

# **ABCs to 123s**

## **A Guide to Changing Route Nomenclature from Letters to Numbers**



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for the Centre Area Transportation Authority



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## Why Now?

The Centre Area Transportation Authority provides transportation access to the Centre Region including State College and Penn State University through its CATABus, CATARide, and CATACommute programs. Today CATABus service includes 23 community routes and 4 campus routes that serve Penn State University. Service continues to grow with the development of the State College region, especially expanding off-campus student housing. As current routes continue to be optimized and new routes are added, it becomes increasingly clear CATA's route lettering system is unsustainable. Route letters no longer relate to the route's destination because most letters have already been used. Letters must be doubled for certain routes to avoid duplication. As more letters are used, similar sounding letters like 'B' and 'C' make auditory communication more difficult. Now is the time for CATA to move from a route nomenclature system based on letters to one based on numbers to make the network simple to understand and communicate, valuable for the information it provides, and expandable far into the future.

## Definitions

A few terms can appear almost identical but will be used in specific ways throughout this report:

<b>Route nomenclature system</b>	The route numbers comprising all names for all CATA routes
<b>Number</b>	Full one, two, or three digit designation for a specific CATA route
<b>Digit</b>	A single numerical digit which may be combined with other digits to create each route number

## Background Information

Along with literature from other transit agencies and transit consultants who have changed route nomenclature systems before, a survey was conducted including agencies around Pennsylvania and North America to gather information on the benefits and challenges of certain types of route nomenclature systems.

The majority of systems around the country surveyed use a numbering system, of course usually paired with a short description of the routing or destinations similar to CATA. CATA was one of very few systems which exclusively used letters for even some bus route designations. On the other hand, many systems use letter prefixes and suffixes paired with numbers to differentiate between express and local service or to designate destinations as CATA does currently (V for Vairo Blvd). Many larger systems use a hundreds digit to differentiate between local service and other specialty or express services, but since CATA routes almost exclusively serve Campus and/or Downtown as a destination, these hundreds digits wouldn't be necessary. Most systems use a different system of nomenclature for rail transit, BRT, or circulator services to differentiate them from regular bus service. CATA already does this with Loop and Link services and should continue to do so.

The most common organizational systems are systems conserved from previous services in the area as closely as possible, systems by route type including express versus local routes, and systems based on geography including grid networks, corridors, or areas of service. Many systems of nomenclature are not as organized as they could be in theory. The most common organization system to be maintained in practice is the hundreds digit explained above. This is probably because the system is very general. After all, each category has at least 99 different numbers to use.

Almost all challenges with current nomenclature systems focused on places where expansion has overreached what the system could handle and so the system needed to be broken. For this reason it is imperative CATA's system is designed to expand with new routes. This will be discussed in later sections in greater detail.

## Goals of the Change

The numbering options will each be assessed based on a set of four criteria determined by concatenating all the input gathered through the survey and other literature. They are described below, not necessarily in order of importance:

**Simple:** The numbering system should be as short as possible without losing embedded information. It should be legible and audible. The numbers should also be understandable, both for customers who know the network and would like to gather information about a route from the numbering system, and for customers who must remember route numbers and don't know the numbering system behind them.

**Informative:** Simplicity must not come at the expense of information. The numbering system must convey an understanding of the CATA system, by no means every detail of every route, but the most important parts of the system which route numbers can denote.

**Expandable:** Expandability was the main challenge related to route nomenclature for most other transit agencies so it is imperative for CATA to anticipate future network changes so they can maintain the system into the future, especially due to the ever growing number of student housing corridors which must be served. This means routes must be able to be added to the current system while upholding the numbering system without renumbering other routes for the foreseeable future. The foreseeable future does not mean to eternity but rather until the arterial structure of roads, and most likely therefore bus routes, change substantially so the route numbering organization system does not fit with the route structure.

**Conservative:** It is important to take into account the history of the route naming systems used by CATA to ease the transition to a new route numbering system. Because the agency is moving from route nomenclature based on letters to nomenclature based on numbers, the switch will be inherently inconsistent, but parts of the old organization system can be retained. For example, some routes are already organized into corridors, including the R, RC, and RP. These corridor denotations could remain in the new numbering system. However, conservation of current structure is only relevant during the transition between systems and must be weighed against other concerns which will be relevant for far longer, even if it requires a more difficult transition between systems.

## Basic Rules and Assumptions

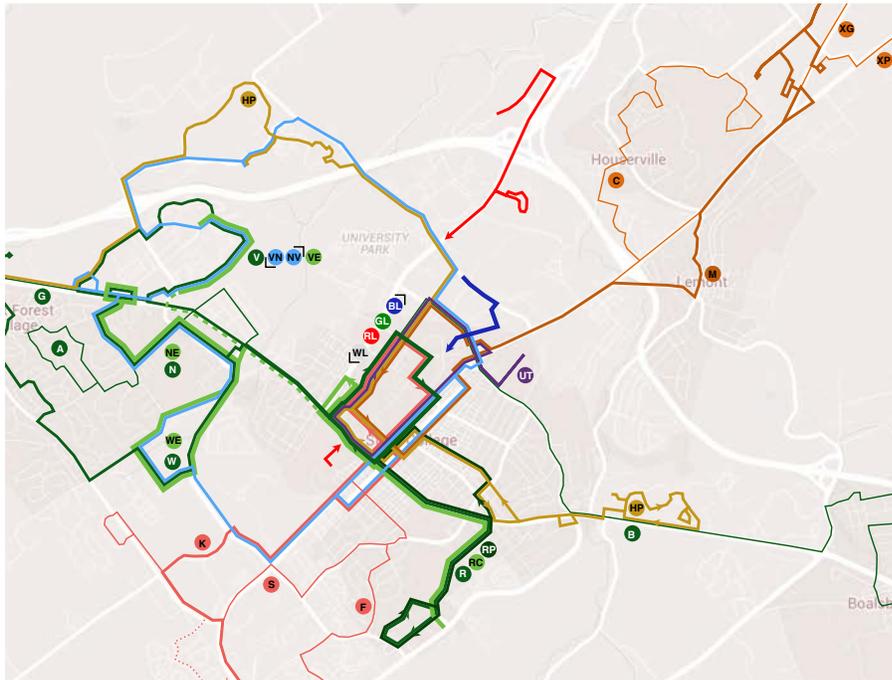
Some basic rules present themselves based on the goals described above. These rules will be implied in each option to the extent possible and are as follows:

- **Lower digits will be used and reserved for services which offer higher frequencies, while higher digits will be used and reserved for peak-only and commuter services.** Because humans perceive numbers on a logarithmic scale, they have an easier time differentiating between smaller numbers and digits. Therefore services with the most ridership, especially ridership which might not ride the same bus every day, should receive lower digits, and peak-only services which are used primarily by the same people each day should use high digits to allow for higher ridership services to have smaller numbers (Walker 2011). This scale also allows customers to see whether a route is generally more frequent or peak-only based on its number, although this would never be a perfect system due to ever optimizing service changes.
- **This report will retain the current campus service route names.** Loop and Link names will differentiate the generally more frequent, solely campus serving services just as frequent bus networks are differentiated on system maps, or subway lines have different route nomenclature organizational systems than their bus counterparts. Differentiation will allow for greater understanding of campus service patterns and the differences between campus and community service, including price and frequency, among customers. This concept is shown in New York City, where differentiation allows some customers to understand the structure of subway service throughout the city without knowing the structure of the bus route system and to understand the differences between the two systems, in their case mainly speed and frequency. Three digit numbers could identify campus services internally at CATA for operations purposes if so desired. However, numbers below 100 should not be used solely internally because this removes lower-number possibilities for route designations that customers might use.
- **The route numbers 1 to 9 will be reserved for future campus, circulator, or rapid transit service, even though they will not be used immediately.** Reserving these low numbers will allow for differentiation of different services and will make the community route nomenclature organization system more consistent, using solely two digit route numbers, discussed next.
- **Letter prefixes and suffixes, for example ‘14E’ for an express route, will not be used in the first version of the new system of route nomenclature.** These letters will make route

nomenclature more confusing and less consistent due to the extra characters. Letter prefixes or suffixes will also retain some of the problems with the current system, namely the difficulty of differentiating between some pairs of letters when spoken, for example 'B', 'C', 'D', and 'E'. Although it is common to differentiate between express and local service with an 'E', one of the main reasons for the practice is that express services sometimes cost more than local services and can have long express segments and thus should be separate in the eye of a customer, whereas CATA's express buses are much more similar to local buses. This will also allow for more flexibility in the future if it is decided letter prefixes or suffixes are necessary to differentiate between routes.

- **NV and VN services will receive two separate names in the new system, resembling the current system.** If the routes had the same frequency, span, and geographic path where possible, the report would recommend otherwise, but because the routes are different in all three respects, they will remain two separately labeled routes. If the routes become more similar in respect to any or all of the discussed differences, CATA should consider combining the route names into a single route with clockwise and counterclockwise directions or into two routes which turn into one another downtown and at a stop at the opposite side of the loop, similar to at the Colonnade with the V and N routes.
- **The new nomenclature organization system will be composed of two digit route numbers,** except for campus service. A two digit route nomenclature organization system will allow for expandability while encouraging simplicity. The system will be expandable for the foreseeable future with 90 possible route numbers, but will not be so expandable it loses simplicity, as a three digit organization system would.
- **Each digit of the two digit route numbers will attempt to denote something generally about the route, unless the random digit option is selected** or if a specific option requires two digits, in which case it would be evaluated as a complete route number organization system. The possibilities for these digits will be discussed next.

## Digit Options

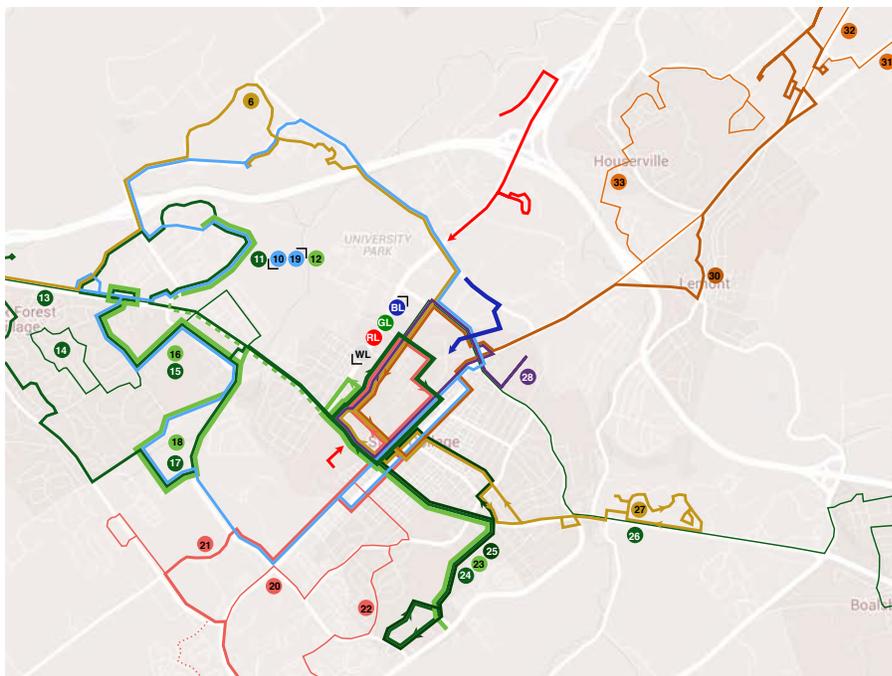


### Current System

The current system of route nomenclature organization uses letters and combinations of letters. Routes are labeled based on a letter from a main destination if that letter is not already taken by another route. Some routes have two letters, including expresses which end with an E. Much of the system has been inherited from previous iterations.

## Geography

Geographic nomenclature organizational systems tell customers where the bus will take them. This information is vital for navigation but can also be obtained by reviewing a system map.

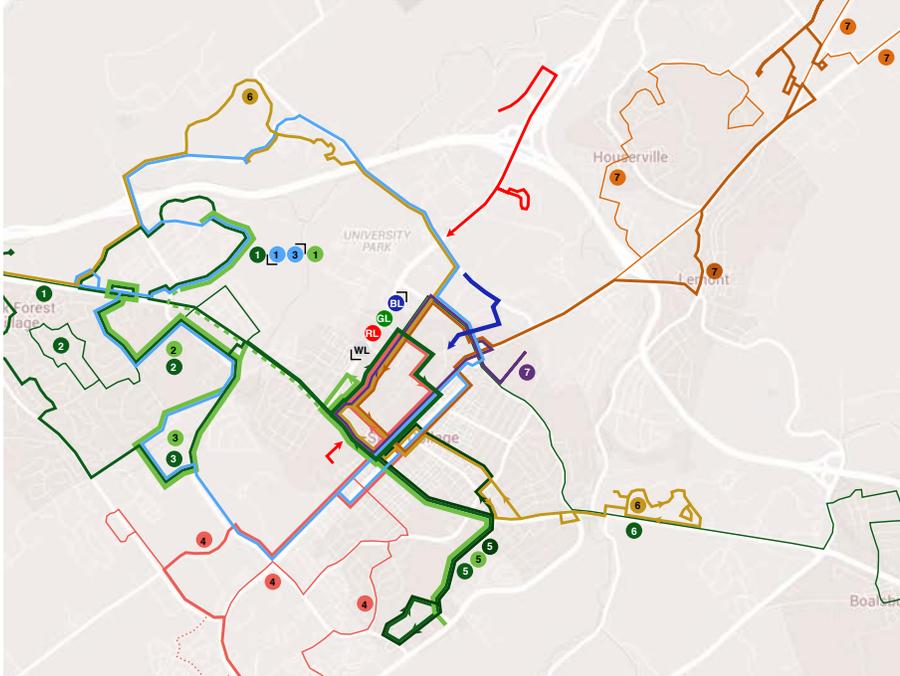


### Circle around Campus and Downtown

Each route would receive a number labeled clockwise or counterclockwise around Campus and Downtown. This system would require both digits of the route number.

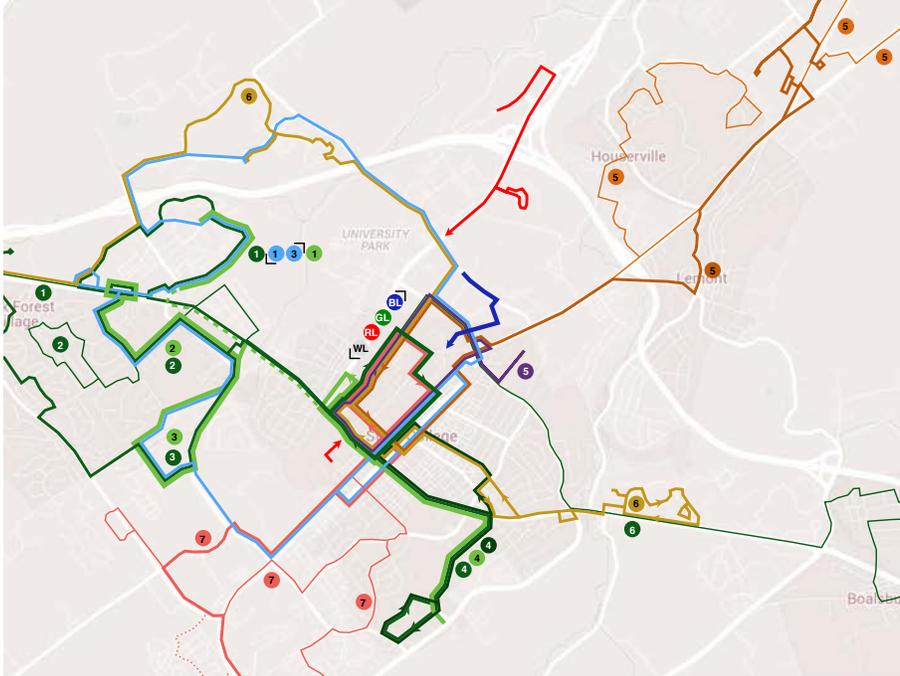
**Corridors Counter  
Clockwise**

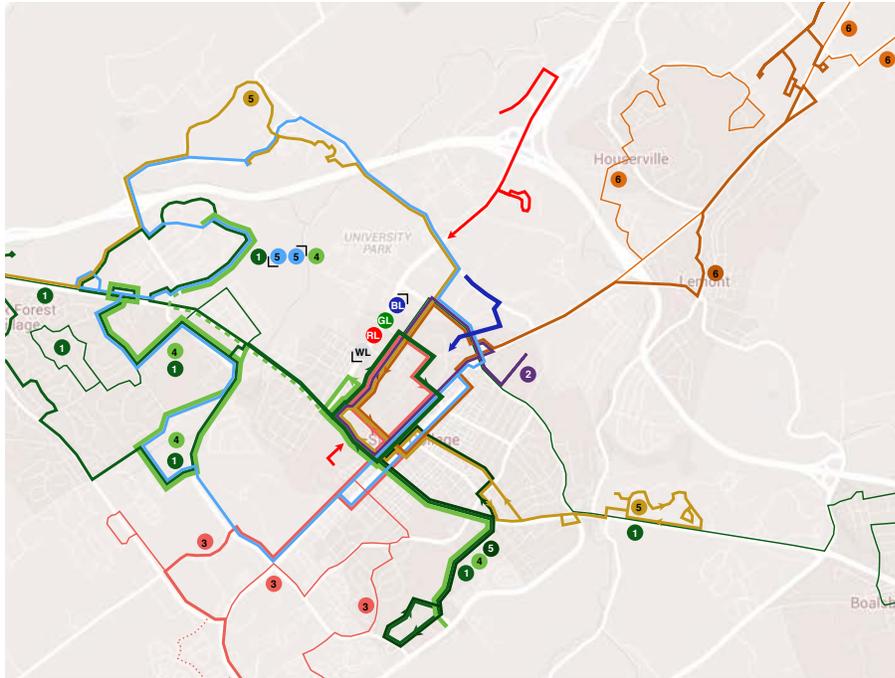
Each corridor would receive a digit, labeled clockwise or counterclockwise around Campus and Downtown, and all routes serving that corridor would use that digit in conjunction with some other digit.



**Corridors by Intensity  
of Service**

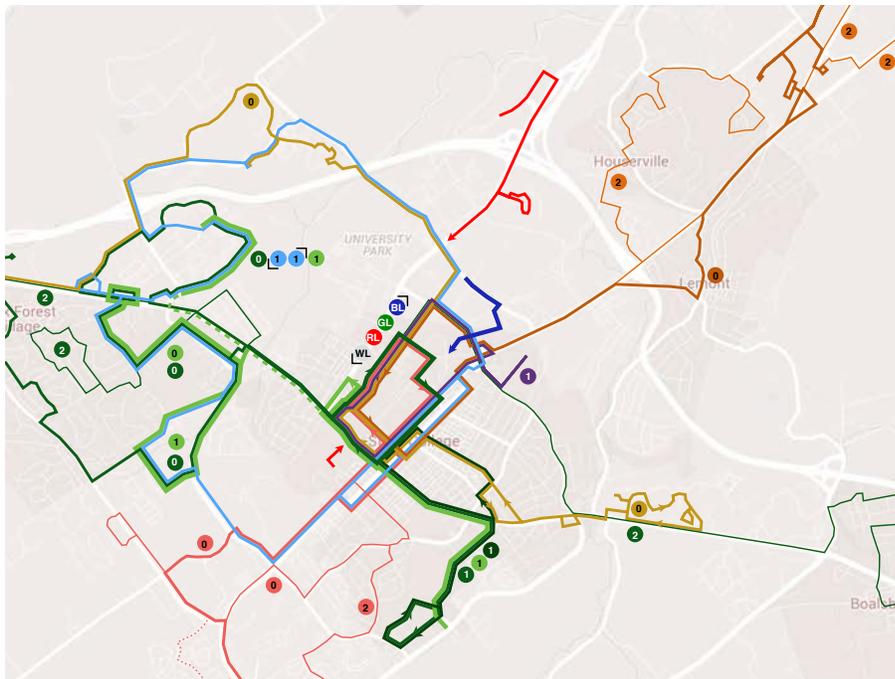
This system would be similar to the last but corridors would be labeled based on their intensity of service with higher intensity corridors receiving lower digits.





**Pattern on Campus and Downtown**

Each routing through or around Campus and Downtown would receive one or multiple digits, and all routes serving that routing would use that digit in conjunction with some other digit.

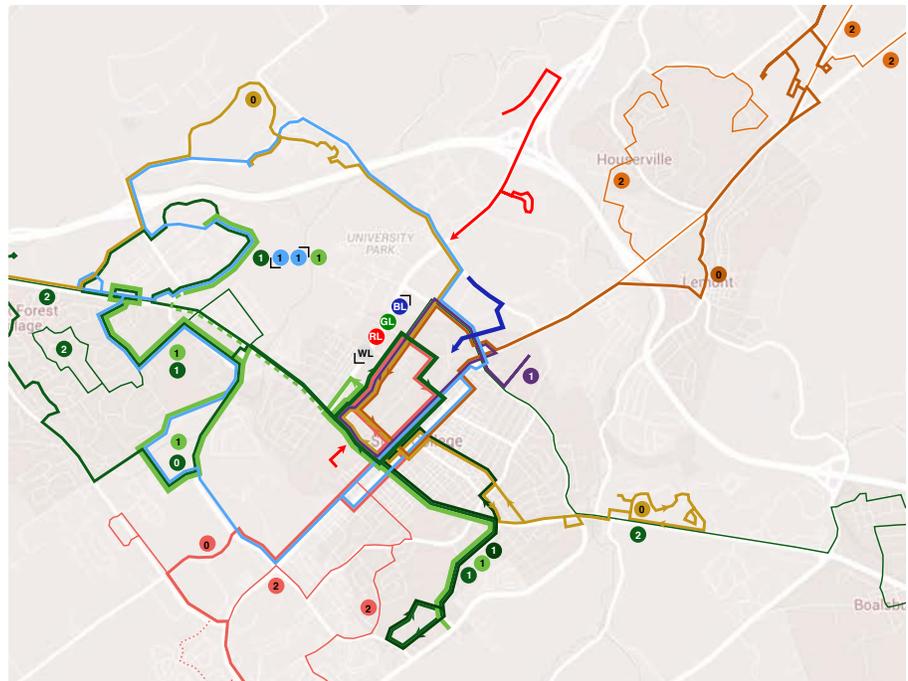


**Destinations**

Each destination would receive one or multiple digits, and all routes terminating at that destination would use that digit in conjunction with some other digit.

## Type

Nomenclature organizational systems based on type tell customers how the bus will take them to their destination. This could include frequency: whether the bus will take them there every twenty minutes or only 4 times a day.

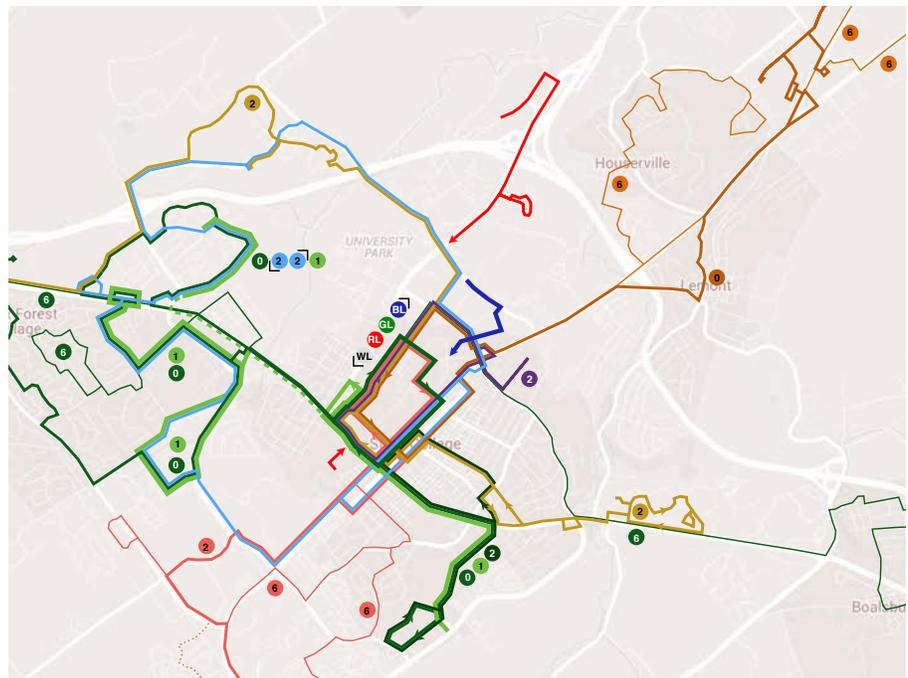


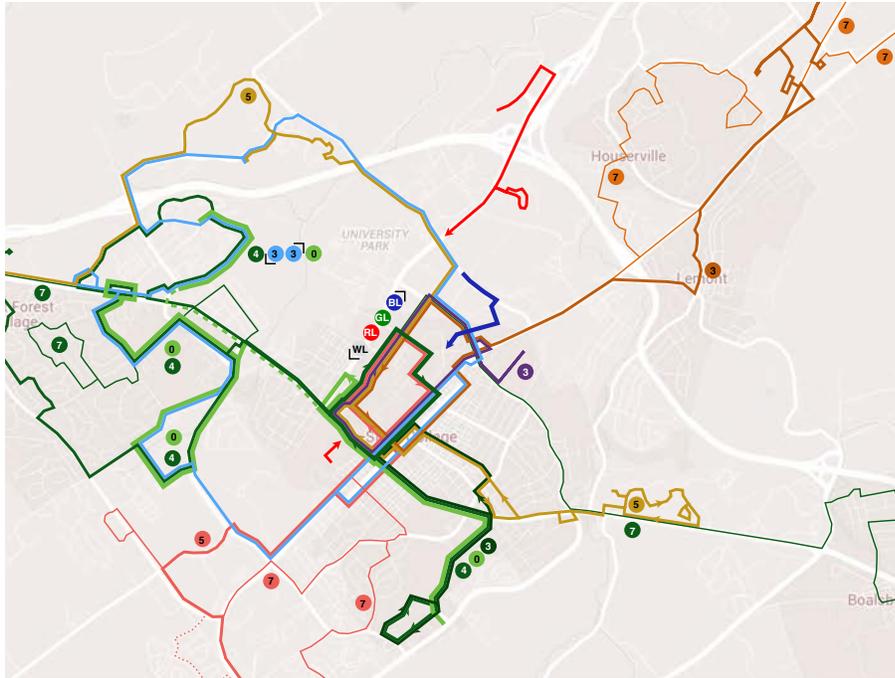
## Market

Each route would be assigned a digit based on its typical rider. For instance, the V route would receive a digit denoting students whereas the A would receive a digit denoting commuters. This gets challenging with a route like the HP, which serves many commercial markets but also serves student apartments like The Grove.

## Route Type

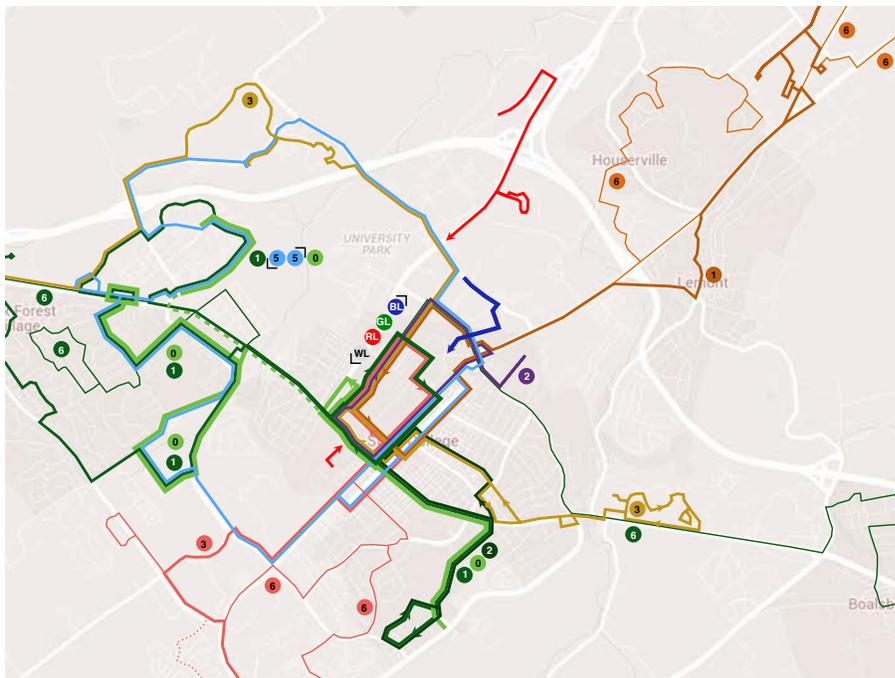
Each route would be assigned a category: main trunk routes, high frequency all day service, low frequency all day service, or peak only service. Each category is then assigned a digit or digits which all routes in the category inherit.





**Frequency**

Each route would receive a digit based on its frequency, with higher frequency ranges receiving lower digits.

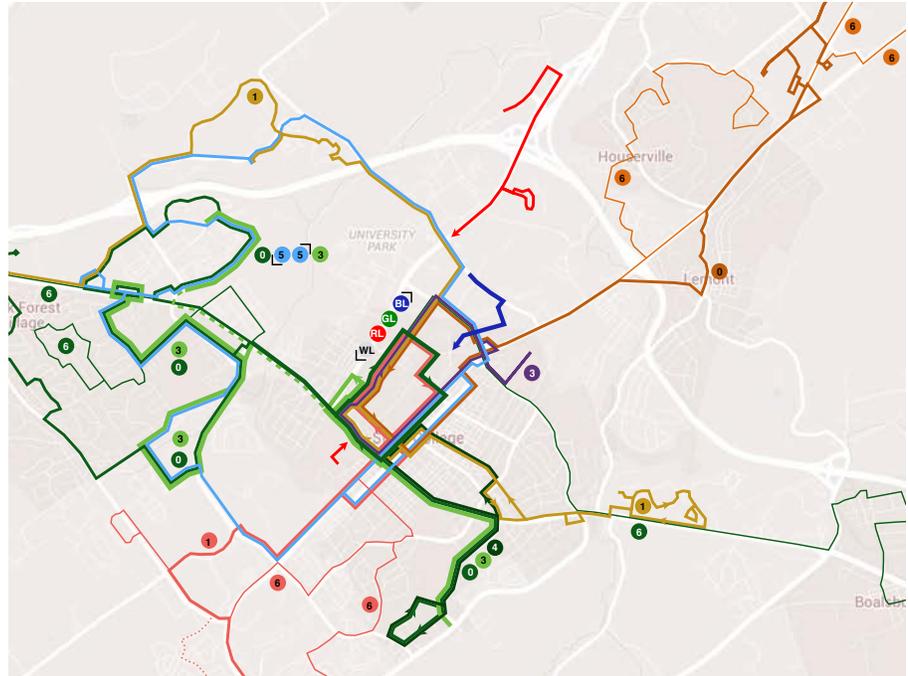


**Local, Express, Circumferential**

Each route would be assigned a category: express routes, high frequency all day local service, low frequency all day local service, circumferential service or peak only service. Each category is then assigned a digit or digits which all routes in the category inherit.

## Span

Nomenclature organizational systems based on span tell customers when the bus will take them to their destination. This includes what times, what days of the week, or what days of the year the bus will come.

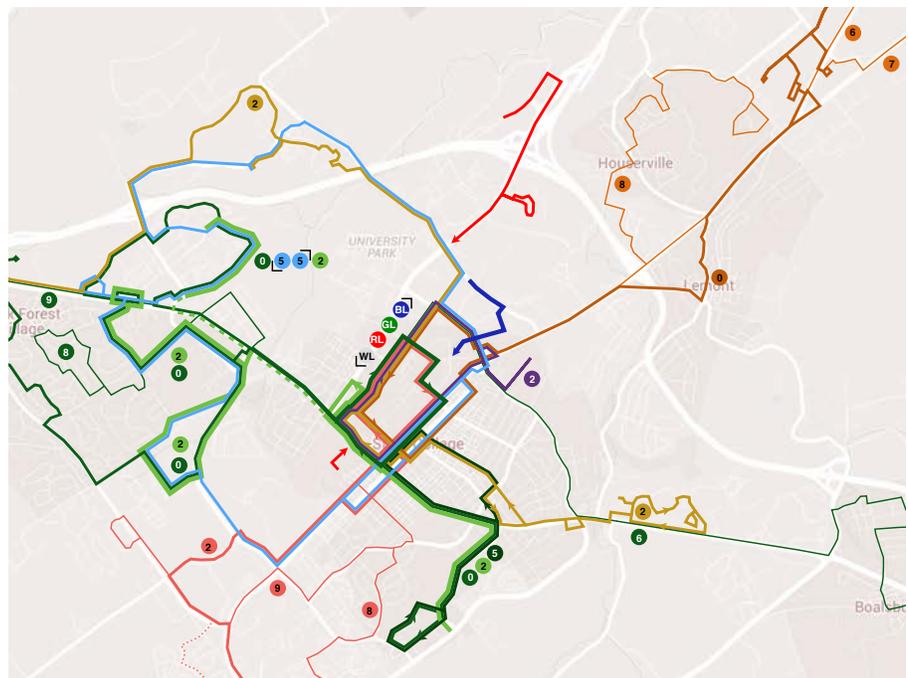


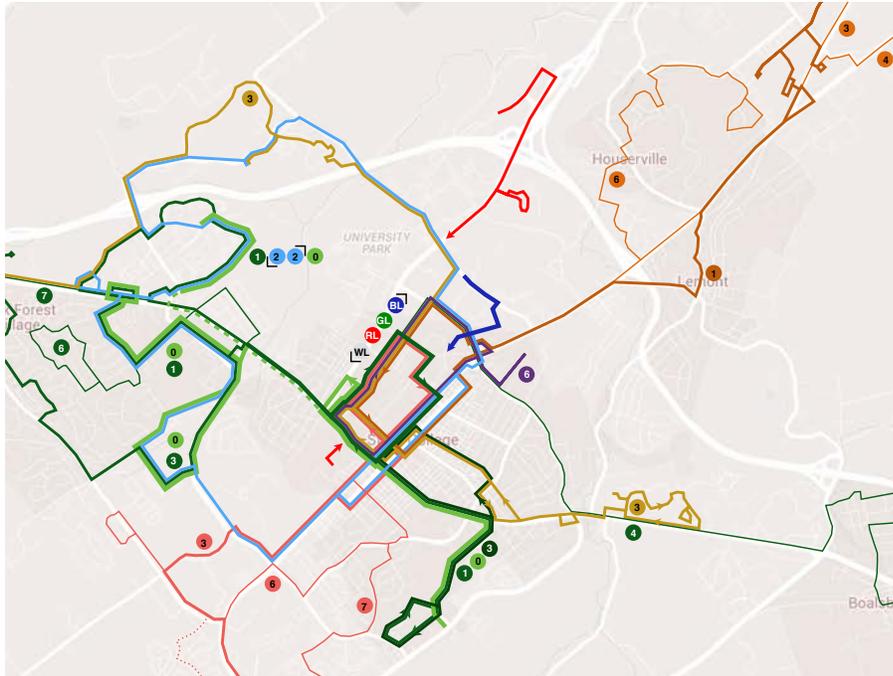
## Full/Reduced

Each route would receive a digit based on whether it operates during full service only or during both full and reduced service. Peak services would be separate from other reduced service routes.

## Span

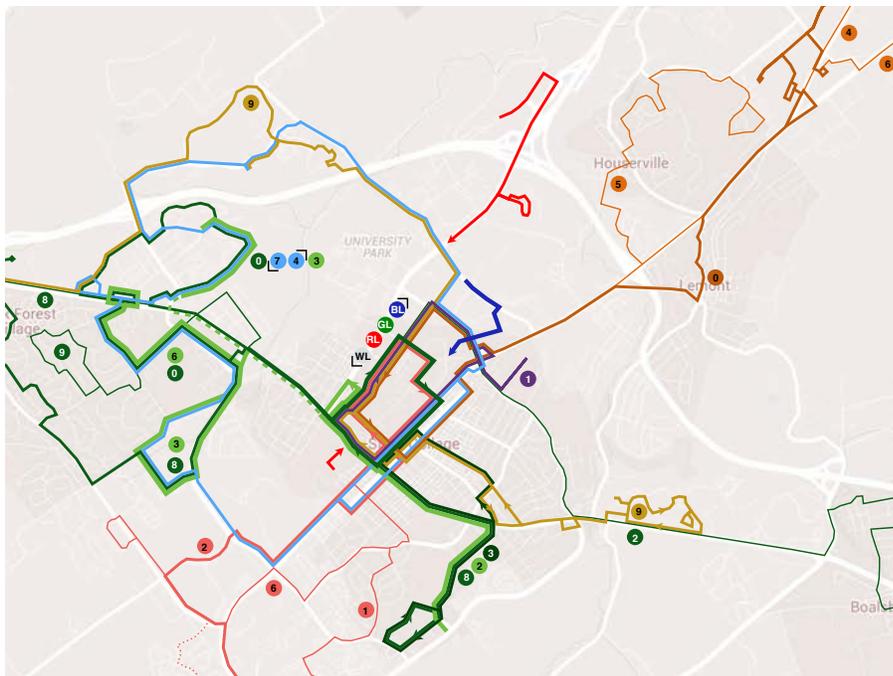
Each route would receive a digit based on when the bus runs during the day: all day into the night, all day, afternoon and night, selected times all day, or only during the peak.





**Days**

Each route would receive a digit based on when the bus runs during the week: seven days a week, Monday to Saturday, or Monday to Friday. Expresses would be separated so their digits could be lower because they have high spontaneous ridership, even though they operate only Monday to Friday.



Random

A random nomenclature organizational system would provide no information about the overall system of CATA routes, but some posit random numbers like 2, 43, 14, 27 are easier to memorize than those with patterns, such as 23, 25, 26, 29.

# Analysis of Digit Options

System	Total (4-17)	1-5	Simple	1-2	Conservative
<b>Current</b>	8	3	Medium - individual route letters usually relate to a word related to the destination - double letters get more and more confusing - many sound the same	2	Extreme - the same
Circle around CBD	7	3	Medium - names are somewhat easy to understand as a system (although some routes crisscross so can be confusing) but could be confusing in smaller areas (What's the difference between the 13 and 14 when they're actually a local versus express)	1	Low - No connection
Corridors counter clockwise	14	4	Med-High - names are easy to understand as a system but would rely on a second digit to differentiate between routes in the same area, allows services with similar routes to be grouped (Priven 2016)	2	High - Groups corridors together like current (R, RP, RC)
<b>Geo-graphic</b> Corridors by intensity	14	4	Med-High - names are easy to understand as a system but would rely on a second digit to differentiate between routes in the same area, allows services with similar routes to be grouped (Priven 2016)	2	High - Groups corridors together like current (R, RP, RC)
CBD Pattern	8	3	Medium - names are easy to understand as a system although multiple numbers may mean a single routing downtown but would rely on second digit to differentiate between many different routes in large areas (V, N, W, A, G, R all with same digit)	1	Low - No connection
Destinations	6	1	Low - names can be hard to understand as a system because many routes serve multiple areas and destinations are not always the most important. Would rely on a second digit to carry information to differentiate between two routes in some areas	1	Low - No connection

1-5 <b>Info</b>	1-5 <b>Expandable</b>
<p>2 Med-Low - Gives information about geography which can already be clearly identified from system map (but does not allow for differentiation between community and Loop/Link service)</p>	<p>1 Low - already have double letters and will only get more confusing especially since they sound similar - new letters are less likely to mean anything relating to the destination since most letters have been taken</p>
<p>2 Med-Low - Gives information about geography which can already be clearly identified from system map</p>	<p>1 Low - many other route numbers must change to add a route in the middle and maintain the system</p>
<p>3 Med - Gives info about service in each corridor but is still giving info that can be found on the system map</p>	<p>5 High - routes can be added up to 10 per corridor and corridors can be added, should leave extra tens digit if one corridor could get more than 10 or if new corridor could form in a certain area</p>
<p>4 Med-High - Gives info about service in each corridor which can be found on system map but also gives info about more intense service areas</p>	<p>4 Med-High - routes can be added up to 10 per corridor and corridors can be added, should leave extra tens digit if one corridor could get more than 10 routes - corridors could change intensity so would be hard to rearrange system</p>
<p>2 Med-Low - Gives (usually least pertinent) info about geography which can already be clearly identified from system map</p>	<p>2 Med-Low - as routings are simplified in the Campus/Downtown area, the digit will differentiate less and less between routes and more and more digits will refer to single routings</p>
<p>1 Low - A user wants to go to a certain place rather than a land use type</p>	<p>3 Medium - certain types would go over 10 routes quickly and would need multiple different digits - as CATA and State College expand, routes should be able to serve more and more places (not just destinations) so as time passes the system would get worse and worse</p>

System		Total (4-17)	1-5	Simple	1-2	Conservative
Type	Market	6	1	Low - names can be hard to understand as a system because many routes serve multiple markets and would rely on a second digit to carry information to differentiate between two routes in some areas	1	Low - No connection
	Route Type	13	5	High - names are easy to understand as a system but would rely on a second digit to carry information to differentiate between two routes in different areas	1	Low - No connection
	Frequency	12	4	Med-High - names are easy to understand as a system although so many stratifications could get confusing but would rely on a second digit to carry information to differentiate between two routes in different areas	1	Low - No connection
	Local/ Exp./ Circumferential	10	4	Med-High - names are easy to understand as a system but would rely on a second digit to carry information to differentiate between two routes in different areas - express and circumferential service differentiation doesn't really relate to the rest of the numbering system	1	Low - Only differentiates expresses similarly
Span	Full/ Reduced	11	3	Medium - names are easy to understand as a system although multiple numbers may mean one running calendar but would rely on second digit to differentiate between many different routes	2	High - Full service only services are usually double letter currently
	Span	13	3	Medium - names are easy to understand as a system although span may be less apparent for differentiation to the average CATA user than geography or frequency, for instance, and would rely on second digit to differentiate between many different routes	1	Low - No connection
	Days	11	3	Medium - names are easy to understand as a system although multiple numbers may mean the same running days but would rely on second digit to differentiate between many different routes	1	Low - No connection
Random		10	3	Medium - some people think it's easier to remember random numbers than similar numbers, although others disagree (Walker 2011).	1	Low - No connection

1-5 **Info**

Low - A user doesn't care who rides the route as much as where it goes or when it goes and how frequently - some parts look like they're classified by frequency but this is only a byproduct of classifying by market

1

Med-High - Gives basic info about frequency at a glance

4

High - Gives specific info about frequency at a glance

5

Medium - Gives basic info about frequency at a glance and express and circumferential service, although this doesn't really relate to the rest of the numbering system

3

Med-Low - Gives basic info about running calendar that's only on schedules but most riders will know or not care, also keeps peak service separate

2

High - Gives specific info about span at a glance

5

Medium - Gives specific info about running week at a glance but this is not important most of the time, especially to most people

3

Low - no information given

1

1-5 **Expandable**

Medium - certain types would go over 10 routes quickly and would need multiple different digits - as CATA expands, routes should be able to serve anyone in a certain area better and better so as time passes the system would get worse and worse

3

Medium - as definition of frequent changes (hopefully to more frequent) and routes become more frequent, the numbers may need to change for some routes to maintain the system

3

Med-Low - as definition of frequent changes (hopefully to more frequent) and routes become more frequent, the numbers may need to change for some routes to maintain the system and this is amplified by the number of stratifications

2

Med-Low - as definition of frequent changes (hopefully to more frequent) and routes become more frequent, the numbers may need to change for some routes to maintain the system and this is amplified by the number of stratifications

2

Med-High - routes can be added up to 30 per running calendar - routes could change running calendar so would be hard to rearrange system

4

Med-High - routes can be added up to 20 per span - routes could change span so would be hard to rearrange system

4

Med-High - routes can be added up to 20 per running week - routes could change span so would be hard to rearrange system

4

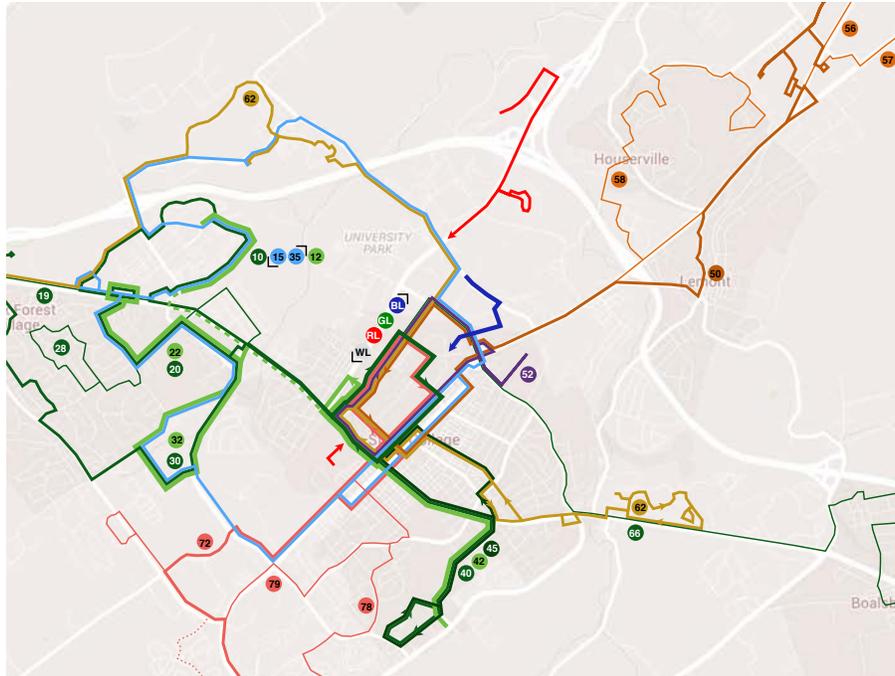
Can be expanded infinitely

5

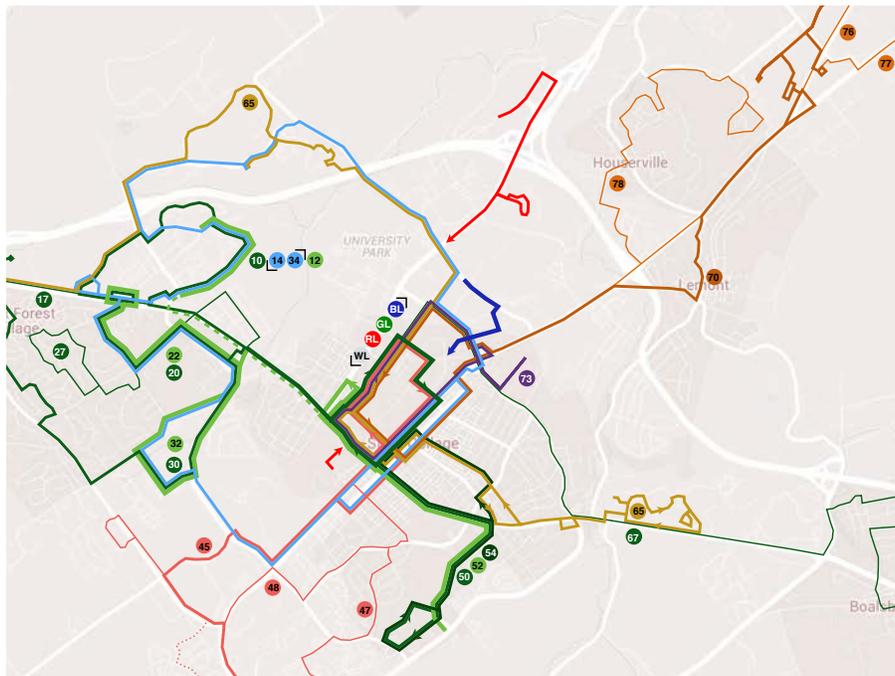
# Combined Options

The analysis of all possible digit options revealed one clear leader in each category of organizational system. Corridors, either organized by geography or intensity, Route Type, and Span were the digits which balanced the objectives of being simple, informative, expandable, and conservative of previous organizational patterns best. These three digit types were paired into three final route numbering options, displayed below:

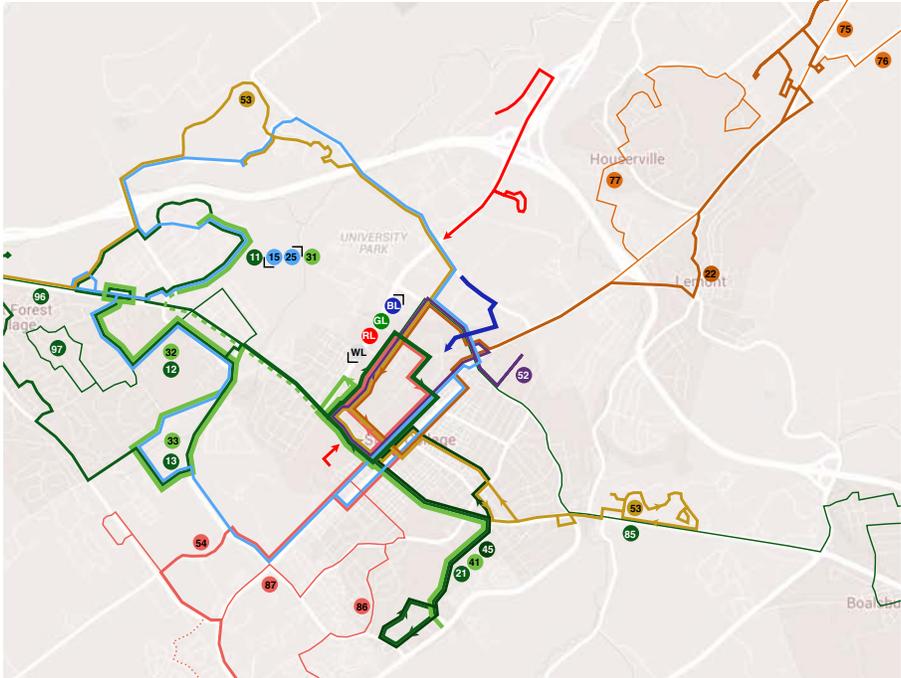
## Corridors by Intensity & Span



## Corridors Counter Clockwise & Route Type



Route Type & Span



# Analysis of Combined Options

System	Total (8-34)	2-10	Simple	2-4	History
Corridors by intensity/Span	26	7	In general, the span digit could differentiate between routes in the same service area and the corridor digit could differentiate between routes in different service areas with similar spans, although span may be less apparent for differentiation to the average CATA user than geography or frequency.	4	Groups corridors together like current (R, RP, RC)
Corridors by geography/Route Type	29	9	In general, the route type digit could differentiate between routes in the same service area and the corridor digit could differentiate between routes in different service areas with similar route types.	4	Groups corridors together like current (R, RP, RC)
Route Type/Span	22	5	Without a geographic component in each route number, to the first time user who looks at the system map, the numbering system looks completely random (unless the map includes frequency indicating thickness of route lines)	2	Low - No connection

2-10 Info

2-10 Expandable

7 Gives info about service in each corridor which can be found on system map but also gives info about more intense service areas and gives specific info about span at a glance. However, to the average user how often the service comes is more important than span, at least during the day when most users are interested.

8 Geo - Routes can be added up to 10 per corridor and corridors can be added, should leave extra tens digit if one corridor could get more than 10 routes - corridors could change intensity so would be hard to rearrange system. If a route changes its location dramatically, it will probably need to be rebranded anyway to reduce confusion. Span - Routes can be added up to 20 per span - routes could change span so would be hard to rearrange system.

8 Gives info about service in each corridor which can be found on the system map but also gives info about frequency.

8 Geo - Routes can be added up to 10 per corridor and corridors can be added, should leave extra tens digit if one corridor could get more than 10 or if new corridor could form in a certain area. If a route changes its location dramatically, it will probably need to be rebranded anyway to reduce confusion. Type - As definition of frequent changes (hopefully to more frequent) and routes become more frequent, the numbers may need to change for some routes to maintain the system.

8 Gives info about span and frequency; this paired with the system map is most of what a user needs to know the basics about a route

7 Span - Routes can be added up to 20 per span - routes could change span so would be hard to rearrange system. Type - As definition of frequent changes (hopefully to more frequent) and routes become more frequent, the numbers may need to change for some routes to maintain the system.

## Combined Option Selection

The organizational system using geographic corridors and route type was the system which provided the most benefit and least challenges of the three. The rationale for each decision related to the final system plan is explained below:

The geographic corridor was selected as the first digit in each route designation because to a first-time user looking at a system map, these digits will stand out as a clear system considering the map is already organized to make sense of the geographic digits, whereas route type can provide even more information to veteran users.

Corridor labels start at Vairo Blvd and go counter-clockwise until East College Ave and the Mall, which is the 7th corridor. This is because the largest geographic gap between two corridors is between the Mall and Vairo Blvd, and therefore this area is a natural gap in customers' mental maps of the system and is likely to host the 8th corridor in the future. Conveniently, this system corresponds roughly to service intensity in each corridor. Vairo Blvd is the most travelled of any corridor and Martin St is close behind with Havershire Blvd and Valley Vista Dr close behind that (Corridors 1, 2, and 3 respectively). The second largest corridor, Waupelani Dr, is corridor 5. The large gap between the Vairo Blvd corridor and the East College Ave corridor happens to be the place where the next probable corridor will be placed: Fox Hollow Road. When Toftrees service requires expansion and this corridor is put into place, any future route will exit the downtown and campus area through or close enough to one of the already established corridors, as there is a corridor which exits the CBD in each direction.

The second, route-type digit will have to differentiate any new route from others in its corridor. The table on the following page describes the initial iteration of the system for the second digit.

As time goes on, each digit value will get less defined as frequencies change and new routes are added. However, the hope for the system is that all routes will become more frequent as time goes on and so digits will still indicate relative frequency. For example, when the Bellefonte route (76) becomes hourly which in the first iteration would have been considered a 5, the Houserville route (78) may receive a new mid-day and evening bus which would have been considered a 6 or 7. At the same time, a new subdivision might warrant a new line in the 7th corridor but can only support the type of service the old Houserville route had and might be called route 79. In this way each digit value means more frequency than it did before but still means the same relative frequency compared to other digit values.

- 0 Main trunk routes
- 1 Empty for future trunk routes
- 2 Express routes
- 3 Almost empty for future high frequency routes
- 4 High frequency routes - especially night services
- 5 Lower frequency all day routes
- 6 Peak only service with mid-day trips, etc.
- 7 Peak only services
- 8 Peak only services
- 9 Empty for peak only services

Initial iteration of the system for the route type digit.

Of course this will not always work, in which case the system may become compromised if other route numbers are not changed. Breaks in the route nomenclature system will not be detrimental, as most users will be used to a certain one or two route numbers which they ride often and will use trip planners for journeys they are not used to. However, to help those who utilize the whole system and can therefore appreciate the nomenclature system and the information it provides, the system should be maintained as much as possible. One of the two digit systems should be chosen as the more important of the two and should be maintained as much as possible, even if that means the other digit loses some of its meaning. Some might argue this means CATA should begin with a more general system so they can follow it invariably. However, route nomenclature can always and will almost definitely get less organized, but without re-organizing numbers it is impossible for the system to get more organized. A specific system to start will work perfectly while it lasts and will provide a backbone of support when the system is inevitably broken.

## Public outreach

The most important part of the CATA public outreach campaign is that the public knows there will be a change, understands why they change is necessary, and understands the new system so they can remain informed customers. The following is a list of possible outreach avenues, compiled from survey results:

- In person:
  - open houses (King 2016)
  - fair and festival outreach booths (King 2016)
  - ambassadors at stops on days before and after changes (Desmond, King, Jones 2016)
  - public information forums (Dickson 2016)
- Ads, flyers, and literature
  - rider alerts, emails, and press releases (King, Peeples 2016)
  - ride guides, maps, timetables, website, social media (King, Nouchi, Desmond, York 2016)
  - newspaper ads (King 2016)
  - behind the driver posters (King, Peeples 2016)
  - interior bus ads
  - notices at bus stops (Peeples 2016)
  - local elected leaders' newsletters (Peeples 2016)
  - souvenir buttons (Dickson 2016)

The transition between letters and numbers will be a long one. Once the system is announced, CATA literature can be updated to show both the new and old system to reduce confusion. Information about the new numbering system should gradually be rolled out onto signage, again with both old and new nomenclature systems. Timing replacements of signs to when they would already need to be replaced due to deterioration or service changes will quell fears that the new identity will cost CATA (Haskill 2016). More generally, timing the first or subsequent route nomenclature changes during service changes would not only allow for only one change of literature and signage but would allow for one public outreach campaign instead of two and might focus the public on the service changes and deemphasize the route nomenclature changes during the period of usually negative feedback (Desmond, Engelmann, Carter, Jones, Luna 2016). Regular riders will easily memorize the routes they take on their daily

commute or the routes they take to shop, but occasional riders will have the most trouble adapting because they will not have the same exposure to the new system (Desmond 2016).

After knowing a change will happen and how to navigate the new system, the next most important thing for the public to know is why the change was made (York, Watkins 2016). The challenges with the current system for route nomenclature and the goals CATA aspired to should be shared to allow customers to see how they will benefit from the new system. Even with fantastic public outreach, there will still most likely be dissatisfied customers who think the old system was better, but over time customers' perceptions relating to the system usually become positive as they learn the new system and its benefits. Additionally, there may be more community buy-in if customers have a part in the selection and perfection of the organization system through CATA general forums, as well as some of the outreach methods described above.

In general, the public will most likely be opposed to the change until they get used to it, when they will realize the benefits, but as Ian Dickson says, "We had prepared for resistance that never occurred," (Dickson 2016). There are many other concerns when changing the route nomenclature system, namely operations. All staff must be able to use the new nomenclature system efficiently to process and extract data (Amoruso, Desmond 2016), however customers should still be the first priority.

When a line is truncated or rerouted substantially during service changes so much that most of its riders will be affected, the line can be renumbered. For example, if the 30 (old route W) was changed to serve the new West End on College Avenue and the future Pine Hall Development on Blue Course Drive instead of its current route on Atherton St, the whole line could be renumbered to make sure riders understood there was a change. This would verify that people realized the new routing but would also allow CATA to continue changing route designations to maintain the system. "It is better to ask people to learn a new line number than to have them end up somewhere they didn't expect because they got on a bus they didn't realize had changed," (Priven 2016). The 30 (old route W) could become the new 40 because it would be extended from the 4th corridor, making the system more clear. Conveniently, the signage changes will already be occurring because of the service changes. A few more general rules can be a base for how to treat route numbering during service changes:

- Lines that are substantially or unsubstantially extended without a change in the current route should not change route nomenclature because riders will not travel to the wrong destination, even if they don't realize the change. (Priven 2016)

- Lines should only change nomenclature if there is a corresponding service change (Priven 2016)
- Route numbers should not be reused for a time after they are discontinued. At AC Transit, the rule is, “Unless a discontinued line is revived, in which case it should receive its old number if available, numbers should not be re-used for two years after discontinuance. A decade or more should pass before the same number is used for a different line in the same section of the district,” (Priven 2016)
- Sometimes changing the route description can be enough warning to passengers that a route has changed if the change only affects a certain part of the route. (Hingson 2016)

# Appendix

## Survey Questions

Introduction:

### Moving from Route Letters to Numbers

The Centre Area Transportation Authority (CATA), which serves State College, PA, the Penn State main campus, and surrounding areas, is currently exploring the possibility of moving from a route nomenclature system based on letters and destinations to one based on numbers, in recognition of future expansion and a desire to reduce system complexity.

We appreciate your responses to the following questions, which will allow us to best take advantage of your knowledge of what's already been done in this vein and your experiences. We may contact you later for more information concerning your system of route nomenclature or your transition between systems. As a thank you and token of our appreciation, a copy of the final evaluation and plan will be provided to all respondents via email upon completion.

Thank you in advance for your time.

James Graef  
CATA Intern

Please respond to this survey by July 15th.  
Thank you for your help.



Page 1:

1. Survey respondent's name: \*
2. Survey respondent's title: \*
3. Transit agency name: \*
4. Transit agency address: \*
5. Transit agency city: \*
6. Transit agency state: \*
7. Transit agency postal code: \*
8. Survey respondent's email: \*
9. Survey respondent's phone: \*

Page 2:

1. What type of route nomenclature does your transit agency use? (Check all that apply)
  - Numbers
  - Letters

- Names
  - Images
  - Colors
  - Other:
2. Please provide examples of the route names currently used:
  3. In theory, how is the system organized? (Check all that apply)
    - Randomly
    - Conserved from previous routes and systems from the same area as closely as possible
    - Corresponding to destinations or street names
    - Corresponding to a grid system
    - Ascending in a circle around the Central Business District (CBD)
    - Corresponding to corridors radiating from the CBD
    - Corresponding to different service patterns within the CBD
    - Span of service (peak, all day, etc.)
    - Route type (local, rapid, express, etc.)
    - Letter prefixes for branches
    - Other:
  4. In practice, how closely is this organization system followed? Does your transit agency take specific steps to follow this system?
 

Example: Route numbers ascend clockwise around downtown. This is followed exactly in practice. To maintain this system, when a new route is added all route numbers after it increase by one.
  5. What benefits do you experience from having your routes named in this way?
  6. What challenges have you experienced from having your routes named in this way?
  7. Other comments:

Page 3:

If your transit agency has recently undergone a change in the way in which you name your routes, please answer the following questions:

1. Have you undergone a change in the way in which you name your routes in the past? If so, when did that change take place?
2. What specific goals did you have for your new organization system?
 

Examples: Simple, Expandable, etc.
3. How did you market the change in route names to riders? What response did you get from riders?
4. Other comments:

## Line Numbering Principles

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The most important thing about line numbers is that they are public information: their purpose is to help customers use the transit system. Line numbering should be focused on customers' needs.

It is not uncommon for people to see apparently disordered line numbering and assume that it is aimless, and that it would be better to systematize the line numbers — so the numbers make it easier to understand the transit system as a whole, or simply because order seems better than disorder.

But, while there are exceptions, most transit riders do not use the transit system as a whole. They use particular lines in particular places, and making the numbers work as a system can actually make it harder for people to use the small pieces of the network that they typically use.

In 2000, AC Transit restructured lines in Fremont, and introduced a series of line numbers for the new lines there. At Fremont BART, the available lines were 211, 212, 213, 214, 215, 217, 218, and 219. So there was order. But it was very difficult to use, because all those numbers were so similar that it was hard to remember which of them one wanted. Was it the 215 or 217 that went along Mission Blvd.? Was it the 218 or 219 that served Thornton Blvd.? You had to check – not just at the BART station, but anywhere in the system where two or more lines came together. It was hard to remember and frustrating.

Customers use line numbers primarily to remember which line they are supposed to take. Line numbering should be crafted in order to make this task as easy as possible. And, in general, numbers should be chosen such that the more people use a line, the easier that line number is to remember.

- If a line is associated with a numbered street or highway, then using that number for the line makes the number easy to remember: Line 98 runs on 98th Avenue.
- People's perception of number is logarithmic: small numbers seem further apart than big numbers, so that "1" and "2" seem more different than "225" and "226." Numbers that are further apart are easier to distinguish.

It follows that short numbers are easier to remember than longer numbers, and that, all else being equal, lower two- and three-digit numbers are easier to remember than higher two- and three-digit numbers. The lines with the highest ridership should be given single-digit numbers.

- Other numbers may also be more memorable than others. Which numbers are most memorable is an empirical question that ideally should be researched, but it's probably a safe assumption that round numbers (ending in 0) and numbers with repeated digits are relatively more memorable.
- One easy and common mistake is to confuse one line number with another. Thus, line numbers should be chosen to be as different as possible from other nearby line numbers. Ideally, a line's number will not share digits in the same places with nearby lines' numbers (so 27 and 29 should not be nearby), or be the reverse of a nearby line (27 and 72 should not be nearby).
- An exception is when two lines are very similar over a large part of their travel, such that it is desirable to make them seem tied together. In this case, two separate but similar numbers are preferred (e.g., 20 and 21). Letter suffixes should be avoided for this purpose.

- It is confusing when the same line number refers to several different things. Variants that take people different places should be numbered differently. Short turns may not require a separate designation, but significant branches and deviations should have a separate number.
- Letter suffixes should generally be used for service types (“L” for limited, “R” for Rapid, “X” for express, etc.), not for variants.
- At AC Transit, the hundreds digit should be used primarily to indicate the general time of day:
  - 300-series lines: atypical hours not otherwise assigned
  - 600-series lines: school days and hours
  - 800-series lines: All Nighter hours (primarily 1-5 a.m.)

An exception is that 400-series lines will be used for flexible services.

The 200-series routes have been used to indicate a geographic area. This is not helpful for customers, who already know whether they are going to the Fremont/Newark area or not. The exclusive use of the 200-series to indicate a geographic region should be phased out, and all line numbers from 1 through 299 made available for regular bus lines districtwide, where low ridership would indicate the use of high numbers.

(The 100-series is used internally, not publicly, for Transbay lines. Line numbers in this series not currently used should be made available for public use, and new internal-only line group numbers should use 900-series numbers.)

- At AC Transit, letters should continue to be used publicly for Transbay lines.
- AC Transit should encourage harmonization of line numbering between regional transit agencies, and promote these principles in any such effort.

When lines are changed, numbers should be assigned such that customers will not be surprised by the changes.

- When lines are substantially truncated or rerouted, they should be given new numbers. There is no bright-line rule for how much is substantial, but the decision should consider numbers of passengers as well as distance. It is better to ask people to learn a new line number than to have them end up somewhere they didn’t expect because they got on a bus they didn’t realize had changed.
- On the other hand, lines that are extended (without changing the existing portion substantially) should keep the same number, even if that extension is very long.
- Lines should not change numbers arbitrarily (that is, without a corresponding change in the service).
- Unless a discontinued line is revived, in which case it should receive its old number if available, numbers should not be re-used for two years after discontinuance. A decade or more should pass before the same number is used for a different line in the same section of the district.

### **The Bus and Rail Route Numbering Definitions**

#### **Urban Trunk Routes**

Trunk routes within urban Honolulu's city center (between Halawa in the west to Hawaii Kai in the east) will be numbered between 1 and 39.

#### **Other Trunk Routes**

Trunk routes outside of urban Honolulu's city center serving bus-only transit centers, major transfer points, and rail stations with bus-rail connections will be numbered with two-digit numbers between 40 and 99. These two-digit numbers will be assigned to bus-only transit centers, major transfer points, and rail stations with bus-rail connections. For example, Waianae Transit Center is assigned the two-digit number 40. Route 40 is the main trunk line that serves Waianae Transit Center. See connecting community circulators. Trunk routes in West Oahu (Makaha-Waipahu) shall be numbered in the 40s, Central Oahu (Haleiwa-Halawa) in the 50s, and Windward Oahu (Haleiwa-Waimanalo) in the 60s.

#### **Community Circulators**

Community circulators serving bus-only transit centers, major transfer points, and rail stations with bus-rail connections will be numbered with three-digit numbers; the first two-digits will represent the main bus-only transit centers, major transfer points, or rail stations with bus-rail connections that they focus on. For example, community circulators focused on the Waianae Transit Center (transit facility #40) served by Route 40 are numbered 401-Waianae, 402-Lualualei, and 403-Nanakuli.

#### **Peak-Hour Express Services to and from Downtown Honolulu**

Peak-hour express services to and from Downtown Honolulu will be preceded with X with a following number, (X1, X2, X3, etc.)

#### **Peak-Hour Express Services to and from Kapolei**

Peak-hour express services to and from Kapolei will be preceded with K with a following number, (K1, K2, K3, etc.)

#### **Peak-Hour Express Services to and from Pearl Harbor**

Peak-hour express services to and from Pearl Harbor will be preceded with PH with a following number, (PH1, PH2, PH3, etc.)

#### **Peak-Hour Express Services to and from Waikiki**

Peak-hour express services to and from Waikiki will be preceded with W with a following number, (W1, W2, W3, etc.)

#### **Peak-Hour Express Services to and from University of Hawai'i at Manoa**

Peak-hour express services to and from the University of Hawai'i at Manoa will be preceded with U with a following number, (U1, U2, U3, etc.)

#### **Peak-Hour Express Services to and from Rail Stations**

Peak-hour express services connecting only to rail stations will be preceded with R with a following number, (R1, R2, R3, etc.)

#### **Peak-Hour Express Services to and from Ferry Services**

Peak-hour express services connecting only to ferry services will be preceded with F with a following number, (F1, F2, F3, etc.)

#### **Overnight "Owl" Network All-Night Service**

All-night service will be preceded with N with a following number, (N1, N2, N3, etc.)

#### ***CityExpress!* and *CountryExpress!* All-Day Rapid Service**

All-day *CityExpress!* and *CountryExpress!* limited-stop rapid bus service shall be designated with single-character letters between A and H.

# Survey Answers

Each heading color represents a vertical section of the whole table. Use the first column to match between each row.

	Timestamp:	Survey respondent's name:	Survey respondent's title:	Transit agency name:	Transit agency address:	Transit agency city:	Transit agency state:	Transit agency postal code:	Survey respondent's email:	Survey respondent's phone:
1	7/7/2016 13:34:29	Karen King	CEO	Golden Empire Transit District	1830 Golden State Ave.	Bakersfield	CA	93301	[REDACTED]	[REDACTED]
2	7/7/2016 13:37:44	Lawrence Kopf	Chief Operations Planning Officer	Charlotte Area Transit System	600 East Fourth Street	Charlotte	NC	28202	[REDACTED]	[REDACTED]
3	7/7/2016 13:57:32	Brian Horton	Transportation Planner	Charlotte Area Transit System	600 E. 4th St.	Charlotte	NC	28202	[REDACTED]	[REDACTED]
4	7/7/2016 14:07:51	Ray Amoruso	Chief Planning & Development Officer	Hampton Roads Transit	509 E. 18th Street, Bldg #4	Norfolk	Virginia	23504	[REDACTED]	[REDACTED]
5	7/7/2016 14:19:40	Denis Desmond	Manager of Planning	San Diego Metropolitan Transit System	1255 Imperial Ave., #1000	San Diego	CA	92101	[REDACTED]	[REDACTED]
6	7/7/2016 14:33:41	Sherwin Lee	Senior Planner	Pace Suburban Bus	550 W Algonquin Rd	Arlington Heights	IL	60005	[REDACTED]	[REDACTED]
7	7/7/2016 14:36:43	David Huffaker	Deputy Executive Director, Operations and Support Services	Sound Transit	401 S Jackson St	Seattle	WA	98122	[REDACTED]	[REDACTED]
8	7/7/2016 14:36:46	Peter Stackpole	Service Planning Assistant Manager	Pierce Transit	3701 96th St. SW	Lakewood	WA	98499	[REDACTED]	[REDACTED]
9	7/7/2016 14:40:16	Jon Nouchi	Deputy Director, Planning	Honolulu Authority for Rapid Transportation	1099 Alakea Street, Suite 1700	Honolulu	HI	96813	[REDACTED]	[REDACTED]
10	7/7/2016 15:17:32	Michael York	Deputy General Manager - Operations	Greater Cleveland Regional Transit Authority	1240 W. 6th Street	Cleveland	Ohio	44224	[REDACTED]	[REDACTED]
11	7/7/2016 15:44:02	Scott Haskill	Senior Planner - Transit Service	Toronto Transit Commission	1900 Yonge Street	Toronto	Ontario	M4S 1Z2	[REDACTED]	[REDACTED]
12	7/7/2016 15:45:58	David Morris	Director of Operations	Piedmont Authority for Regional Transportation	107 Arrow Road	Greensboro	North Carolina	27409	[REDACTED]	[REDACTED]
13	7/7/2016 16:53:10	Andrew Mikkelson	Director of Transit Operations	Gold Coast Transit	301 E Third Street	Oxnard	CA	93030	[REDACTED]	[REDACTED]
14	7/7/2016 17:20:04	John Engelman	Service Planner	Edmonton Transit Services	11904 154 Street NW	Edmonton	Alberta	TV5 1J2	[REDACTED]	[REDACTED]
15	7/7/2016 17:37:23	Aaron Priven	Service Information Administrator	AC Transit	1600 Franklin St.	Oakland	CA	94706	[REDACTED]	[REDACTED]
16	7/7/2016 17:50:08	Laura Minns	Sr. Project Manager	LYNX - Orlando, FL	455 N. Garland Ave	Orlando	FL	32801	[REDACTED]	[REDACTED]
17	7/7/2016 18:53:22	Jessie Carter	Manager of Service Planning & Scheduling	Regional Transportation District - Denver, CO	1600 Blake Street	Denver/ Aurora/ Boulder	Colorado	80202	[REDACTED]	[REDACTED]
18	7/7/2016 21:13:21	H. E. Christian Peeples	At-Large Director / President	Alameda-Contra Costa Transit District	1600 Franklin Street, 10th Floor	Oakland	California	94612-2800	[REDACTED]	[REDACTED]
19	7/7/2016 22:00:22	John Andoh	Program Manager, Bus Contracts	Capital Metro	2910 East 5th Street	Austin	TX	78702	[REDACTED]	[REDACTED]
20	7/8/2016 11:28:52	Gary Moses	Director of Operations	Transpo	1401 S. Lafayette Blvd.	South Bend	IN	46613	[REDACTED]	[REDACTED]

	Timestamp:	Survey respondent's name:	Survey respondent's title:	Transit agency name:	Transit agency address:	Transit agency city:	Transit agency state:	Transit agency postal code:	Survey respondent's email:	Survey respondent's phone:
21	7/8/2016 11:58:05	Dottie Watkins	Vice President, Bus and Paratransit Services	Capital Metropolitan Transportation Authority	2910 E. Fifth Street	Austin	Texas	78749	[REDACTED]	[REDACTED]
22	7/8/2016 13:21:45	Ryan Jones	Senior Operations Planner - Transportation Planner III	Fairfax County DOT / Fairfax Connector	4050 Legato Road, Suite 400	Fairfax County	Virginia	22033	[REDACTED]	[REDACTED]
23	7/11/2016 8:48:35	Jim Moore	Service Planner	Sound Transit	401 S Jackson St	Urban areas of King, Pierce and Snohomish Counties	Washington	98104	[REDACTED]	[REDACTED]
24	7/11/2016 11:51:14	Jorge Luna	Manager of Service Planning	Valley Metro	101 N 1st Ave., Suite 1300	Phoenix	AZ	85003	[REDACTED]	[REDACTED]
25	7/11/2016 13:14:19	Ryan Harshbarger	Director of Transportation	CATA	2081 West Whitehall Road	State College	PA	16801	[REDACTED]	[REDACTED]
26	7/11/2016 17:26:50	Tom Hingson	Director	Everett Transit	3201 Smith Ave Suite 215	Everett	WA	98201	[REDACTED]	[REDACTED]
27	7/11/2016 18:51:17	Joyce Rooney	Transit Manager	City of Redondo Beach - Beach Cities Transit	415 Diamond St	Redondo Beach	California	90277	[REDACTED]	[REDACTED]
28	7/12/2016 17:50:19	Chris Pangilinan	Director, Technology and	TransitCenter (not an agency)	1 Whitehall Street, 17th Floor	New York	NY	10004	[REDACTED]	[REDACTED]
29	7/13/2016 17:39:46	Ian Dickson	Manager, Design & Wayfinding	Toronto Transit Commission	1900 Yonge Street	Toronto	Ontario	M4S 1Z2	[REDACTED]	[REDACTED]
30	7/14/2016 14:40:34	Julie Tolar	Director of Service Planning	Regional Transit Service	1372 East Main Street	Rochester	NY	14609	[REDACTED]	[REDACTED]
31	7/20/2016 13:33:19	Jason Popik	GIS & Transit Planner	Akron METRO RTA	416 Kenmore Blvd	Akron	Ohio	44240	[REDACTED]	[REDACTED]

What type of route nomenclature does your transit agency use? (Check all that apply)	Please provide examples of the route names currently used:	In theory, how is the system organized? (Check all that apply)	In practice, how closely is this organization system followed? Does your transit agency take specific steps to follow this system?
1 Numbers, Names	Rt. 44 Bakersfield College/White Lane	Corresponding to destinations or street names, Route type (local, rapid, express, etc.)	Route numbers reflect type and frequency of service.
2 Numbers, Letter suffix for express	2 Ashley Park, 61X Arboretum Express, 16W South Tryon to Whitehall, 16T South Tryon via Tyvola Road	Randomly, Route type (local, rapid, express, etc.), Letter suffixes for branches and for express	Not very organized
3 Numbers, Colors	1-Mount Holly, 2-Ashley Park, 3-The Plaza, etc.	Conserved from previous routes and systems from the same area as closely as possible, Route type (local, rapid, express, etc.), Rail connections	Newer routes follow a more organized methodology than older routes
4 Numbers	We have 70 local fixed routes that start with Route #1 and range up to Route #121. We also have 8 Express bus routes that have three digit numbers in the series of 900's. We also have commuter routes that go to specific employment destinations that are numbered in the 400's....	Conserved from previous routes and systems from the same area as closely as possible, Route type (local, rapid, express, etc.), Our service district is comprised of six distinct municipalities. We try to assign route numbers in groups that are reserved for each of the six cities. Once a route number is used, even if that route is subsequently eliminated, the route number is "retired". As an example, all City of Norfolk routes are numbered 1-through 20.....	see response above
5 Numbers, Colors	LRT lines are named by color (Blue, Green, etc.). All bus routes are numbered.	Conserved from previous routes and systems from the same area as closely as possible, Route type (local, rapid, express, etc.), Letter prefixes for branches	Not strictly, as the street network and urban form is not conducive to an easy geographical numbering system. Ours is a combination of legacy numbering and, as routes change and are added, using an updated system based on route type.
6 Numbers	550, 616, 472, 303, etc.	Conserved from previous routes and systems from the same area as closely as possible, Organized by garage/area. Each hundredth place corresponds to a specific garage, usually.	Not rigorously. We will never change route numbers unless a major restructure happens.
7 Numbers		Conserved from previous routes and systems from the same area as closely as possible	Our service is regional and is layered on top of some local transit service. Our first number--"5"--designates the service as ours. When possible, our 5 is put on top of historical or companion local service, such as route 177, the local, and 577, our express service.
8 Numbers	Route 53 University Place	Corresponding to destinations or street names	Followed exactly in practice. Route numbers correspond to locations with lower numbers corresponding to the CBD (e.g., route 10 would serve downtown Tacoma while route 425 is an exurban service in the East County)
9 Numbers, Letters, Names	A-CityExpress! UH Manoa, C-CountryExpress! Makaha, 8-Waikiki-Ala Moana PH1 Express-Pearl Harbor,	Conserved from previous routes and systems from the same area as closely as possible, Span of service (peak, all day, etc.), Route type (local, rapid, express, etc.), Numbered based on regional transit centers. For example, trunk Route 40 services a certain transit center; all circulator routes that feed this trunk use 40 in their 3-digit numbers: 401, 402, 403, etc.	As closely as possible. Sometimes it is not practicable to renumber a route just because it is shortened or interlined or consolidated.
10 Numbers, Letters, Names, Colors	Heavy rail is the Red Line and the two light rail lines are the Blue Line and the Green Line	Conserved from previous routes and systems from the same area as closely as possible, Corresponding to destinations or street names, Span of service (peak, all day, etc.), Route type (local, rapid, express, etc.), Letter prefixes for branches	The GCRTA has used the same process for years.
11 Numbers, Letters, Names, Colors	Line 1 Yonge-University (a subway line, identified additionally by the colour yellow. 49 Bloor West (a bus route). 505 Dundas (a streetcar route). 320 Yonge (an overnight bus route).	Corresponding to destinations or street names, Span of service (peak, all day, etc.), Route type (local, rapid, express, etc.), Letter prefixes for branches	Route numbers are grouped by service type. 1 to 4 are rapid transit; 5 to 139 and 160-171 are regular bus routes; 140s are premium fare bus routes; 180s and 190s are limited stop bus routes; 300s are overnight bus and streetcar routes; 400s are community bus routes; 500s-514 are streetcar routes.
12 Numbers	1 Winston-Salem Express	Route type (local, rapid, express, etc.)	Our region is very large, covering 10 counties, so we number the routes as they are created. No route is reassigned when it is eliminated either.
13 Numbers, Letters	2 - Colonia, 1A Port Hueneme & 1B Porthu	Conserved from previous routes and systems from the same area as closely as possible, Letter Suffixes for Branches	Routes are added as needed numbers progress up from last number used
14 Numbers, Names	1, 5, 9, 78, 100	Conserved from previous routes and systems from the same area as closely as possible, Corresponding to destinations or street names	Where ever possible. Due to lack of numbers for certain areas not always possible
15 Numbers, Letters	1, 6, 20, 79, 200, 251, 314, 654, 805, B, F, FS, NX, NX4	Randomly, Conserved from previous routes and systems from the same area as closely as possible, Route type (local, rapid, express, etc.), Varies. Letters are trips to San Francisco; numbers are not. Hundreds digit used for time of day (mostly). Specific numbers within categories chosen to avoid confusion on-street	Our organization is "generally" followed although there are exceptions

What type of route nomenclature does your transit agency use? (Check all that apply)	Please provide examples of the route names currently used:	In theory, how is the system organized? (Check all that apply)	In practice, how closely is this organization system followed? Does your transit agency take specific steps to follow this system?
16 Numbers, Letters, Citrus	our routes are also referred to Links. Some routes/links are named after major corridors. For example, Link 436N/436S is a route that primarily runs along a state road (ie SR436) - it's split by geographic area since it is a very long route. Most routes/links are just a simple number 'Link 7, Link 18, etc) with no real pattern other than historically numbered over time as they were added to service.  Our BRT routes are citrus themed - the system is called LYMMO (pronounced as limo, like limousine). We have three LYMMO routes - Orange, Lime, and Grapefruit	Randomly, Conserved from previous routes and systems from the same area as closely as possible, Corresponding to destinations or street names, Route type (local, rapid, express, etc.)	New services are put into the system with a planned number, generally based on chronology. Other new services may be done in a particular sequence based on type of service - in particular an express route.
17 Numbers, Letters, Names	Route 0 - Broadway, Route AB - Boulder/DIA, F Line (light rail), SKIP- Broadway (CU Boulder)	Conserved from previous routes and systems from the same area as closely as possible, Corresponding to a grid system, Route type (local, rapid, express, etc.), in some cases number related to zip code locations	The system s closely followed, but challenged by duplication of number sequencing.
18 Numbers		Conserved from previous routes and systems from the same area as closely as possible, Geographic and functional (e.g. 600 buses are school service. 800 buses are all night buses)	Quite closely. Done in the planning dept. We may have a policy and administrative regs. on the subject.
19 Numbers, Names	300 Govalle	Route type (local, rapid, express, etc.)	Very specifically. All routes to downtown are 1-99, all feeder routes to a transit center is 200-299, all flyer routes on freeways are 100-199, all crosstown routes are 300-399, all special shuttles are 400-499, rail is 500-599, UT Shuttles are 600-699, express routes are 900-999 and rapid routes are 800-899.
20 Numbers, Names	Sweep, Blackthorn Express	Conserved from previous routes and systems from the same area as closely as possible, Corresponding to destinations or street names, Corresponding to corridors radiating from the CBD	Very closely. Routes to the west and south of CBD are even numbered, and routes to the north and east of CBD are odd numbered. System is primarily a hub-and-spoke system.
21 Numbers, Names	1 - North Lamar; 300 - Govalle; 642 - East Campus	Route type (local, rapid, express, etc.)	Route numbers are grouped by service type (locals, limited stop, express, BRT, University Shuttles, and "specials"
22 Numbers	Route 393: Saratoga - Pentagon - Mark Center	Conserved from previous routes and systems from the same area as closely as possible	The first digit denotes location and is followed closely. Subsequent two digits are more random, and then we have RIBS Routes (Reston Internal Bus System), which is an absorbed legacy.
23 Numbers, Names	North Line, South Line, Link light rail, Tacoma Link	Conserved from previous routes and systems from the same area as closely as possible, Ascending in a circle around the Central Business District (CBD), Rail modes are named. Bus lines are numbered.	Fairly close for the bus system. Rail modes are named and light rail lines will be identified by color within a few years.
24 Numbers, Letters	Route 0 - Central Ave., Route 7 - 7th St., Route 72 - Scottsdale Rd., Express 533, I-10E RAPID, MARY Neighborhood Circulator, Orbit Jupiter Neighborhood Circulator, Grand Avenue Limited.	Corresponding to destinations or street names, Corresponding to a grid system, Route type (local, rapid, express, etc.)	*
25 Letters	A	Corresponding to destinations or street names	Historically routes are named on destination but this has degraded with route expansions. We have also added E to the first letter to denote an express route
26 Numbers	2,3,4,5,6,7.8.12,29,70	Conserved from previous routes and systems from the same area as closely as possible, Corresponding to a grid system, Corresponding to different service patterns within the CBD, Span of service (peak, all day, etc.), Route type (local, rapid, express, etc.)	Only 70 is unique as it identifies a weekday only commuter route.
27 Numbers	102, 109	Conserved from previous routes and systems from the same area as closely as possible	N/A
28 Numbers, Letters	M101, B62, Bx5	Letters indicate borough	Followed exactly.
29 Numbers, Letters, Names, Colors, shapes (circles, squares, etc)	Line 1 Yonge-University	Corresponding to destinations or street names, Span of service (peak, all day, etc.), Route type (local, rapid, express, etc.), Letter prefixes for branches, Ascending route numbers based on when route went into service	We work hard to be consistent in our application of route numbers much as possible. I suggest you download a copy of our system map from TTC.ca. It will provide a good representation of our route numbering and a key to what each number and letter represents. Also to add to the list above - modality is another way our system numbers are organized. For instance 500s represent streetcar routes.
30 Numbers, Names	1 Lake, 31 Park, 24 Marketplace Mall	Corresponding to destinations or street names	Use street name and destination, interlined from downtown transit center
31 Numbers, Names	101 Richfield/Bath	Corresponding to destinations or street names	Route numbers are simply numeric and names are area destinations

\*For local routes (which operates grid-type services, with high frequency on major arterial streets, some secondary streets, weekdays, Saturdays and Sundays/ Holidays), "100" block designations, accompanied with a name, e.g. McDowell Rd. is the 1700 N block, therefore the route is "1700". For Express commuter routes (which is a service that transports commuters into and out of the CBD in the AM and PM from area suburbs), "clock-face" geography, using triple digits (currently, just express uses the convention, with "500's"), accompanied with a city or subarea name, e.g. Fountain Hills/Scottsdale "514". For Limited services, based upon "100" block designations or major state corridor including the abbreviation LTD (the system currently only has one such route: Grand Ave. LTD). For RAPID (which is a City of Phoenix only commuter service) labeled for the major interstate or state highway of travel, e.g. I-10W RAPID. Regional/Rural Connector (modeled by current rural service which provides a service that connects cities beyond the Large and Small UZA to the metropolitan area) is numbers and clock-faced based, e.g. 685 Ajo/Gila Bend Connector. Neighborhood Circulators (services that connect neighborhoods to all other modes of service) and Shuttles (services that specialize in providing connecting and distribution services within an urbanized center) are letters based and generally named by citizens within the area they serve., e.g. Phoenix MARY (Maryvale Area Ride for You).

	What benefits do you experience from having your routes named in this way?	What challenges have you experienced from having your routes named in this way?	Other comments:
1	Customers know the destination and the frequency of the service.	When frequency has been increased the route number no longer fits the pattern.	
2	The suffixes help customers to know what branch the bus trip is going to	We use three digit numbers for neighborhood routes, but we truncated routes into light rail (effectively making them neighborhood routes) and we retained two digit numbers. As a result, our system is not consistently organized in terms of naming convention.	We color code timetables, with expresses in red and locals in green
3	Route type and sub-region identifiable by number and color	Running out of numbers	
4	Historic continuity dating back to when transit service was still provided by private companies. Pre-1970....	none, other than we run out of numbers in a particular city sequence, then we assign an out of sequence number that doesn't fall within the range assigned for a particular city.	
5	Using legacy numbers is easier for passengers and keeps external transit information collateral current for longer. But at the same time slowly transitioning to a newer system that will be more useful to new riders.	For a large and complex system, for every possible rule there winds up some exceptions. So it would be difficult to expect a perfect system that will work for every instance.	Regular riders adapt fairly quickly to numbering changes; it's more difficult for occasional users. For some specific routes, the number can become almost a part of the branding, so that makes it challenging to change without confusing people and/or losing some brand equity. Also, note impacts on data collection and monitoring. The numbering system can impact how easily will data be sorted and processed on the back end. Consider the need for other non-users, like I.T. staff, to be able to understand the system.
6	Clarity - passengers have a better idea of garage/area based on a route's hundredth place value.	Inconsistencies will come up with other service types (e.g., special event, commuter express). For ex., we had three special-event routes numbered very closely, but they were operated by two different garages.	
7	People can remember route numbers easily.	The numbers can be abstract for someone who is not familiar with the system.	
8	Consistency and a readily identifiable route service based on the numbering system (e.g., someone riding a 200 range service would know that it travels primarily within the jurisdictions of Lakewood and / or Steilacoom).	None to speak of although I will say that trunk routes (highest performing routes with lowest numbers like 1, 2 & 3) tend to travel greater distances and through multiple jurisdictions so the numbering doesn't correspond with location as other route numbers do. While not necessarily a challenge, it is a deviation from usual numbering protocol.	
9	Sometimes the benefits are only in the pleasure of planners creating a rational system. Passengers generally remember the routes they need to take and don't regard the system.		
10	Service area communities are familiar with the route designations.	None that I am aware of.	
11	Categorising route numbers by type (e.g. 180s and 190s for express routes, 300s for overnight routes) helps customers and employees understand the type of service provided by the route.	1. We are running out of route numbers for regular bus routes in the 170s. 2. Our present express route numbering system (180s, 190s) don't match or reflect the parallel local bus routes. As an example, the local service along the Jane Street corridor is numbered 35, and the express is 195. We may switch these to 35 and 935, to help make it clear that both serve the same corridor. 3. On multi-branch routes we use letters to identify the branches. Some customers find this confusing.	
12	Clear for the public, staff and call center employees all being on the same page as to what route someone is referring to.	Sometimes the public does not know exactly what area the route covers.	
13	No discernible benefit	No discernible challenges	We are looking to restructure our routes and remove some from neighborhoods to more major arterials. At that time we may consider changing the number system as well
14	For knowledgeable customers an idea as to where a route goes	Groups of numbers were assigned to various areas. Problems with lack of numbers after the numbering system was last organized in 1997.	
15	I think people generally learn the few rules that are mostly consistent (the hundreds place and letters rule), which is useful for them.	Mostly buy-in from staff who think of bus lines as something that should "just make sense"	I'm emailing our line numbering principles document to you.
16	Routes named after corridors are quite helpful. Our destination signs generally are most useful for our customers though as they will note direction of a route via final or interim destination.	Random numbers don't mean a whole lot to our customers	

	What benefits do you experience from having your routes named in this way?	What challenges have you experienced from having your routes named in this way?	Other comments:
17	Following the grid pattern using the block numbers simplifies thing for our planning efforts, but has limited value to customers. Many customers do not relate street numbers to the names of the streets they commonly use.	When naming routes that operate on one side of the District, along the same roadway requires the naming system to be modified. As an example, our largest bus route operates on East Colfax Avenue and is named Route 15/15L. We have a corresponding route on West Colfax that were consequentially named Route 16/16L.	
18	Riders know where the buses are and what they do.	We tried a - b circular routes, but they did not work well.	We are an old system. Our predecessor private agency started in 1903. We try to keep the same numbers on the same streets.
19	Simplicity regarding the type of route and what it does, and in some cases, the fare charged	None, that I am aware of.	
20	General part of town served, by seeing the route number.	No problems	
21	It helps customers understand what type of route they will be using. Our fares are also different (higher for express routes, for example) and fare categories are tied to route categories.	None.	
22	It helps with internal planning, clarity & consistency with customers, communications and delegation of routes between our three divisions since it pretty much breaks down by 100 allocation (i.e. Huntington Division gets 100s, 200s, and 300s).	I'm not aware of any. We promote major destinations as part of the long name. The three digit route number is just shorthand and helps with radio traffic, incident reports, etc. There might be confusion with overlapping MetroBus Routes, but they use numbers and letters for the pattern variant (i.e. 11Y, 9A, etc.). Perhaps we could use a pattern variant letter? 402S = 402 Route with a Short Trip?	
23	It is a quick reference for staff to determine what bus corridor is being served.	None to speak of	Route numbers for bus lines are coordinated with a regional system. This system started prior to Sound Transit's existence by King County Metro.
24	The ease of remembering the route numbers for the major services, e.g. connect from Route 0 to Route 61. Ensuring continuity for analysis (e.g. ridership trends over the years). Route published material (print or electronic) flows in ascending order.	The arterial street block number changes between cities, the challenge is deciding which city to anchor the route number to.	-
25	Minimal today, originally effective in matching a route to the primary destination	Long term sustainability and naming routes with similar destination	N/A
26	easy for people to remember each route as two directions and end destination in route description e.g. Route 7 N College Station or Route 7 S Everett Mall	People get confused about directions. All but two routes serve our major transit center near the CBD (Everett Station) but most do not lay for time there. By calling out the end destination, many want to know or make sure, is it via Everett Station.	We have some loop routes which while efficient, are very confusing to new riders and irritating to old riders. When resources allow we will create bi-directional routing for all.
27	Easy to remember	none	
28	Borough quickly identifies location of route. Origin of number is unknown.	Routes cross into 2 boroughs sometimes.	
29	We have a large multicultural Customer base on Toronto. The use of numbers and letters are more accessible to people with language barriers. Additionally, the use of colours and shapes as secondary identifiers is helpful to customers with cognitive barriers. For instance, our main line - Line 1 is identified with a black number 1 inside a yellow circle. The circle signifies that this is a subway line. The legacy name "Yonge-University) is also included in some applications. We adopted line numbers for our subways in 2013. The legacy names were retained as part of our change management Strategy and may be phased out at a later date. Numbers and letters are also beneficial to support digital applications - mobile apps, next vehicle arrival displays, route identifier displays on vehicles.	Generally our route numbering system is very well received and understood by our customers. We have had very few complaints. Occasionally, make improvements / revisions. We use multiple tactics to inform the public when we make these changes.	Our most recent changes have been focused on a strategy to emphasize levels of service. For instance, green route numbers mean express service. Solid red route numbers means regular 10 minute or less frequency all day service.
30	Customers know where bus is headed	none	
31	Simplicity	none that have been brought to my attention	

Have you undergone a change in the way in which you name your routes in the past? If so, when did that change take place?	What specific goals did you have for your new organization system?	How did you market the change in route names to riders? What response did you get from riders?	Other comments:
1 2012	We redesigned the entire route system and we wanted the names of routes to make the destination clear.	We used open houses, outreach at the transit centers, rider alerts, newspaper ads, behind the driver posters, fair and festival outreach booths, rider's guides. Customers and drivers were very confused for sometime until they learned the new routes and nomenclature.	
2 We need to, but no we haven't	If we would reorganize, we would renumber routes that don't go into our CBD	NA	NA
3 Not in years	Not applicable	One new route has same number as state highway number of corridor	
4 when we merged with the Penn Tran agency in 1999 (serving the cities of Hampton and Newport News) they were using a color based system of routes. We transitioned those routes to a numbering system similar to the southside cities of Norfolk, Portsmouth, Chesapeake and Virginia Beach	continuity of how we name routes no matter where a customer was in the HRT service district. Also HASTUS scheduling Software does not recognize alpha designations...only numeric designations....	was not here in 1999 to be able to answer this question	
5 Not a specific policy change, but a slow evolution of numbering over the past ten years, with each potential change vetted for need and difficulty.	No official new "organization system" but general goals for route numbering would be to organize by route type (so the number could provide some insight into route characteristics like fare, frequency, days/hours of service, etc.), and to better set up for back-end data purposes.	Our number changes have coincided with other system changes, so it would be part of the outreach for those changes, which would include printed materials (maps, timetables, "take one" flyers, etc.), ambassadors at stations/stops on the days before and after the changes, etc.	
6 N/A	N/A	N/A	
7 No	n/a	n/a	
8 N/A	N/A	N/A	The route numbering system was inherited when Tacoma Transit became Pierce Transit in 1980 and was expanded to include other jurisdictions as the agency grew.
9 Yes, in our old system, shuttle routes (circulators) took up the numbers 70-79 and expresses took 80-99, but we've had to renumber as the system grew.	Expandable and rational.	Pamphlets and other educational materials. It is hard to kill references to old routes, however.	
10 The GCRTA was formed through a consolidation of eight different transit agencies in 1975 and has maintained the numbering system that was in place at that time.	NA	Whenever we do make changes we post Rider Alerts on the routes being changed to explain to our customers why the change is being made. For example, in 2015 we implemented a new Bus Rapid Transit line in a corridor that was previously served by a route #55. Prior to beginning construction of the BRT we started distributing Riders Alerts and posting information on our web page and social media sites explaining what was coming. We sold the naming rights to the BRT service to Cleveland State University (CSU). The new articulated buses that were purchased for the new service are branded on the exterior with CSU logo and colors and the interior is branded with CSU logo and colors on the seats. Our first BRT line was opened in 2008 and the naming rights were sold to the Cleveland Clinic and University Hospitals, again branded on the exterior with their logos.	
11 Until the 1950s, all our routes had names only. Numbers were added for bus routes in the 1950s, for streetcar routes in the 1970s, and for subway lines just a few years ago. All three are identified by a number and a name; the subway lines are additionally identified by colour.	The addition of line numbers for the subway was intended to simplify the identification of the lines, including for people for whom English is not their first language; and to allow better wayfinding signage.	The line numbers for the subway were gradually rolled out in customer information and some signs. There was some criticism from riders (largely because it was new) and from other stakeholders that the new line identity would cost money.	The regional transit planning agency has considered whether there should be co-ordination of route numbers and names between all the transit agencies in the greater Toronto area. To date there is no agreement on this. Some of our route names date from the early 20th century, and many bus route numbers have been used for more than 60 years. They are well known to customers and wholesale changes would be disruptive.
12 N/A	N/A	N/A	
13 N/A	N/A	N/A	
14 Three major changes. Originally the buses were only numbered. In 1962, most routes were changed to letter-number. In 1977 switched to all numbers. In 1997 the number system was nearly completely changed. Names are for LRT only.	Low numbers for line haul routes. Thereafter numbers assigned to areas of city.	The re-numbering was done at the same time as a complete network change of the route system. Customers were more concerned over the network changes	
15 Not an overwhelming radical change, but we changed the way we assigned numbers to new routes by removing geographic signifiers.	Easy for customers to remember when on the street.	We didn't since it didn't involve changing the numbers of existing routes.	

Have you undergone a change in the way in which you name your routes in the past? If so, when did that change take place?	What specific goals did you have for your new organization system?	How did you market the change in route names to riders? What response did you get from riders?	Other comments:
16 Not recently	not applicable	When we expanded the LYMMO system we had to re-brand and distinguish between routes. We had initially chosen colors, however, the City economic development department chose citrus types for each line since they were closest to colors.	
17 At the request of certain municipalities within the District we have named designated routes with simple names. As an example the City of Boulder has several route services with names such as: SKIP, Jump, Stampede, Bolt...	The goal of the short names in Boulder and other areas was to make the service more appealing to the customer through branding.	The name changes were done in concert with a service reconfiguration.	
18 We have made some changes several times over the last 50 years.	Make the system clear and simple.	E-mail blasts, press releases, notices on buses, notices at bus stops, asking our local electeds to put it in their newsletters.	Good luck.
19 No	N/A	N/A	N/A
20 No	n/a	n/a	
21 In 2015 changed from lettered designations for our University routes to numbered designations. The route "name" stayed the same, and there was little to no confusion. For example, Route EC-East Campus turned into 642-East Campus.	Organized, easily explainable, expandable	We explained that we were organizing routes by type and some routes would get a new number. There was very little confusion.	
22 Not that I'm aware.	Simple, easy for customers to understand, ease of communication, geographic identity at least internally.	It's just part of regular service change public outreach. The last two rounds we've done pop-up events at metro stations.	
23 No. The bus route numbering system was developed in 1998 when staff was told that by the partnering agencies that their systems could not use letters as identifiers. Since then, they have found a way but Sound Transit had been operating buses for over a decade by then.	Not applicable.	Not applicable.	Hopefully you have included King County Metro in your survey list.
24 December 2008 when the last few local routes went from Blue, Green, Red to 39, 29 and LRT, respectively.	Simplicity.	In conjunction with the biannual service changes and launch of LRT. Positive response.	
25 No	N/A	N/A	N/A
26 We used to name routes not by end destinations but by neighborhoods served. We transitioned away about 12 years ago.	Customers could know the end destination.	In some cases, when a route changed slightly we kept the old number but gave it a new description. For instance Route 8 was Route 8 Seaview. A circulator route that never had a specific terminal where you could transfer to other routes. Over time we kept it Route 8 but redefined its path and gave it a destination at the transit center and at the end of city. Now it is Route 8 N Everett Station and Route 8 S Airport Road. Route 20 Riverside was stretched and changed so much that we renamed it all together to Route 29 N College Station and Route 29 S Mall Station. Though it still serves Riverside, it does so much more than that and we needed the customers to think of it as a longer, more useful route as well.	
27 No	N/A	N/A	
28			
29 Changed our subway routes from street names to line numbers in 2013	Simplification, more accessible, future-friendly, better for mobile apps, more understandable on audible announcements.	Held public information forums. Gave out souvenir buttons, maintained legacy names as a secondary identifier for a transition period. Overall, the public was very accepting of the change. We had prepared for resistance that never occurred.	
30 Used to through-route before opening transit center November 2015	Clearer end destination for route	Widespread marketing campaign - customers didn't like the change at first, but they like it now that they have gotten used to it	
31 no	N/A	N/A	

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