ATTACHMENT A

A RESOLUTION RECEIVING ADDITIONAL PUBLIC COMMENTS ON A REVISED DESIGN FOR SMITH LEVEL ROAD IMPROVEMENTS
Resolution No. 163/2009-10

WHEREAS, planning activities related to improvements to Smith Level Road in Carrboro have occurred since the 1980s; and

WHEREAS, the Smith Level Road corridor has been identified as a priority for the Town;

WHEREAS, under Transportation Improvement Program project #U-2803, the North Carolina Department of Transportation (NCDOT) has proposed a revised design for improvements to Smith Level Road from the Town limits south of Woodcrest Drive to the Morgan Creek bridge; and

WHEREAS, at a public hearing on April 27, 2010, the Board of Aldermen received public comments and referred questions on the revised design for Town staff review;

NOW, THEREFORE BE IT RESOLVED by the Carrboro Board of Aldermen that the Board of Aldermen receives the staff report and additional public comments on the revised design for Smith Level Road.

BE IT FURTHER RESOLVED by the Carrboro Board of Aldermen that:

1. _____
2. _____
3. _____

This is the 1st day of June in the year 2010.

ATTACHMENT B-1

TOWN OF CARRBORO

NORTH CAROLINA

MEMORANDUM

DELIVERED VIA: ☒ *HAND* ☐ *MAIL* ☐ *FAX* ☐ *EMAIL*

DATE: **May 28, 2010**

TO: **Steven Stewart, Town Manager**
Mayor and Board of Aldermen

FROM: **Patricia McGuire, Planning Administrator**
Jeff Brubaker, Transportation Planner

RE: **Smith Level Road (TIP #U-2803): April 27, 2010, public hearing follow-up report**

Background

NCDOT is proposing a revised design for improvements to Smith Level Rd. from the Town limits south of Woodcrest Dr. to the Morgan Creek bridge (Bridge No. 88). The improvements comprise State Transportation Improvement Program (TIP) project #U-2803.

The Board of Aldermen received public input on the revised design at a public hearing on April 27, 2010. The Board voted to continue the public hearing and referred a list of questions on the revised design for staff review. Staff have communicated with NCDOT to address these questions.

Traffic and accidents in the Berryhill neighborhood

The Berryhill neighborhood is bounded by Smith Level Rd. to the east, BPW Club Rd. to the south, and Morgan Creek to the west and north. There are 113 single-family dwelling units.

Table 1 shows the number of elementary, middle, and high school students in Berryhill for the latest years the Town has data. Students are assigned to Frank Porter Graham Elementary, Culbreth Middle School, and Carrboro High School.

Level	2005-06 school year	2006-07 school year
Elementary	42	38
Middle	16	16
High	37	N/A

Table 1. Students in Berryhill, 2005-2007

Planning Department • Planning Division
301 West Main Street, Carrboro, NC 27510 • (919) 918-7329 • FAX (919) 918-4454 • jbrubaker@townofcarrboro.org
AN EQUAL OPPORTUNITY EMPLOYER

The neighborhood is designated as a walk zone for Carrboro High School due to sidewalks on BPW Club Rd. and Tar Hill Dr., but it is not a walk zone for elementary and middle school. Morgan Creek Greenway Phase 1 may make Berryhill walk-zone eligible for Frank Porter Graham. Furthermore, every parcel in Berryhill is within a 1.5-mile walking distance from Culbreth Middle School and would have a contiguous sidewalk network assuming completion of this project as designed and the completion of a Chapel Hill Safe Routes to School sidewalk project on Culbreth between Rossburn Way and Cobbleridge Dr.[1] However, the ultimate determination of walk zone status is up to the Board of Education, taking into account a number of criteria. School administration stated they would not be comfortable making any decision on walk zone status until the project is complete.

Traffic

Traffic counts were conducted from 4/28/10-4/30/10 on BPW Club Rd. and Orchard Ln. and from 5/4/10-5/5/10 on Manor Ridge Dr. and Willow Oak Ln. (Table 2 and Figure 1). BPW Club Rd. counts were taken early enough to capture traffic during the last week of regular classes at UNC.

Location	Vehicles per day
Manor Ridge Dr. – 500 block	539
Willow Oak Ln. (westbound)	459
Willow Oak Ln. (eastbound)	446
Manor Ridge Dr. – 600 block	403
Orchard Ln. (b/t Oak Spring and BPW Club)	295
BPW Club Rd. (w. of Orchard)	3127
BPW Club Rd. (e. of Orchard)	3204

Table 2. Traffic counts in Berryhill (April-May 2010). Some counts averaged over two days. See Appendix A for daily counts and dates.

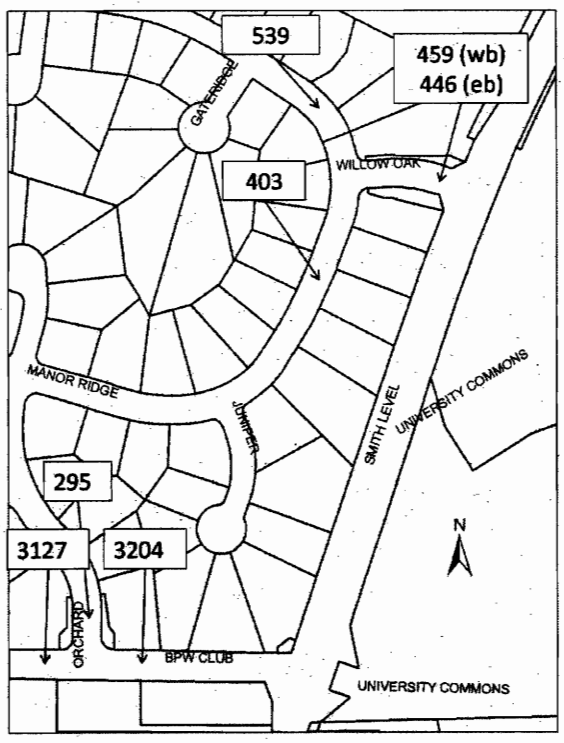

Figure 1. Traffic count map.

The two ways of accessing Berryhill are Orchard Ln. and Willow Oak Ln. The combined traffic count for the two streets of 1200 comes close to according with the general principle of 10 trip ends per day per single family household.

[1] For more information on the Chapel Hill project, visit: http://www.dchcmpo.org/agenda/agendafiles/tac/2010-03-10/Individual/Att%2011%20-%20Description%20of%20Culbreth%20Road%20SRTS%20Project.pdf.

The traffic counts show an average of 905 vehicles per day travel on Willow Oak Ln., with an almost 50-50 directional split. Eastbound vehicles can either turn right or left on Smith Level Rd. According to NCDOT estimates (Appendix B), a much higher proportion of vehicles on Willow Oak are coming from or going to the north – likely NC-54, downtown Carrboro, or downtown Chapel Hill – compared to the south. Based on these proportions, it is estimated that about 350-400 vehicles per day turn left from Willow Oak Ln. onto Smith Level Rd.

Adding sidewalks and bike lanes on Smith Level Rd. – along with the planned construction of Phase 1 of the Morgan Creek Greenway – has the potential to reduce the amount of vehicles traveling on internal and adjacent roads.

Accidents

Reported accident data for the last three years (4/1/07 to 3/31/10) was provided by NCDOT.

There were 12 reported accidents during the data period on Smith Level Rd. and BPW Club Rd. adjacent to Berryhill. A detailed table is available in Appendix D.

Street	Cross-street or segment	# of accidents
Smith Level Rd.	BPW Club Rd.	4
Smith Level Rd.	b/t BPW Club-Willow Oak	5
Smith Level Rd.	Willow Oak Ln.	2
BPW Club Rd.	b/t Smith Level-Orchard	1

Table 3. Number of accidents by location on Smith Level Rd. or BPW Club Rd., adjacent to Berryhill

Half of the accidents were rear-enders. Both accidents at the Willow Oak Ln. intersection involved northbound vehicles striking animals. One accident involved a left turn – at the Smith Level-BPW Club intersection.

There were no reported accidents on Orchard Ln., Manor Ridge Dr., or Willow Oak Ln. during the data period.

More details will be provided at the presentation on Tuesday.

NCDOT right-of-way policy

NCDOT's right-of-way design guidance is contained in Chapter 9 of the NCDOT *Roadway Design Manual*.[2] For urban arterials, the guidelines state to "[s]et right of way or easements a minimum distance of 5' to 15' beyond the construction limits". A typical ROW is defined as 100 to 150 ft.

[2] http://www.ncdot.org/doh/preconstruct/altern/value/manuals/RDM2001/part2/chapter9/pt2ch9.pdf

For Smith Level Rd., NCDOT has offered the following clarification on the ROW (Attachment D):

> Clearing will be done to the slope stake line or construction limit. The construction limits shown at this time have been minimized to meet the current and any future needs along Smith Level Road. Any future improvements would need to be requested by the Town of Carrboro.

This suggests that ROW width is determined by the width of the cross-section. Since the two-lane/median cross-section shows the 5-ft. sidewalk to be 37.75 to 42.75 ft. from the centerline of the road, this is a contributing factor to a ROW width of 99.5 ft. (Attachment B-2). For the 2-lane/divided section, NCDOT is proposing a 17.5 ft. median width. NCDOT guidelines stipulate a minimum median width of 16 ft. if it will have directional crossovers like the one currently proposed at Willow Oak Ln. Because the 2-lane/divided section is not proposed as curb-and-gutter, NCDOT guidelines state that for roads of Smith Level Rd.'s traffic volume and design speed, the vehicle recovery area (cleared space outside of a travel lane where a vehicle running off the road could recover) should be at least 18 ft. for 6:1 slopes and 24 ft. wide for 4:1 slopes.[3] These guidelines contribute to the construction width of the 2-lane cross-section.

Project cost comparisons based on different widths

The following cost comparison has been provided by NCDOT (Attachment D):

- Currently proposed three- or two-lane divided sections with sidewalk and bicycle lanes: $3,450,000.
- Previously proposed three- or four-lane divided sections with sidewalk and bicycle lanes: $4,050,000.

Most of the existing ROW between Willow Oak Ln. and BPW Club Rd. is 90-95 ft.

Sidewalk extension from town limits to Woodcrest Drive

NCDOT project staff have stated they are open to adding a sidewalk on the western side of Smith Level Rd. south of Woodcrest Dr. to connect with the existing sidewalk on the high school frontage.

Adding the sidewalk may have additional right-of-way impacts and will add cost to the Town.[4] However, it will provide a crucial connection for pedestrians.

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[3] See NCDOT *Roadway Design Manual*, Ch. 1, 1-6J and 1-4N: http://www.ncdot.org/doh/preconstruct/altern/value/manuals/RDM2001/part1/chapter1/pt1ch1.pdf.

[4] NCDOT's policy requires municipalities of Carrboro's size to cover a 30% local match for sidewalks. At $75/linear foot for a ~550 ft. sidewalk, this would cost the Town an estimated $12,375.

Left turns onto Smith Level Rd. from Willow Oak Ln.

As stated previously, it is estimated that approximately 350-400 vehicles per day make left turns from Willow Oak Ln. onto Smith Level Rd.

NCDOT has provided the following response to this question (Attachment D):

> The most recent study by the Federal Highway Administration (FHWA) entitled ***Access Management in the Vicinity of Intersections*** states that the median, the elimination of left turn movements combined with a reduction of conflict points will enhance safety for motorist, pedestrians and bicyclists. The link is http://safety.fhwa.dot.gov/intersection.
>
> Also, the minimum spacing requirements for full movement crossovers in the Median Crossover Guidelines of the NCDOT Roadway Design Manual is 1200'. The distance between BPW Club Road and Willow Oak Lane is approximately 1020'.

Possibility of limited left turns during peak hours at Willow Oak Lane

Limiting left turns during peak hours would be difficult to enforce (Attachment D), and enforcement would require additional resources devoted by the Police Department.

A report by the National Cooperative Highway Research Program (NCHRP)[5] suggests prohibiting left turns at unsignalized intersections where there is inadequate storage of left-turning vehicles. It recommends that the following conditions should influence the decision to install a left-turn restriction at an intersection:

- "Left-turn related delay, conflicts, or crash frequency should be at unacceptable levels.
- An alternative route is available for the redirected left-turn vehicles.
- The alternative route is not expected to add more than a few minutes to the redirected motorist's travel time.
- The intersection is in an urban or suburban area. (Note: in suburban settings, turn restriction is generally not found except where such treatments are part of an areawide circulation plan.)"

The report recommends that "all four of the above criteria should be satisfied before turn restriction is given further consideration". Furthermore,

> the potential benefits of turn restriction should be carefully weighed against the increased travel time and trip length that is likely to be incurred by redirected motorists...Turn restrictions at an intersection...can cause traffic to divert to

[5] National Cooperative Highway Research Program (NCHRP). (2001). *Report 457: Evaluating Intersection Improvements: An Engineering Study Guide.* http://onlinepubs.trb.org/onlinepubs/nchrp/esg/esg.pdf, p. 19.

other, local roads.

The left-turn-related travel delay described in the report refers to delay "resulting from left-turn vehicles queued in a through lane because of nonexistent or inadequate bay storage [i.e. storage in a separate left-turn-only lane]". Such a situation exists at the Main/Weaver/Roberson intersection downtown. T-intersections like Smith Level/Willow Oak, without a through lane on the minor road, are different.

School board position on walkability and roundabouts

On May 20, the Chapel Hill-Carrboro Board of Education considered the revised design for Smith Level Rd. and approved the following resolution by a 6-1 vote:

> Be it, therefore, resolved that the Board of Education is in support of improvements to Smith Level Road to make it more pedestrian friendly and a safe walking route to and from Carrboro High School without the requirement of a crossing guard and without taking a position on specific items such as a roundabout. Furthermore, the Board of Education encourages the Town of Carrboro to carefully consider whether the proposed design meets these criteria and to make needed adjustments if it does not.

A letter from Assistant Superintendent Todd LoFrese and other relevant agenda packet materials from the meeting provided by CHCCS administration are in Attachment E.

Tree canopy along Smith Level Road

Aerial photos will be shown during the presentation at the meeting.

Pedestrian safety in roundabouts

Research has shown that pedestrians are generally at a lower risk of severe collisions at roundabouts as compared to other intersections.[6] This is likely influenced by at least three factors:

- Lower vehicle speeds
- Reduced number of conflict points
- Splitter islands that allow pedestrians to cross one direction of vehicle travel at a time. (Traditional intersections may also have refuge islands that accomplish the same thing.)

Vehicle speeds

A roundabout's circular design means that vehicles must go through it via a curved path that slows them down compared to a through movement at a traditional intersection. At

[6] Federal Highway Administration (FHWA). 2000. Roundabout: An Informational Guide. FHWA-RD-00-67, June 2000. http://www.tfhrc.gov/safety/00068.htm, pp. 117-118.

appropriately designed roundabouts, the curve makes vehicles travel about 15-20 mph.[7] This is compared to the 45-50 mph through movement going north- or southbound on Smith Level Rd. at a green light (or illegally through a red) at Rock Haven Rd., as would be consistent with the design speed.

Lower vehicle speeds from well-designed roundabouts thus have been shown to improve pedestrian safety.[8] Vehicle speed at the point of a pedestrian-vehicle collision influences the probability of the pedestrian being killed: at 40 mph, the probability is 85%; at 30 mph, the probability is 45%; and at 20 MPH, the probability is 5%.[9] At lower speeds, the driver can focus more on surroundings and can react and brake over a shorter distance.[10]

The fact that roundabouts require vehicles to travel a curved path is important to their ability to reduce speeds. The Federal Highway Administration (FHWA) recommends that the approach centerline go right through the center of the roundabout, or be at least slightly offset to the left. This is to ensure that vehicles have to turn a fair amount and are not able to speed through the roundabout at a tangent with only a slight turn of the steering wheel.[11] (See Figure 2.) The Transportation Advisory Board recommends that the splitter island at the proposed Smith Level/Rock Haven roundabout be modified to increase vehicle deflection and decrease the curve radius, necessitating a sharper, slower turn (Attachment C).

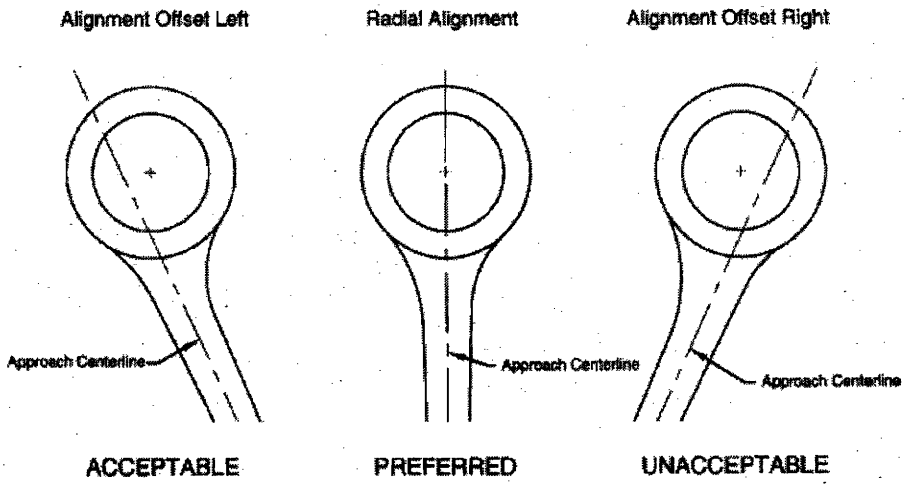

Figure 2. FHWA recommendations for orienting the approach to a roundabout. Source: FHWA 2000.[12]

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[7] FHWA 2000, pp. 136-141
Insurance Institute for Highway Safety. 2008. "Roundabouts can be even safer with easy changes". *Status Report* 43, 4, p. 3.
[8] FHWA 2000, pp. 103-104, 117-118
[9] U.K. Dept. of Transportation. 1987. *Killing Speed and Saving Lives.* Cited in: Harkey, David L. and Charles V. Zegeer. 2004. PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. FHWA-SA-04-003.
[10] NCDOT. 2010. Designing Streets for Pedestrian Safety. Workshop on April 26-27, 2010, in Raleigh NC.
[11] FHWA 2000, pp. 144-145
[12] FHWA 2000, p. 145

Conflict points

A pedestrian-vehicle conflict point is a point in an intersection where a vehicle making a certain movement could collide with a pedestrian. There are 16 pedestrian-vehicle conflict points or a traditional signalized intersection and eight at a roundabout. These include typically legal movements such as right turns on green, left turns on green, and right turns on red, as well as illegal movements such as running the red light. There are 8 pedestrian-vehicle conflict points at a single-lane roundabout. These include conflicts at crosswalks with entering or exiting vehicles (Figure 3).

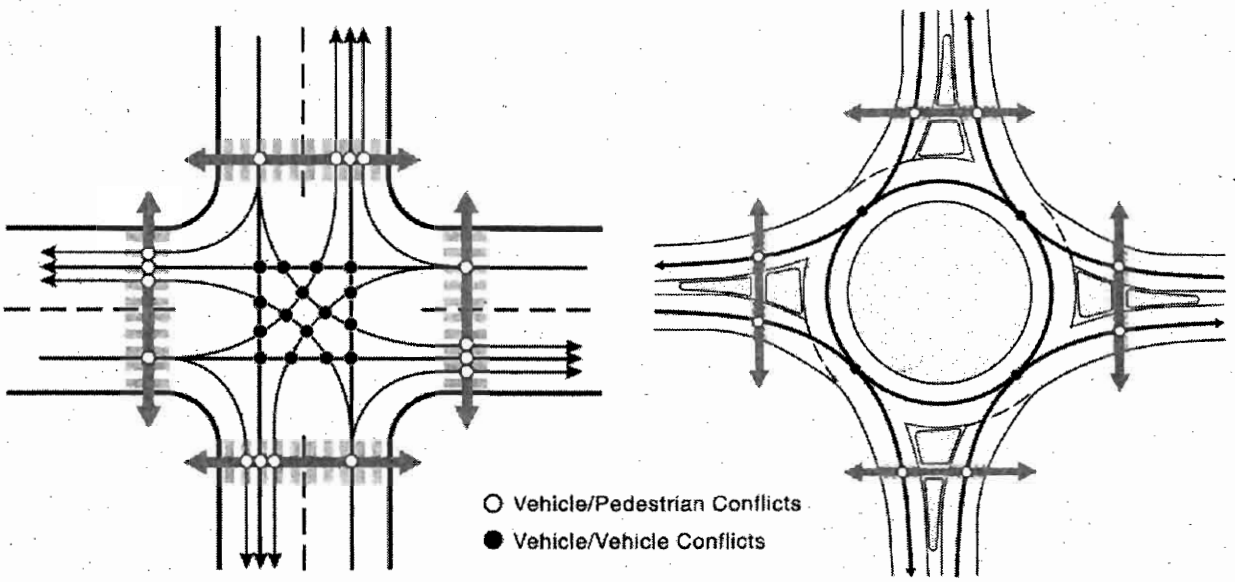


Figure 3. Pedestrian-vehicle conflict points at a traditional, signalized intersection and roundabout. Source: FHWA 2000.[13]

Splitter islands

Splitter islands are triangular-shaped raised medians at each approach of a roundabout (see Figure 3). They help guide vehicles into the roundabout's circular roadway, deter wrong-way movements, calm vehicle speeds, and at the same time serve as refuge islands for crossing pedestrians. The FHWA recommends installing splitter islands at virtually every roundabout. The islands should be at least 6 feet wide at the pedestrian crossing.[14] With a splitter island, like a refuge island at a traditional intersection or mid-block crosswalk, the pedestrian needs only to focus on one direction of traffic at a time, and can rest out of traffic before completing the crossing.

There are still some risks to pedestrians at roundabouts, but the risk is generally found to be lower than at traditional intersections.

[13] FHWA 2000, p. 109
[14] FHWA 2000, p. 157

Possibility of pedestrian signal heads at NC-54 on- and off-ramp and Merritt Mill Rd. intersections with Smith Level Rd.

The NC-54 on- and off-ramps and the Merritt Mill Rd. intersection are outside the scope of the Smith Level Rd. project, but they are considered here due to their proximity to the project's northern terminus.

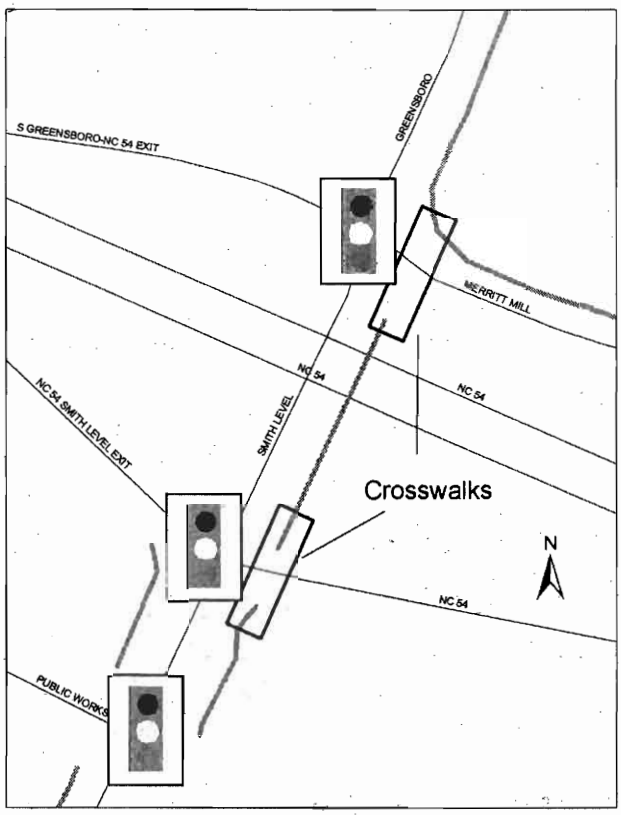


Figure 4. Location of sidewalks and marked crosswalks in the Smith Level Rd./S. Greensboro St. and NC-54/Merritt Mill Rd. intersection area. Sidewalks are represented by gray lines.

Figure 4 shows the location of sidewalks, traffic signals, and crosswalks in the area. As can be seen, sidewalks exist only on the east side of Smith Level/S. Greensboro. Marked crosswalks connect the sidewalks from Merritt Mill to the Frank Porter Graham driveway. Since there are no sidewalks and crosswalks on the western side of the road, it is not recommended that pedestrian signal heads are placed there.

The possibility of installing pedestrian signal heads is determined by criteria in Chapter 4E of the *Manual on Uniform Traffic Control Devices (MUTCD)*.[15] (See Appendix C). Ped heads should only be installed in conjunction with a traffic signal and under certain conditions. Two of these relate to whether the traffic signal is-was installed to establish a school crossing or in response to a certain volume of pedestrians. It is assumed that the existing traffic signals at the on-/off-ramps and Merritt Mill Rd. were installed because of vehicle-related, not pedestrian- or school-related, warrants. Despite the proximity of

[15] The chapter is available here: http://mutcd.fhwa.dot.gov/htm/2009/part4/part4e.htm.

Frank Porter Graham and the assignment of neighborhoods along Merritt Mill Rd. to the school, these neighborhoods are not in the walk zone. Crossing where there are high-volume turning movements, like at NC-54, may present risks for schoolchildren.

If there are no ped heads, then pedestrians have to cross based on their judgment while looking at the traffic signal. If the traffic signal is not visible, or if it might confuse a pedestrian by inducing him or her to cross at an unsafe time, this lends credence to installing a ped head, which could help to guide a safe crossing.

However, it is beyond the scope of this memo to determine the feasibility of ped heads at the intersection. This should undergo an engineering study that takes into account the criteria in Section 4E.03 of the MUTCD (Appendix C).

Fruit trees along roadways

North Carolina law requires a permit for the planting of any tree or shrub along a state roadway. NCDOT has published guidelines that must be followed by all planting permittees. The guidelines are available at: http://www.ncdot.org/doh/operations/dp_chief_eng/roadside/design/graphics/PlantingGuidelines.pdf. Pages 15-17 list common plants used by NCDOT. One of the guidelines states that plantings must "not interfere nor endanger vehicular or pedestrian traffic". This might be especially relevant for plants whose fruits attract deer or other animals or that drop their fruit on the sidewalk, bike lane, or roadway.

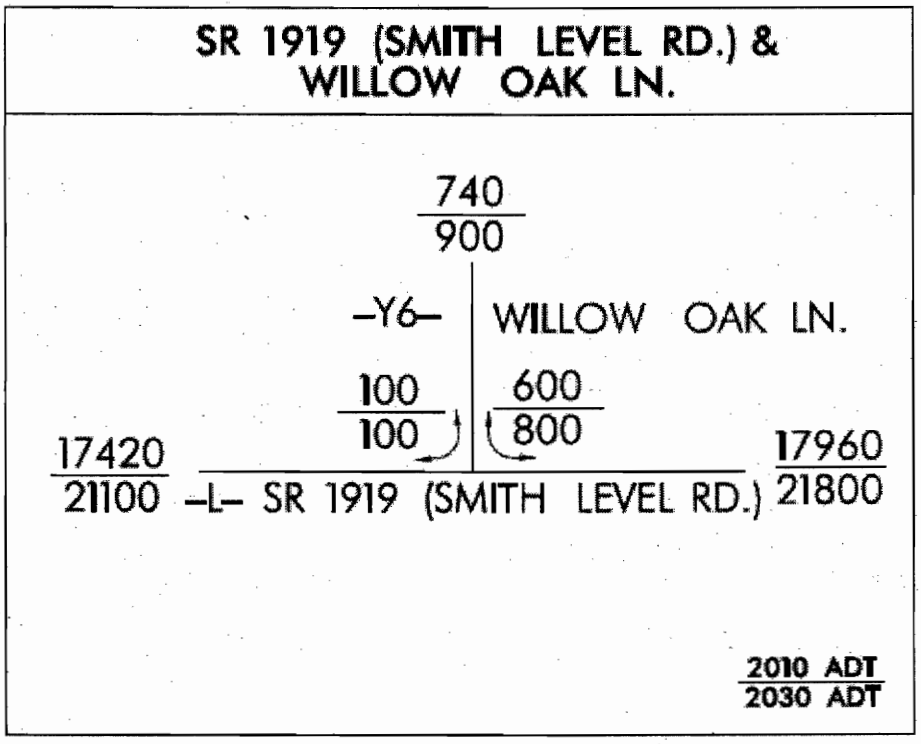
Appendix A

Detailed traffic count data for the Berryhill neighborhood.

Location	Date	24-hour vehicle count
Manor Ridge Dr. – 500 block	5/4/10	521
	5/5/10	557
Willow Oak Ln. (westbound)	5/4/10	461
	5/5/10	456
Willow Oak Ln. (eastbound)	5/4/10	434
	5/5/10	457
Manor Ridge Dr. – 600 block	5/4/10	431
	5/5/10	374
Orchard Ln. (b/t Oak Spring and BPW)	4/29/10	295
BPW Club Rd. (w. of Orchard)	4/29/10	3127
BPW Club Rd. (e. of Orchard)	4/29/10	3204

Appendix B

NCDOT average daily traffic estimates – Smith Level Rd. and Willow Oak Ln. (Source: Smith Level Rd. revised design).



In 2030, 800 of 900 vehicles (89%) on Willow Oak are going to/coming from the north, while 11% are going to/coming from the south.

Appendix C

MUTCD criteria for installing pedestrian signal heads. For the entire chapter, visit: http://mutcd.fhwa.dot.gov/htm/2009/part4/part4e.htm.

Section 4E.03 Application of Pedestrian Signal Heads

Standard:

01 **Pedestrian signal heads shall be used in conjunction with vehicular traffic control signals under any of the following conditions:**

- **A. If a traffic control signal is justified by an engineering study and meets either Warrant 4, Pedestrian Volume or Warrant 5, School Crossing (see Chapter 4C);**
- **B. If an exclusive signal phase is provided or made available for pedestrian movements in one or more directions, with all conflicting vehicular movements being stopped;**
- **C. At an established school crossing at any signalized location; or**
- **D. Where engineering judgment determines that multi-phase signal indications (as with split-phase timing) would tend to confuse or cause conflicts with pedestrians using a crosswalk guided only by vehicular signal indications.**

Guidance:

02 *Pedestrian signal heads should be used under any of the following conditions:*

A. *If it is necessary to assist pedestrians in deciding when to begin crossing the roadway in the chosen direction or if engineering judgment determines that pedestrian signal heads are justified to minimize vehicle-pedestrian conflicts;*

B. *If pedestrians are permitted to cross a portion of a street, such as to or from a median of sufficient width for pedestrians to wait, during a particular interval but are not permitted to cross the remainder of the street during any part of the same interval; and/or*

C. *If no vehicular signal indications are visible to pedestrians, or if the vehicular signal indications that are visible to pedestrians starting a crossing provide insufficient guidance for them to decide when to begin crossing the roadway in the chosen direction, such as on one-way streets, at T-intersections, or at multi-phase signal operations.*

Option:

03 Pedestrian signal heads may be used under other conditions based on engineering judgment.

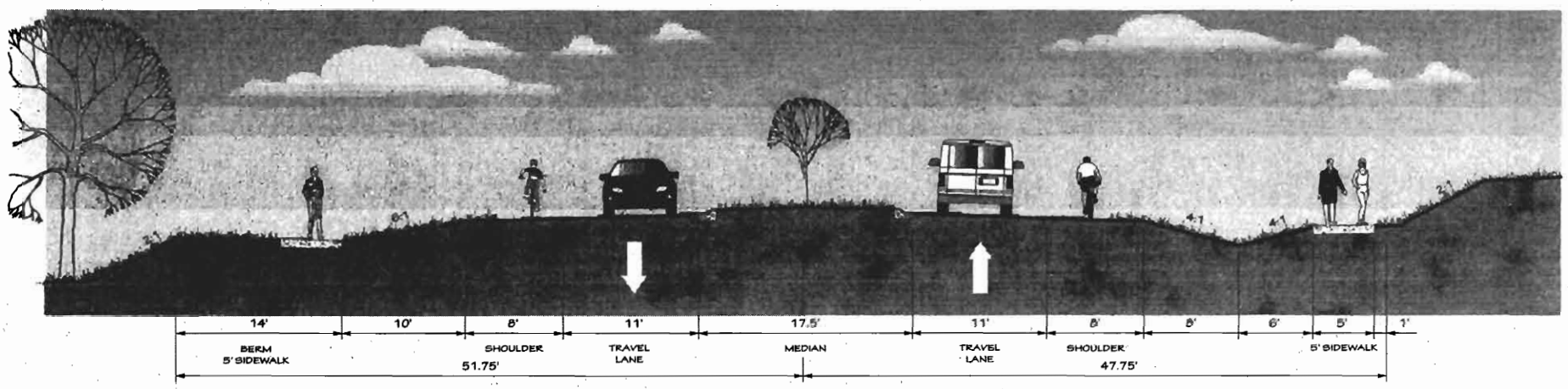
Appendix D

Reported accidents on Smith Level Rd. and BPW Club Rd. adjacent to Berryhill.

Street	Cross-street	Date	Time	Reason	Road	Light	Weather	V1 speed	V2 speed	V3 speed	V1 dir	V2 dir	V3 dir
Smith Level	BPW Club	10/9/2008	7:22 PM	Left turn, different roadways	Wet	Dark - lighted roadway	Cloudy	25	35	-	E	S	-
Smith Level	BPW Club	2/5/2009	2:58 PM	Angle	Dry	Daylight	Clear	5	25	-	N	S	-
Smith Level	BPW Club	5/13/2009	12:32 PM	Rear end, slow or stop	Dry	Daylight	Clear	25	0	-	N	S	-
Smith Level	BPW Club	5/1/2007	3:03 PM	Rear end, slow or stop	Dry	Daylight	Clear	10	35	-	S	S	-
Smith Level	b/t BPW-WO	8/25/2007	3:55 PM	Rear end, slow or stop	Dry	Daylight	Clear	25	5	-	S	S	-
Smith Level	b/t BPW-WO	1/5/2009	8:19 AM	Rear end, slow or stop	Wet	Daylight	Cloudy	35	0	0	S	S	S
Smith Level	b/t BPW-WO	11/26/2007	7:00 AM	Rear end, slow or stop	Wet	Daylight	Rain	0	35	-	N	N	-
Smith Level	b/t BPW-WO	5/1/2007	7:54 PM	Ran off road - right	Dry	Daylight	Clear	25	25	-	S	S	-
Smith Level	b/t BPW-WO	4/29/2009	4:03 PM	Rear end, slow or stop	Dry	Daylight	Clear	5	12	-	S	S	-
Smith Level	Willow Oak	10/26/2009	12:08 AM	Animal	Dry	Dark - lighted roadway	Clear	40	-	-	N	-	-
Smith Level	Willow Oak	12/7/2009	7:43 PM	Animal	Dry	Dark - roadway not lighted	Clear	35	-	-	N	-	-
BPW Club	b/t SLR-Orch	4/1/2009	5:16 AM	Ran off road - left	Dry	Dark - lighted roadway	Cloudy	45	-	-	S	-	-

U-2803 SMITH LEVEL ROAD

PROPOSED 2-LANE SHOULDER SECTION



NCDOT ENTERPRISE Visualization
www.ncdot.gov/Visualization

TOWN OF CARRBORO

TRANSPORTATION ADVISORY BOARD

RECOMMENDATION

May 20, 2010

SUBJECT: Smith Level Road (TIP Project U-2803)

MOTION: The Transportation Advisory Board makes the following recommendation:

In general, we feel this plan is much better than previous plans. However, we do have some concerns and recommend the following conditions:

1. Extend the sidewalks to reach the ends of the project and to connect to existing sidewalks.
2. Extend the sidewalk from Woodcrest Dr. on both sides of Smith Level Rd. to the beginning of the project.
3. If there is a way to reduce the footprint of the project, we think it would be a better, more attractive, less expensive, and more environmentally sound project. It would save trees and personal property. We recommend that the sidewalks be located between 4 to 6 feet from the road to help reduce the footprint of the project while providing a buffer for pedestrians.
4. We would like to see the landscaping plan for the median. We recommend that the plan include trees, and that the trees be planted along the sides of the project where existing trees are removed.
5. We are in favor of the construction of the roundabout, but we would like to see it modified in order to increase the deflection of the approaches (see Attachment A).
6. Given the small number of reported accidents that have occurred at the Willow Oak-Smith Level intersection in the past few years, we do not see the necessity of prohibiting left turns at this intersection and would suggest that left turns be allowed.
7. At the Villages Apartments driveway, remove a portion of the center turn lane and replace it with a refuge island. The center turn lane serves no purpose, and the intersection is close to a retirement community. The island would facilitate crossing for these residents.
8. Heading north on Smith Level Rd., at the beginning of the descent (at the intersection of BPW Club Rd.), we recommend posting a "Bikes may take full lane" sign to allow those bikes that are keeping pace with traffic to take the lane when descending.

9. At each signalized intersection with pedestrian signals, crossing time (pedestrian interval) should be adjusted to accommodate the pace of children, older adults, and citizens with disabilities.

Moved: Brown

Second: Perry

VOTE: Ayes (7): Hileman, Brown, Perry, LaJeunesse, Krasnov, Michler, Pergolotti. Nays (0). Abstain (0). Absent (0).

TAB Chair

5/27/10
DATE

Attachment C - TAB recommendation
- Attachment A of recommendation

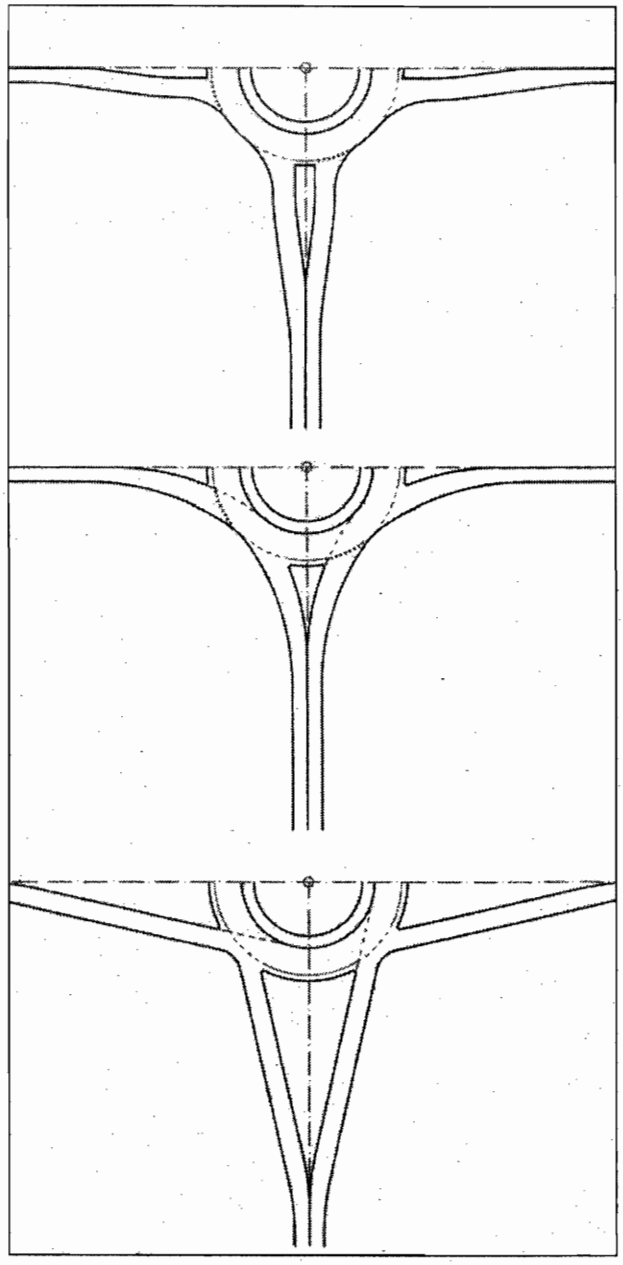


Figure 15: Design of the kerbline of the splitter island

If there is a (very) wide splitter island or refuge (> 3m, which can be beneficial to the capacity, see section 4.7), it is advisable to increase the diameter of the roundabout in order to create enough deflection on entry. Up to 30 m, the outer radius of a roundabout has little influence on speed and therefore on road safety.

Jeff Brubaker

From: Moore, Brenda L [blmoore@ncdot.gov]
Sent: Thursday, May 20, 2010 9:56 AM
To: Jeff Brubaker
Cc: McMillan, Art; Bennett, Jay A; Stone, Dwight L; Tarascio, Eugene; Midkiff, Eric; Dunlop, James H; Drew, Joyce M; Lewis, Ed F; Eason, Patty P; Mills, James M
Subject: Smith Level Road Memo

Jeff,

Since the hearing on April 27th was held by the Town of Carrboro, the Town will need to coordinate and hold its own post hearing meeting. Below is a summary of the data that you requested from NCDOT:

The accident data in the vicinity of the Berryhill neighborhood has been provided by Jim Dunlop of the Congestion Management Unit.

The construction cost of the proposed three and two-lane divided sections with sidewalk and bicycle lanes is $3,450,000. The previous design of three and four-lane divided sections with sidewalk and bicycle lanes was $4,050,000.

Clearing will be done to the slope stake line or construction limit. The construction limits shown at this time have been minimized to meet the current and any future needs along Smith Level Road. Any future improvements would need to be requested by the Town of Carrboro.

At the project beginning, NCDOT is willing to extend the sidewalk limits along Smith Level Road to Woodcrest Drive. However, the extension of the three lane section will result in additional right of way impacts. At the end project limits, the sidewalk limits have been set in anticipation of tying to the future Morgan Creek greenway.

Limiting left turns during a specified time period would be difficult to enforce. The most recent study by the Federal Highway Administration(FHWA) entitled ***Access Management in the Vicinity of Intersections*** states that the median, the elimination of left turn movements combined with a reduction of conflict points will enhance safety for motorist, pedestrians and bicyclists. The link is http://safety.fhwa.dot.gov/intersection.

Also, the minimum spacing requirements for full movement crossovers in the Median Crossover Guidelines of the NCDOT Roadway Design Manual is 1200'. The distance between BPW Club Road and Willow Oak Lane is approximately 1020'.

Let me know if you need any additional information.

Brenda

CHAPEL HILL-CARRBORO CITY SCHOOLS

Date: May 26, 2010

To: Steven Stewart, Town Manager

From: Todd LoFrese, Assistant Superintendent for Support Services

Re: Smith Level Road Improvements

In response to your April 29, 2010 letter and the request from the Carrboro Board of Aldermen, administration reviewed the proposed improvements to the Smith Level Road corridor and presented this item to the Board of Education on May 20, 2010. Attached please find the Board packet that was presented that evening. As described in the abstract, associated attachments, and the modified Board resolution (below), we are supportive of improvements to Smith Level Road to make it more pedestrian friendly.

Based on the improvements described in the letter, we feel that that the Smith Level Road corridor would be much more pedestrian friendly. While we would not be able to determine whether neighborhoods east of Smith Level Road (such as Cobble Ridge, Kent Woodlands, South Bridge, Culbreth Park and perhaps parts of Southern Village) would be deemed walk zones prior to project completion, the possibility is greatly increased by the proposed improvements. It is important to note that there is currently a break in the sidewalk along Culbreth Road (between Rossburn Way and Cobble Ridge Drive) that would need to be completed for the neighborhoods listed above to be realistic walkzones.

Since we are not traffic safety experts and do not have direct experience with traffic circle design, we solicited and received feedback on the proposed improvements from the Institute for Transportation Research and Education at NC State University. Much of this feedback is aimed at making the traffic circle more pedestrian friendly. This feedback is included in the attached memo from Ms. Truelove and we encourage the Town to consider this feedback.

We also noted that the proposed design forces traffic exiting on Willow Oak Lane from the Berryhill subdivision to turn right onto Smith Level Road. Alternatively residents could choose to exit the subdivision onto BPW Club Road using the light to turn left onto Smith Level Road. We received an email from a resident who expressed concerns that if traffic was backed up, some residents may choose to use the Carrboro High School campus to avoid this light. Although on the map this appears unlikely because of distance, it is worth pointing out and we would suggest that the Town's traffic study consider this point.

Given the great expense of the proposed project, we would stress that the measures taken to make pedestrian friendly improvements be sufficient enough to not require a crossing guard for high school aged students.

Finally, administration requests that as part of the improvements a school zone sign with flashing lights be installed on Smith Level Road to notify cars of the Frank Porter Graham Elementary School Campus.

On behalf of the Board of Education, thank you for requesting and considering our feedback. If you have any questions, please feel free to contact me.

Modified Board Resolution:

Be it, therefore, resolved that the Board of Education is in support of improvements to Smith Level Road to make it more pedestrian friendly and a safe walking route to and from Carrboro High School without the requirement of a crossing guard and without taking a position on specific items such as a roundabout. Furthermore, the Board of Education encourages the Town of Carrboro to carefully consider whether the proposed design meets these criteria and to make needed adjustments if it does not.

Cc: N. Pedersen
J. Brubaker

CHAPEL HILL-CARRBORO CITY SCHOOLS

Board of Education

Agenda Abstract

Meeting Date: 5/20/10
Agenda Type: Discussion and Action
Agenda Item #: 4e

Subject: Recommendation for Approval of a Response to the Carrboro Board of Alderman on the Proposed Smith Level Road Improvements.

Division:	Support Services Division, Todd LoFrese	**Department:**	Transportation
Person Responsible:	Mary Lin Truelove, Director of Transportation	**Feedback Requested From:**	

Agenda Item....Prior Submission Dates **Public Hearing Required:** No

Work Session	No	**Date**
Discussion and Action	No	**Date**

Attachment(s):
Letter from Steve Stewart, Town of Carrboro Manager
Memorandum from Mary Lin Truelove, Director of Transportation
Email from Jeff Brubaker, Town of Carrboro Transportation Planner
Map of Proposed Smith Level Road Improvements

PURPOSE: To provide a response from the Board of Education to the Town of Carrboro and Carrboro Board of Alderman on the proposed improvements to Smith Level Road.

BACKGROUND: The Carrboro Board of Alderman are currently holding public hearings to review NCDOT's proposed improvements to Smith Level Road. The proposed improvements include:

- Installing sidewalks on both sides of the road from Willow Oak Lane to Woodcrest Drive and on the west side of the road from the bridge over Morgan Creek to Willow Oak Lane;
- Installing bike lanes on both sides of the road;
- Widening Smith Level Road to a two-lane road divided by a grass median with eight-foot shoulders from the bridge crossing Morgan Creek to BPW Club Road, including a shielded median break allowing left turns from Smith Level Road onto Willow Oak Lane;

- Widening Smith Level Road to a three-lane road, including two through lanes and a center turn lane, from BPW Club Road to Rock Haven Road;
- Installing sidewalks on both sides of Culbreth Road from Smith Level Road to Rossburn Way; and
- Constructing a roundabout near Carrboro High School at the intersection of Smith Level Road and Rock Haven Road.

Smith Level Road, in its current condition, represents too great of a safety hazard to expect children to cross the street to walk to school. Students who reside on the east side of Smith Level Road receive busing service to Carrboro High School. Based on the improvements described above, administration feels that that the Smith Level Road corridor would be much more pedestrian friendly. While we would not be able to determine whether neighborhoods east of Smith Level Road (such as Cobble Ridge, Kent Woodlands, South Bridge, Culbreth Park and perhaps parts of Southern Village) would be deemed walk zones prior to project completion, the possibility is greatly increased by the proposed improvements. The current street network would actually funnel most of these neighborhoods to Carrboro High School onto the existing sidewalks on Culbreth Road. Based on the proposed improvements, students would then have the option of crossing Smith Level Road with the light at Culbreth Road or proceeding southward along Smith Level Road crossing at the proposed traffic circle. While we do not have experience with the level of safety of pedestrians crossing at traffic circles, there appears to be research support for it being safe, especially with single lane traffic circles as proposed. Based on the proposed configuration, pedestrians would only have to look in one direction and only have to cross one lane of traffic at a time. In addition, vehicles are forced to travel at a lower rate of speed to navigate the curves of the circle. Based on the proposed improvements, it appears likely that many students would likely cross with the traffic light at the Culbreth Road intersection.

We solicited and received feedback on the proposed improvements from the Institute for Transportation Research and Education at NC State University. Much of this feedback is aimed at making traffic circles more pedestrian friendly. This feedback will be shared with the Town of Carrboro. Other information regarding traffic circles was provided to us by the Town of Carrboro and is shared with the Board for information purposes.

We also noted that the proposed design forces traffic exiting on Willow Oak Lane from the Berryhill subdivision to turn right onto Smith Level Road. Alternatively residents could choose to exit the subdivision onto BPW Club Road using the light to turn left onto Smith Level Road. We received an email from a resident who expressed concerns that if traffic was backed up, some residents may choose to use the Carrboro High School campus to avoid this light. Although on the map this appears unlikely because of distance, it is worth pointing out to the Town of Carrboro for review purposes. Their traffic study should be able to determine whether the traffic light at that location could handle the level of service demanded by residents of the area.

Finally, given the great expense of the proposed project, we would stress that the measures taken to make pedestrian friendly improvements would be sufficient enough to not require a crossing guard for high school aged students.

FINANCIAL IMPACT: Long term potential of reducing the number of buses needed to transport students to Carrboro High School.

PERSONNEL IMPACT: None

RECOMMENDATION: Approval of the Resolution.

RESOLUTION: Be it, therefore, resolved that the Board of Education is in support of improvements to Smith Level Road to make it more pedestrian friendly and a safe walking route to and from Carrboro High School without the requirement of a crossing guard. Furthermore, the Board of Education encourages the Town of Carrboro to carefully consider whether the proposed design meets these criteria and to make needed adjustments if it does not.

New Resolution see memo

E-6

TOWN OF CARRBORO
NORTH CAROLINA
WWW.TOWNOFCARRBORO.ORG

MAR - 4 2010

29 April 2010

Superintendent Neil Pedersen
Chapel Hill-Carrboro City Schools
750 S. Merritt Mill Rd.
Chapel Hill, NC 27516

RECEIVED
MAY 7 2010
By Asst Sup SS

Re: Smith Level Road Improvements

Dear Neil,

This letter is to request information regarding the position of the Chapel Hill-Carrboro Board of Education on the proposed Smith Level Road improvements in Carrboro. NCDOT has proposed the following improvements to Smith Level Road:

- Installing sidewalks on both sides of the road from Willow Oak Lane to Woodcrest Drive and on the west side of the road from the bridge over Morgan Creek to Willow Oak Lane;
- Installing bike lanes on both sides of the road;
- Widening Smith Level Road to a two-lane road divided by a grass median (sample cross section in *Attachment B)* with eight-foot shoulders from the bridge crossing Morgan Creek to BPW Club Road, including a shielded median break allowing left turns from Smith Level Road onto Willow Oak Lane;
- Widening Smith Level Road to a three-lane road, including two through lanes and a center turn lane, from BPW Club Road to Rock Haven Road;
- Installing sidewalks on both sides of Culbreth Road from Smith Level Road to Rossburn Way; and
- Constructing a roundabout near Carrboro High School at the intersection of Smith Level Road and Rock Haven Road.

A detailed project map is available on the Town's online Message Board at: http://townofcarrboro.org/msg.htm.

As a part of the discussion at the recent Public Hearing held by the Carrboro Board of Aldermen regarding the aforementioned Smith Level Road improvements, staff was asked to determine the position of Chapel Hill-Carrboro City Schools as it relates to the road design proposed by the North Carolina Department of Transportation and how the proposed design, specifically the

proposed roundabout, may affect the "walk zone" for Carrboro High School. There will be a continuation of this public hearing on June 1, 2010 at 7:30 pm. If there is an official position of your elected officials, please inform the Town of Carrboro before the June 1st, 2010 meeting. Members of your board or staff are welcome to attend that meeting as well.

Please let me know if you have any questions.

Sincerely,

Steven E. Stewart
Town Manager

E-8

CHAPEL HILL-CARRBORO CITY SCHOOLS

1708 High School Rd
Chapel Hill, N.C. 27516
919 942-5045
919 969-2466 (fax)

MEMORANDUM

TO: Todd LoFrese

FROM: Mary Lin Truelove
Transportation Director

RE: Request for District Feedback on the Town of Carrboro's Proposed Improvements to Smith Level Rd

DATE: May 11, 2010

Per your request, I have reviewed the proposed improvements for the Smith Level Rd project being conducted by the Town of Carrboro. Here are my observations:

- Smith Level Rd is currently very dangerous for all vehicular and pedestrian traffic. Most motorists' travel in excess of the posted speed on a regular basis and the condition of the road is, in my opinion, substandard.

- Widening the road to two lanes with a grassy median, adding sidewalks and bike lanes will all enhance safety for motorists, bicycle riders and pedestrians.

- Based on the state regulations of the 1.5 walkzone radius around a school, it is possible for us to evaluate expanding the walkzones that currently serve, Carrboro HS, Culbreth MS and Frank Porter Graham. (Much more detail would go in to this project than time allows at this point but the potential is certainly there)

- Because I do not have any direct, personal experience with roundabouts, I made contact with Jeff Tsai at ITRE (Institute for Transportation Research and Education) at NC State University. He consulted with a colleague who has experience with and knowledge of roundabouts. I explained to him the purpose of our review and sent him a copy of the map you provided for me. I have included his colleague's comments below.

I cannot speak to the cognitive abilities of middle school aged children crossing at roundabouts, nor do I believe there is really any literature available on this topic. However, we have done fairly extensive work with sighted (adults) and visually impaired pedestrians. Knowing what we have learned from visually impaired pedestrians (in concert with others at NC State University, Western Michigan University, Boston College, and Accessible Design for the Blind), I can give the following advice (or observations):

- The roundabout is a single lane roundabout, which is much easier to cross than a dual or triple lane roundabout. The multilane roundabouts are more dangerous because the pedestrian must observe multiple crossable gaps or yields (or some combination of the two) and make good decisions based on that cognitive information. We found that visually impaired pedestrians were less apt to make good decisions, and I would presume this is the same with middle school aged children. The "multiple threat" issue is a big problem at multilane roundabouts (ie. a car coming around a yielded vehicle and not seeing the pedestrian in the crosswalk), so having a single lane roundabout is definitely a bonus.

- Deflection is very important at a roundabout. I notice the roundabout has pretty good deflection entering and exiting the roundabout on the major road. This deflection causes drivers to maneuver the roundabouts geometry in a safe manner by slowing drivers down entering, and accelerating later as they exit. Deflection, in my opinion, is particularly important at the exit to a roundabout where a driver will tend to accelerate as they are going towards the crosswalk (whereas at the entry they tend to slow down as they are looking for a gap to enter, especially at busy roundabouts). The north approach of the roundabout has good deflection on the entry, and NOT AT THE EXIT, so I would think it would be important to add some deflection by straightening the approach (it is currently skewed) just before the roundabout without hurting the sight distance of drivers entering or exiting the roundabout.

- Last, our research efforts have not looked into this subset of pedestrians, but have generally found that visually impaired pedestrians generally make good decisions at single lane roundabouts and that risk is generally low because speeds are usually fairly controlled with compact roundabouts such as this one. If pedestrian and/or vehicular traffic is high enough, and there is a belief that middle school aged children may be at risk, I would consider thinking about low cost treatments that would aid drivers and pedestrians at the crosswalk, especially at the exit which is the more dangerous crossing maneuver of the two. We have tested flashing beacons with pedestrian push buttons AND a raised crosswalk (and even a combination) and have found that the raised crosswalk is particularly helpful in keeping drivers speeds down and increasing yielding behavior at crosswalks. We believe that this is because they are already slowing down to maneuver the crosswalk and figure they might as well stop. In addition, the crosswalk (and even a supplementary beacon) helps bring attention to the crossing.

- One other low cost treatment that we have not been able to study to date is the idea of a "distal" crosswalk, sometimes referred to as a zig-zag. The idea is to keep the current crossing location at the **entry to the roundabout**, but to have the crossing at the **exit approach shifted back** approximately two car lengths making it act more like a mid-block crossing at the exit approach. This does three things (we believe): 1) pedestrians have more sight distance to determine if there is a crossable gap, 2) drivers cognitive and spatial environment focuses from maneuvering the roundabout to the next driving issue (ie. the pedestrian in the crosswalk in this case) which could be muddled as they are just exiting the roundabout, and 3) provides queue storage when vehicles yield which is very important because a vehicle stopped in the roundabout causes gridlock in the circle because no other vehicles can circulate.

Todd,

Trish asked me to send you some information on roundabouts. I am providing some information, citations, and quotes from various publications. This is not a comprehensive amount of info, but it should give a sense of what some of the transportation engineering research has been.

I am also copying Dale McKeel at DCHC-MPO, in case he has additional info to add. I believe Dale did extensive research on roundabouts when he was Carrboro transportation planner.

Thanks,

Jeff

Design

A modern roundabout such as what is proposed for Smith Level Rd. or what exists near Carrboro H.S. is different in operation and design from a traffic circle, like DuPont Circle in Washington DC. Modern roundabouts require traffic entering the roundabout to yield, instead of traffic circles' requiring traffic already within the circle to yield (via traffic signals). The FHWA guide (link below), p. 7, has some good comparisons.

IIHS video of how roundabouts work: [http://www.iihs.org/research/topics/roundabouts.html]http://www.iihs.org/research/topics/roundabouts.html

Safety

"The modern roundabout represents a substantial improvement, in terms of operations and safety, when compared with older rotaries and traffic circles" [FHWA]. In the UK, the modern roundabout had the effect of "reducing the number and particularly the severity of collisions". [FHWA].

"Many studies have found that one of the benefits of roundabout installation is the improvement in overall safety performance. Several studies in the U.S., Europe, and Australia have found that roundabouts perform better in terms of safety than other intersection forms (1, 2, 3, 4). In particular, single-lane roundabouts have been found to perform better than two-way stop-controlled (TWSC) intersections in the U.S. (5). Although the frequency of reported crashes is not always lower at roundabouts, the reduced injury rates are usually reported." [FHWA]

Traditional two-way intersections have 32 potential vehicle conflict points, while modern roundabouts have only 8. For conflicts between vehicles and pedestrians, traditional intersections have 16 potential conflict points compared to 8 at roundabouts [notes from TRB conference presentation on roundabouts, Jan. 2010]. You can see a diagram of the conflict point comparison for vehicles, pedestrians, and bicyclists in the FHWA guide, Ch. 5, pp. 105-106 and pp. 109-111.

A study of 11 intersections in the U.S. that were converted to roundabouts showed reduced annual crash frequencies after the roundabout was installed. For small/moderate roundabouts, there was a 51% reduction in crash frequencies [FHWA, p. 112].

"Experiences in the United States show a reduction in crashes after building a roundabout of about 37 percent for all crashes and 51 percent for injury crashes...The findings of these studies

show that injury crashes are reduced more dramatically than crashes involving property damage only. This again is in part due to the configuration of roundabouts, which eliminates severe crashes such as left turn, head-on, and right angle collisions. Most of these studies also show that crash reduction in rural areas is much higher than in urban areas." [FHWA, pp. 112-113].

"For pedestrians, the risk of being involved in a severe collision is lower at roundabouts than at other forms of intersections, due to the slower vehicle speeds.

Likewise, the number of conflict points for pedestrians is lower at roundabouts than at other intersections, which can lower the frequency of collisions. The splitter

island between entry and exit allows pedestrians to resolve conflicts with entering and exiting vehicles separately…A Dutch study of 181 intersections converted to roundabouts (4) found reductions (percentage) in all pedestrian crashes of 73 percent and in pedestrian injury crashes of 89 percent." [FHWA, p. 117]

Several design issues related to pedestrians with disabilities must be carefully addressed when designing roundabouts [FHWA, p. 119].

There is conflicting data related to bicycle crash rates at roundabouts [FHWA, p. 120].

Splitter islands at single-lane roundabouts allow pedestrians to only cross one travel lane at a time.

"Effects on road safety of converting intersections to roundabouts has been the subject of extensive research in the United States and abroad. Results clearly indicate that roundabouts are an extremely safe form of intersection traffic control. For example, an Institute supported evaluation of 23 U.S. intersections converted from stop sign or traffic signal control reported large reductions in motor vehicle crashes after roundabouts were installed (Persaud et al., 2001).

Overall, crashes were reduced by an estimated 40 percent, injury crashes declined by 80 percent, and crashes resulting in fatal or incapacitating injuries were reduced by 90 percent." [Insurance Institute for Highway Safety, 2002 - comment on pedestrian signal heads at roundabouts – http://www.iihs.org/laws/comments/pdf/otis_rar_102302.pdf]

"Roundabouts generally are safer for pedestrians than traditional intersections. In a roundabout, pedestrians walk on sidewalks around the perimeter of the circulatory roadway. If it is necessary for pedestrians to cross the roadway, they cross only one direction of traffic at a time. In addition, crossing distances are relatively short, and traffic speeds are lower than at traditional intersections. Studies in Europe indicate that, on average, converting conventional intersections to roundabouts can reduce pedestrian crashes by about 75 percent. Single-lane roundabouts, in particular, have been reported to involve substantially lower pedestrian crash rates than comparable intersections with traffic signals." [Insurance Institute for Highway Safety, [http://www.iihs.org/research/qanda/roundabouts.html]http://www.iihs.org/research/qanda/roundabouts.html]

"Traffic signals appear to be unnecessary at single-lane roundabouts and, if mandated, actually could be detrimental to highway safety. It is likely that the arbitrary addition of traffic signals to well designed roundabouts could increase the risk of injury crashes due to disruptions in traffic flow." [Insurance Institute for Highway Safety, 2002 – comment on pedestrian signal heads at roundabouts].

"There are large and highly significant safety benefits of converting signalized and two-way stop– controlled intersections to roundabouts. The benefits are larger for injury crashes than for all crash types combined. For the conversions from all-way-stop–controlled intersections, there was no apparent safety effect." [NCHRP, p. 32]

Public Opinion

"Drivers may be skeptical, or even opposed, to roundabouts when they are proposed. However, opinions quickly change when drivers become familiar with roundabouts. A 2002 Institute study in three communities where single-lane roundabouts replaced stop sign-controlled intersections found 31 percent of drivers supported the roundabouts before construction compared with 63 percent shortly after. Another study surveyed drivers in three additional communities where single-lane roundabouts replaced stop signs or traffic signals. Overall, 36 percent of drivers supported the roundabouts before construction compared with 50 percent shortly after. Follow-up surveys conducted in these six communities after roundabouts had been in place for more than one year found the level of public support increased to about 70 percent on average." [IIHS]

Resources

Roundabouts: An Informational Guide – Federal Highway Administration (FHWA), [http://www.tfhrc.gov/safety/00068.htm]http://www.tfhrc.gov/safety/00068.htm

Roundabouts web page – Insurance Institute for Highway Safety - [http://www.iihs.org/research/topics/roundabouts.html]http://www.iihs.org/research/topics/roundabouts.html

Roundabouts in the United States – NCHRP 572 - [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_572.pdf]http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_572.pdf

Jeff Brubaker

Transportation Planner
Town of Carrboro

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Town of Carrboro, NC Website - [http://www.townofcarrboro.org/]http://www.townofcarrboro.org

(ext)

ATTACHMENT F

SMITH LEVEL ROAD (PROJECT U-2803)
CHRONOLOGY
1985 – 2010

DATE	ACTION
1985	NCDOT's Chapel Hill-Carrboro Thoroughfare Plan lists Smith Level Road as a primary arterial in need of widening. The Plan recommends widening the road to a four-lane cross section with a median.
March 13, 1990	Carrboro Board of Aldermen held a public hearing, and adopted the 1990-1991 Municipal TIP as recommended by the TAB. The second priority among "urban" projects that were requested was to "widen Smith Level Road to five lanes from NC 54 to Rock Haven Road with bikelanes and grade for sidewalks."
Winter 1990	Durham-Chapel Hill-Carrboro MPO listed the project as one of regional significance in the regional 1990-1992 TIP.
April 2, 1991	Carrboro Board of Aldermen held a public hearing, and adopted the 1991-1992 Municipal TIP as recommended by the TAB and continued to include the Smith Level widening as a second priority.
March 3, 1992	The Carrboro Board of Aldermen held a public hearing, and adopted the 1992-1993 Municipal TIP with Smith Level Road listed as the number two priority.
June 1992	North Carolina Board of Transportation included the project in the 1993-1999 TIP, and designated the project U-2803.
October 27, 1992	The Carrboro Board of Aldermen held a public hearing, and adopted the 1993-1994 Carrboro Transportation Improvement Program as recommended by the TAB, with Smith Level Road listed as the number two priority. The widening would be done in accordance with the previously stated requests.
December 11, 1992	NCDOT presented the results of a feasibility study for the Smith Level Road project (U-2803). The study looked at widening the road from the county line to the Morgan Creek Bridge.
April 8, 1993	Town officials met with NCDOT to discuss feasibility study and to reject the proposal that widening should extend to county line/intersection with US 15-501.
April 23, 1993	NCDOT presented an addendum to the feasibility study that clarified that the project, as studied, did not match the town's request. NCDOT, in evaluating projected traffic volumes, had recommended expanding the scope to the county line.
November 23, 1993	The Board of Aldermen held a public hearing, and adopted the 1994-1995 Municipal TIP as recommended by the TAB. The 1994-1995 TIP lists widening Smith Level Road as the number two priority.

December 14, 1993	Mayor Eleanor G. Kinnaird wrote a letter to Mr. Whitmel Webb of NCDOT requesting that the agency combine the project proposal for Hillsborough Road to include the widening of Old Fayetteville Road from NC 54 northwards to Hillsborough Road.
June 26, 1995	Governing boards of Chapel Hill and Carrboro jointly adopted a resolution for protecting entranceways, Smith Level among them, and requires each community to exercise plans and policies that will protect the visual character of the road.
December 4, 1995	NCDOT submitted a letter to the town that presented its finding regarding existing right-of-way along Smith Level Road. The letter also stated that surveys for U-2803 would not be authorized until October 1997 and that completed plans for right-of-way acquisition would be expected in 1999.
July 7, 1997	A scoping meeting was held on U-2803, which called for widening Smith Level Road to a multi-lane facility between the Morgan Creek Bridge and Rock Haven Road. NCDOT proposed a five-lane section with curb and gutter, accommodations for bicycles and grading for sidewalks. With the exception of Kenneth Withrow, Carrboro Transportation Planner, all attendees supported extending the project to Damascus Church Road and relocating that road's intersection with Smith Level Road in order to allow for better transition.
January 30, 1998	Representatives of Chapel Hill and Carrboro met with NCDOT representatives to discuss the status of TIP projects. The town representatives noted that the proposal to extend the project beyond Rock Haven Road was incompatible with the rural buffer and joint planning plan/agreement.
February 2, 1998	Alderman Alex Zaffron submitted a letter to NCDOT Traffic Engineer, J.W. Watkins, reiterating the outcome of the January 30th meeting. Agreement was reached between Orange County officials and NCDOT staff that "(1) Smith Level Road would be designed as a five-lane facility from the Morgan Creek bridge to its intersection with Rock Haven Road, and (2) south of Rock Haven Road intersection, Smith Level Road would be reduced to no more than three lanes and tapered down to two lanes prior to its entrance into the University Lake watershed area (i.e. the intersection of Smith Level Road and Ray Road).
February 13, 1998	J. W. Watkins replied to Alderman Zaffron's correspondence and stated that "it is our understanding that the plan for improvements...will be a five lane, curb and gutter section from Morgan Creek Bridge to Rock Haven Road. South of Rock Haven Road, a three lane section will taper into the existing two lane road in the shortest distance possible for a safe transition."
February 13, 1998	Mayor Mike Nelson submitted a letter to Governor Jim Hunt requesting his support for Orange County's request, as expressed in Alderman Zaffron's letter of February 3rd. A copy of that letter was attached.

March 17, 1998	NCDOT submitted a request for information as part of its research on the proposed improvements. The memo also noted that the project was included in the 1998-2004 TIP and that it was scheduled for r/w acquisition in 2000 and construction in 2002.
July 2, 1998	Town staff met with NCDOT staff to discuss the project scope and to recommend that a four-lane, median divided highway was preferable to a five lane section.
August 11, 1998	Town staff submitted a letter to NCDOT providing justificaiton for the four-lane request. NCDOT staff informed the town that until the town adopts a design and defines the width of the road project, NCDOT would not proceed.
November 3, 1998	Transportation Advisory Board met to review possible road designs.
February 25, 1999	Robert W. Morgan, Town Manager, presented a status report to the Board of Aldermen on U-2803.
April 25, 1999	The Board of Aldermen, during their April 20, 1999 meeting directed staff to, "in cooperation with NCDOT staff, schedule a public meeting to create and present three design alternatives for Smith Level Road's widening. The three design alternatives proposed for Smith Level Road are: (1) a two-lane curb and gutter facility with bikelanes and a sidewalk on both sides, (2) a five-lane curb and gutter facility with bikelanes and a sidewalk on both sides, and (3) a four-lane, median divided facility with curb and gutter, bikelanes, and a sidewalk on both sides." A request to schedule this public meeting was forwarded to NCDOT.
January 6, 2000	Meeting between town officials and NCDOT staff to decide on typical sections that would be presented during a Citizens Informational Workshop. Due to projected traffic volumes, NCDOT did not consider the two-lane option reasonable. The four-lane and five-lane options would be presented at the citizens workshop.
April 19, 2000	NCDOT presented a Citizens Information Workshop in Room 110 at the Carrboro Town Hall from 4:00 p.m. to 7:00 p.m. Fifteen citizens attended the workshop. Most of the attendees preferred the four-lane section, appreciated the bike/ped facilities and were pleased that the project limits did not continue south of Rock Haven Road.
May 19, 2000	NCDOT sent a letter to the Town requesting any additional comments on the proposed sections.
October 25, 2001	The N.C. Department of Transportation held a Pre-Hearing Open House and Formal Public Hearing from 5:00 p.m. to 9:00 p.m. Approximately 50 persons attended the meeting. Most speakers expressed support for the bike/ped facilities, but many speakers questioned the need for the project, expressed concern about impacts of the proposed four-lane roadway, and stated that the project did not address existing problems on Smith Level Road.

November 13, 2001	The Board of Aldermen during their meeting heard from citizens regarding concerns about the proposed road design. The Board of Aldermen authorized Mayor Nelson to forward a letter to NCDOT and the Town's legislative delegation requesting additional information and reconsideration of the widening project.
December 4, 2001	Town officials met with State officials in Raleigh to discuss the project. Those in attendance included Mayor Mike Nelson, Senator Eleanor Kinnaird, Board of Transportation member Doug Galyon, Town Manager Robert Morgan, Deputy State Highway Administrator Len Hill, and Division Engineer Mike Mills. At the close of the meeting, Mr. Galyon said that the State recognizes that Orange County is different and unique and would try to accommodate local desires in every way possible as long as good, safe transportation practices will continue.
January 7, 2002	Meeting between town officials and NCDOT staff to discuss the comments from the October 25 public hearing and to determine additional actions to be taken by NCDOT staff. Attendees included Mayor Mike Nelson, Alderman Alex Zaffron, Town Manager Robert Morgan, Deputy State Highway Administrator Len Hill, and Division Engineer Mike Mills. It was determined that additional information was needed to address many of the issues and an interim plan of action was developed. The State prepared a written summary of this meeting, entitled the Interim Post Hearing Response
May 21, 2002,	Town staff sent a follow-up letter to the State, noting several additional issues that were discussed at the Post Public Hearing Meeting but were not referenced in the Interim Post Hearing Response.
August 15, 2002	Meeting between town officials and NCDOT staff to review revised traffic projections and analysis of level of service for intersections and the road corridor.
August 20, 2002	The Carrboro Town Manager, Police Chief, Fire Chief, Deputy Fire Chief and representatives from the Planning Department meet to discuss the emergency response and public safety issues related to Smith Level Road.
October 15, 2002	A joint worksession was held with the Transportation Advisory Board (TAB) to meet with NCDOT staff and review the information that has been compiled. Following the joint worksession, the Board of Aldermen adopted a resolution accepting the report and referring it to Town staff and the TAB for a recommendation within 30 days.
November 21, 2002	The Transportation Advisory Board adopted a resolution which recommends that the Board of Aldermen reject NCDOT's proposal for widening Smith Level Road to four lanes and also provides additional comments on the project.
February 11, 2003	The Board of Aldermen discussed the proposed widening of Smith Level Road and reviewed three options identified by Town staff. The Board adopted a

	resolution indicating that the Town will propose an alternative to the four-lane design proposed by NCDOT.
March 18, 2003	The Board of Aldermen adopted a resolution requesting that the N.C. Department of Transportation consider an alternative design for the proposed modifications to Smith Level Road between Morgan Creek and Rock Haven Road.
June 28, 2004	Meeting between town and county officials, NCDOT staff, and Board Member Doug Galyon to discuss the project. Mr. Galyon requested that NCDOT staff prepare revised traffic projections and analysis of level of service for intersections and the road corridor.
January 5, 2005	Meeting between town officials, NCDOT staff, and Board Member Doug Galyon to review revised traffic projections and analysis of level of service for intersections and the road corridor. NCDOT proposes an alternative to the four-lane, median divided design.
April 26, 2005	Board of Alderman adopted a resolution: 1) to accept a three-lane cross-section that includes curb and gutter, bike lanes, and sidewalks on both sides, and 2) that NCDOT be requested to use Moving Ahead funds set aside for Smith Level Road for improvements to Homestead Road.
May 3, 2005	Carrboro Town Manager sent a letter to Mr. Douglas Galyon, outlining the above resolution.
June 20, 2006	Residents of south Orange County submit a request to the Board of Aldermen to create a Smith Level Road Task Force.
August 9, 2006	Carrboro Town Manager sent a letter to Ms. Deborah Barbour, NCDOT Dir. of Preconstruction, requesting TIP Project U-2803 to be completed as soon as possible, given the 2007 opening of the new high school.
August 15, 2006	The Board of Alderman passed a resolution to accept Chapel Hill's report on the Morgan Creek Trail conceptual plan, and requested that the Carrboro town staff prepare a report on how to accommodate the Carrboro portion of the plan for Board consideration; this may include some treatment relevant to Smith Level Road.
September 5, 2006	The Board of Aldermen passed a motion to establish the Smith Level Road Task Force.
September 29, 2006	The Smith Level Task Force convened for its first meeting.
December 11, 2006	Mr. Galyon replied to the August 9, 2006 request to move forward with TIP Project U-2803, requesting a date be set for a meeting with Town staff and NCDOT staff to discuss.
February 27, 2007	Town of Carrboro officials and NCDOT staff met to discuss Smith Level road improvements. At the meeting, Mayor Chilton asked NCDOT to investigate a roundabout at the intersection of Smith Level Road and Rock Haven Road.

March 20, 2007	Mr. Gregory Thorpe, from NCDOT, contacted Mayor Chilton (via letter) to inform the Town that NCDOT would be restarting TIP Project U-2803, specifically the development, environmental and engineering studies for the project. The letter also informed the Town that a scoping meeting for the project is set to be scheduled.
April 4, 2007	NCDOT sent an updated preliminary design to Town Staff. The design included 3 cross-sections: A) 3-lane curb and gutter facility with 4-ft. bike lanes from Rock Haven to Culbreth; B) 4-lane curb and gutter facility with 4-ft. bike lanes from Culbreth to BPW; and C) 4-lane divided facility with median and 4 ft. bike lanes from BPW to project end at bridge over Morgan Creek. The requested roundabout at Rock Haven and Smith Level was also included in the preliminary design.
April 20, 2007	Town Staff responded to Mr. Thorpe's letter from March 20, 2007.
May 9, 2007	The project scoping meeting was held at NCDOT, with attendance from Town Staff and NCDOT staff. Staff was informed that the project has been placed on an accelerated schedule that, if all deadlines are met, will allow construction to begin in FY 2011, rather than 2012.
June 19 2007	Staff presented revised plans for the preliminary design of U-2803 to the Board of Aldermen. The Board generated a list of questions for staff to forward to NCDOT. These were sent to NCDOT in a letter dated July 18, 2007.
November 5, 2007	NCDOT held a public workshop for the U-2803 project. The workshop was held at Carrboro High School. NCDOT shared the current design and solicited feedback from citizens.
September 2, 2008	Staff presented to the Board of Aldermen the response from NCDOT to their questions from June 2007.
December 1, 2008	The Town of Carrboro received the completed Environmental Assessment for U-2803.
December 15, 2008	NCDOT staff held a meeting to plan for a public workshop on preliminary design and findings of environmental assessment for project.
March 9, 2009	NCDOT held a public hearing at Carrboro Elementary for the revised preliminary design.
April 21, 2009	Board of Aldermen held a public hearing on the preliminary design for the STIP Project U-2803
April 28, 2009	NCDOT staff held a post-public hearing meeting to discuss comments received. NCDOT indicated that it would like to receive comments from the Town by July 1.

June 2, 2009	Board of Aldermen discussed the response from NCDOT to public hearing comments and adopted a resolution stating Town's interest in two travel lanes, sidewalks, bike lanes and other safety improvements necessary to create a pedestrian and bicycle friendly corridor.
June 22, 2009	Board's resolution was forwarded to NCDOT staff.
June 24, 2009	DCHC MPO TCC voted to recommend that the TAC support Carrboro's position on Smith Level Road.
July 31, 2009	Town received letter from Secretary Conti indicating that the project would be discontinued if the Town does not support NCDOT's current design.
December 9, 2009	Meeting between Town elected officials, TAB chair, Town staff, NCDOT COO Gen. Jim Trogdon and other staff, former Board Member Doug Galyon, and Speaker of the House Joe Hackney at the state legislative building. NCDOT presented several alternative cross-sections for the northern portion of the project, including a 2-lane, median-divided cross-section.
March 17, 2010	Meeting between Town elected officials, Town staff, and NCDOT to review revised design. The design included a 3-lane section from Rock Haven Rd. to BPW Club Rd. and a 2-lane, median-divided section from BPW Club Rd. to the Morgan Creek Bridge. The design included a roundabout at Rock Haven and sidewalks and bike lanes virtually throughout the corridor. The 2-lane section was designed to accommodate future widening to 4 lanes if needed.
April 27, 2010	Town and NCDOT held a public hearing on the revised design at Town Hall. The Board of Aldermen referred several questions about the plans to Town staff.
May 27, 2010	Town staff and NCDOT held a post-public hearing meeting.