garage Indicates that flood water is above the Garage Floor Elevation.

Decrease
Increase

		River Sta	Profile	Lloyd Farm Existing Condition W.S. Elev (ft)	Lloyd Farm Eckel Detention W.S. Elev (ft)	Diff. (ft)
House - 7 115 Carol St	NG 454.97 FFE 455.80	12442	4.4" Storm	453.85	453.85	0.0
		12377	4.4" Storm	451.41	451.41	0.0
		12170	4.4" Storm	450.15	450.15	0.0
House - 8 208 James St	NG 450.88 FFE 455.84	11753	4.4" Storm	450.18	450.18	0.0
House - 9 206 James St	NG 447.40 FFE 456.56 FFB 447.88		4.4" Storm	450.18	450.18	0.0
House - 10 204 James St	NG 447.40 FFE 456.97 Garage 448.32		4.4" Storm	450.18	450.18	0.0
House - 11 400 Lorraine St	NG 446.76 FFE 450.54	11457	4.4" Storm	450.18	450.18	0.0
House - 12 202 James St	NG 450.59 FFE 451.86	11382	4.4" Storm	450.17	450.17	0.0
House - 13 200 James St	NG 449.92 FFE 454.82 Garage 451.32	11382	4.4" Storm	450.17	450.17	0.0
		11368	4.4" Storm	450.17 OT	450.17 OT	0.0
	Lorraine St OT Elev = 450.01	11329		1 @ 66" CMP	1 @ 66" CMP	
House - 14 401 Lorraine St	NG 445.43 FFE 449.70	11294	4.4" Storm	443.12	443.40	0.3
House - 15 109 Mary St	NG 446.86 FFE 450.62		4.4" Storm	442.92	442.86	-0.1
House - 16 107 Mary St	NG 446.82 FFE 451.74		4.4" Storm	442.71	442.32	-0.4
House - 17 403 Lorraine St	NG 442.98 FFE 445.84 Garage 442.67	11012	4.4" Storm	442.51	441.78	-0.7

Appendix C

NG	Indicates that flood water is up on the foundation, but below the Finished Floor Elevation.
FFE	Indicates that flood water is up above the finished floor elevation.
FFB	Indicates that flood water is above the Finished Basement Elevation, but below the Finished Floor Elevation.
Garage	Indicates that flood water is above the Garage Floor Elevation.

Decrease
Increase

		River Sta	Profile	Lloyd Farm Existing Condition W.S. Elev (ft)	Lloyd Farm Eckel Detention W.S. Elev (ft)	Diff. (ft)
House - 18 106 James St	NG 444.26 FFE 446.70		4.4" Storm	442.49	441.79	-0.7
House - 19 104 James St	NG 442.89 FFE 446.52		4.4" Storm	442.47	441.80	-0.7
House - 20 102 James St	NG 442.50 FFE 443.51		4.4" Storm	442.45	441.81	-0.6
House - 21 100 James St	NG 440.72 FFE 448.33 FFB 439.83	10605	4.4" Storm	442.43	441.82	-0.6
House - 22 302 Simpson St	NG 446.05 FFE 449.62	10439	4.4" Storm	442.25	441.66	-0.6
	W. Main St OT Elev = 444.54	10395		1 @ 6' x 6' RCBC	1 @ 6' x 6' RCBC	
		10346	4.4" Storm	440.57	440.41	-0.2

Appendix D

NG	Indicates that flood water is up on the foundation, but below the Finished Floor Elevation.
FFE	Indicates that flood water is up above the finished floor elevation.
FFB	Indicates that flood water is above the Finished Basement Elevation, but below the Finished Floor Elevation.
Garage	Indicates that flood water is above the Garage Floor Elevation.

Decrease
Increase

		River Sta	Profile	Lloyd Farm Existing Condition W.S. Elev (ft)	McDougle School Original Condition W.S. Elev (ft)	Diff. (ft)
		14111	4.4" Storm	475.88	475.88	0.0
		13876	4.4" Storm	473.44	473.44	0.0
		13827	4.4" Storm	473.40	473.40	0.0
	James St	13796				
		13761	4.4" Storm	471.12	471.12	0.0
		13622	4.4" Storm	469.19	469.19	0.0
	Driveway	13597				
		13579	4.4" Storm	468.03	468.03	0.0
House - 1 101 Dove St	NG 464.52 FFE 467.65	13236	4.4" Storm	464.86	464.88	0.0
House - 2 200 Rainbow Dr	NG 463.11 FFE 468.09 Garage 464.96	13121	4.4" Storm	464.83	464.86	0.0
		13057	4.4" Storm	464.82 OT	464.85 OT	0.0
	Rainbow Dr OT Elev = 464.45	13029		2 @ 30" RCP	2 @ 30" RCP	
		12998	4.4" Storm	460.78	460.57	-0.2
House - 3 201 Rainbow Dr	NG 461.16 FFE 470.96					
House - 4 300 James St	NG 463.43 FFE 466.93 Garage 461.93	12824	4.4" Storm	460.72	460.49	-0.2
House - 5 118 Carol St	NG 460.93 FFE 464.99	12635	4.4" Storm	460.66	460.41	-0.3
House - 6 116 Carol St	NG 458.02 FFE 458.64	12607	4.4" Storm	460.69	460.45	-0.2
		12576	4.4" Storm	460.68 OT	460.37 OT	-0.3
	Carol St OT Elev = 460.53	12544		2 @ 36" RCP	2 @ 36" RCP	
		12513	4.4" Storm	455.18	455.16	0.0

Appendix D

NG Indicates that flood water is up on the foundation, but below the Finished Floor Elevation.
FFE Indicates that flood water is up above the finished floor elevation.
FFB Indicates that flood water is above the Finished Basement Elevation, but below the Finished Floor Elevation.
Garage Indicates that flood water is above the Garage Floor Elevation.

Decrease
Increase

		River Sta	Profile	Lloyd Farm Existing Condition W.S. Elev (ft)	McDougle School Original Condition W.S. Elev (ft)	Diff. (ft)
House - 7 115 Carol St	NG 454.97 FFE 455.80	12442	4.4" Storm	453.85	453.81	0.0
		12377	4.4" Storm	451.41	451.39	0.0
		12170	4.4" Storm	450.15	450.14	0.0
House - 8 208 James St	NG 450.88 FFE 455.84	11753	4.4" Storm	450.18	450.17	0.0
House - 9 206 James St	NG 447.40 FFE 456.56 FFB 447.88		4.4" Storm	450.18	450.17	0.0
House - 10 204 James St	NG 447.40 FFE 456.97 Garage 448.32		4.4" Storm	450.18	450.16	0.0
House - 11 400 Lorraine St	NG 446.76 FFE 450.54	11457	4.4" Storm	450.18	450.16	0.0
House - 12 202 James St	NG 450.59 FFE 451.86	11382	4.4" Storm	450.17	450.16	0.0
House - 13 200 James St	NG 449.92 FFE 454.82 Garage 451.32	11382	4.4" Storm	450.17	450.16	0.0
		11368	4.4" Storm	450.17 OT	450.16 OT	0.0
	Lorraine St OT Elev = 450.01	11329		1 @ 66" CMP	1 @ 66" CMP	
House - 14 401 Lorraine St	NG 445.43 FFE 449.70	11294	4.4" Storm	443.12	443.12	0.0
House - 15 109 Mary St	NG 446.86 FFE 450.62		4.4" Storm	442.92	442.90	0.0
House - 16 107 Mary St	NG 446.82 FFE 451.74		4.4" Storm	442.71	442.70	0.0
House - 17 403 Lorraine St	NG 442.98 FFE 445.84 Garage 442.67	11012	4.4" Storm	442.51	442.50	0.0

Appendix D

- NG** Indicates that flood water is up on the foundation, but below the Finished Floor Elevation.
- FFE** Indicates that flood water is up above the finished floor elevation.
- FFB** Indicates that flood water is above the Finished Basement Elevation, but below the Finished Floor Elevation.
- Garage** Indicates that flood water is above the Garage Floor Elevation.

Decrease
Increase

		River Sta	Profile	Lloyd Farm Existing Condition W.S. Elev (ft)	McDougle School Original Condition W.S. Elev (ft)	Diff. (ft)
House - 18 106 James St	NG 444.26 FFE 446.70		4.4" Storm	442.49	442.48	0.0
House - 19 104 James St	NG 442.89 FFE 446.52		4.4" Storm	442.47	442.45	0.0
House - 20 102 James St	NG 442.50 FFE 443.51		4.4" Storm	442.45	442.43	0.0
House - 21 100 James St	NG 440.72 FFE 448.33 FFB 439.83	10605	4.4" Storm	442.43	442.41	0.0
House - 22 302 Simpson St	NG 446.05 FFE 449.62	10439	4.4" Storm	442.25	442.23	0.0
	W. Main St OT Elev = 444.54	10395		1 @ 6' x 6' RCBC	1 @ 6' x 6' RCBC	
		10346	4.4" Storm	440.57	440.57	0.0

Lloyd Farm Affordable Housing Update

Donated Land

The Lloyd Farm development proposal includes an offer to donate two parcels of land to the Town, totaling 4.6 acres. A particular use for this land has not yet been determined. The applicant framed the offer of donation as allowing a 'civic' use and a draft condition clarified this as 'recreational.' At the conclusion of the hearing the Board of Aldermen asked staff to look into the feasibility of providing affordable housing on the parcels.

In early July, two Board members and staff toured the parcels to gain a better understanding of the existing conditions and physical characteristics of the property. The offer of donation includes two existing parcels at and near the southwest corner of Carol Street and James Street. A Duke Energy overhead powerline easement makes up the eastern James Street frontage of both parcels and an intermittent stream and buffer bisects the larger of the two parcels. These features remove approximately 1.5 acres from the developable portion of the parcels. Another, smaller area of is encumbered with construction debris that was deposited on the site some years ago. An environmental assessment conducted by the applicant did not reveal any materials of concern.

Staff determined there weren't any absolute barriers on the properties to affordable housing development. To gain further insight on the feasibility of affordable housing development on the parcels, staff reached out to a few affordable housing developers. After taking a look at the property and the previous concept plan for development of the parcels as a neighborhood of townhomes, DHIC, CASA, and JOIN Development concluded that it was very likely possible to develop affordable housing on the site. The presence of the Duke Energy substation was found to likely significantly reduce the chance that an affordable housing development in this location would be selected for Low-Income Housing Tax Credits. Given the potential payment-in-lieu from the developer and the ability to provide free or low-cost land, it is believed an affordable housing development could be financially feasible through means other than tax credits.

The type and size of a possible affordable housing development is a factor that the Town would need to consider, but all indications so far point to it being possible to develop affordable housing on these parcels.

Affordability in the Proposed Age-Restricted Units

The current proposal is for approximately 200 apartment units in a full service senior community, and 20 cottage homes that would not be age-restricted. None of the units are proposed to be restricted in terms of price or occupancy and a payment of \$743,000 has been offered in lieu of providing any affordable units. The Board of Aldermen and Planning Board have expressed a strong interest in seeing some affordable units provided within the development.

The Town has been communicating with the applicant and future developer of the senior community to explore the feasibility of providing affordable units in this type of full service community. The combined payment for housing, meals, transportation, and services is what complicates such a project from providing affordable units. In these conversations, the developer has expressed an openness to exploring affordability options.

Staff has identified a model where similar types of developments included affordable units. This model has been used in a couple developments in New Jersey and Maryland. These examples have been shared with the developer and we are awaiting feedback on the viability of this model for the proposed full service senior community.

**Lloyd Farm Development
Carrboro, NC**

Construction Cost Estimates

Land/Site Infrastructure/Soft Costs		\$25,000,000
Main Retail Center Vertical Construction	83,600 sf at \$165/sf	\$13,800,000
Free Standing Businesses Vertical Construction	32,400 sf @ \$200/sf	\$6,500,000
Senior Living Complex Vertical Construction	200 units at \$145,000/unit	<u>\$29,000,000</u>
	TOTAL	\$74,300,000

Anticipated Tax Value at Completion

Retail Center (land and buildings)	83,600 sf	\$22,500,000
Free Standing Businesses (land and buildings)	32,400 sf	\$18,000,000
Senior Living Complex (land and building)	200 units	<u>\$42,800,000</u>
	TOTAL	\$83,300,000

Real Estate Tax Contribution

Retail Center	Carrboro Tax	\$132,600/year
	Orange County Tax	\$197,550/year
	CH/Carrboro Supplemental School Tax	\$46,700/year
Free Standing Businesses	Carrboro Tax	\$106,000/year
	Orange County Tax	\$158,000/year
	CH/Carrboro Supplemental School Tax	\$37,500/year
Senior Living Complex	Carrboro Tax	\$252,250/year
	Orange County Tax	\$375,750/year
	CH/Carrboro Supplemental School Tax	\$89,200/year
TOTALS	Carrboro Tax	\$491,000/year
	Orange County Tax	\$731,300/year
	CH/Carrboro Supplemental School Tax	\$173,400/year
	TOTAL	\$1,395,700/year

Affordable Housing ContributionPayment in lieu of approximately **\$743,000** for senior living development**Impact Fees for Chapel Hill/Carrboro Schools**Approximately **\$364,000** for senior living development**Sales Tax Contribution**

Grocery stores in Orange County average approximately \$550/sf in sales volume*	(60,000 sf @ \$550/sf = \$33,000,000 estimated sales)
In-line Specialty Stores/Restaurants average approximately \$400/sf in sales volume**	(23,600 sf @ \$400/sf = \$9,440,000 estimated sales)
Free Standing Businesses average approximately \$500/sf in sales volume**	(32,400 sf @ \$500/sf = \$16,200,000 estimated sales)

TOTALS	Approximately \$1,500,000 in Orange County sales tax revenue***
	Approximately \$135,000 to Carrboro (9% of Orange County total)***

Employment

60k sf Harris Teeter averages 45-50 FTE and 75-80 PTE for a total of 120-130 employees
Specialty Stores (15 businesses estimated @ 10 employees/business) will employ 150 employees
Restaurants (6 restaurants estimated at 20 employees per restaurant) will employ 120 employees
Senior Living Complex will employ approximately 15 full time employees
Ongoing maintenance of shopping center will employ up to 15 employees

Construction of the project will employ up to 350 employees, depending on staging.

Notes:

*Grocery volumes obtained from Grocery Database

**Specialty stores/restaurants/freestanding volumes estimates obtained from ICSC data

***Orange County Sales Tax calculated at 2.75% of gross sales, with Carrboro receiving 9% of Orange County's receipts.

***Qualifying Food Sales are taxed at 2%, rather than 2.75%, assumed 1/2 of grocery store sales are qualifying