Appendix A: Traffic Information Update

RaganSmith

Memorandum

TO:	Scott Niesen, PE Vice President, RaganSmith	FROM:	Brandon Baxter, PE, PTOE Senior Associate Traffic Engineering Practice Leader
		DATE:	August 31, 2022
		REFERENCE:	Central Avenue Extension Traffic Information Update
		JOB NUMBER:	11058-9409

The purpose of this memorandum is to provide additional and updated information related to traffic considerations of the proposed Central Avenue extension in the city of Chattanooga, Tennessee. The contents of this memorandum will include a list of traffic-related background information, a review of traffic and safety related impacts, and an assessment of emergency vehicle routes for the project alternatives and existing street network. This memorandum will supplement the consideration of alternatives that are being reviewed in the Section 4(f) document.

Background Information

The Central Avenue extension from E 3rd Street to Riverside Drive has been studied and reviewed multiple times since the Transportation Planning Report (TPR) for the project was prepared in 2008. A list and brief description of the studies and reviews is provided below.

- March 2008 – The Central Avenue Corridor Study TPR was completed in 2008 and included a review of traffic and safety information consisting of traffic counts, traffic redistribution, signal warrant evaluation, and intersection capacity analysis.

- August 2017 – The Chattanooga Hamilton County Regional Planning Agency provided information from a scenario in the long-range transportation model that included an assessment and forecast of future traffic flow on the Central Avenue extension.

- June 2018 – RaganSmith prepared updated traffic forecasts for the Central Avenue extension based on traffic count data from 2016 and 2017, a traffic impact study of a proposed development near the project, and the Chattanooga Hamilton County Regional Planning Agency.

- September 2021 – RaganSmith reviewed the traffic forecasts prepared in June 2018 and determined that based on information from the Chattanooga-Hamilton County/North Georgia TPO and the Chattanooga Area Chamber of Commerce there was not a need to update the future traffic forecasts.

Traffic Review

The Chattanooga Hamilton County Regional Planning Agency 2045 long-range transportation model indicates that the Central Avenue extension would have an average daily traffic (ADT) flow of approximately 13,400 vehicles per day. As discussed in the TPR, the extension of Central Avenue would be expected to reduce the traffic volumes on existing routes that are used to travel between Riverside Drive, E 3rd Street, and the existing portion of Central Avenue. These existing routes currently have ADTs between 11,000 and 25,000 vehicles per day and it is reasonable to expect that the establishment of a new route that would be attractive to approximately 13,400 vehicles per day would reduce traffic volumes and improve traffic operations on the existing routes.

Preferred build alternative K3 and alternatives A, A+, B, B+, C, F, H, I, and K4 would have a similar traffic flow attractiveness because they provide an extension of Central Avenue from E 3rd Street to Riverside Drive. A factor in this route's attractiveness is that Central Avenue south of E 3rd Street is a logical termini because it is a minor arterial street with an ADT between 8,300 and 11,900 vehicles per day and it provides 1 of only 8 street crossings of the Norfolk Southern and CSX railroad corridor over almost 7 miles between Interstate 24 and the Tennessee River. It is important to note that while the avoidance alternatives D, E, G, and J do connect to Riverside Drive, none of them do so as an extension of Central Avenue. The indirect connection that the avoidance alternatives provide to Riverside Drive from existing Central Avenue would be less attractive and, therefore, would provide less benefit to traffic flow in the area than an extension of Central Avenue.

Safety Review

From a safety perspective, the preferred build alternative K3 and alternatives A, A+, B, B+, C, F, H, I, and K4 would extend an existing arterial street where vehicular traffic is expected and where the coexistence of different modes of travel has either been in place for many years or can be planned for and accommodated by providing appropriate facilities on a new roadway alignment via the extension of Central Avenue.

The avoidance alternatives D, E, G, and J utilize portions of existing local streets where an increase in through and emergency traffic due to a new roadway connection could be disruptive and cause conflicts with mobility patterns already in place along those routes. The Siskin Hospital for Physical Rehabilitation on Siskin Drive would be affected by avoidance alternatives E and J that would be adjacent to that facility. In the 2008 Central Avenue Corridor Study TPR, there are documented concerns from Siskin Hospital for Physical Rehabilitation staff related to the safety of patients and impacts of increased traffic adjacent to that facility and in that facility's parking lots. The following is an excerpt from the 2008 TPR related to concerns of Alternate E and that apply to Alternate J.

> *"Field investigation and interviews with Erlanger security personnel identified challenges associated with this alternative. The Siskin extension would provide a connection to Riverside Drive, but access to the hospitals or professional office would be routed through the Siskin parking area to E. 3rd Street.*

> *"It was noted that the Siskin complex includes St. Barnabas, a residential facility for senior citizens and Siskin's Hospital, an in-patient rehabilitation facility. Consequently, this area is frequented by a population of pedestrians whose reaction time may be altered due to age or physical impairment. Security personnel reported ongoing problems with CSAS traffic "taking a shortcut" through the Siskin complex to access the student drop-off area located at the rear of the school. These drivers were perceived to be largely disrespectful of the nature of the complex and its residents. Although this route through the Siskin complex is not open as a public thoroughfare, it remains open because it provides a necessary connection between the St. Barnabas/Siskin complex and Erlanger hospital. Although every precaution has been taken to discourage "through" traffic, this connector drive remains an invitation to unauthorized vehicles avoiding E. 3rd Street traffic.*
>
> *"A review of this information indicates the extension of Siskin Drive to Riverside Drive would compound these particular problems. The connector would likely increase the volume of school traffic through this area and the safe and efficient movement of hospital traffic through this area would be problematic. It is likely there would be increased pedestrian conflicts. In addition, any public thoroughfare through this area would likely reduce employee and residential parking, already at a premium within the Erlanger complex. The proposed facility would not give direct access to the hospital complex, but rather to E. 3rd Street where traffic would continue on to a destination from there. After reviewing this information, it was determined that further evaluation of this alternative was not considered appropriate at this time."*

As was determined in 2008, after reviewing this information and the current conditions, we do not believe Alternative E or J can appropriately resolve the safety risks associated with combining Siskin Hospital for Physical Rehabilitation pedestrian traffic with increased through and emergency response traffic.

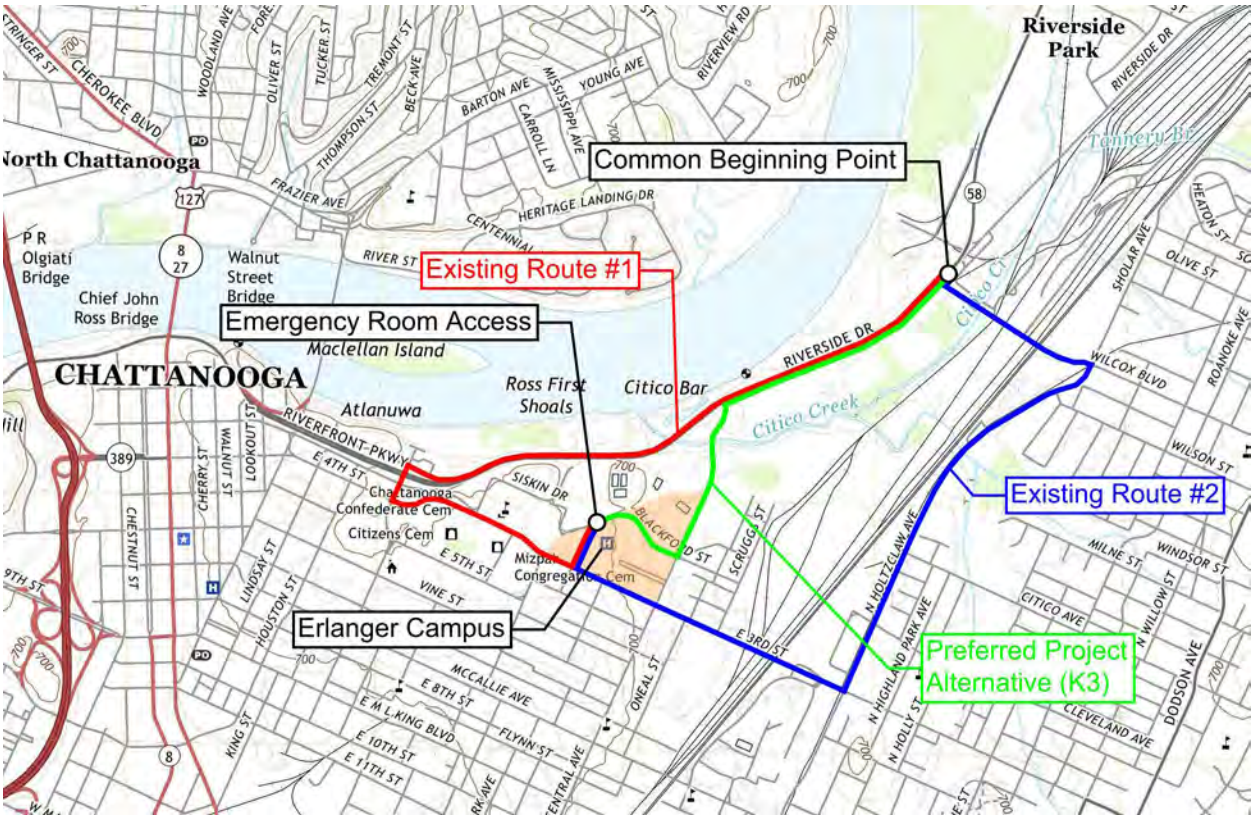
Critical concerns related to the prudence and feasibility of Alternatives D and G including impacts to the Tennessee American Water Company treatment facility, homeland security aspects, and constructability are detailed in the Section 4(f) document.

Emergency Response Time Assessment

The Central Avenue Corridor Study TPR completed in 2008 stated that emergency vehicle routes would be substantially shortened with a connector road between Riverside Drive and the Erlanger complex. To assess the emergency vehicle routes, the preferred project alternative (Alternate K3) and the existing routes utilizing Mabel Street or Holtzclaw Avenue were evaluated to estimate a travel time on each route from a common beginning point to the emergency room access at the Erlanger complex. The common beginning point for each route was established on Riverside Drive at the intersection with Wilcox Boulevard. This location represents the current decision point where drivers from the north on Amnicola Highway must decide which existing route to take to access the Erlanger complex. Additionally, the travel time of the emergency vehicle routes were reviewed based on emergency medical service (EMS) characteristics, which would typically consist of an ambulance traveling with lights and sirens activated, and personal

vehicle travel for medical services, which could include travel to the Erlanger complex for urgent medical services such as childbirth, sports injuries, etc.

The two existing routes that currently provide a connection between Riverside Drive and the Erlanger campus and emergency room access are shown on the map below.



The preferred project alternative (K3) was used for the assessment of emergency vehicle routes because there is not a notable time savings between other build alternatives (A, A+, B, B+, C, F, H, I, and K4) involving the extension of Central Avenue. Table 1 below presents the length and estimated travel time for each existing route, the preferred project alternative (Alternative K3), and the avoidance alternatives D, E, G, and J.

TABLE 1				
EMERGENCY VEHICLE ROUTE ASSESSMENT				
Emergency Vehicle Route	**Length of Route**	**# of Signalized Intersections on Route**	**Estimated Travel Time**	
			EMS Vehicle	**Personal Vehicle**
Existing Route #1	2.2 miles	7	4.1 minutes	6.0 minutes
Existing Route #2	2.4 miles	7	4.6 minutes	6.5 minutes
Preferred Project Alternative K3 (1)	1.3 miles	4	2.8 minutes	4.1 minutes
Alternate D	1.1 miles	4	2.3 minutes	3.4 minutes
Alternate E	1.5 miles	6	3.4 minutes	4.5 minutes
Alternate G	1.2 miles	4	2.5 minutes	3.6 minutes
Alternate J	1.3 miles	4	2.7 minutes	3.9 minutes
(1) Also represents alternatives A, A+, B, B+, C, F, H, I, and K4				

As shown in table 1 above, the impacts to the emergency vehicle routes referred to in the Central Avenue Corridor Study 2008 TPR can be quantified with the preferred project alternative and avoidance alternatives having both shorter distances and travel times and a lower number of signalized intersections encountered than the existing routes.

Summary of Findings

1. The travel time, safety, and emergency response information in this memorandum is intended to supplement the consideration of alternatives that are being reviewed in the Section 4(f) document.

2. There have been multiple reviews of traffic related factors for the Central Avenue extension. This memorandum provides additional and updated information for the project.

3. With logical termini of Riverside Drive and the existing portion of Central Avenue near E 3rd Street, the Central Avenue extension would have an average daily traffic (ADT) flow of approximately 13,400 vehicles per day and would reduce traffic volumes and improve traffic operations on existing routes.

4. The avoidance alternatives E and J would impact the safety elements of the Siskin Hospital for Physical Rehabilitation and context of Blackford Street.

5. The preferred project alternative and avoidance alternatives have shorter distances and travel times and a lower number of signalized intersections encountered than the existing routes from Riverside Drive to the Erlanger campus and emergency room.

Figure 9. Alternatives A through E

LEGEND

- Central Avenue Extension Project (Alt. K3)

Land Use

- Chattanooga School of Arts and Sciences
- Electric Power Board
- Erlanger Health System Campus
- Former Cumberland Corporation
- Lincoln Park Neighborhood
- Norfolk Southern Railroad Property
- Lincoln Park
- Siskin Rehabilitiation Hospital
- Tennessee American Water
- One Riverside Apartments

N

0 250 500 Feet

Figure 10. Avoidance Alternatives

LEGEND

Central Avenue Extension Project (Alt. K3)

Land Use

- Chattanooga School of Arts and Sciences
- Electric Power Board
- Erlanger Health System Campus
- Former Cumberland Corporation
- Lincoln Park Neighborhood
- Norfolk Southern Railroad Property
- Lincoln Park
- Siskin Rehabilitiation Hospital
- Tennessee American Water
- One Riverside Apartments

N

0 250 500 Feet

Figure 11. Alternative A+

LEGEND

Alternative A+

Land Use

- Chattanooga School of Arts and Sciences
- Electric Power Board
- Erlanger Health System Campus
- Former Cumberland Corporation
- Lincoln Park Neighborhood
- Norfolk Southern Railroad Property
- Lincoln Park
- Siskin Rehabilitiation Hospital
- Tennessee American Water
- One Riverside Apartments

N

0 250 500 Feet

Figure 12. Alternative B+

LEGEND

Alternative B+

Land Use

- Chattanooga School of Arts and Sciences
- Electric Power Board
- Erlanger Health System Campus
- Former Cumberland Corporation
- Lincoln Park Neighborhood
- Norfolk Southern Railroad Property
- Lincoln Park
- Siskin Rehabilitiation Hospital
- Tennessee American Water
- One Riverside Apartments

N

0 250 500 Feet

Figure 13. Alternative F

LEGEND

Alternative F

LandUse

- Chattanooga School of Arts and Sciences
- Electric Power Board
- Erlanger Health System Campus
- Former Cumberland Corporation
- Lincoln Park Neighborhood
- Norfolk Southern Railroad Property
- Lincoln Park
- Siskin Rehabilitiation Hospital
- Tennessee American Water
- One Riverside Apartments

N

0 250 500 Feet

Figure 14. Alternative H

LEGEND

Alternative H

LandUse

- Chattanooga School of Arts and Sciences
- Electric Power Board
- Erlanger Health System Campus
- Former Cumberland Corporation
- Lincoln Park Neighborhood
- Norfolk Southern Railroad Property
- Lincoln Park
- Siskin Rehabilitiation Hospital
- Tennessee American Water
- One Riverside Apartments

N

0 250 500 Feet

Figure 15. Alternative I

LEGEND

Alternative I

LandUse

- Chattanooga School of Arts and Sciences
- Electric Power Board
- Erlanger Health System Campus
- Former Cumberland Corporation
- Lincoln Park Neighborhood
- Norfolk Southern Railroad Property
- Former Lincoln Park
- Siskin Rehabilitiation Hospital
- Tennessee American Water
- One Riverside Apartments

N

0 250 500 Feet

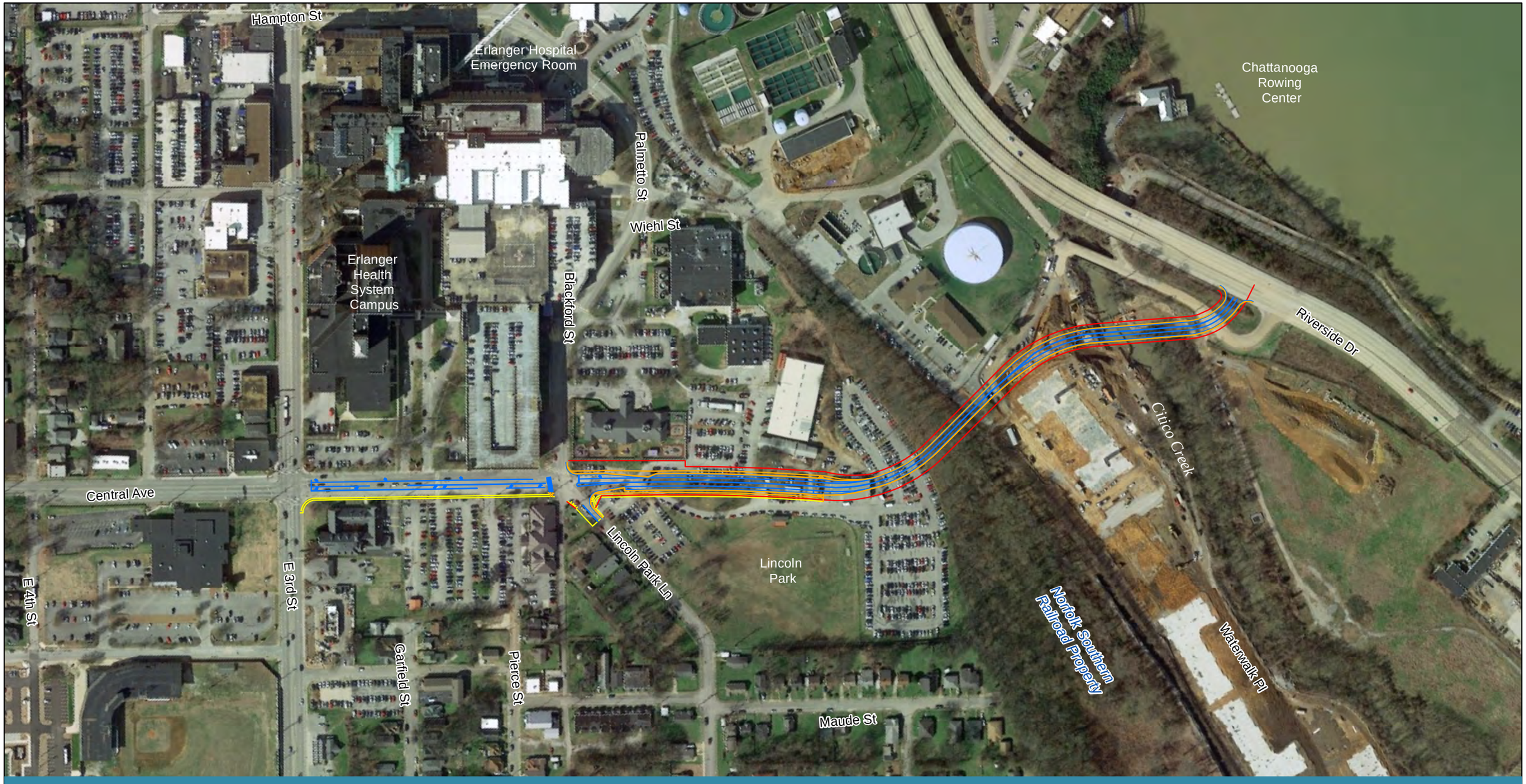


Figure 4. Preferred Build Alternative

LEGEND

Central Avenue Extension Project (Alt. K3)

- Edge of Pavement
- Pavement Markings
- Right-of-Way
- Sidewalk

N

0 500 1,000 Feet

Figure 5. Alternative K4

LEGEND

- Alternative K4
- NRHP-Eligible Boundary Lincoln Park

Land Use

- Chattanooga School of Arts and Sciences
- Electric Power Board
- Erlanger Health System Campus
- Former Cumberland Corporation
- Lincoln Park Neighborhood
- Norfolk Southern Railroad Property
- Lincoln Park
- Siskin Rehabilitiation Hospital
- Tennessee American Water
- One Riverside Apartments

N

0 250 500 Feet

EMS VEHICLE ROUTE ASSESSMENT TO ERLANGER EMERGENCY ROOM

Existing Route #1

Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Riverside Dr at Wilcox Blvd Intersection				8
Riverside Dr between Wilcox Blvd and CSL Plasma Access	0.360	55	24	
Riverside Dr at CSL Plasma Access Intersection				8
Riverside Dr between CSL Plasma Access and Waterwalk Pl	0.326	55	21	
Riverside Dr at Waterwalk Pl Intersection				8
Riverside Dr between Waterwalk Pl and Battery Pl Exit	0.654	55	43	
Battery Pl between Riverside Dr and Mabel St	0.155	35	16	
Battery Pl at Mabel St Intersection				4
Mabel St between Battery Pl and E 3rd St	0.051	35	5	
Mabel St at E 3rd St Intersection				8
Mabel St between E 3rd St and E 4th St	0.045	35	5	
Mabel St at E 4th St Intersection				8
E 4th St between Mabel St and E 3rd St/Siskin Dr	0.220	35	23	
E 4th St at E 3rd St/Siskin Dr Intersection				8
E 3rd St between E 4th St/Siskin Dr and Hampton St	0.275	35	28	
E 3rd St at Hampton St Intersection				8
Hampton St between E 3rd St and Erlanger ER	0.121	20	22	
			Total Route Length (miles) =	**2.207**
			Travel Time (minutes) =	**4.1**

Existing Route #2

Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Riverside Dr at Wilcox Blvd Intersection				8
Wilcox Blvd between Riverside Dr and N Holtzclaw Ave	0.440	40	40	
Wilcox Blvd at N Holtzclaw Ave Intersection				8
N Holtzclaw Ave between Wilcox Blvd and Citico Ave	0.691	50	50	
N Holtzclaw Ave at Citico Ave Intersection				8
N Holtzclaw Ave between Citico Ave and E 3rd St	0.379	45	30	
N Holtzclaw Ave at E 3rd St Intersection				8
E 3rd St between N Holtzclaw Ave and Central Ave	0.520	35	53	
E 3rd St at Central Ave Intersection				8
E 3rd St between Central Ave and Wiehl St	0.140	35	14	
E 3rd St at Wiehl St Intersection				8
E 3rd St between Wiehl St and Hampton St	0.085	35	9	
E 3rd St at Hampton St Intersection				8
Hampton St between E 3rd St and Erlanger ER	0.121	20	22	
			Total Route Length (miles) =	**2.376**
			Travel Time (minutes) =	**4.6**

Preferred Build Alternative K3 [1]

Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Riverside Dr at Wilcox Blvd Intersection				8
Riverside Dr between Wilcox Blvd and CSL Plasma Access	0.360	55	24	
Riverside Dr at CSL Plasma Access Intersection				8
Riverside Dr between CSL Plasma Access and Central Ave Extension	0.350	55	23	
Riverside Dr at Central Ave Extension Intersection				8
Central Ave Extension between Riverside Dr and Blackford St	0.370	30	44	
Central Ave Extension at Blackford St Intersection				8
Blackford Ave between Central Ave Extension and Erlanger ER	0.252	20	45	
			Total Route Length (miles) =	**1.332**
			Travel Time (minutes) =	**2.8**

[1] Also applicable to Alternatives A, A+, B, B+, C, F, H, I, and K4

EMS VEHICLE ROUTE ASSESSMENT TO ERLANGER EMERGENCY ROOM

Alternative D

Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Riverside Dr at Wilcox Blvd Intersection				8
Riverside Dr between Wilcox Blvd and CSL Plasma Access	0.360	55	24	
Riverside Dr at CSL Plasma Access Intersection				8
Riverside Dr between CSL Plasma Access and Waterwalk Pl	0.326	55	21	
Riverside Dr at Waterwalk Pl Intersection				8
Riverside Dr between Waterwalk Pl and Wiehl St Extension	0.173	55	11	
Riverside Dr at Wiehl St Extension Intersection				8
Wiehl St Extension between Riverside Dr and Blackford St	0.175	30	21	
Wiehl St at Blackford St Intersection				8
Blackford St between Wiehl St and Erlanger ER	0.099	20	18	
			Total Route Length (miles) =	**1.133**
			Travel Time (minutes) =	**2.3**

Alternative E

Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Riverside Dr at Wilcox Blvd Intersection				8
Riverside Dr between Wilcox Blvd and CSL Plasma Access	0.360	55	24	
Riverside Dr at CSL Plasma Access Intersection				8
Riverside Dr between CSL Plasma Access and Waterwalk Pl	0.326	55	21	
Riverside Dr at Waterwalk Pl Intersection				8
Riverside Dr between Waterwalk Pl and Siskin Dr Extension	0.369	55	24	
Riverside Dr at Siskin Dr Extension Intersection				8
Siskin Dr Extension between Riverside Dr and E 3rd St	0.265	30	32	
Siskin Dr Extension at E 3rd St Intersection				25
E 3rd St between Palmetto St/Siskin Dr Extension and Hampton St	0.077	35	8	
E 3rd St at Hampton St Intersection				14
Hampton St between E 3rd St and Erlanger ER	0.121	20	22	
			Total Route Length (miles) =	**1.518**
			Travel Time (minutes) =	**3.4**

Alternative G

Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Riverside Dr at Wilcox Blvd Intersection				8
Riverside Dr between Wilcox Blvd and CSL Plasma Access	0.360	55	24	
Riverside Dr at CSL Plasma Access Intersection				8
Riverside Dr between CSL Plasma Access and Waterwalk Pl	0.326	55	21	
Riverside Dr at Waterwalk Pl Intersection				8
Riverside Dr between Waterwalk Pl and Wiehl St Extension	0.108	55	7	
Riverside Dr at Wiehl St Extension Intersection				8
Wiehl St Extension between Riverside Dr and Blackford St	0.306	30	37	
Wiehl St at Blackford St Intersection				8
Blackford St between Wiehl St and Erlanger ER	0.099	20	18	
			Total Route Length (miles) =	**1.199**
			Travel Time (minutes) =	**2.5**

Alternative J

Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Riverside Dr at Wilcox Blvd Intersection				8
Riverside Dr between Wilcox Blvd and CSL Plasma Access	0.360	55	24	
Riverside Dr at CSL Plasma Access Intersection				8
Riverside Dr between CSL Plasma Access and Waterwalk Pl	0.326	55	21	
Riverside Dr at Waterwalk Pl Intersection				8
Riverside Dr between Waterwalk Pl and Siskin Dr Extension	0.369	55	24	
Riverside Dr at Siskin Dr Extension Intersection				8
Siskin Dr Extension between Riverside Dr and Siskin Rehab Pvt Dr	0.068	30	8	
Siskin Dr Extension at Siskin Rehab Pvt Dr Intersection				8
Siskin Rehab Pvt Dr between Siskin Dr Extension and Blackford St	0.153	20	28	
Siskin Rehab Pvt Dr at Blackford St Intersection				8
Blackford St between Siskin Rehab Pvt Dr and Erlanger ER	0.039	20	7	
			Total Route Length (miles) =	**1.315**
			Travel Time (minutes) =	**2.7**

PERSONAL VEHICLE ROUTE ASSESSMENT TO ERLANGER EMERGENCY ROOM

	Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Existing Route #1	Riverside Dr at Wilcox Blvd Intersection				25
	Riverside Dr between Wilcox Blvd and CSL Plasma Access	0.360	50	26	
	Riverside Dr at CSL Plasma Access Intersection				15
	Riverside Dr between CSL Plasma Access and Waterwalk Pl	0.326	50	23	
	Riverside Dr at Waterwalk Pl Intersection				15
	Riverside Dr between Waterwalk Pl and Battery Pl Exit	0.654	50	47	
	Battery Pl between Riverside Dr and Mabel St	0.155	30	19	
	Battery Pl at Mabel St Intersection				4
	Mabel St between Battery Pl and E 3rd St	0.051	30	6	
	Mabel St at E 3rd St Intersection				27
	Mabel St between E 3rd St and E 4th St	0.045	30	5	
	Mabel St at E 4th St Intersection				28
	E 4th St between Mabel St and E 3rd St/Siskin Dr	0.220	30	26	
	E 4th St at E 3rd St/Siskin Dr Intersection				15
	E 3rd St between E 4th St/Siskin Dr and Hampton St	0.275	30	33	
	E 3rd St at Hampton St Intersection				14
	Hampton St between E 3rd St and Erlanger ER	0.121	15	29	
				Total Route Length (miles) =	**2.207**
				Travel Time (minutes) =	**6.0**

	Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Existing Route #2	Riverside Dr at Wilcox Blvd Intersection				35
	Wilcox Blvd between Riverside Dr and N Holtzclaw Ave	0.440	35	45	
	Wilcox Blvd at N Holtzclaw Ave Intersection				15
	N Holtzclaw Ave between Wilcox Blvd and Citico Ave	0.691	45	55	
	N Holtzclaw Ave at Citico Ave Intersection				15
	N Holtzclaw Ave between Citico Ave and E 3rd St	0.379	40	34	
	N Holtzclaw Ave at E 3rd St Intersection				25
	E 3rd St between N Holtzclaw Ave and Central Ave	0.520	30	62	
	E 3rd St at Central Ave Intersection				28
	E 3rd St between Central Ave and Wiehl St	0.140	30	17	
	E 3rd St at Wiehl St Intersection				7
	E 3rd St between Wiehl St and Hampton St	0.085	30	10	
	E 3rd St at Hampton St Intersection				14
	Hampton St between E 3rd St and Erlanger ER	0.121	15	29	
				Total Route Length (miles) =	**2.376**
				Travel Time (minutes) =	**6.5**

	Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Preferred Build Alternative K3 [1]	Riverside Dr at Wilcox Blvd Intersection				25
	Riverside Dr between Wilcox Blvd and CSL Plasma Access	0.360	50	26	
	Riverside Dr at CSL Plasma Access Intersection				15
	Riverside Dr between CSL Plasma Access and Central Ave Extension	0.350	50	25	
	Riverside Dr at Central Ave Extension Intersection				28
	Central Ave Extension between Riverside Dr and Blackford St	0.370	25	53	
	Central Ave Extension at Blackford St Intersection				15
	Blackford Ave between Central Ave Extension and Erlanger ER	0.252	15	60	
				Total Route Length (miles) =	**1.332**
				Travel Time (minutes) =	**4.1**

[1] Also applicable to Alternatives A, A+, B, B+, C, F, H, I, and K4

PERSONAL VEHICLE ROUTE ASSESSMENT TO ERLANGER EMERGENCY ROOM

Alternative D

Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Riverside Dr at Wilcox Blvd Intersection				25
Riverside Dr between Wilcox Blvd and CSL Plasma Access	0.360	50	26	
Riverside Dr at CSL Plasma Access Intersection				15
Riverside Dr between CSL Plasma Access and Waterwalk Pl	0.326	50	23	
Riverside Dr at Waterwalk Pl Intersection				15
Riverside Dr between Waterwalk Pl and Wiehl St Extension	0.173	50	12	
Riverside Dr at Wiehl St Extension Intersection				25
Wiehl St Extension between Riverside Dr and Blackford St	0.175	25	25	
Wiehl St at Blackford St Intersection				15
Blackford St between Wiehl St and Erlanger ER	0.099	15	24	
			Total Route Length (miles) =	**1.133**
			Travel Time (minutes) =	**3.4**

Alternative E

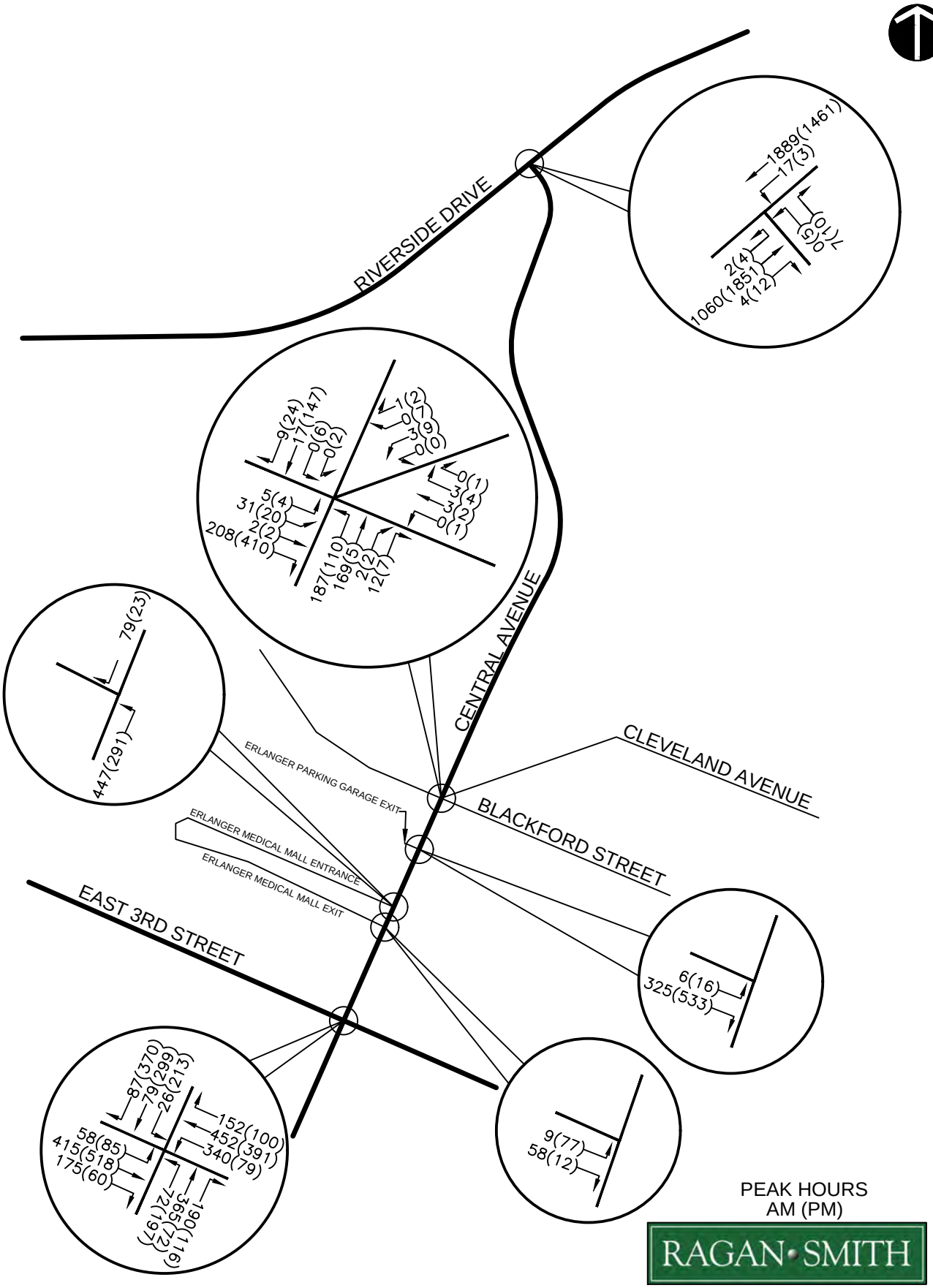
Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Riverside Dr at Wilcox Blvd Intersection				25
Riverside Dr between Wilcox Blvd and CSL Plasma Access	0.360	50	26	
Riverside Dr at CSL Plasma Access Intersection				15
Riverside Dr between CSL Plasma Access and Waterwalk Pl	0.326	50	23	
Riverside Dr at Waterwalk Pl Intersection				15
Riverside Dr between Waterwalk Pl and Siskin Dr Extension	0.369	50	27	
Riverside Dr at Siskin Dr Extension Intersection				25
Siskin Dr Extension between Riverside Dr and E 3rd St	0.265	25	38	
Siskin Dr Extension at E 3rd St Intersection				25
E 3rd St between Palmetto St/Siskin Dr Extension and Hampton St	0.077	30	9	
E 3rd St at Hampton St Intersection				14
Hampton St between E 3rd St and Erlanger ER	0.121	15	29	
			Total Route Length (miles) =	**1.518**
			Travel Time (minutes) =	**4.5**

Alternative G

Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Riverside Dr at Wilcox Blvd Intersection				25
Riverside Dr between Wilcox Blvd and CSL Plasma Access	0.360	50	26	
Riverside Dr at CSL Plasma Access Intersection				15
Riverside Dr between CSL Plasma Access and Waterwalk Pl	0.326	50	23	
Riverside Dr at Waterwalk Pl Intersection				15
Riverside Dr between Waterwalk Pl and Wiehl St Extension	0.108	50	8	
Riverside Dr at Wiehl St Extension Intersection				25
Wiehl St Extension between Riverside Dr and Blackford St	0.306	25	44	
Wiehl St at Blackford St Intersection				10
Blackford St between Wiehl St and Erlanger ER	0.099	15	24	
			Total Route Length (miles) =	**1.199**
			Travel Time (minutes) =	**3.6**

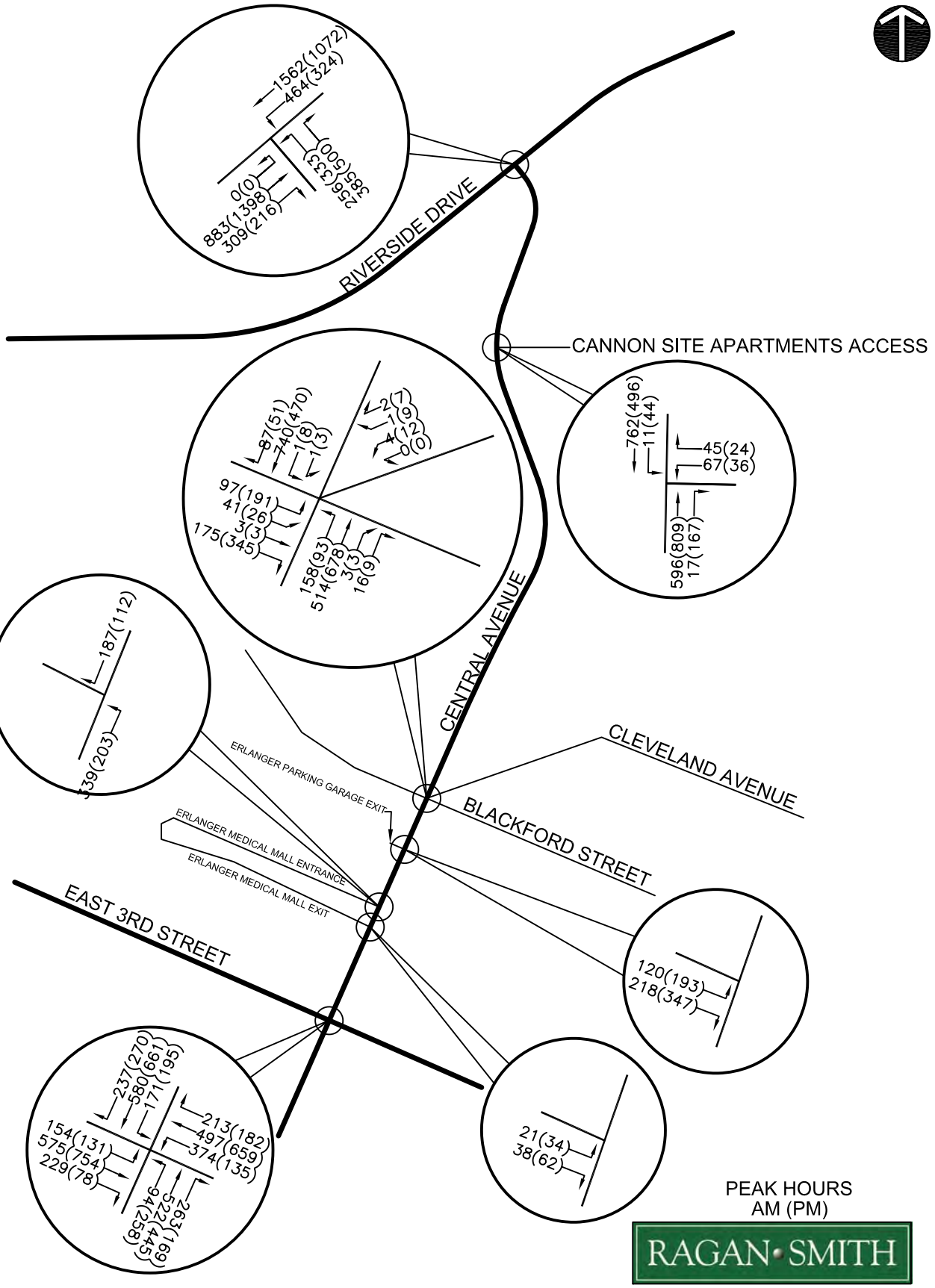
Alternative J

Location/Segment	Length (miles)	Speed (mph)	Segment Travel Time (sec)	Intersection Delay (sec)
Riverside Dr at Wilcox Blvd Intersection				25
Riverside Dr between Wilcox Blvd and CSL Plasma Access	0.360	50	26	
Riverside Dr at CSL Plasma Access Intersection				15
Riverside Dr between CSL Plasma Access and Waterwalk Pl	0.326	50	23	
Riverside Dr at Waterwalk Pl Intersection				15
Riverside Dr between Waterwalk Pl and Siskin Dr Extension	0.369	50	27	
Riverside Dr at Siskin Dr Extension Intersection				25
Siskin Dr Extension between Riverside Dr and Siskin Rehab Pvt Dr	0.068	25	10	
Siskin Dr Extension at Siskin Rehab Pvt Dr Intersection				10
Siskin Rehab Pvt Dr between Siskin Dr Extension and Blackford St	0.153	15	37	
Siskin Rehab Pvt Dr at Blackford St Intersection				10
Blackford St between Siskin Rehab Pvt Dr and Erlanger ER	0.039	15	9	
			Total Route Length (miles) =	**1.315**
			Travel Time (minutes) =	**3.9**



CENTRAL AVENUE
2018 EXISTING TRAFFIC VOLUMES

Figure
1



CENTRAL AVENUE
2045 PROJECTED TRAFFIC VOLUMES

Figure
2

Lanes, Volumes, Timings
4: Central Ave & Blackford St & Cleveland Ave

With Right Turn Lane

Lane Group	EBL2	EBL	EBT	EBR	NBL	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	26	3	343	93	678	3	9	3	8	470	51
Future Volume (vph)	191	26	3	343	93	678	3	9	3	8	470	51
Satd. Flow (prot)	0	1770	1585	0	1770	1857	0	0	0	0	1861	1583
Flt Permitted		0.950			0.211						0.979	
Satd. Flow (perm)	0	1770	1585	0	393	1857	0	0	0	0	1824	1583
Satd. Flow (RTOR)			373			1						220
Lane Group Flow (vph)	0	236	376	0	101	750	0	0	0	0	523	55
Turn Type	Split	Split	NA		pm+pt	NA			Perm	Perm	NA	Perm
Protected Phases	4	4	4		5	2					6	
Permitted Phases					2				6	6		6
Total Split (s)	15.0	15.0	15.0		12.0	45.0			33.0	33.0	33.0	33.0
Total Lost Time (s)		6.3	6.3		5.5	5.3					5.3	5.3
Act Effct Green (s)		8.7	8.7		39.5	39.7					30.1	30.1
Actuated g/C Ratio		0.12	0.12		0.53	0.53					0.40	0.40
v/c Ratio		1.15	0.73		0.31	0.76					0.72	0.07
Control Delay		143.7	13.8		11.6	20.4					30.8	0.1
Queue Delay		0.0	0.0		0.0	0.0					0.0	0.0
Total Delay		143.7	13.8		11.6	20.4					30.8	0.1
LOS		F	B		B	C					C	A
Approach Delay			63.9			19.3					27.8	
Approach LOS			E			B					C	
Queue Length 50th (ft)		~132	1		22	256					319	0
Queue Length 95th (ft)		#264	#105		45	400					m316	m0
Internal Link Dist (ft)			344			65					1060	
Turn Bay Length (ft)		50			50							100
Base Capacity (vph)		205	513		326	983					731	767
Starvation Cap Reductn		0	0		0	0					0	0
Spillback Cap Reductn		0	0		0	0					0	0
Storage Cap Reductn		0	0		0	0					0	0
Reduced v/c Ratio		1.15	0.73		0.31	0.76					0.72	0.07

Intersection Summary

Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of 1st Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.15
Intersection Signal Delay: 34.6 Intersection LOS: C
Intersection Capacity Utilization 106.6% ICU Level of Service G
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Central Ave & Blackford St & Cleveland Ave

With Right Turn Lane

Lane Group	SWL	SWR	SWR2
Lane Configurations			
Traffic Volume (vph)	12	9	7
Future Volume (vph)	12	9	7
Satd. Flow (prot)	1681	0	0
Flt Permitted	0.979		
Satd. Flow (perm)	1681	0	0
Satd. Flow (RTOR)	205		
Lane Group Flow (vph)	31	0	0
Turn Type	Prot		
Protected Phases	8		
Permitted Phases			
Total Split (s)	15.0		
Total Lost Time (s)	6.3		
Act Effct Green (s)	8.7		
Actuated g/C Ratio	0.12		
v/c Ratio	0.08		
Control Delay	0.4		
Queue Delay	0.0		
Total Delay	0.4		
LOS	A		
Approach Delay	0.4		
Approach LOS	A		
Queue Length 50th (ft)	0		
Queue Length 95th (ft)	0		
Internal Link Dist (ft)	339		
Turn Bay Length (ft)			
Base Capacity (vph)	376		
Starvation Cap Reductn	0		
Spillback Cap Reductn	0		
Storage Cap Reductn	0		
Reduced v/c Ratio	0.08		

Intersection Summary

Phasings
4: Central Ave & Blackford St & Cleveland Ave

With Right Turn Lane

Lane Group	EBL	EBT	NBL	NBT	SBL2	SBL	SBT	SBR	SWL
Protected Phases	4	4	5	2			6		8
Permitted Phases			2		6	6		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.3	11.3	10.5	10.3	10.3	10.3	10.3	10.3	11.3
Total Split (s)	15.0	15.0	12.0	45.0	33.0	33.0	33.0	33.0	15.0
Total Split (%)	20.0%	20.0%	16.0%	60.0%	44.0%	44.0%	44.0%	44.0%	20.0%
Maximum Green (s)	8.7	8.7	6.5	39.7	27.7	27.7	27.7	27.7	8.7
Yellow Time (s)	3.0	3.0	3.0	3.3	3.3	3.3	3.3	3.3	3.0
All-Red Time (s)	3.3	3.3	2.5	2.0	2.0	2.0	2.0	2.0	3.3
Lead/Lag			Lead		Lag	Lag	Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	C-Max	Max	Max	Max	Max	Max
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	8.7	8.7	6.5	39.7	27.7	27.7	27.7	27.7	8.7
90th %ile Term Code	Max	Max	Max	Coord	Coord	Coord	Coord	Coord	MaxR
70th %ile Green (s)	8.7	8.7	6.5	39.7	27.7	27.7	27.7	27.7	8.7
70th %ile Term Code	Max	Max	Max	Coord	Coord	Coord	Coord	Coord	MaxR
50th %ile Green (s)	8.7	8.7	6.5	39.7	27.7	27.7	27.7	27.7	8.7
50th %ile Term Code	Max	Max	Max	Coord	Coord	Coord	Coord	Coord	MaxR
30th %ile Green (s)	8.7	8.7	6.5	39.7	27.7	27.7	27.7	27.7	8.7
30th %ile Term Code	Max	Max	Max	Coord	Coord	Coord	Coord	Coord	MaxR
10th %ile Green (s)	8.7	8.7	0.0	39.7	39.7	39.7	39.7	39.7	8.7
10th %ile Term Code	Max	Max	Skip	Coord	Coord	Coord	Coord	Coord	MaxR

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of 1st Green
Control Type: Actuated-Coordinated

Queues
4: Central Ave & Blackford St & Cleveland Ave

With Right Turn Lane

Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	SWL
Lane Group Flow (vph)	236	376	101	750	523	55	31
v/c Ratio	1.15	0.73	0.31	0.76	0.72	0.07	0.08
Control Delay	143.7	13.8	11.6	20.4	30.8	0.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	143.7	13.8	11.6	20.4	30.8	0.1	0.4
Queue Length 50th (ft)	~132	1	22	256	319	0	0
Queue Length 95th (ft)	#264	#105	45	400	m316	m0	0
Internal Link Dist (ft)		344		65	1060		339
Turn Bay Length (ft)	50		50			100	
Base Capacity (vph)	205	513	326	983	731	767	376
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.15	0.73	0.31	0.76	0.72	0.07	0.08

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings
4: Central Ave & Blackford St & Cleveland Ave

Without Right Turn Lane

Lane Group	EBL2	EBL	EBT	EBR	NBL	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	26	3	343	93	678	3	9	3	8	470	51
Future Volume (vph)	191	26	3	343	93	678	3	9	3	8	470	51
Satd. Flow (prot)	0	1770	1585	0	1770	1857	0	0	0	0	1837	0
Flt Permitted		0.950			0.254						0.981	
Satd. Flow (perm)	0	1770	1585	0	473	1857	0	0	0	0	1804	0
Satd. Flow (RTOR)			373			1					8	
Lane Group Flow (vph)	0	236	376	0	101	750	0	0	0	0	578	0
Turn Type	Split	Split	NA		pm+pt	NA			Perm	Perm	NA	
Protected Phases	4	4	4		5	2					6	
Permitted Phases					2				6	6		
Total Split (s)	15.0	15.0	15.0		12.0	45.0			33.0	33.0	33.0	
Total Lost Time (s)		6.3	6.3		5.5	5.3					5.3	
Act Effct Green (s)		8.7	8.7		39.5	39.7					30.1	
Actuated g/C Ratio		0.12	0.12		0.53	0.53					0.40	
v/c Ratio		1.15	0.73		0.28	0.76					0.79	
Control Delay		143.7	13.8		11.1	20.4					43.3	
Queue Delay		0.0	0.0		0.0	0.0					0.0	
Total Delay		143.7	13.8		11.1	20.4					43.3	
LOS		F	B		B	C					D	
Approach Delay			63.9			19.3					43.3	
Approach LOS			E			B					D	
Queue Length 50th (ft)		~132	1		22	256					479	
Queue Length 95th (ft)		#264	#105		45	400					m332	
Internal Link Dist (ft)			344			65					1060	
Turn Bay Length (ft)		50			50							
Base Capacity (vph)		205	513		361	983					728	
Starvation Cap Reductn		0	0		0	0					0	
Spillback Cap Reductn		0	0		0	0					0	
Storage Cap Reductn		0	0		0	0					0	
Reduced v/c Ratio		1.15	0.73		0.28	0.76					0.79	

Intersection Summary

Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of 1st Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.15
Intersection Signal Delay: 38.9 Intersection LOS: D
Intersection Capacity Utilization 99.5% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Central Ave & Blackford St & Cleveland Ave

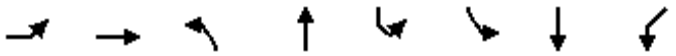
Without Right Turn Lane

Lane Group	SWL	SWR	SWR2
Lane Configurations			
Traffic Volume (vph)	12	9	7
Future Volume (vph)	12	9	7
Satd. Flow (prot)	1681	0	0
Flt Permitted	0.979		
Satd. Flow (perm)	1681	0	0
Satd. Flow (RTOR)	205		
Lane Group Flow (vph)	31	0	0
Turn Type	Prot		
Protected Phases	8		
Permitted Phases			
Total Split (s)	15.0		
Total Lost Time (s)	6.3		
Act Effct Green (s)	8.7		
Actuated g/C Ratio	0.12		
v/c Ratio	0.08		
Control Delay	0.4		
Queue Delay	0.0		
Total Delay	0.4		
LOS	A		
Approach Delay	0.4		
Approach LOS	A		
Queue Length 50th (ft)	0		
Queue Length 95th (ft)	0		
Internal Link Dist (ft)	339		
Turn Bay Length (ft)			
Base Capacity (vph)	376		
Starvation Cap Reductn	0		
Spillback Cap Reductn	0		
Storage Cap Reductn	0		
Reduced v/c Ratio	0.08		

Intersection Summary

Phasings
4: Central Ave & Blackford St & Cleveland Ave

Without Right Turn Lane



Lane Group	EBL	EBT	NBL	NBT	SBL2	SBL	SBT	SWL
Protected Phases	4	4	5	2			6	8
Permitted Phases			2		6	6		
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.3	11.3	10.5	10.3	10.3	10.3	10.3	11.3
Total Split (s)	15.0	15.0	12.0	45.0	33.0	33.0	33.0	15.0
Total Split (%)	20.0%	20.0%	16.0%	60.0%	44.0%	44.0%	44.0%	20.0%
Maximum Green (s)	8.7	8.7	6.5	39.7	27.7	27.7	27.7	8.7
Yellow Time (s)	3.0	3.0	3.0	3.3	3.3	3.3	3.3	3.0
All-Red Time (s)	3.3	3.3	2.5	2.0	2.0	2.0	2.0	3.3
Lead/Lag			Lead		Lag	Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	C-Max	Max	Max	Max	Max
Walk Time (s)								
Flash Dont Walk (s)								
Pedestrian Calls (#/hr)								
90th %ile Green (s)	8.7	8.7	6.5	39.7	27.7	27.7	27.7	8.7
90th %ile Term Code	Max	Max	Max	Coord	Coord	Coord	Coord	MaxR
70th %ile Green (s)	8.7	8.7	6.5	39.7	27.7	27.7	27.7	8.7
70th %ile Term Code	Max	Max	Max	Coord	Coord	Coord	Coord	MaxR
50th %ile Green (s)	8.7	8.7	6.5	39.7	27.7	27.7	27.7	8.7
50th %ile Term Code	Max	Max	Max	Coord	Coord	Coord	Coord	MaxR
30th %ile Green (s)	8.7	8.7	6.5	39.7	27.7	27.7	27.7	8.7
30th %ile Term Code	Max	Max	Max	Coord	Coord	Coord	Coord	MaxR
10th %ile Green (s)	8.7	8.7	0.0	39.7	39.7	39.7	39.7	8.7
10th %ile Term Code	Max	Max	Skip	Coord	Coord	Coord	Coord	MaxR

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of 1st Green
Control Type: Actuated-Coordinated

Queues
4: Central Ave & Blackford St & Cleveland Ave

Without Right Turn Lane

Lane Group	EBL	EBT	NBL	NBT	SBT	SWL
Lane Group Flow (vph)	236	376	101	750	578	31
v/c Ratio	1.15	0.73	0.28	0.76	0.79	0.08
Control Delay	143.7	13.8	11.1	20.4	43.3	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	143.7	13.8	11.1	20.4	43.3	0.4
Queue Length 50th (ft)	~132	1	22	256	479	0
Queue Length 95th (ft)	#264	#105	45	400	m332	0
Internal Link Dist (ft)		344		65	1060	339
Turn Bay Length (ft)	50		50			
Base Capacity (vph)	205	513	361	983	728	376
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.15	0.73	0.28	0.76	0.79	0.08

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.