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Subject: Ridership Projections – Gainesville Streetcar Feasibility Study

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## 1.0 Background

This technical memo addresses the estimated ridership projections associated with the conceptual preferred alignment for a new streetcar line connecting downtown Gainesville with the University of Florida. The routing is shown in Figure 1, and would connect the existing RTS #46 Circulator stop at Rawlings Hall (McCarty Drive) on the UF campus with the Rosa Parks Transfer Station south of downtown. The route would use Newell Drive and Union Road on campus, 2<sup>nd</sup> Avenue east of campus to SE 3<sup>rd</sup> Street, then south to Rosa Parks.

The ridership projections were estimated for an average weekday for the year 2022, an estimated year of opening for a new streetcar line; opening year considers project implementation timelines for streetcar efforts and surrounding major development activities but does not consider the possible implementation schedule of other premium transit services.

## 2.0 Methodology

A four-tier evaluation methodology was employed in the development of the ridership projections:

1. Identify existing stop ridership for applicable existing RTS bus routes which could be diverted to a new two-directional circulator route along 2<sup>nd</sup> Avenue. This would represent a refined base bus circulator ridership if the service were in operation today.
2. Distribute base bus ridership from existing bus stops to assumed streetcar station locations.
3. Identify base population and employment growth in the area to be served by the streetcar routes, to an assumed 2022 year of opening for the streetcar line, translated into added circulator ridership if just projected growth were accommodated.

**Figure 1 - Conceptual Preferred Alignment**







4. Identify added ridership associated with the attractiveness of streetcar, as opposed to local bus, over the base 2022 circulator ridership

Each step in the methodology is further reviewed below:

## 2.1 Existing RTS Ridership

Based on a review of RTS routes serving downtown Gainesville and the University of Florida, it was decided that streetcar ridership if operating today would replace portions of ridership on the existing RTS #46 circulator connecting UF with downtown, as well as a portion of the #1 route ridership, in particular the ridership on that route oriented between the UF and Rosa Parks Transfer Station.<sup>1</sup> Recent (2013) on and off passenger counts from Automatic Passenger Counters (APCs) on board the RTS buses were used to identify existing ridership. Figures 2 and 3 identify the existing stop locations and ridership for the #1 and #46 routes in the study area. Other routes that use only a small portion of 2<sup>nd</sup> Avenue or include extended routing outside of the study area in particular routes #121, #127, #27, #25, and #126, were assumed not to divert any ridership to a new streetcar line.

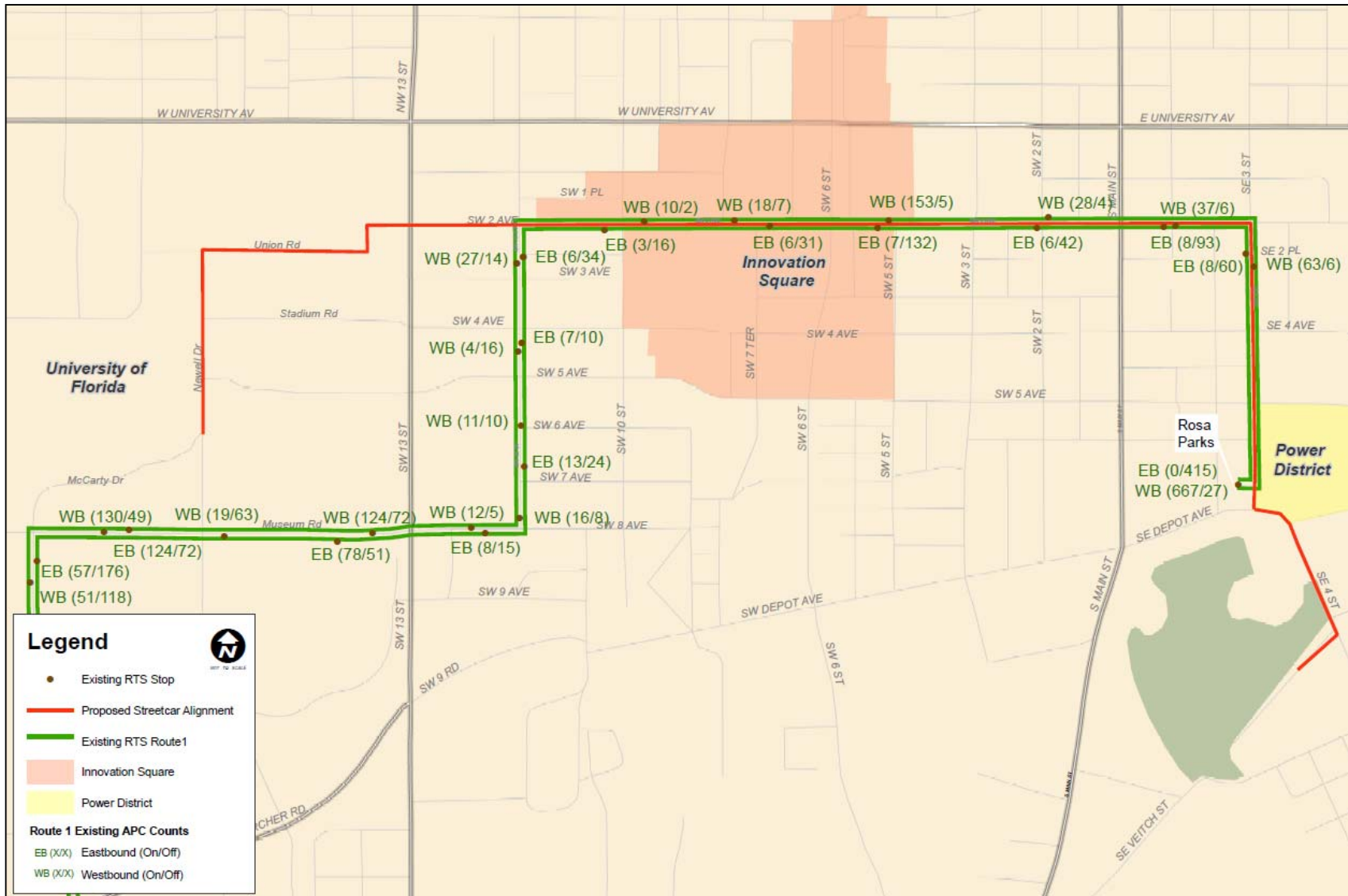
Figure 4 identifies the diverted ridership to a two-directional circulator service along 2<sup>nd</sup> Avenue based on existing conditions if most of the #46 ridership and a portion of the #1 ridership were diverted to a 2<sup>nd</sup> Avenue service. The following diversion assumptions were made:

1. 100% of the ridership along the 2<sup>nd</sup> Avenue leg of the #46 circulator was diverted to a 2<sup>nd</sup> Avenue circulator route, as well as those portions of the #46 on Union Road and Newell Drive.
2. 80% of the ridership along the 4<sup>th</sup> Avenue leg of the #46 circulator east of SW 10<sup>th</sup> Street was diverted to a 2<sup>nd</sup> Avenue circulator route given the proximity to 2<sup>nd</sup> Avenue (remainder of ridership would use the #10 route along 4<sup>th</sup> Avenue).
3. 50% of the #46 circulator ridership at the UF Reitz Union stop and at the stops along SW 8<sup>th</sup> Avenue west of SW 13<sup>th</sup> Street were diverted to a 2<sup>nd</sup> Avenue circulator route.
4. None of the #46 circulator ridership along SW 8<sup>th</sup> Avenue between SW 13<sup>th</sup> Street and SW 10<sup>th</sup> Street were diverted to a 2<sup>nd</sup> Avenue circulator route because the stops would be greater than ¼-mile from the nearest 2<sup>nd</sup> Avenue circulator stop.
5. 22% of the #1 route ridership along 2<sup>nd</sup> Avenue and the northerly section of SW 12<sup>th</sup> Street was diverted to a 2<sup>nd</sup> Avenue circulator route. This percentage was derived from the MTPo regional model person trips which show 22% of trips in the downtown area oriented within downtown and to the UF campus.

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<sup>1</sup> In late Fall the pattern of the #46 route was adjusted to serve Rosa Parks Transfer Station. Due to when this modification occurred it is not reflected in the analysis.

**Figure 2 - Existing Weekday Ridership Route 1**



**Figure 3 - Existing Weekday Ridership Route 46**

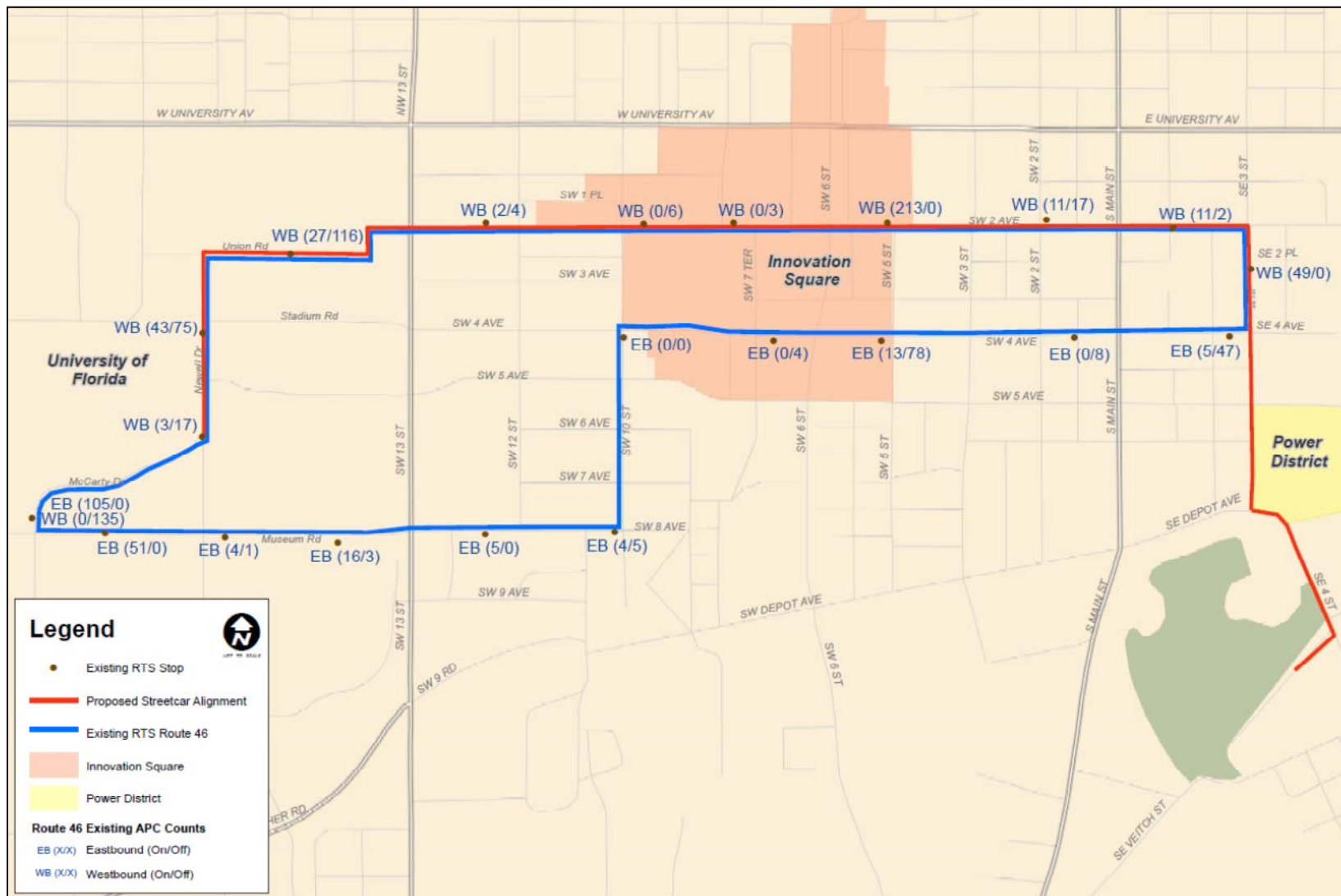
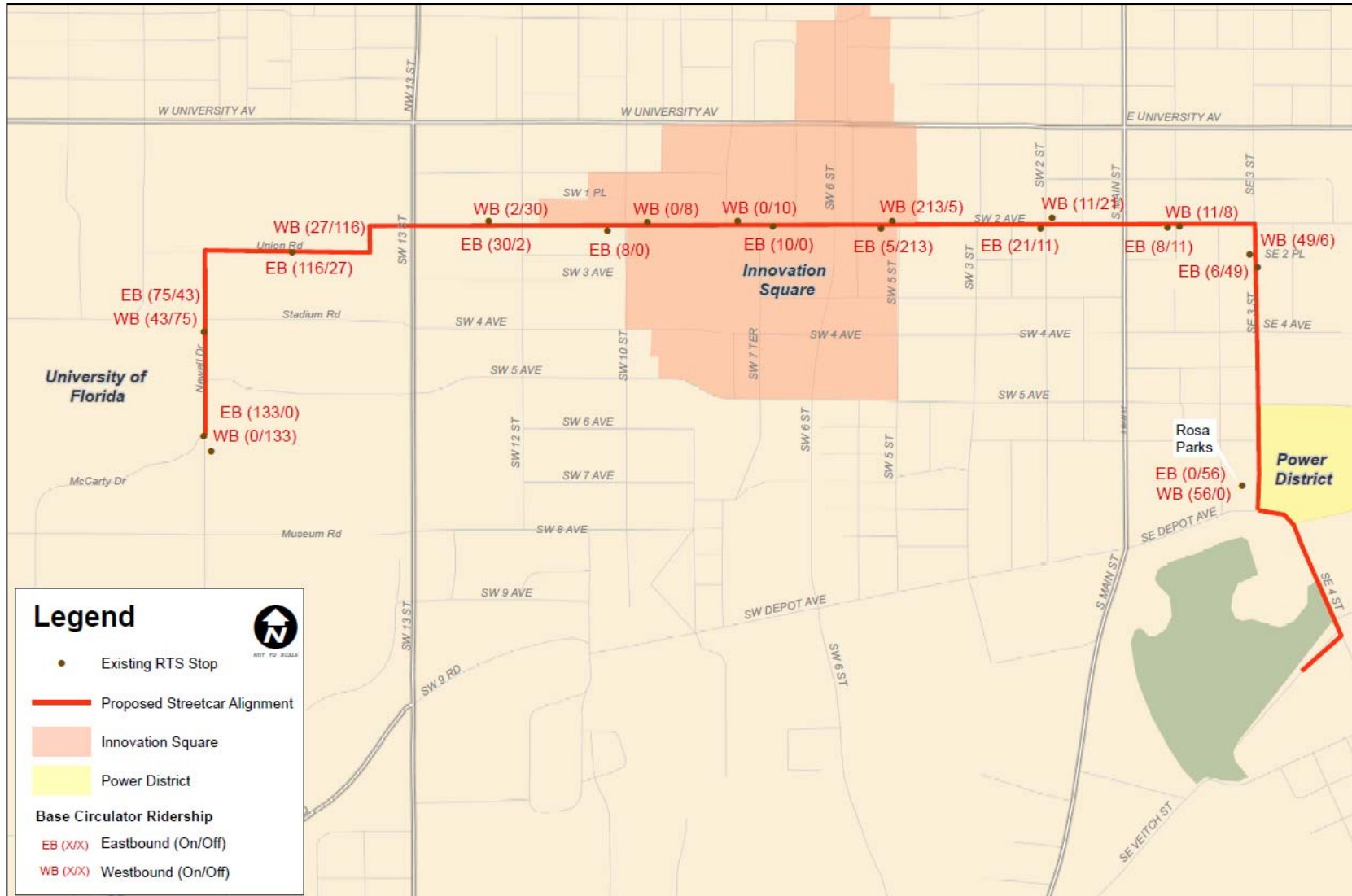




Figure 4 – Diverted Ridership to a Two-Directional Bus Circulator Route on 2<sup>nd</sup> Avenue Under Existing Conditions



Ridership was then adjusted for a 2<sup>nd</sup> Avenue circulator route to reflect the same total number of ons and offs in each direction, and a similar number of offs vs. ons at particular stops, assuming riders would board and alight at the same stop. This balancing was done to assure that subsequent application of growth factors reflecting added development in the area would continue to result in total stop ons and offs along the new circulator route equaling one another.

## 2.2 Distribute Base Bus Ridership to Streetcar Station Locations

It was assumed that a streetcar line along 2<sup>nd</sup> Avenue would have seven stations, as compared to the ten existing bus stops in each direction along 2<sup>nd</sup> Avenue for the existing #46 and #1 services. As such, the base ridership for ten stops was reallocated to the following seven stations<sup>1</sup> (eliminating every other stop of the existing stops along 2nd Avenue and SE 3<sup>rd</sup> Street):

- McCarty Drive
- Newell Drive/Stadium Road (UF)
- East of SW 13<sup>th</sup> Street
- SW 7<sup>th</sup> Terrace (Innovation Square)
- SW 2<sup>nd</sup> Street (Downtown)
- SE 2<sup>nd</sup> Place (Downtown)
- Rosa Parks Transfer Station

## 2.3 Impact of Development Growth

Two development scenarios were used to present a range of ridership projections for year 2022. This included: 1) use of MTPO regional model development projections and 2) development projections for Innovation Square developed by UDMS for the economic development analysis conducted for the Streetcar Feasibility Study.

### **Use of Regional Model Data**

A baseline development growth for the year 2022 was then identified for a radius of ¼ mile around each of the streetcar station locations by using the population and employment projections within each area as identified using the MTPO regional model data.<sup>2</sup> Year 2022 growth was calculated by interpolation of year 2007 (regional model calibration year) and 2035 (travel projection year) data, with population and employment projections added together. The base ridership for the seven stations was then incremented to reflect the base 2022 growth conditions. Figure 5 shows the ¼-mile station service areas. The growth identified thru 2022 (from 2007 conditions) by station area is as follows:

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<sup>1</sup> These are to be viewed as approximate locations.

<sup>2</sup> General transit ridership growth from the model is believed to be too gross an assumption for the localized area.

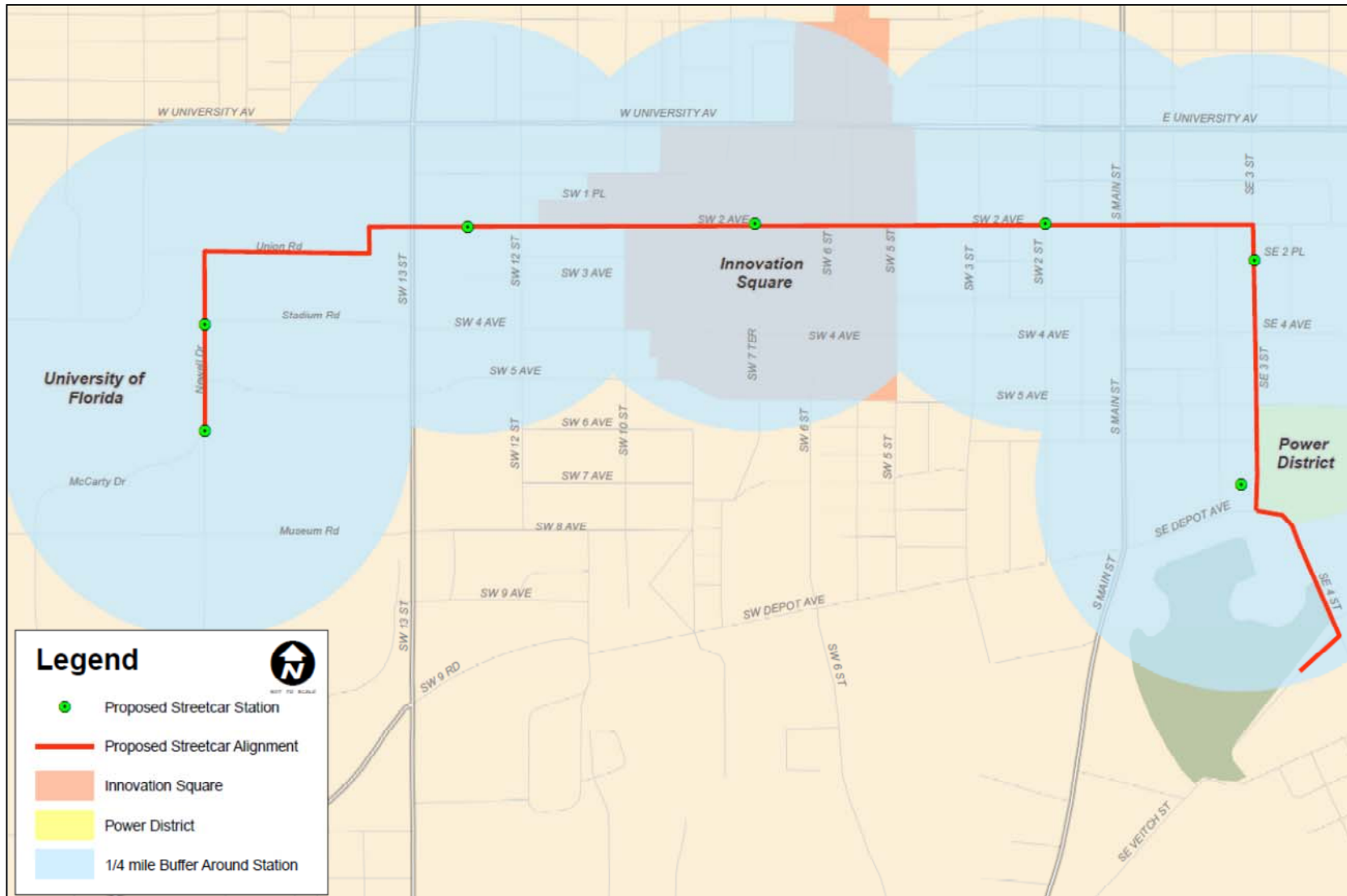
- McCarty Drive (UF) – 2%
- Stadium Road (UF) – 2%
- East of SW 13<sup>th</sup> Street – 2%
- SW 7<sup>th</sup> Terrace (Innovation Square) – 18%
- SW 2<sup>nd</sup> Street (Downtown) – 18%
- SE 2<sup>nd</sup> Place (Downtown) – 4%
- Rosa Parks Transfer Station – 4%

**Use of Higher Innovation Square Development Projections**

To identify a potential upper bound for the 2022 streetcar ridership and to account for higher growth at Innovation Square than estimated from the regional model, the growth in employment from 2013 to 2022 from the “Base Model” scenario in the Economic Development Analysis conducted by UDMS was applied to the station area located near the development. This growth was distributed to the ¼-mile buffer around the SW 2<sup>nd</sup> Street SW 7<sup>th</sup> Terrace and east of SW 13<sup>th</sup> Street streetcar stops based on the percentage of the designated Innovation Square area within each buffer. For the remainder of the station areas, the population and employment projections within each area, as identified using the regional model data, were used. Year 2022 growth for the areas outside of Innovation Square again was calculated by interpolation of year 2007 (regional model calibration year) and 2035 (travel projection year) data.



**Figure 5 - Proposed Streetcar Stations and Service Areas**



## 2.4 Impact of Streetcar Attributes

Once the base 2022 circulator ridership along the 2<sup>nd</sup> Avenue corridor was identified, the added ridership associated with the provision of streetcar as opposed to local bus was identified. Streetcar was assumed to be more attractive than local bus as a mode given that it exhibits more premium features and sense of permanence as opposed to local bus. This includes enhanced vehicles and stations with level boarding (assuming modern streetcars would be used) and off-board fare collection.

To identify the added attributes of streetcar, the methodology identified in Transit Cooperative Research Program (TCRP) Report 118 to identify the translation of premium transit features to added ridership was applied. Though the procedure in the report was developed to identify the incremental impact of bus rapid transit (BRT) on ridership, it was assumed to be appropriate for streetcar, as well. It has been shown that premium full-featured BRT service could attract an added 25 percent in ridership based on its attributes over local bus alone. This is beyond the impact associated with travel time and service frequency improvements. Thus, the ridership adjustment associated with streetcar was based on the presence of other “qualitative” attributes.<sup>1</sup>

Table 1 identifies the maximum percentage of “qualitative” attributes for BRT and the percentage assumed applicable to streetcar. As rail could be considered more of a premium mode than BRT, working off of the BRT maximums is considered to be a conservative approach to identifying applicable streetcar percentages. Only a minor running-way component was assumed for streetcar because most of the streetcar circulator route would operate in mixed traffic on-street (only a portion of the route within the UF campus would operate in a non-auto-oriented corridor). Also, less than the maximum was assumed for service patterns as the envisioned peak period service frequency (15 minutes) would be greater than 10 minutes.

Combined, only 65 percent of the maximum ridership would be associated with all identified attributes. As 60 percent would meet the threshold for applying the added 15 percent synergy effect (combined impact of packaging multiple attributes), a total of 80 percent of a 25 percent increase in ridership would be achieved, or 20 percent. Thus, 20 percent additional ridership was added to the base 2022 transit circulator ridership for the two development scenarios evaluated to arrive at an estimated range in streetcar ridership for 2022.

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<sup>1</sup> Case studies identifying ridership levels before and after the implementation of streetcar systems could not be identified.

**Table 1 – Estimated Additional Ridership Impacts of Selected Streetcar Components<sup>1</sup>**

Component	Maximum % (BRT)	Applicable % to Streetcar
Running ways	20%	5%
Stations	15%	15%
Vehicles	15%	15%
Service Patterns	15%	10%
ITS Applications	10%	10%
Branding	10%	10%
Subtotal	85%	65%
Component synergy (when subtotal is 60% or more)	15%	15%
Total	100%	80%

<sup>1</sup>Derived from Exhibit 3-21, TCRP Report 118, BRT Practitioners Guide, 2007

### 3.0 Regional Model Analysis Results

Applying the regional model growth scenario and 20 percent streetcar attribute adjustment, a calculation of 1,065 total boardings per day has been identified for 2022. This translates to a ridership of 266 on a per-track-mile basis (for a two-directional corridor two miles in length, or four track miles). This compares favorably with the Portland, Oregon, Eastside streetcar extension that was recently implemented, which experienced 299 riders per track mile in its opening year.

While there are many differences between Gainesville and Portland, the ridership estimates for the Portland Eastside extension are instructive for this feasibility study and serve as a guide as to what modern streetcar systems have experienced in terms of ridership trends. As described above, Gainesville's streetcar ridership at its opening is expected to be somewhat less than that for Portland's Eastside extension given the lower development level along the 2<sup>nd</sup> Avenue corridor, at least through the 2022 time horizon.

### 4.0 Impact of Added Innovation Square Development

For the Innovation Square area, by 2022, the UDMS Base Model scenario for the Innovation Square area identifies employment to increase to slightly over 2,550, compared to an estimated 540 in 2013. This is the major growth area in the corridor and would have the greatest impact on ridership at the SW 7<sup>th</sup> Terrace streetcar station, and

to a lesser extent at the SW 2<sup>nd</sup> Street and East of SW 13<sup>th</sup> Street stations. In the other station areas, employment (and population growth) to 2022 was identified to be minimal, assuming the Power District development by Rosa Parks station would not occur until after 2022.

Applying the Innovation Square Base Model projection for year 2022 and 20 percent streetcar attribute adjustment, a calculation of 2,187 total boardings per day has been identified for 2022. This translates to a ridership of 547 per day per track mile.

## 5.0 Summary Insights on Ridership

Given the approximate nature of the ridership estimation process, it is believed that a range in potential ridership is the most appropriate way to represent the data. Applying the two development growth methodologies (with the same percentage for the added impact of streetcar attributes) resulted in a range of 1,065 to 2,187 riders per day. To translate the weekday streetcar ridership into an annual streetcar ridership estimate, it was assumed that typical weekend day and holiday ridership would be 20 percent of weekday ridership. Applying this adjustment results in an annual ridership range of 300,000 to 620,000 in the first year of streetcar operation. The lower end of this range could actually be lower if there were less diversion than assumed from existing RTS routes, while the upper end of the range could actually be higher if more transfers to streetcar occurred at Rosa Parks pending what level of regional transit service improvements to that transfer station occur in the future and/or potential redevelopment on the Power District occurring sooner rather than later.

## 6.0 Potential Local Bus Service Modifications

If a streetcar line on 2<sup>nd</sup> Avenue were to be developed and replace the existing #46 circulator, portions of other bus routes using 2<sup>nd</sup> Avenue such as routes #25, #27, and #126, could also be diverted to 4<sup>th</sup> Avenue.<sup>2</sup>

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<sup>2</sup> It should be recognized that the current RTS Comprehensive Operations Analysis could result in modifications to one or more of the local bus routes independent of streetcar operation.