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# NORTH CAROLINA COMMUNITY TRANSPORTATION SYSTEM TECHNOLOGY IMPLEMENTATION PLANNING

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## Introduction

This technology plan establishes anticipated funding years for three kinds of demand response transportation technologies: 1) Scheduling Software, 2) Tablets, and 3) Maintenance Software. Other technologies will be added as needed.

This plan provides guidance on when money should be budgeted by the state and the local transit agencies. Because there are prerequisites for most of these technologies, this plan should be used to help the transit agencies meet the requirements of each technology before the technologies are funded. See the Project Implementation Timing section for implementation steps.

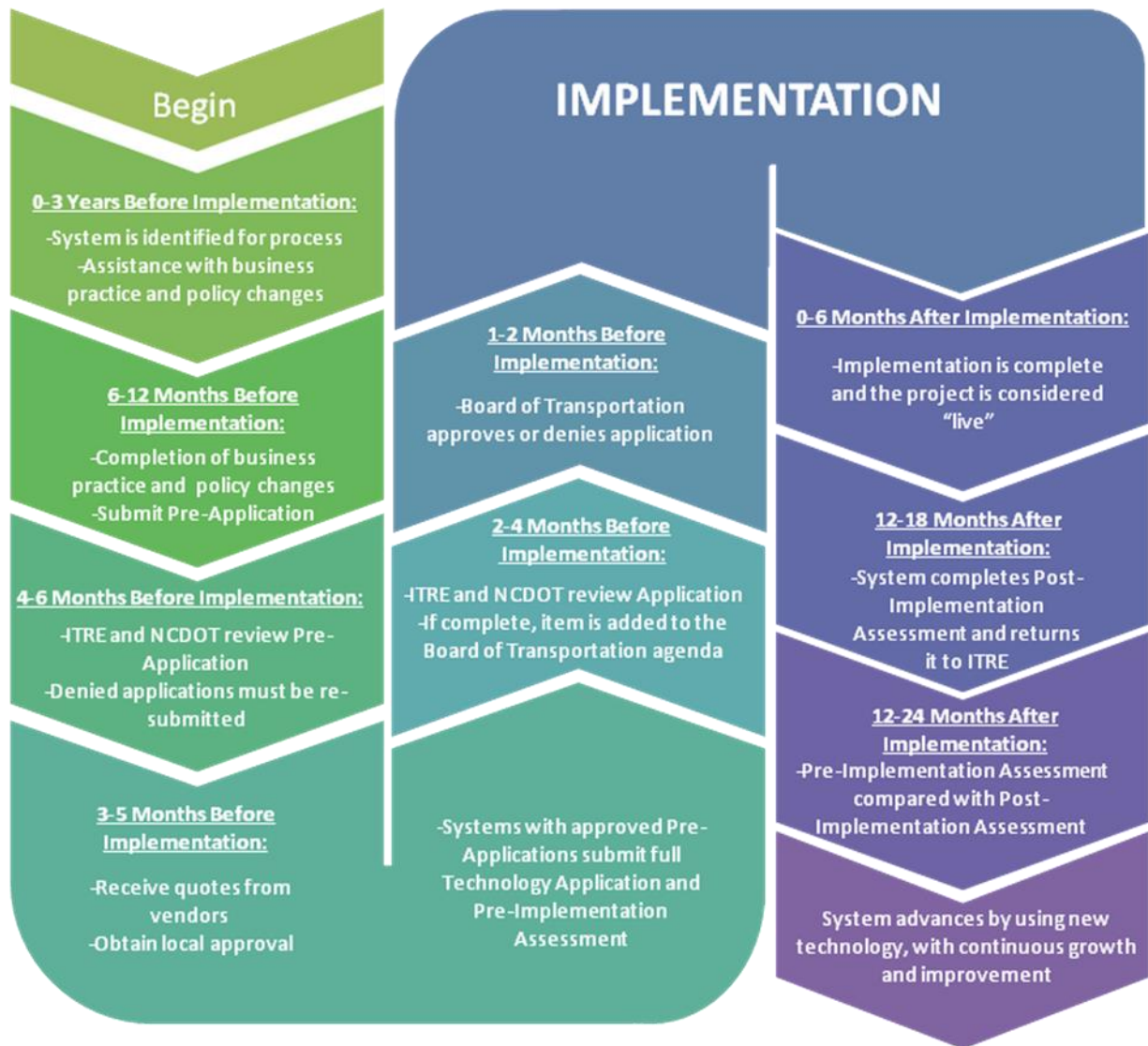
All technology projects must be endorsed by NCDOT and funding must be approved by the North Carolina Board of Transportation or the Federal Transit Administration.

## Project Implementation Timing

This *Technology Implementation Plan* anticipates the next series of technology implementations so transit agencies can make business practice changes to prepare for the technology and make plans to obtain the local match. The timeline and graphic below identify the review requirements and other tasks that must be completed before and after the technology implementation.

	Task	Timing
1.	Systems eligible for technology are identified based on actual and estimated average daily passengers. Systems are contacted to determine if they are interested in proceeding with the technology.	0- 3 years before implementation
2.	Systems proceeding with the technology receive assistance with identifying business practices and policies that may hinder successful implementation. The type of assistance depends on the technology, as listed below: <ul style="list-style-type: none"><li>• Schedule Assistance Software- Manifest and policies review</li><li>• Advanced Scheduling Software- A performance plan specific to the system is created by ITRE and updated annually by the system</li><li>• MDC/AVL- Review to ensure full implementation of the Advanced Scheduling Software.</li></ul>	0-3 years before implementation
3.	The <i>Pre-Application: Community Transportation Advanced Technology Funding</i> document is provided to the identified systems and the systems identify areas that need improvement.	0-3 years before implementation

4.	With the help of NCDOT/PTD and ITRE, systems begin working toward addressing all business practice and policy concerns identified the review in Task 2 and the pre-application in Task 3.	0-3 years before implementation
5.	System completes all necessary business practice and policies changes identified in the review in Task 2 and in the <i>Pre-Application: Community Transportation Advanced Technology Funding</i> document.	6-12 months before implementation
6.	The system submits the completed <i>Pre-Application: Community Transportation Advanced Technology Funding</i> . If Federal funds are requested, the system also submits the grant application at this point.	6-12 months before implementation
7.	ITRE and NCDOT/PTD review the <i>Pre-Application: Community Transportation Advanced Technology Funding</i> and/or the Federal funds grant application and approve or deny the application. Denied applications must address the reasons for denial and resubmit the application, returning to Task 3.	4-6 months before implementation
8.	Approved systems receive the full <i>Community Transportation Technology Application</i> , fill it out completely, and submit it NCDOT/PTD. At this time, systems schedule site visits to view the requested technology.	3-5 months before implementation
9.	NCDOT/PTD and ITRE verify completeness of the application and prepare the Board of Transportation agenda item (if necessary).	2-4 months before implementation
10.	The Board of Transportation approves or denies funding (if necessary).	1-3 months before implementation
11.	Implementation begins.	Implementation
12.	Implementation is complete and the project is 'Live'.	0-6 months after implementation
13.	The system completes a <i>Post-Implementation Assessment</i> and submits it to ITRE.	12-18 months after implementation
14.	ITRE assesses the implementation by comparing the <i>Pre-Implementation Assessment</i> required in the <i>Community Transportation Technology Application</i> with the <i>Post-Implementation Assessment</i> .	12-24 months after implementation



### Average Daily Passenger Projections

The purpose of this section is to anticipate when a transit system will cross the required average daily passenger trip threshold to qualify for technology. At 300 average daily passenger trips per weekday, the system becomes eligible for *Advanced Scheduling Software* and *Mobile Data Computer/Automated Vehicle Locator*.

The current year and previous year average daily passenger totals from the Vehicle Utilization Data are compared to achieve an *Actual Growth* rate. Because only two years of data are compared, the *Actual Growth* is tempered by assuming that high growth systems (>10% *growth*) may realize an *Estimated Growth* of 7% over time, moderate growth systems (1-10% *growth*) may realize a 4% *Estimated Growth*, and low growth systems (negative or less than 1% *growth*) may realize a 1% *Estimated Growth*. Average daily passenger totals are highlighted in **RED** when they reach 290 trips/day because it is anticipated that the system may potentially cross the threshold in the next fiscal year.

Growth projections should be updated annually, based on the most current data available.

**Table 1. Average Daily Passengers Projections**

System	Type	Avg Daily Passengers		Growth Rate		Estimated Avg Daily Passengers				
		FY13	FY14	Actual	Estimated <sup>1</sup>	FY15	FY16	FY17	FY18	FY19
Alamance- ACTA	Single	296	295.1	0%	1%	298	301	304	307	310
Alleghany	Single	60	64	7%	4%	67	69	72	75	78
Anson	Single	151	134.4	-11%	1%	136	137	138	140	141
Apple Country	Single	172	157.1	-9%	1%	159	160	162	163	165
ARHS-ICPTA	Regional	595	367.2	-38%	1%	371	375	378	382	386
Ashe	Single	227	213.2	-6%	1%	215	217	220	222	224
Avery	Single	36	123.4	244%	7%	132	141	151	162	173
Beaufort	Single	141	131.4	-7%	1%	133	134	135	137	138
Bladen	Single	104	104.3	1%	1%	105	106	107	109	110
Brunswick	Single	214	207.2	-3%	1%	209	211	213	216	218
Buncombe- MM	Single	680	663.3	-2%	1%	670	677	683	690	697
Cabarrus	Single	298	374.4	26%	7%	401	429	459	491	525
Carteret	Single	247	259.5	5%	4%	270	281	292	304	316
CARTS	Regional	412	385.8	-6%	1%	390	394	397	401	405
Caswell	Single	96	98.2	2%	4%	102	106	110	115	119
Chatham	Single	281	302.9	8%	4%	315	328	341	354	369
Cherokee	Single	250	229.8	-8%	1%	232	234	237	239	242
Clay	Single	116	70.7	-39%	1%	71	72	73	74	74
Cleveland	Single	288	277.9	-4%	1%	281	283	286	289	292
Columbus	Single	150	150	0%	1%	152	153	155	156	158
CPTA	Regional	378	355.9	-6%	1%	359	363	367	370	374
Cumberland	Single				1%	0	0	0	0	0
Dare	Single	70	61.8	-11%	1%	62	63	64	64	65
Davidson	Single	607	564.6	-7%	1%	570	576	582	588	593
Duplin	Single	161	149.5	-7%	1%	151	153	154	156	157
Durham	Single	215	133.4	-38%	1%	135	136	137	139	140
Eastern Band (EBCI)	Single	316	333.4	6%	4%	347	361	375	390	406
Gaston	Single	446	456.2	2%	4%	474	493	513	534	555
Gates	Single	114	110.7	-3%	1%	112	113	114	115	116
Goldsboro/Wayne	Regional	230	218	-5%	1%	220	222	225	227	229
Graham	Single	63	67.8	7%	4%	71	73	76	79	82
Greene	Single	83	81.7	-1%	1%	83	83	84	85	86
Guilford	Single	187	187.3	0%	1%	189	191	193	195	197
Harnett	Single	271	236.4	-13%	1%	239	241	244	246	248
Haywood	Single	164	168.5	3%	4%	175	182	190	197	205
Hoke	Single	303	359.3	19%	7%	384	411	440	471	504
Hyde	Single	83	58.9	-29%	1%	59	60	61	61	62
Iredell	Single	433	496.2	15%	7%	531	568	608	650	696
Jackson	Single	87	104.8	20%	7%	112	120	128	137	147
Johnston	Single	428	418	-2%	1%	422	426	431	435	439
KARTS	Regional	772	785	2%	4%	816	849	883	918	955
Lee	Single	208	252.5	21%	7%	270	289	309	331	354
Lenoir	Single	257	276.3	8%	4%	287	299	311	323	336
Lincoln	Single	310	309.5	0%	1%	313	316	319	322	325
Macon	Single	164	140.8	-14%	1%	142	144	145	147	148
Madison	Single	59	65.1	11%	7%	70	75	80	85	91

**Table 1. Average Daily Passengers Projections (Continued)**

System	Type	Avg Daily Passengers		Growth Rate		Estimated Avg Daily Passengers				
		FY13	FY14	Actual	Estimated <sup>1</sup>	FY15	FY16	FY17	FY18	FY19
Martin	Single	106	104.9	-1%	1%	106	107	108	109	110
McDowell	Single	76	96.9	27%	7%	104	111	119	127	136
Mecklenburg	Single	379	284.6	-25%	1%	287	290	293	296	299
Mitchell*3	Single	385	265.8	-31%	1%	268	271	274	277	279
Moore	Single	300	166.9	-44%	1%	169	170	172	174	175
Nash Edgecombe (Tar River)	Regional	348	349.1	0%	1%	353	356	360	363	367
New Hanover	Single	233	257.8	11%	7%	276	295	316	338	362
Onslow	Single	327	349	7%	4%	363	377	393	408	425
Orange	Single	221	230.9	5%	4%	240	250	260	270	281
Pender	Single	91	110.7	21%	7%	118	127	136	145	155
Person	Single	161	188.6	17%	7%	202	216	231	247	265
Pitt	Single	158	150.3	-5%	1%	152	153	155	156	158
Polk	Single	161	161.3	0%	1%	163	165	166	168	170
Randolph	Regional	273	299.4	10%	4%	311	324	337	350	364
Richmond	Single	238	139.1	-42%	1%	140	142	143	145	146
Rockingham	Single	226	220.3	-2%	1%	223	225	227	229	232
Rowan	Single	429	368.3	-14%	1%	372	376	379	383	387
Rutherford	Single	236	251.4	7%	4%	261	272	283	294	306
Sampson	Single	139	99	-29%	1%	100	101	102	103	104
Scotland	Single	165	149.3	-9%	1%	151	152	154	155	157
SEATS (Robeson)	Single	204	213.3	5%	4%	222	231	240	250	260
Stanly	Single	186	195.5	5%	4%	203	211	220	229	238
Swain	Single	98	59.4	-40%	1%	60	61	61	62	62
Transylvania	Single	86	102.1	19%	7%	109	117	125	134	143
Tyrrell	Single	5	5.5	15%	7%	6	6	7	7	8
Union	Single	495	298.3	-40%	1%	301	304	307	310	314
Wake	Single	418	279.6	-33%	1%	282	285	288	291	294
Washington	Single	124	68.2	-45%	1%	69	70	70	71	72
Watauga (AppalCART)	Single	148	144.1	-3%	1%	146	147	148	150	151
Western Piedmont (WPRTA)	Regional	670	470.1	-30%	1%	475	480	484	489	494
Wilkes	Single	202	196.4	-3%	1%	198	200	202	204	206
Wilson	Single	244	255.7	5%	4%	266	277	288	299	311
Yancey	Single	79	90.7	15%	7%	97	104	111	119	127
YVEDDI	Regional	700	691.8	-1%	1%	699	706	713	720	727

<sup>1</sup> Estimated Growth based on Actual growth between current year and previous 1 year. High growth (>10%) = 7%, Moderate = 4%, Low = 1% (≤ 1%)

<sup>2</sup> Estimated Average Daily Passengers for FY09 = Average Daily Passengers FY08 \* (1+Estimated Growth)

<sup>3</sup> Mitchell County performed special event transportation in August 2013, increasing their average substantially

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## Scheduling Software Implementations

### ***Types of Scheduling Software***

There are two categories of scheduling software addressed in this report. The most basic assists transit systems in scheduling trips, but has no capability for routing. This *Schedule Assistance Software (SA)* includes CTS and TrIP\_Maker, for example.

Homemade software solutions must be independently analyzed to determine if they qualify as *Schedule Assistance Software*. Qualifying Homemade software must:

- Be a relational database
- Minimize data entry errors by allowing the user to select clients, runs, vehicles, drivers, etc.
- Create agency bills
- Accurately report passenger trips, service and revenue miles and hours, and other essential data.

*Schedule Assistance Software* implementations identified in this document are suggestions. There are no minimum requirements for *Schedule Assistance Software* and there is no application or budget approval necessary to implement the software. *Scheduling Assistance Software* implementations are listed in this report to help transportation systems plan for growth and to ensure that the transportation system has successfully implemented a qualifying *Schedule Assistance Software* for at least 3 years before *Advanced Scheduling Software* will be funded. TrIP\_Maker and CTS are common scheduling assistance software packages used in North Carolina.

*Advanced Scheduling Software (AD)* will schedule passengers to vehicles and plan the vehicle's daily route. RouteMatch, StrataGen, HBSS, CTS, and Trapeze are examples of *Advanced Scheduling Software*. Transit systems must meet very specific criteria before being eligible for *Advanced Scheduling Software* to ensure that the software will be fully implemented and used to its maximum potential. The exact criteria are included in the document titled "*Pre-Application: Community Transportation Advanced Technology Funding*."

**Table 2. Anticipated Scheduling Software Installations**

Advanced Scheduling Software (AD)
  Schedule Assistance Software (SA)
  Implementation Year

Advanced Scheduling Software (AD)
  Ineligible

Schedule Assistance Software (SA)
  Timing uncertain

Implementation Year

System	Go Live Year	FY16	FY17	FY18	FY19	FY20	Comments	Review Complete
Alamance- ACTA	FY05							
Alleghany	FY15							
Anson	FY07							
Apple Country	FY15							Y
ARHS-ICPTA	FY01							
Ashe	FY15						Approved Other	Y
Avery	FY14							
Beaufort	FY16	SA						
Bladen	FY06							
Brunswick	FY03							
Buncombe- MM	FY04							Y
Cabarrus	FY09							
Carteret	FY07							
CARTS	FY06							
Caswell	FY12							Y
Chatham	FY08		AD					Y
Cherokee	FY14						VTCLI Funded	
Clay	FY14						VTCLI Funded	
Cleveland	FY11						ARRA Funded	Y
Columbus	FY09						Self-Funded AD	
CPTA	FY01							Y
Cumberland	FY14							
Dare	FY11							Y
Davidson	FY02							
Duplin	FY03							
Durham	FY09						Regional Project	
Eastern Band (EBCI)	FY14							
Gaston	FY09							
Gates	FY15							
Goldsboro/Wayne	FY05							Y
Graham	FY06							
Greene	FY01							Y
Guilford	FY02							
Harnett	FY14							
Haywood	FY14							
Hoke	FY05	AD						Y
Hyde	FY15							
Iredell	FY05							Y
Jackson	FY14							
Johnston	FY12							Y
KARTS	FY04							

**Table 2. Anticipated Scheduling Software Installations (Continued)**

Lee	FY05			AD			Voluntarily Waiting	Y
Lenoir				AD				
Lincoln	FY11						Self-Funded AD	
Macon	FY11						Self-Funded AD	
Madison	FY15							
Martin	FY08							
McDowell	FY15						Not Coordinated	
Mecklenburg	FY08							
Mitchell*3	FY11							
Moore	FY08						Self-Funded AD	
Nash Edgecombe (Tar River)	FY08	XXXX	XXXX	XXXX	XXXX	XXXX	Reverted from AD FY07	Y
New Hanover	FY11						Urban Tech Funds	
Onslow	FY07							
Orange	FY00							
Pender	FY03							
Person	FY04							
Pitt	FY15						Approved Other	
Polk	FY14							
Randolph	FY11						ARRA Funded	Y
Richmond	FY15							
Rockingham	FY04							
Rowan	FY12							Y
Rutherford	FY15							
Sampson	FY07							
Scotland	FY15						Reverted from SA FY09	
SEATS (Robeson)	FY00							Y
Stanly	FY15							
Swain	FY14						VTCLI Funded	
Transylvania	FY06							Y
Tyrrell							OK with no software	
Union	FY05						Self-Funded AD	
Wake	FY04							
Washington	FY11							
Watauga (AppalCART)	FY15						Approved Other	Y
Western Piedmont (WPRTA)	FY09							Y
Wilkes	FY04							Y
Wilson	FY05				AD			Y
Yancey	FY15							
YVEDDI	FY13							



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## Anticipated Tablet/Automatic Vehicle Locator Installations

Tablet/Automatic Vehicle Locator (AVL) installations are an add-on technology for *Advanced Scheduling Software*. All requirements for *Advanced Technology Software* implementations must be met, in addition to the following requirements:

Tablet technologies work with *Advanced Scheduling Software*. Tablets perform many functions to increase productivity and mobility, including:

- Visually display location of transit vehicles, estimated travel speed, estimated arrival times, and passengers currently on the vehicle
- Allow real time updating of driver manifests to add/remove/alter trips as needed
- Assist drivers with directions and routing
- Automatically capture essential trip data, such as odometer readings and times, no shows, and cancellations
- Automatically report trip data to the office

Transit systems must meet very specific criteria before being eligible for *tablets* to ensure that the devices will be fully implemented and used to their maximum potential. The exact criteria are included in the document titled “*Pre-Application: Community Transportation Advanced Technology Funding.*”

Many of the scheduled *tablet* implementations are dependent upon fully implemented installations of *Advanced Scheduling Software*. This plan allows three years for new installations of *Advanced Scheduling Software* to become fully implemented and prepare for *tablet* technology.

**Table 3. Anticipated Tablet Installations**

	MDC/AVL	????	Timing uncertain
	No Timeframe	XXXX	Ineligible
	Funding Year	+++	Voluntarily waiting

System	Go Live Year	FY16	FY17	FY18	FY19	FY20	Comments
Alamance- ACTA	FY15						
Alleghany							
Anson							
Apple Country							
ARHS-ICPTA	FY09						
Ashe							
Avery							
Beaufort							
Bladen							
Brunswick							
Buncombe- MM	FY10						
Cabarrus	FY11						ARRA Funded
Carteret							<300 trips/day
CARTS							
Caswell							
Chatham							
Cherokee	FY14						
Clay	FY14						
Cleveland	FY15						
Columbus							<300 trips/day
CPTA							
Cumberland							No State vehicles
Dare							
Davidson	FY13						
Duplin	FY07						
Durham							<300 trips/day
Eastern Band (EBCI)							3 years after AD
Gaston	FY15						
Gates							
Goldsboro/Wayne							
Graham							
Greene							
Guilford	FY11						ARRA Funded
Harnett							3 years after AD
Haywood							
Hoke							3 years after AD
Hyde							
Iredell	FY09						
Jackson	FY14						
Johnston							3 years after AD
KARTS	FY09						

**Table 3. Anticipated MDC/AVL Installations (Continued)**

Lee							3 years after AD
Lenoir							
Lincoln							3 years after AD
Macon							
Madison							
Martin							
McDowell							
Mecklenburg	FY11						ARRA Funded
Mitchell*3							
Moore							<300 trips/day
Nash Edgecombe (Tar River)		????	????	????	????	????	Needs AD
New Hanover	FY12						3 years after AD
Onslow	FY15						VCTLI funded
Orange							
Pender							
Person							
Pitt							
Polk							
Randolph							<300 trips/day
Richmond							
Rockingham							
Rowan							3 years after AD
Rutherford							
Sampson							
Scotland							
SEATS (Robeson)							3 years after AD
Stanly							
Swain							<300 trips/day
Transylvania							
Tyrrell							
Union	FY13						
Wake	FY09						MPO Funded
Washington							
Watauga (AppalCART)							
Western Piedmont (WPRTA)							Returned ARRA funds
Wilkes							<300 trips/day
Wilson							
Yancey							
YVEDDI							3 years after AD