TOPEKA METRO

REQUEST FOR PROPOSAL – TM-24-01
TECHNOLOGY FOR BUSES

DECEMBER 14, 2023

Contact: Jordan Brock
Vice President of Global Sales
Strategic Mapping Inc.
4830 West Kennedy Blvd. Suite 600
Tampa, FL 33609
www.mapstrat.com

December 14th, 2023

Richard Appelhanz
Topeka Metropolitan Transit Authority
201 N. Kansas Avenue
Topeka, KS 66603

RE: RFP TM-24-01 TECHNOLOGY FOR BUSES

Dear Richard,

As Strategic Mapping's Vice President of Global Sales, I am pleased to provide Topeka Metropolitan Transit Authority (Metro) with the enclosed proposal for our Technology for Buses Solution. With proven and robust integration capabilities coupled with world-class transit technologies, Strategic Mapping brings both the experience and qualifications to help Metro achieve and exceed its goals in this solicitation.

This is made possible through our hardware design, software applications, system integration, and maintenance and support services. Strategic Mapping's technologies are relied upon by more than a billion riders annually, which represents thousands of bus installations.

Our proposal reflects our strong desire to work and collaborate with Metro on this important endeavor. As detailed in our proposal response, our proven deployment methods will ensure that this project is completed successfully and efficiently, without straining Metro's time and resources. Our dedicated project team will be by their side every step of the way, laying the foundation for Metro and the community it serves to realize the benefits of this project for years to come.

Strategic Mapping Inc. was founded in 2006 by Bram Granovsky, our President and CEO, and is a privately held company with office locations in New York City, Tampa Florida, and Toronto, Canada. Strategic Mapping has never changed ownership and since our inception, remains profitable and debt-free. Our employees are completely dedicated to the transit market and providing technology solutions to help agencies manage their business, and our comprehensive portfolio of technology continues to expand as we continue to meet the demands of the ever-evolving public transportation marketplace.

Our technologies modernize daily transit operations by providing users with the visibility to better manage their fleet as well as exceptions while simultaneously enhancing safety, accessibility, communications, reporting, planning, and the overall passenger experience. We are confident that our solution can help Metro enhance their operating performance to better serve their community.

In planning our project approach, we understand that Metro staff will still have transit operations to manage, and we recognize it is imperative that Metro continues to meet their daily service commitments without compromising ridership or revenue. Our approach is to leverage our internal resources and experience to make the entire process as easy as possible, with little to no down time during the transition of the technologies.

We are excited about this project for several reasons, but our primary reason is that meeting and exceeding the technology needs of a diverse agency like Metro truly excites us. We strongly believe Strategic Mapping has the best solution for this project and will provide a significant return on investment.

We have the resources, financial stability, technology and a demonstrated track record of working with agencies of similar size to Metro.

As your main point of contact, I may be reached by cell phone at (416) 566-5731 or my office (416) 483-7522 ext. 230 or by email at jbrock@mapstrat.com.

Thank you very much for this opportunity, we look forward to speaking with you soon.

Happy Holidays,

Jordan Brock
Vice President of Global Sales
Strategic Mapping Inc.

Table of Contents

Understanding of the Scope and Specifications

Strategic Mapping views this project as an opportunity to tailor an approach that will significantly enhance Metro's day-to-day operations, accessibility, safety and reporting, while not losing sight of your community's local needs. We understand that a one-size fits all approach will not work. Strategic Mapping's ultimate goal is to demonstrate that we are the ideal partner to work with based on our 18 years of experience, as well as our track record of working with dozens of transit agencies similar in size to Metro.

Strategic Mapping recognizes that Metro is preparing to make another significant bus technology investment and long-term commitment that will affect operations and the passenger experience for years to come. Success will not be defined simply by selecting a vendor and deploying a technology package. The only success that will pass this kind of scrutiny is the kind of success that Strategic Mapping described earlier; where Metro will be able to demonstrate that when all is said and done, a capable and established partner was selected.

Based on the requirements set out in Part I, we understand the following goals in mind for this project:

- ✓ Deploy an advanced AVL/CAD solution to improve agency operational efficiency, safety, reporting and cost-effectiveness.
- ✓ Provide Metro customers with a world-class application for accurate bus arrival times, real-time vehicle location, trip planning and general service information.
- ✓ Provide Metro customers with service support.
- ✓ Offer a seamless interface with your existing APCs for planning and NTD reporting, as well as Dynamic Message Signs for real-time service information.
- ✓ Procure a solution that is full featured, while being extremely user-friendly and intuitive to ensure rapid adoption from users.
- ✓ Collaborate with an experienced and hands-on technology vendor to mitigate risks associated with project deployments of this type.

- ✓ Have a utilization plan that is focused on delivering all the core elements, but is futureproofed with an open-architecture so that it is cost effective to add additional capabilities to handle the delivery of new services and technologies.

- ✓ Maintains a focus on your transportation challenges of today.

- ✓ And lastly, supports long-term sustainability by utilizing an advanced technology platform to deliver a customer centered service that makes Metro's services a more attractive travel option to individuals and families.

Strategic Mapping and our entire team love the opportunity that a project of this size and scope presents and we are more than up to the task. Utilizing lessons learned and incorporating industry best practices, Strategic Mapping takes a customer first approach to project implementation, which focuses on identifying and mitigating project risks at every key stage gate. Our success in this area can be attributed to our team's experience working together on similar projects, our ability to assist with data entry and verification to ensure transit resources are not overextended, our thorough implementation documentation, transparent and consistent communication, rigorous product testing and reliable hardware and software.

Achieving these goals will define the success of this project. Implemented and integrated into your operation properly, this project will make Metro a showcase of how to successfully upgrade bus technologies. The solution will be an invaluable asset that will help you meet the challenges of today and into the future.

Everything Strategic Mapping does is geared around minimizing risk and challenges, and maximizing the use of this technology by ensuring that you fully adopt it into your daily operations. **This project will be fully implemented by July 30th, 2024.**

Scope and Specification Details

The following section provides our overall technical approach and details regarding our proposed products and services. Strategic Mapping is fully compliant with all functional requirements in this RFP. Furthermore, we have established integrations with Hella APCs, UTA's NTD reporting, Remix software, Luminator headsigns, Pepwave routers and all Genfare equipment.

Vehicle Logic Unit (VLU)

Our VLU is a device that provides the processing power for many connected bus technology system components, and coordinates activities and the flow of information between all on-board devices. Our solid-state VLU has a highly accurate GPS and dual solid-state drives for data redundancy.

Automated Voice Annunciation (AVA)

Strategic Mapping's AVA is ADA compliant and seamlessly integrates with our System. It also supports time-based, location-based, and bus-operator initiated announcements to on-board passengers regarding the current route, stop and destination. When the bus doors open at a stop, a pre-boarding/exterior announcement of the current route number and destination will be provided. We plan to utilize the existing LEDs; we also offer our own displays if preferred.

Mobile Data Terminal (MDT)

Strategic Mapping's on-board package incorporates a color touch screen for drivers. Our MDT supports many key functions such as single sign-on, performance indicators, maps, messaging, etc., and is further detailed in the proposal.

Automatic Passenger Counting (APC)

Strategic Mapping's APC solution once integrated, counts the number of passengers boarding and alighting the vehicle at both the stop and route level coupled with all NTD reporting requirements. We have both integrated with and deployed Hella sensors and have a close working and established relationship. This will ensure a proven and certified solution.

Destination Sign Integration

This integration provides single sign-on and simplified/automatic message changes for drivers. We have in-production integrations with Luminator/Twinvision.

Farebox Interface

Our integrates with existing in-vehicle Genfare fareboxes to provide single point of logon from the MDT. Additionally, our interface provides reports of revenue by stop, route, day, etc. As work through the scheduled service progresses, updates will be sent to the farebox with the latest work piece, driver, route, trip, and stop. Fare reporting will be consolidated across all the fare payment methods.

Computer Aided Dispatch and Automatic Vehicle Location (CAD/AVL)

We will provide the tools to monitor Metro's bus operations in real-time, and facilitate the handling of delays, disruptions in the service, and incidents as they occur as well as support the adjustment of vehicle headways, dispatching of replacement or additional buses and reporting of the incidences. The CAD/AVL tool will assist operational staff with areas of concern without the need to personally monitor operations to identify an issue. This includes the accurate and real-time location and other pertinent information of buses and non-revenue vehicles.

Reporting and Business Intelligence

Our report engine and Business Intelligence (BI) platform will enable users to view, share and develop reports for service performance, exceptions, NTD, incident reports etc. User defined filters (date, time, driver, stop, route, block, pattern, etc.) and a multitude of data points are incorporated into the solution. Metro users can visualize and customize these reports in several formats (heat maps, tabular, pie charts, excel exports, etc.). All raw data accumulated/utilized for any report is embedded and accessible for the user.

GTFS/RT

The creation and sharing of GTFS/GTFS-RT files/APIs are standard. Our system supports the latest GTFS data fields for a more up-to-date feed.

Event/History Playback

This user-defined feature allows operations to review the historical movement/activity of any transit vehicle coupled with specific time, date, service performance and location information.

On-Board Messaging

The on-board VLU unit and operator MDT will support operator messaging with the ability to receive, view, store, clear, and respond to messages from a dispatcher and the ability to send messages to a dispatcher(s). The MDT will provide indications to the operator that the message queue is empty, a new message has been received, or a message is stored and can be viewed.

Real-Time Passenger Information (RTPI)

Strategic Mapping includes a comprehensive suite of RTPI applications and trip planning tools. Predicted vehicle arrival, departure, vehicle occupancy and service information are accurately calculated and disseminated to passengers through various web and mobile applications, and signage integration.

Disruption/Detour Management

This allows the Metro operation team to quickly and easily create, save and deploy unplanned detours. Detours will be visible to the public (RTPI), the vehicle operator and dispatch.

Hosted/Cloud Based Application Service

Our hosting service provides 24/7/365 operations support, including system backup, security, recovery and system maintenance. Strategic Mapping's hosted solution is a full featured hosting service providing the most up to date safety, monitoring, and security protocols available in the industry.

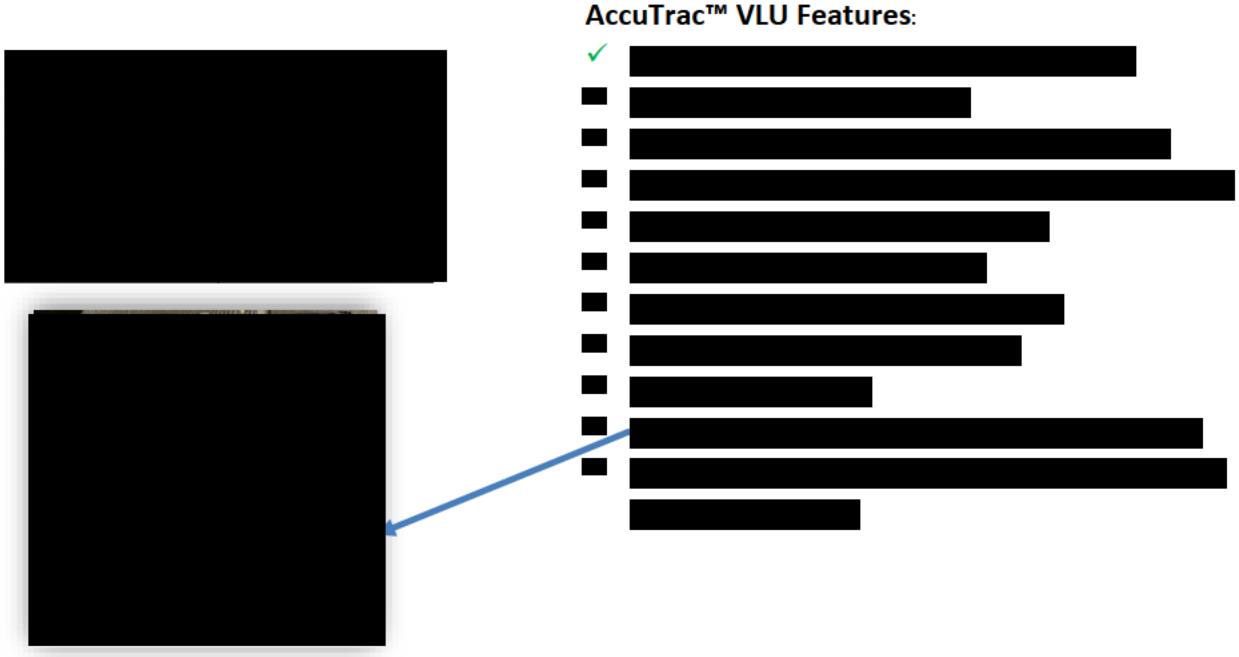
Expanded Details

AccuTrac™ Vehicle Logic Unit (VLU)

Strategic Mapping's AccuTrac™ Vehicle Logic Unit (VLU) is a rugged *transit-grade* system that combines GPS, failover redundancy, on-board computing, data storage, Dead-Reckoning as well as system health monitoring and diagnostics. The unit is solid-state, there are no fans or other moving parts. This safeguards against hardware complications due failures with moving parts which is common to most on-board systems. Strategic Mapping's battle tested solution functions in extreme weather conditions, is shock and tamper resistant and protected from galvanic effects. AccuTrac™ is automatically turned on by the vehicle ignition switch, and will turn off after a predetermined time once the ignition is turned off. Power for the unit is generated by the vehicle's 12–24-volt supply. Our GPS' positional accuracy averages an industry-leading 6.0 feet.

Deploying a highly accurate GPS System ensures captured and communicated data is correct and reflects true vehicle position on the road. Positional accuracy is critical when providing operational analysis and location-based information to passengers.

AccuTrac™ installs seamlessly in all vehicle types. The compact form factor enables agencies to quickly and easily swap units from retired or decommissioned vehicles onto newer ones without replacing or "junking" previous hardware. For added redundancy, AccuTrac™ also contains dual solid-state drives.



Quad-Band Antenna

Weatherproof antennas will be installed on the exterior roof of all vehicles. Our antenna provides high performance operation on all Wi-Fi bands and GPS signals. Our antenna contains separate feeds: Active GPS, Cellular and External Wi-Fi.

4 cables: Cellular, 2x Wi-Fi, GNSS

Cable 1: 800-1250 MHz, 3 dBi & 1650-2700 MHz, 5 dBi
Cable 2: 2.4-2.5 & 4.9-6.0 GHz, 5 dBi
Cable 3: 2.1-2.5 & 4.4-6.0 GHz, 5 dBi
Cable 4 (GNSS): 1561,

Smart Touch – Mobile Data Terminal (MDT)

Strategic Mapping's "Smart Touch" MDT is a rugged and user-friendly color LCD touch screen display for drivers. The scratch-resistant, crystal clear display ensures vibrant visibility in all lighting. We also include an adjustable "RAM" mount with each MDT to accommodate flexible installation locations within the vehicle, several mounting options are available. Smart Touch MDT functions and specifications include:

- ✓ [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]

[redacted]

[redacted]

[redacted]

will be able to log onto any vehicle and select their work.

[redacted]

If an entered password or PIN is invalid, the MDT will advise the driver to try again. Pressing BACK will return the user to the driver selection screen.

MDT Main Menu Sample

Selecting Work Assignment

On the main menu screen the driver presses “Select Route”. Once it is selected, the system will calculate which is the starting trip and puts the vehicle into and out of service at the appropriate times until the end of the run.

When a driver selects an assignment on the previous screen they will be presented with the one below. This screen shows a list of the trips in chronological order with their start time, start location, end location, stops, and any modification made to the route in comparison to the standard pattern. Routes with detours etc. would be displayed this way.

Revenue Service View

The screen below provides Drivers with a real-time view of their current headway, schedule adherence, last stop made, next stop and location on the route location.

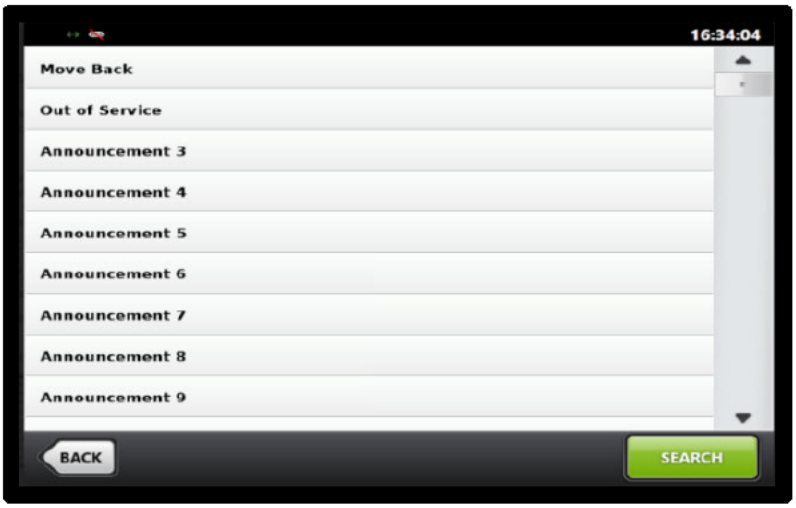
The Service Status screen will display vehicle is *off route* in the bottom right corner when the vehicle is not following the predetermined pattern.

Quick Trip

The Quick Trip feature allows the driver to create a 1 trip block based on any pattern from any service day. The common uses for this feature are temporary shuttles between 2 points, or unexpected load requirements (sporting event, political rally, etc.). When executed a quick trip ends the vehicles current block, if any, and creates a new one with one trip with a current start time based on the stop the vehicle is closest too. The vehicle should be at the starting stop before the Quick Trip command is executed. The block will be added to the work load of the system and also added to the prediction system. Below is the first screen that a driver is presented when the quick trip button is pressed. Here the driver picks the service day they wish to choose from. A "Special" service day can be created for emergency shuttles etc.

Driver Announcements

Selectable canned messages enable the Driver to communicate with the passengers on the vehicle. These messages can have both an audio and visual component. The messages will be played after any current message. If a stop announcement message trigger point is reached while the Driver announcement is being played it will be paused so the stop announcement can be played. The Driver announcement will resume playing after the stop announcement has finished playing. This override is a setting that can be disabled.



Messages

Inbound Messages - This screen is displayed whenever a new message is received, an audible ping to the Driver is also available. The Driver can respond using a transit defined pick-list of canned messages. The agency has the option to disable messaging functions while a vehicle is in motion.

Receiving a Response Required Message

When a driver receives a response required message the screen below is presented

Driver's Message Inbox - The *Inbox* screen displays delivered messages. Black text indicates low priority, orange text indicates medium priority, and red indicates high priority. Pressing the BACK button returns the Driver to the *Main Menu* screen.

Sending Messages - The *NEW MESSAGE* screen provides the Driver with a predefined list of high-level subcategories of messages. The categories and messages can be customer defined. Below are examples of possible categories including: Emergency, Maintenance Issues, Miscellaneous, Passenger Issues, Road Conditions, and Route Issues.

Automated Voice Annunciation System (AVA)

Strategic Mapping has been a long-standing industry advocate to ensure persons with disabilities have the right to access transportation services with dignity and without impediment. Our system is a module that provides a direct solution for agencies to enhance accessibility for their passengers.

Passengers who are visually or hearing impaired as well as those who are unfamiliar with the local area will greatly benefit. This technology has also proven to be of tremendous value to passengers who are unable to see out of a bus due to crowds, inclement weather or when traveling at night when their situational awareness is impaired. Automated voice announcements alerting passengers to upcoming stops are coordinated with on-board LED signage to enable all passengers to travel with confidence, reaching their destination with more security, convenience and independence.

Our system provides clear voice announcements for next stops, transfer points, current route, destinations, service alerts and advertisements. Our system includes a *text-to-speech* application. Transit will have access to their secure web portal to easily and conveniently edit or create announcements.

Pre-boarding route and destination audible announcements are also provided to waiting passengers while the doors are open. The flexibility of our system enables our customers to control what the public hears and sees while travelling. For example, announcement preambles (both audible and visual) are configurable to begin stop announcements with "**Next Stop**….." , or "**Now Arriving at**….", or "**Approaching**….".

Another value-added function is our integrated "Off Route" feature. Our on-board system recognizes when a vehicle has traveled off its service route and will automatically mute stop announcements until the vehicle returns to the planned route. The on-board system is constantly aware of the vehicle's position; therefore, it is able to pick-up from anywhere the vehicle happens to re-enter the route and will continue to announce the upcoming stops in their proper order. This avoids passenger confusion by the system calling incorrect stops during a deviation or detour.

Automated Stop Announcement System Features:

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

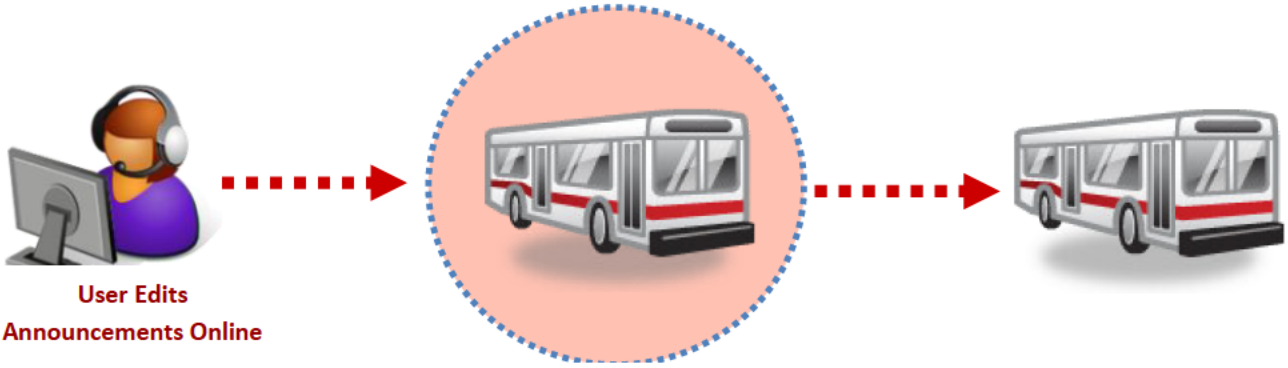
Web-based Announcement Management

Our system includes an intuitive web-based route, stop, and announcement editing solution. Authorized users can quickly and efficiently access and modify their route and stop information via the Internet.

[redacted]

Wireless Updates to Announcement System

The ability to wirelessly communicate with and seamlessly transfer announcement updates to the AccuTrac™ on-board system is essential functionality. Numerous competing systems do not offer this advanced functionality which creates many hours of tedious work for the agency who must manually update/visit each vehicle with any announcement message or route changes. This functionality is standard with our system.



Next Stop LED Visual Display Integration

[redacted]

Our AVA will utilize the existing LEDs. Our system supports all formats in which visual information is displayed to the riders (scrolling, static, flashing, etc.).

Future Option - Infotainment LCD Display & Content Management System (CMS)

Strategic Mapping's LCD offers passengers with a more engaged and pleasurable experience while travelling. This option leverages our core in-vehicle hardware platform coupled with the addition of our rugged 37-inch-wide slim LCD and our Content Management System (CMS) software.

Displays can be installed as a single mount or installed back-to-back as shown below. This solution also acts as a revenue generator for the transit as advertisers can utilize the platform to reach passengers in a more dynamic and targeted format.

Standard features include:

- ✓ [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

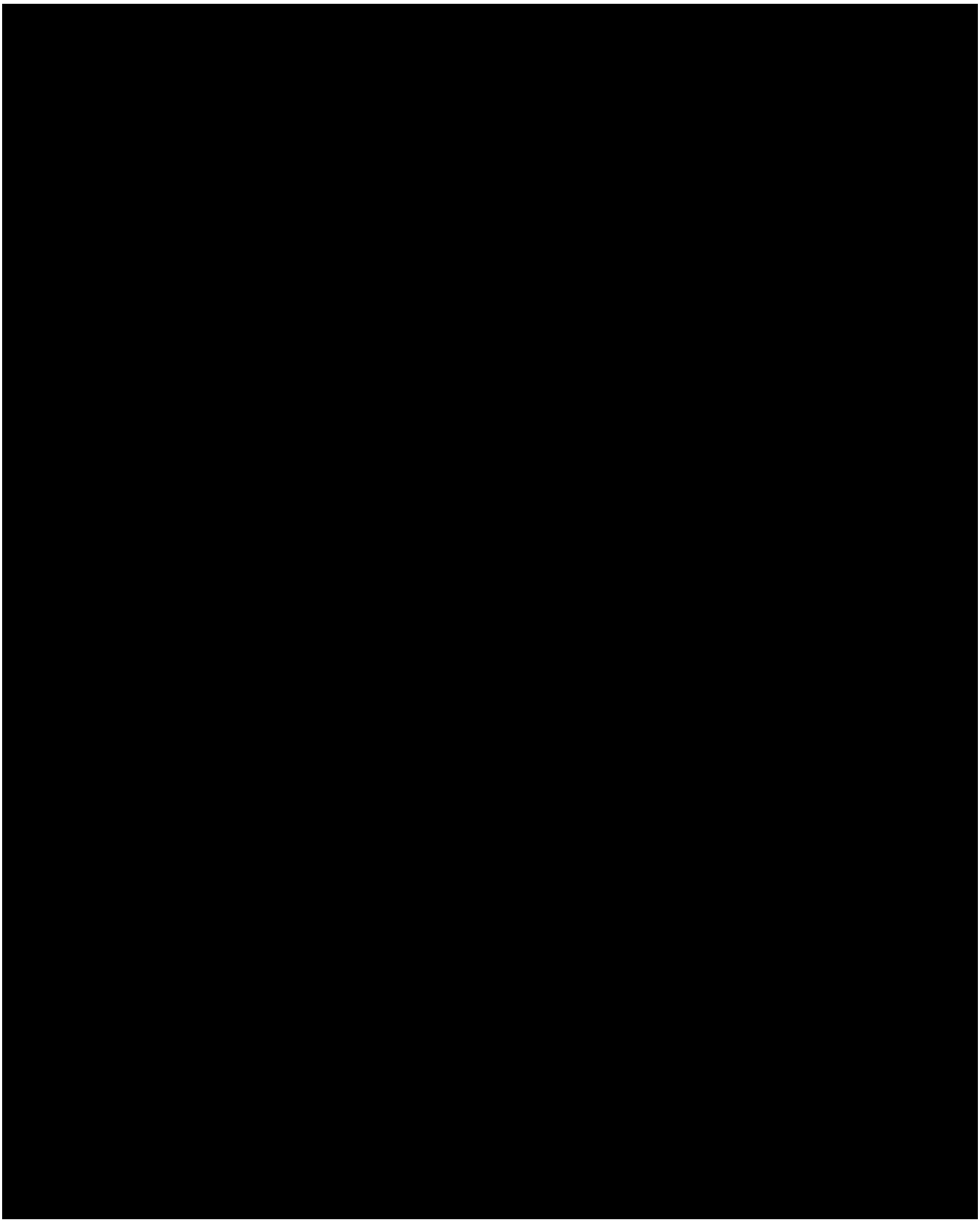
[redacted]

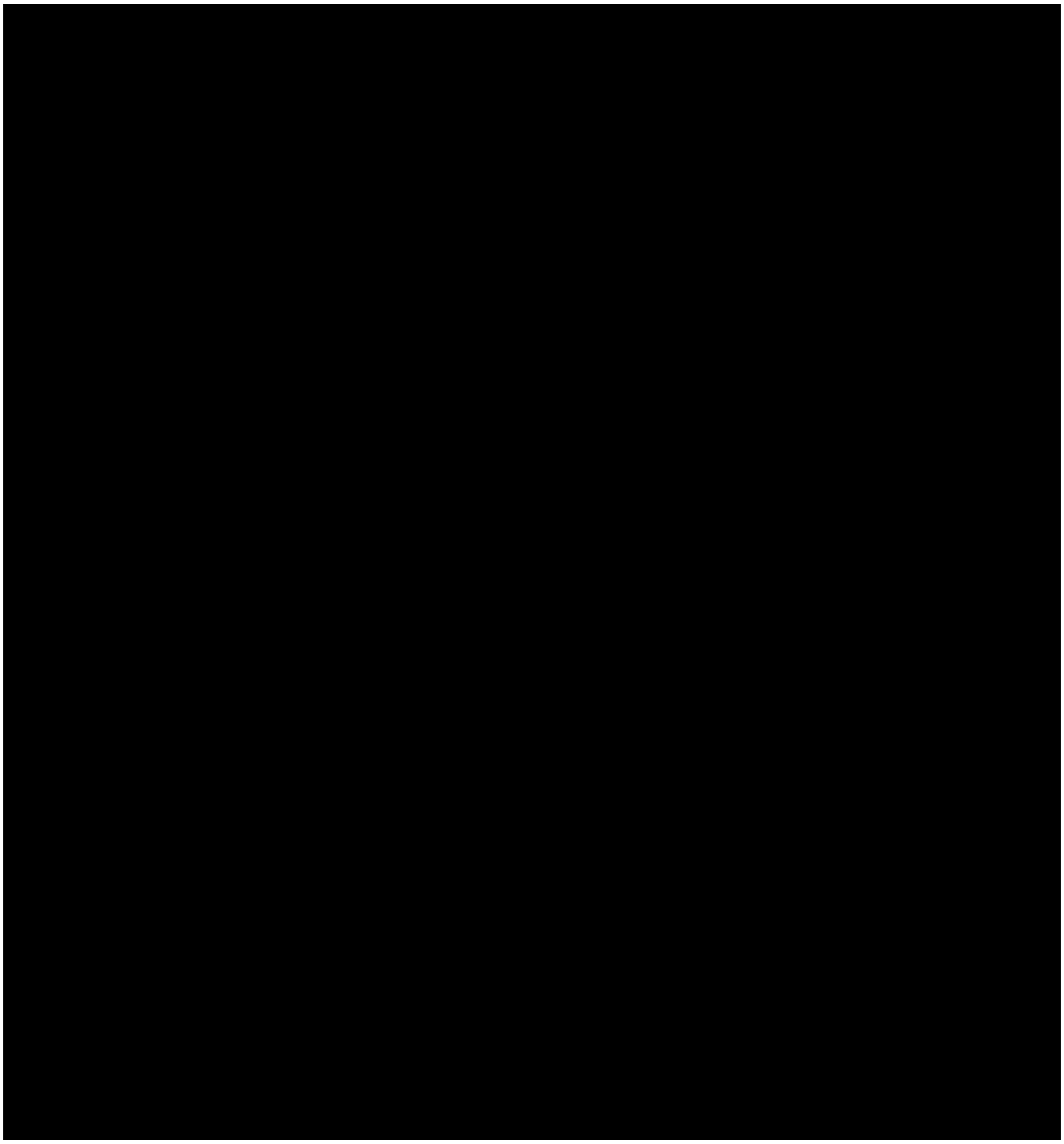
[redacted]

Automatic Passenger Counters (APC) Integration

Our system will be able to record boarding, alighting, and on-board counts down to the stop level for all routes via our APC sensor integration. We have hundreds of installations with utilizing the Hella sensor. The following pages provide examples of our APC/ridership reports.

Passenger Count Dashboard





Real-Time Passenger Information Systems (RTPI)

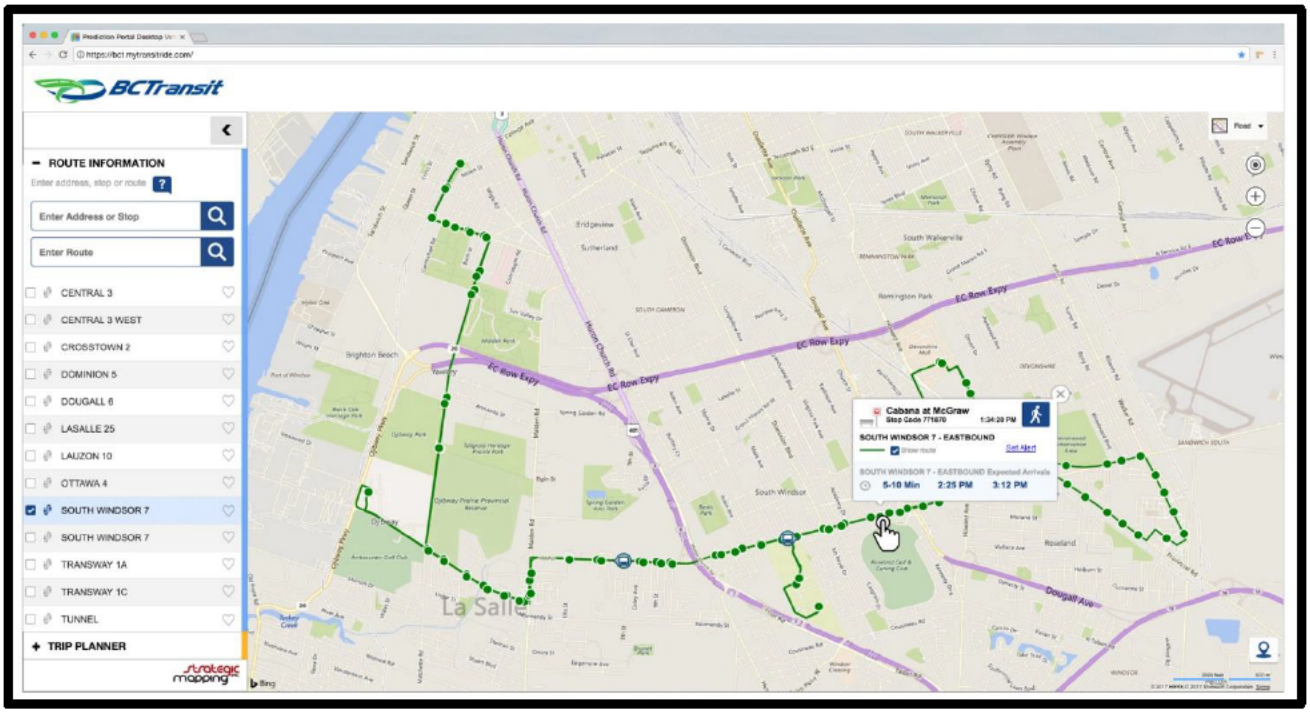
Strategic Mapping's passenger information technologies provide real-time arrival, departure and service advisories to the public. Our modular design and flexibility of this module provides agencies and their passengers with a variety of information components such a web, mobile applications, SMS, IVR, rider alert subscriptions and wayside signage (optional). Our system is not limited to a singular format for disseminating real-time passenger information.

Our Prediction Algorithm

[redacted]

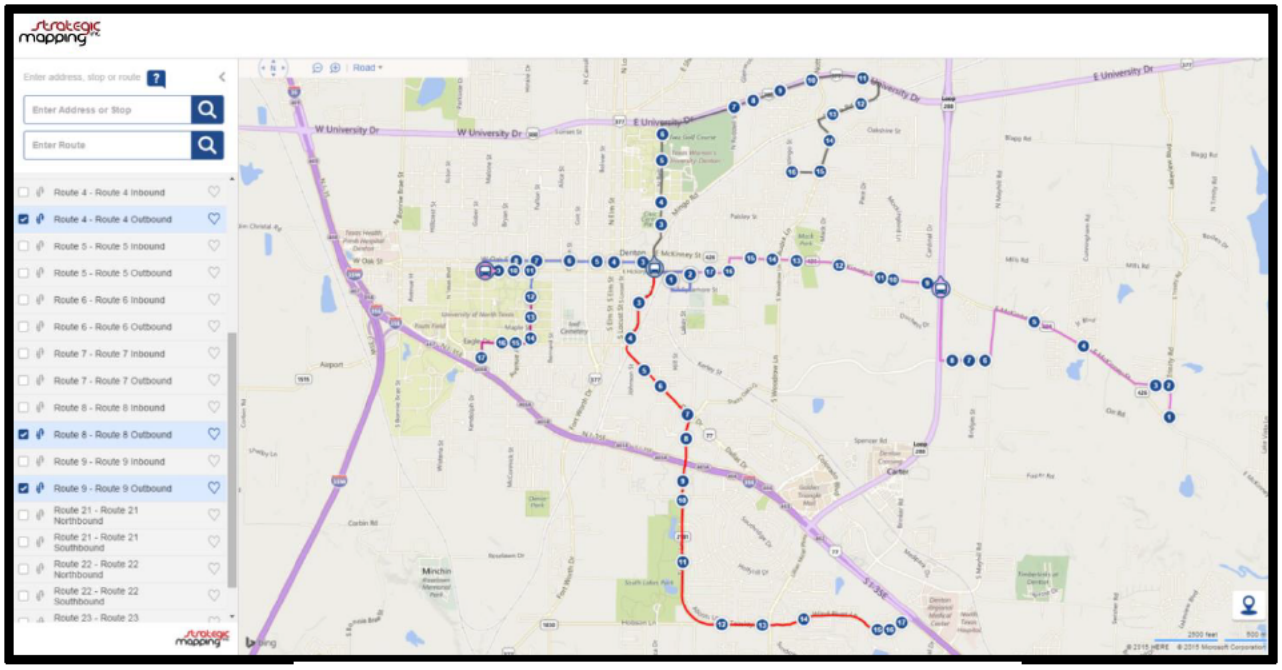
Passenger Information Website

Our passenger information website provides map-based predictions by route and stop for the user. The interface displays vehicles, routes, stops, service messages and has search functionality for routes/stops by location. Transit may select whether to give an exact arrival time (i.e., 4 minutes away) or a time range (i.e., 2-5 minutes away). Our web portal has full "slippy" map functionality (zooming in, zooming out, and panning), and provides the user with the desired information in minimal clicks. We offer a standalone environment free of drivers and applets that provides the user with a fluid and predictable experience.

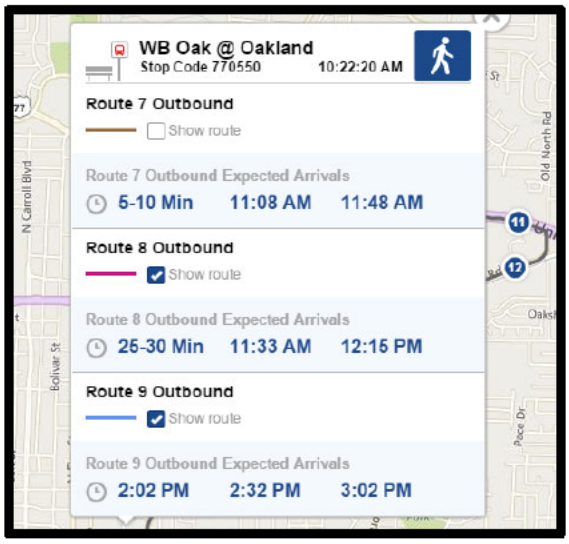


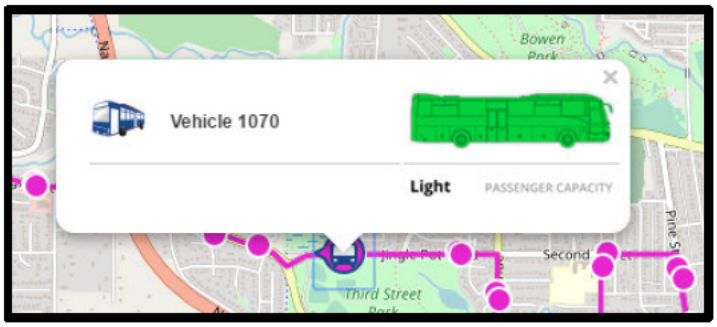
Standard Features

- Search by "Route, Address or Stop"
- Shows "My Current Location"
- Save Stop or Route as a "Favorite"
- Walking Directions to Selected Location
- Help/User Instructions
- Real-time Vehicle Location/Position
- Automatic — Map Controls – Zoom in/out, Road/Automatic/Aerial View
- 10-15 Min — Predicted Arrival Time
- Real-time Service Alerts/Broadcasts



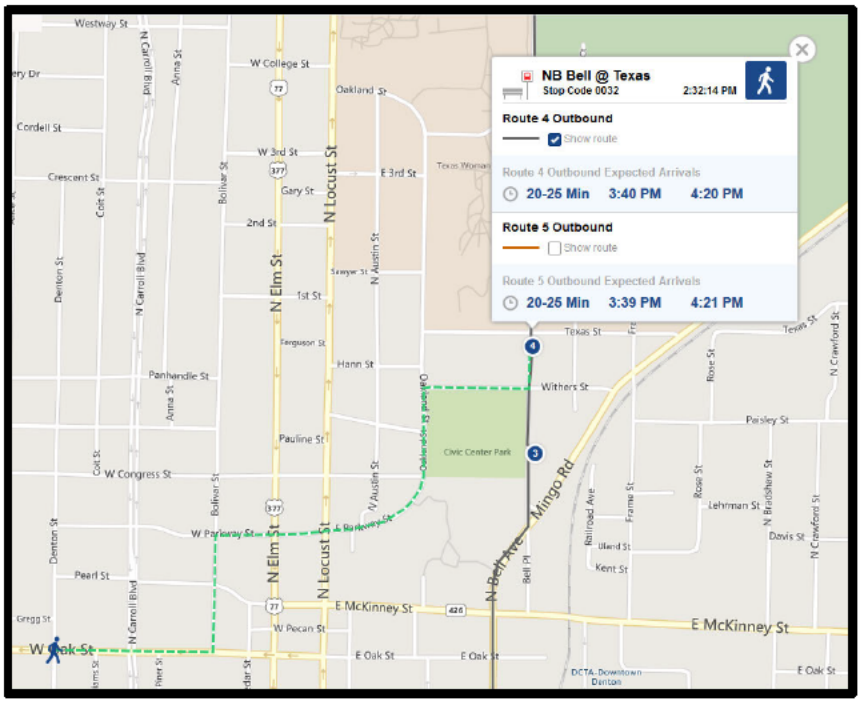
Color Coded Routes and Vehicles



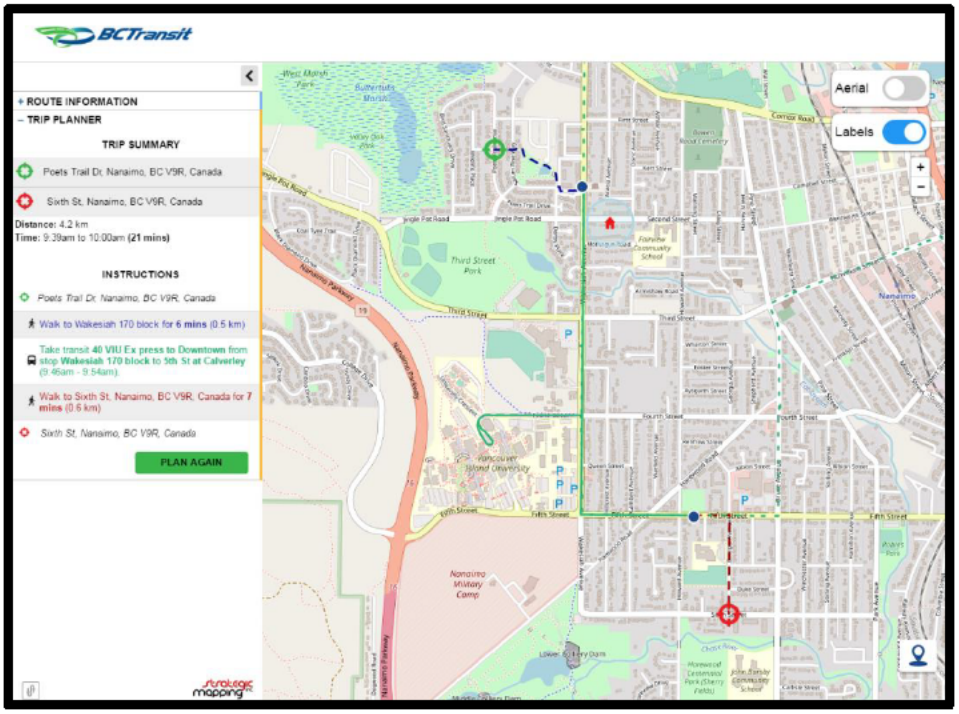


Mouse Click on Bus Icon for Current Passenger Capacity

Hover Over Stop - Predictions for a Stop that is Serviced by Multiple Routes



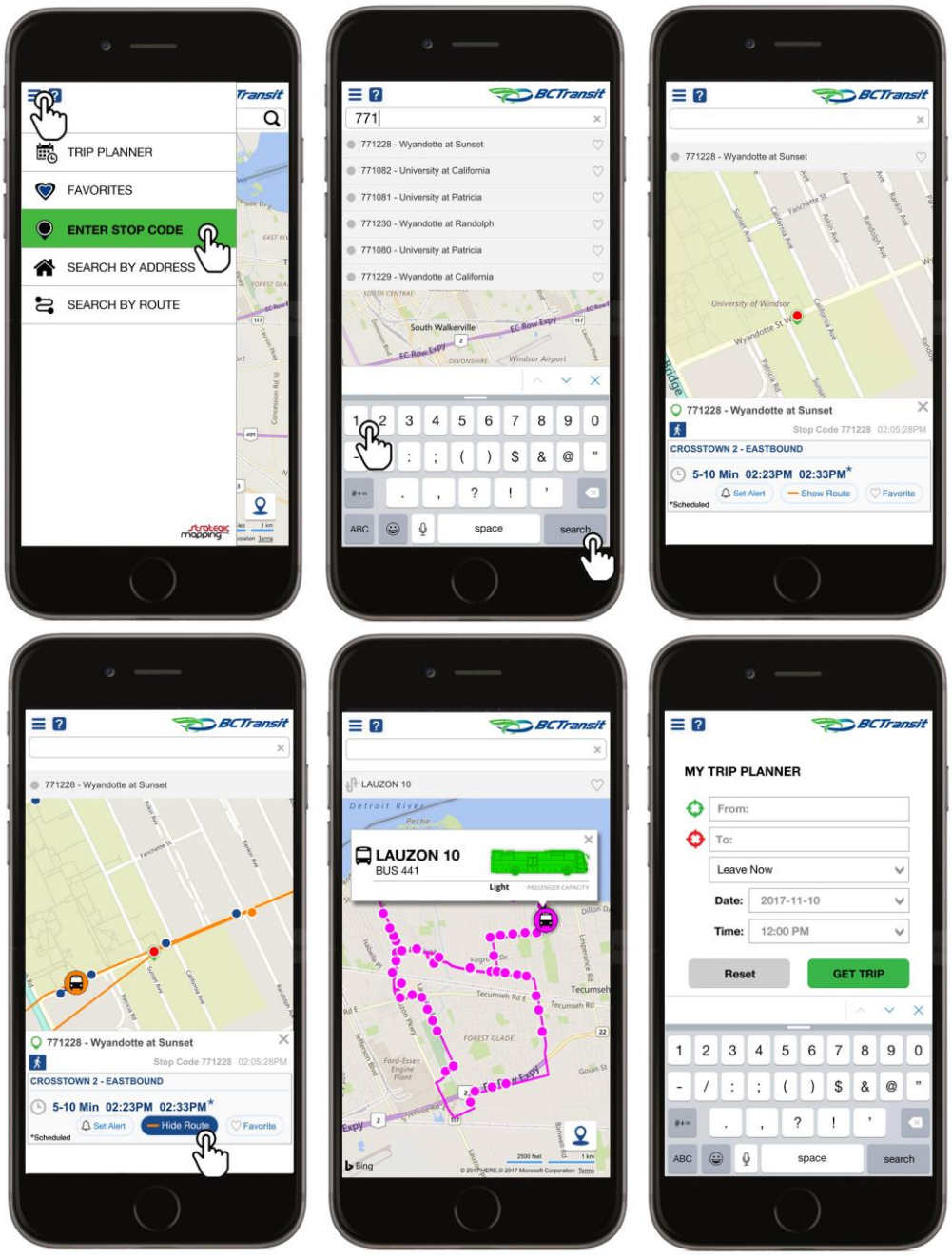
Screen shot of our **walking directions** feature. This comes standard with the Passenger Information Application.



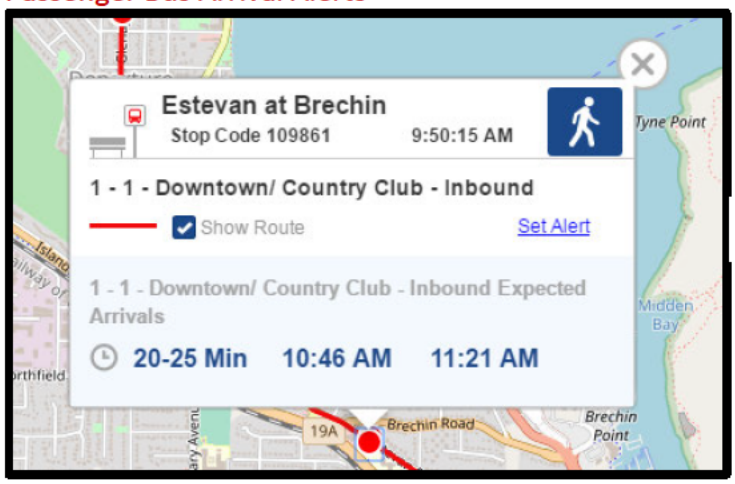
Trip Planning Functionality is Included on Web Portal and Mobile Applications

Passenger Information Mobile Application

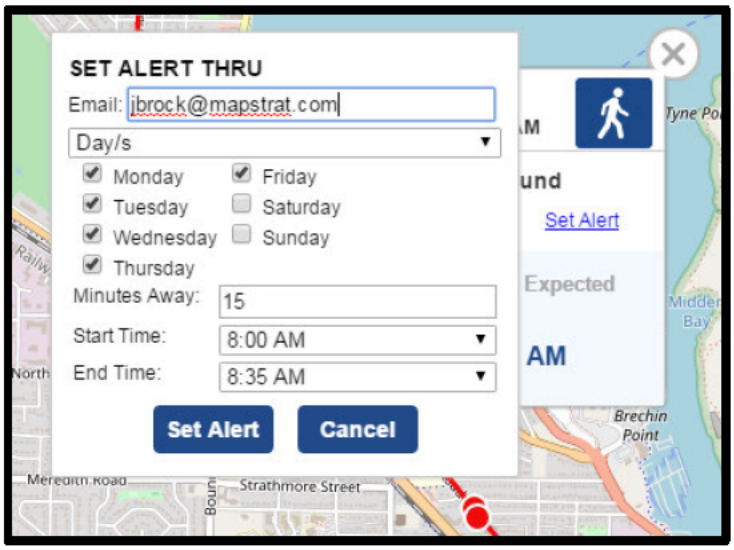
Our mobile application enables passengers with smartphones and tablets to obtain all the functionality described previously (real-time vehicle arrival information, vehicle location, service alerts, trip planning, current passenger capacity, arrival alert notification etc.). Our advanced application is compatible with iPhone, Android and all other browser enabled devices.



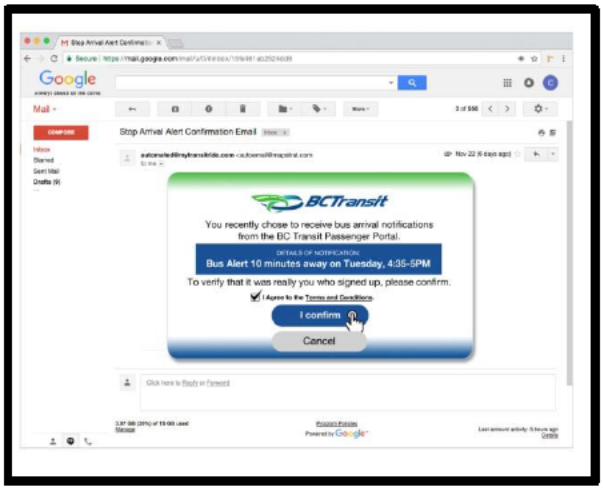
Passenger Bus Arrival Alerts



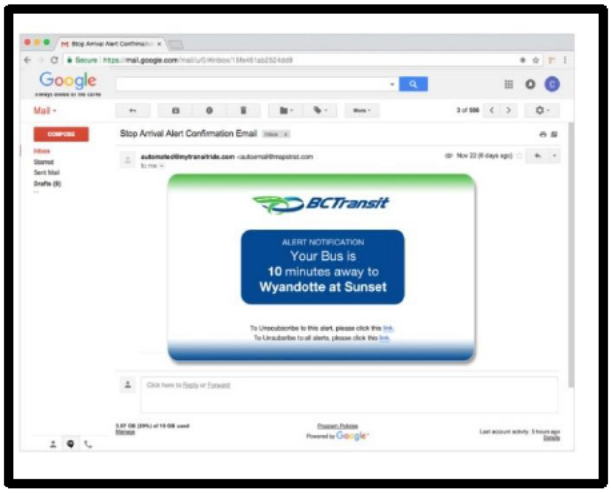
Click on "Set Alert"



Enter Alert Prefences



Passenger Receives Confirmation



Passenger Receives Notification

Wayside Passenger Information Display Integration

Strategic Mapping will utilize Metro's current signs with a state-of-the-art solution. Our display integrations are coupled with wireless data communication (cell and or Wi-Fi), a logic controller and external antennas which enable wireless connection to the central system. Typical information presented to passengers includes predicted departure and arrival times by route or stop, public service information/announcements, current time, advertising, etc.

Broadcast Messaging

Strategic Mapping's Broadcast Messaging tool enables the creation and dissemination of specific alert messages (both audible and visual) to be presented on bus next stop signs, GTFS feeds, Passenger Information applications (Web/Mobile), and outdoor signs. The user can send these alerts in real-time or at scheduled dates/time to target stops, routes, trips, vehicles or a group of vehicles.

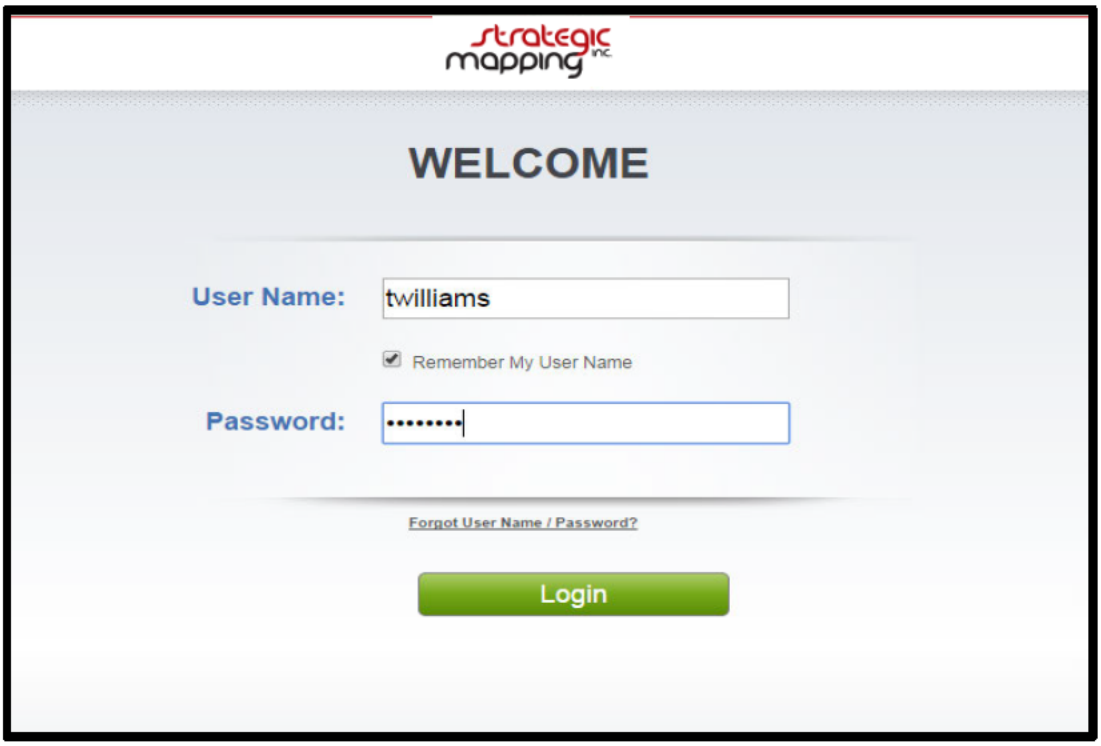
General Transit Feed Specification (GTFS)

Strategic Mapping has successfully deployed both static and real-time interfaces with GTFS at numerous transit agencies and offers one-click GTFS exporting. Our GTFS feed is composed of a series of text files collected in a ZIP file.

Each file models a particular aspect of Metro's transit information: stops, routes, trips, fares, alerts and other schedule data. Metro if desired, can produce a GTFS feed to share their public transit information with third parties and developers, who write tools that consume GTFS feeds to incorporate public transit information into their applications. Our GTFS API has been used to power trip planners, time table publishers, and a variety of transit applications from third party developers.

CAD/AVL Technology

Strategic Mapping's AVL platform is an advanced web-based transit management application that provides operations personnel with a dependable and user-friendly web-based interface. Strategic Mapping's powerful application is designed to streamline daily operations by providing users with the visibility to better manage their fleet as well as exceptions. Our module includes real-time route displays, headway and schedule adherence monitoring, map and grid views, performance indicators, adhoc and canned reporting, incident management, historical playback, event-based alerts and broadcast messaging.

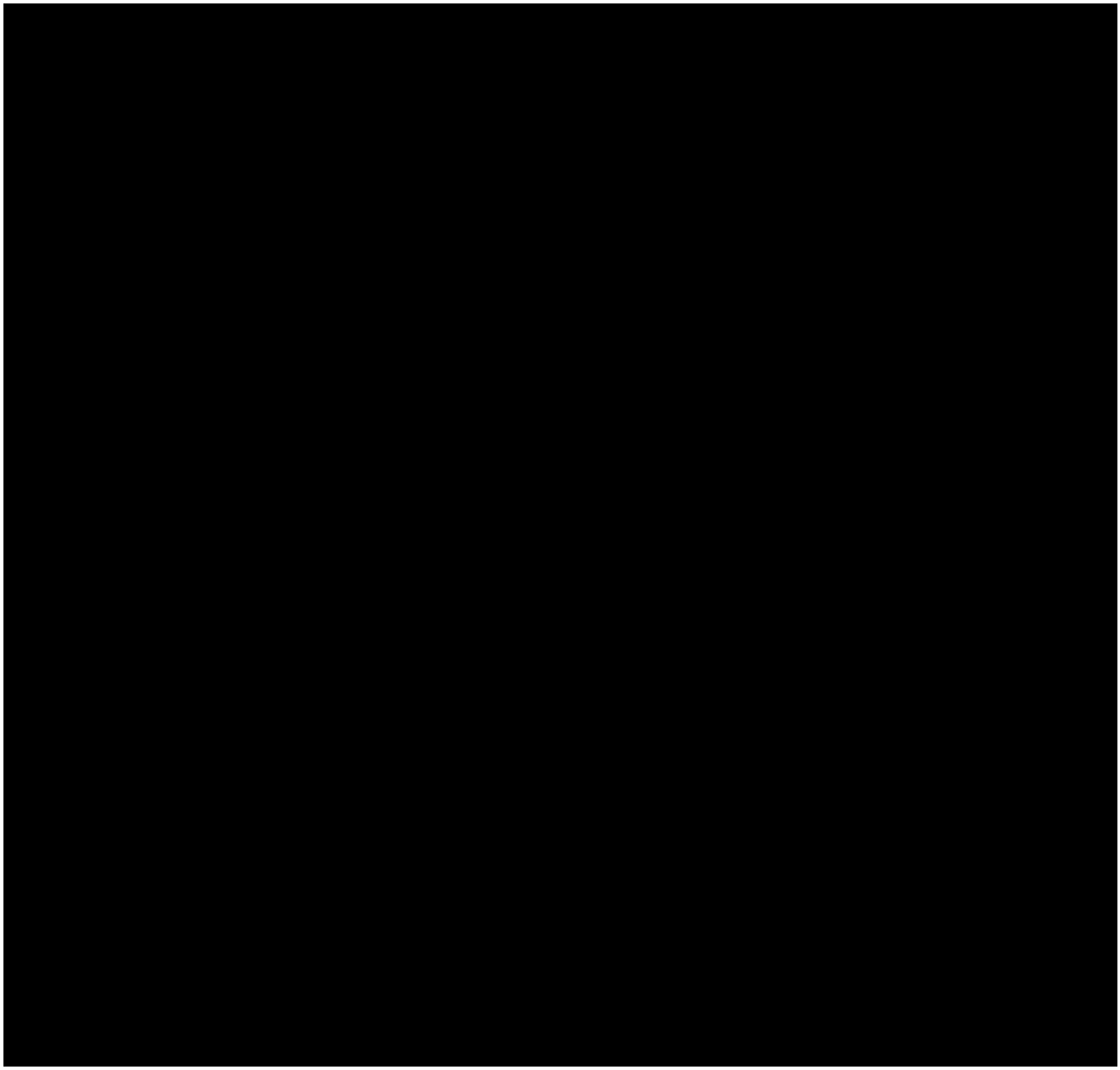


AVL Portal login screen is pictured above.

The portal supports major browsers such as Internet Explorer, Chrome and Firefox. A key benefit to this solution is the ability to gain access from any computer with an Internet connection. There is no need to install specific software. The architecture of our solution is designed to support an unlimited number of concurrent users.

User Privileges and Role Security

System Administrators have the ability to filter portal access views and functionality based on group, user level, and/or role permissions. This enables users from separate departments to view and/or manage only the fleets under their jurisdiction, or to view subsets of data from other groups or departments.



User Interfaces

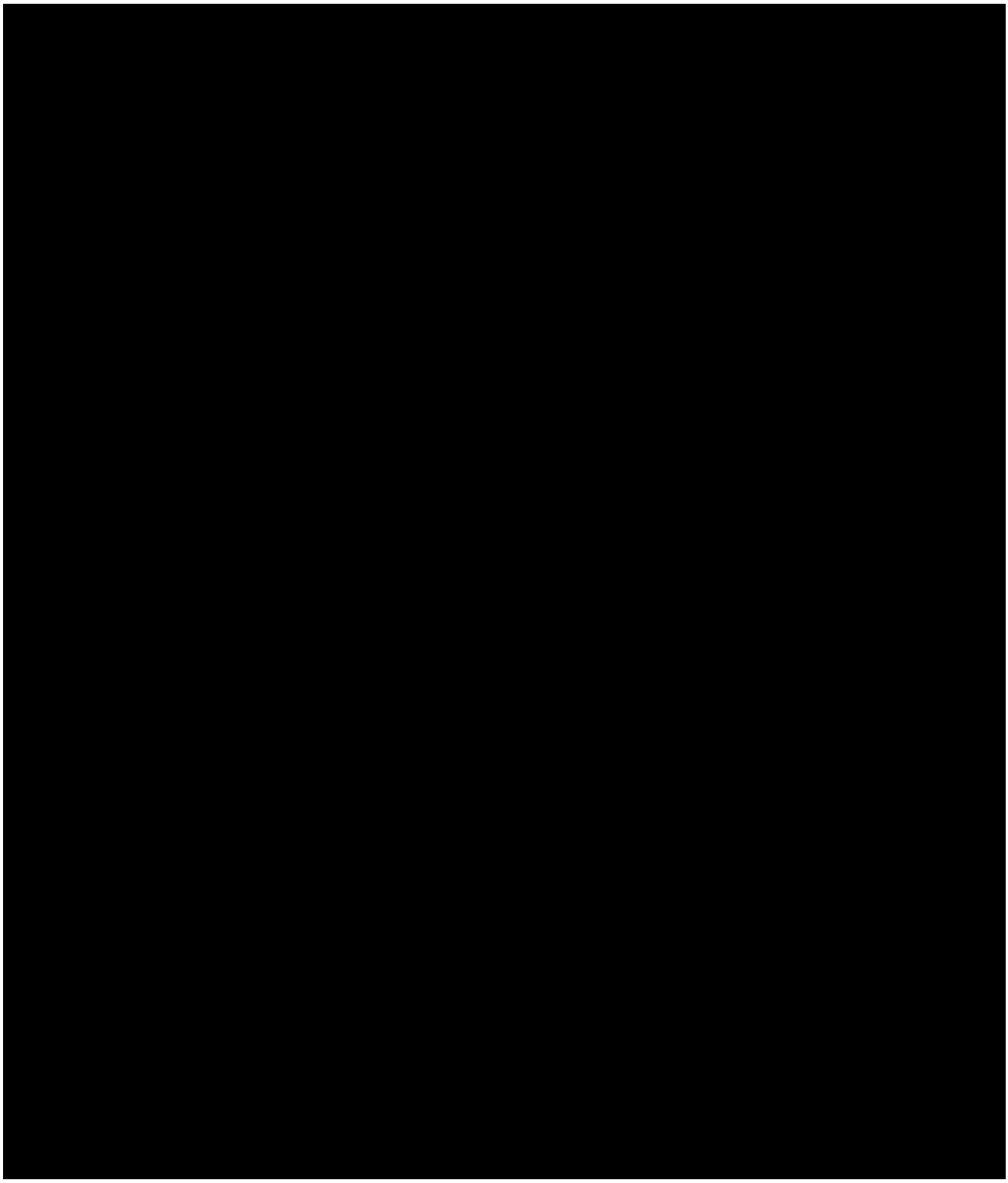
Strategic Mapping's AVL provides unmatched functionality for operations personnel. As noted, our system allows authorized users untethered real-time access to our vehicle tracking and mapping interfaces via the Internet. Users may set up their screens in any format and save their settings.

Strategic Mapping provides dispatchers, mobile supervisors and planners with a powerful and easy-to-use interface to make effective use of resources by better managing their fleet.

As shown above, users have the ability to select and view any or all vehicles in real time. This facilitates quick and accurate decision making. Hovering over map icons produces information such as date, time, speed, direction, route, run, schedule information, and vehicle and driver. Unique identification codes for vehicles, routes, and stops may be customized to conform to organization-specific standards. The following section provides additional screen views.

The vehicle details screen displays real-time information specific to a vehicle selected in the view vehicles screen. To open the *Vehicle Details* screen, double click on a vehicle in the *Grid* view list. The map automatically centers on the vehicle.

The same controls available in map view are present in this dialogue. **To toggle detailed vehicle information** press the **Show / Hide Vehicle Details** button.



[redacted]

[redacted]

minute deviation.

[redacted]

Performance Indicators

The system enables authorized users to select data points and performance indicators in the AVL portal. System Administrator(s) will have the option of permitting authorized users to select/customize their screen views or they may be pre-defined.

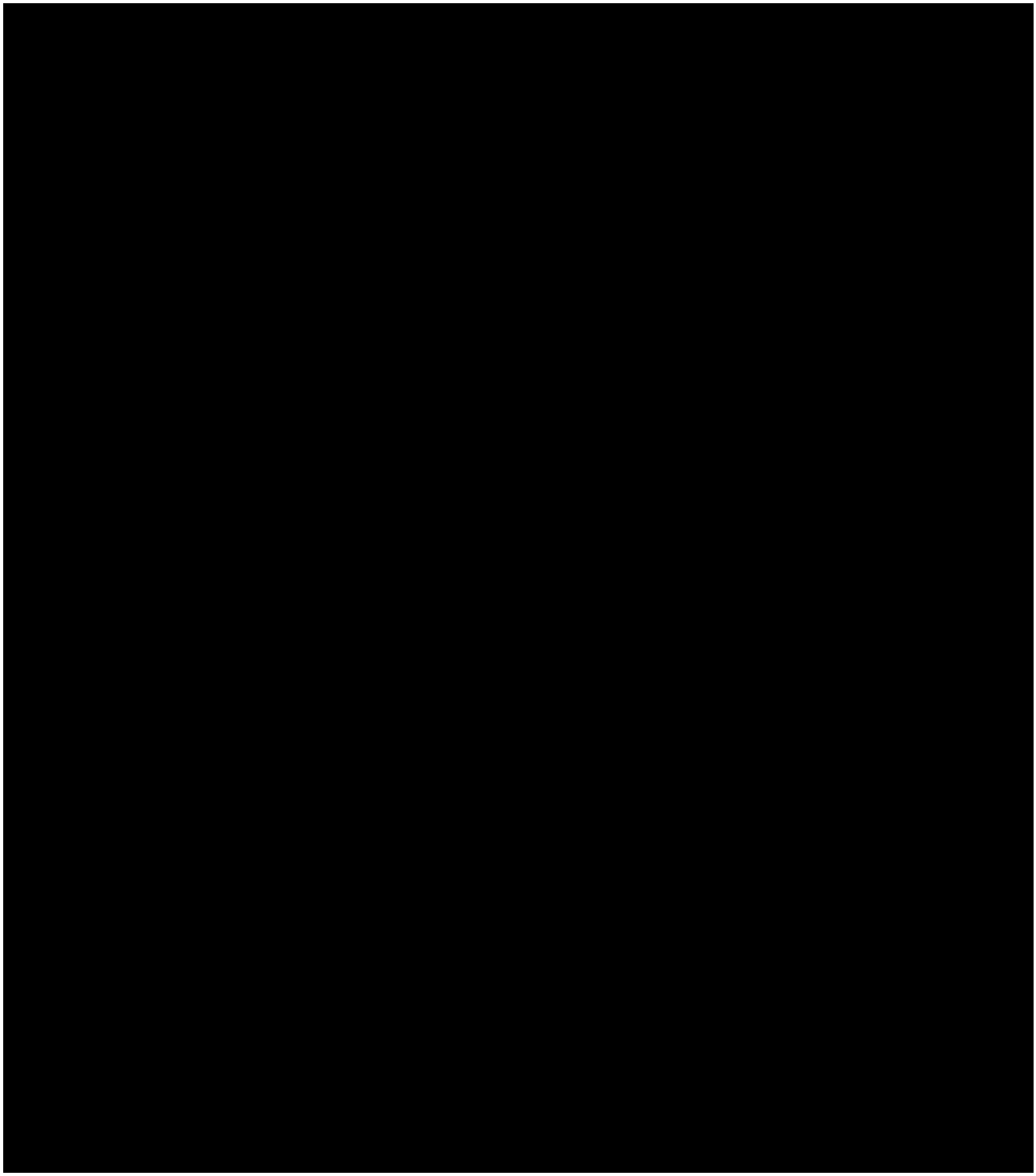
The following is a list of available data points/performance indicators in the AVL Portal:

Real-time Grid View

Once performance indicators have been selected, the AVL portal presents a streamlined, intuitive information dashboard which complements the vehicle location map module. Our tabular dispatch interface (as shown below) provides real-time information and planned versus actual events. The interface has spreadsheet functionality which allows transit personnel to quickly detail the information they need by grouping, filtering, pinning, aggregating, and hiding data as desired. As mentioned previously, exceptions and performance indicators may also be color coded based on status or exceptions. Users may also "Save" their favorite screen display configuration and performance indicators.

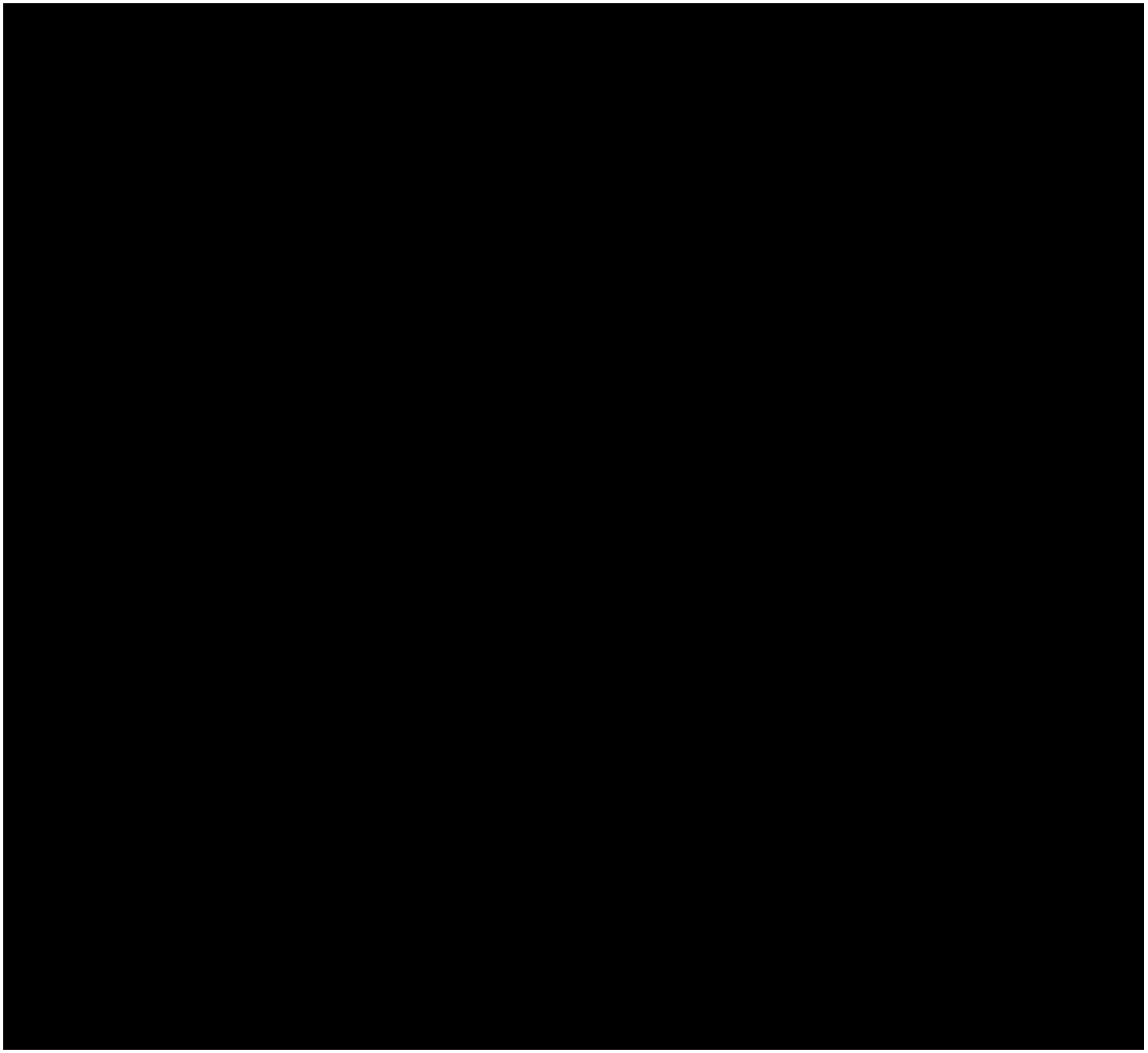
Map Views

The map view will display the Metro fleet on an up-to-date map. In addition, the web portal provides the ability to overlay client-specific map GIS tiles if desired. The screen shots at the lower portion of this page provide a side-by-side comparison of map views when integrated with third party GIS.



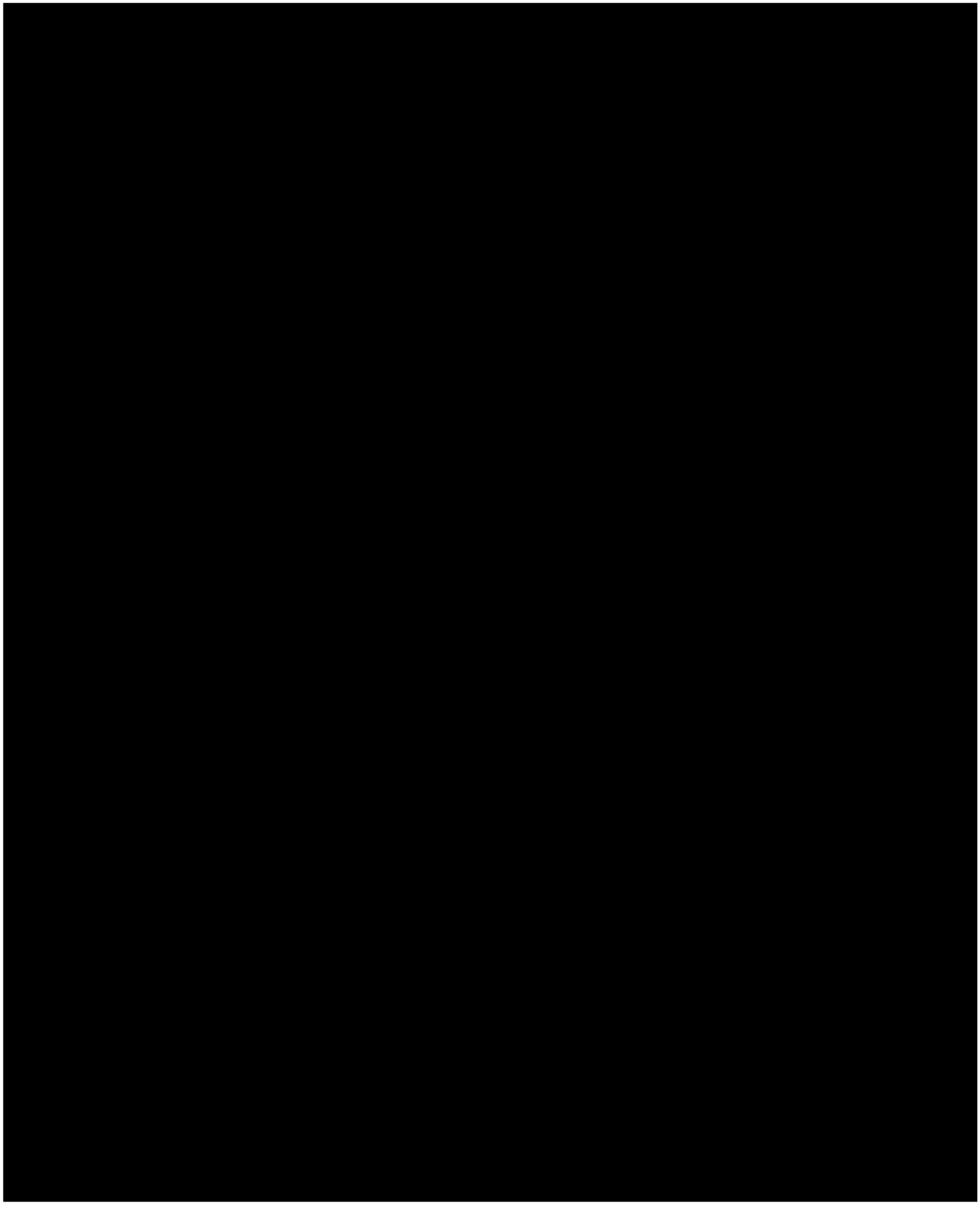
Configurable Dashboards

Our system features a modular, customizable dashboard view which can be arranged in any configuration to show relevant information for individual users. By default, this screen displays a single panel, however the user may opt to see multiple "panels", which act as "windows" the user can move, pin, dock, and close. The user can create a new panel or modify an existing panel's color rules. These customized screens can be saved for quick retrieval in the future. Dashboards support desktop expansion and can be easily configured to accommodate nonstandard display configurations such as large dispatch monitors and multi-monitor desktop PCs. The screen shots below provide examples of a user modifying the configuration their AVL windows.



Real-time Loop Display

The Loop Display enables operations personnel to visualize location, headway and schedule adherence of entire routes in a single view.



Vehicle History Playback

The AVL platform includes a vehicle and route history playback module. Our system stores historical data on the server for later retrieval and analysis. Metro personnel can quickly and efficiently obtain historical views of any or all vehicles' travel history categorized by date, time route, or vehicle ID. You will have historical data ready for analysis and reporting, as well as for use in any liability issues that may arise.

The History Criteria panel is the control panel of the *History* screen and allows users to set specific parameters on what desired time point for a given date range and vehicle, route, driver, or speed is displayed on the map.

The criteria panel can be collapsed and expanded by clicking the minus or plus sign in the top left corner.

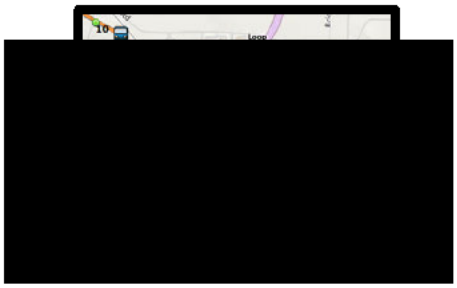
The ***Display route***(s) checkbox toggles the visibility of the vehicle's route (blue line).

To view vehicle history by either filter (Vehicle / Route / Driver / Speed) during a specific time period, select the applicable radio button and select or input the desired value from the list and click *GO*. The map will automatically zoom around the selected trip(s). The slider displays sequential vehicle movements within a specific time range on the map. The path travelled by the vehicle is displayed, this represents the actual track the vehicle has travelled. Using our play and pause functionality, the vehicle and route history playback interface allows users to monitor routes as if they were real-time.

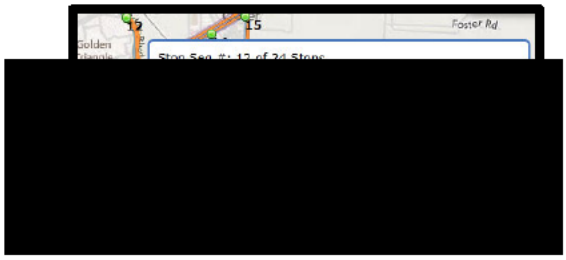
[redacted]

[redacted]

To see vehicle details at a given moment, place the slider on the desired time and hover the mouse cursor over the vehicle icon; a tooltip will display the vehicle details.



To see stop details for the time period, hover the mouse cursor over the stop; a tooltip will display the stop details.



Real-time Messaging

Dispatchers have the ability to send freeform or predefined messages to drivers' Mobile Display Terminals (MDT) from any and all AVL screens. Messages can be sent to a specific vehicle or group of vehicles allowing quick communication between drivers and dispatchers during typical service or emergency situations. The ability to send messages to drivers improves their situational awareness and consequently increases the safety of themselves and their passengers. Messages regarding upcoming traffic can cause smoother decelerations; reducing fuel consumption, lowering emissions, and saving costs. As noted previously, our system is configurable to disable message viewing on the drivers MDT while the vehicle is in motion.

The screen below shows the message management system for Dispatchers to view their current inbox and sent messages. Content word search and filtering is also an included feature. Deleted messages are also retrievable.

Route & Schedule Management

Once the schedule data is imported, our CAD/AVL will enable Metro to create multiple blocks, services, modify schedules, edit routes and stop locations all natively within our system if desired.

Our system defines a vehicle service by weekday (Monday, Tuesday, … and Sunday) and then by exception date (December 25, runs the Holiday Service). Examples of services are Weekday, Weekend, Holiday, etc. In this example the weekday service would be assigned to Monday/ Tuesday/ …/ Friday, the Weekend service would be assigned to Saturday / Sunday, and the Holiday service would only be assigned to specific dates as an override to the normal service.

Patterns, Trips and Blocks can all be modified to optimize transit operations without interrupting the current service.

The screen shot below shows the past, present and future schedules in the system

Each schedule has its own copy of stops, patterns, trips, and blocks. A schedule has a start date and an end date. The start date can be edited until it becomes active for the first time. The end date of a schedule is either onwards (meaning it will continue until the next schedule is created after it) or the day before the next schedule is to become active. The system will not allow the user to define a time gap between schedules.

Block, trips and patterns from past schedules can be copied into new schedules and modified. Complete schedules can be imported from either a GTFS export, third party scheduling software or formatted excel spreadsheets.

Services determine what level of vehicle activity is scheduled on individual days. The screen below displays the services screen. Users can create individual services and assign them to individual days.

Service exceptions are exceptions to the normal daily service of a transit. An example of an exception would be New Year's Day. For most agencies even though New Year's may fall on a Weekday the level of service provided to the public would be reduced in comparison to the normal schedule. In cases like these the agency would assign another service to override the default schedule for that day.

The trip screen (as shown below) is where trips are created and modified. A trip is a pattern with scheduled times. After the first trip is entered, the trip screen will auto-fill estimated times for each additional trip created.

The blocks screen below depicts the entire block for a given service. Users are able to modify blocks by adding/removing trips.

Route Editing

The **stop inventory** screen allows the user to create, view or change the location and properties of any Stop in the system. Stops are the basic building blocks of the routing system. Strategic Mapping can **import stop information** including coordinates from several data formats.

Once stops have been entered the route designer then assigns stops to a **pattern**. This system will automatically route the shortest path between the two stops. The pattern is the drive path of the vehicle.

The **Stop Path** screen allows the user to create and edit the drive paths between two stops which is great for creating detours. The system only supports one drive path between any two stop combinations. Editing is done by either dragging an existing node to a new location, right clicking on an existing node to delete it, or right clicking on an empty part of the map to create a new node. The auto complete checkbox instructs the system to use the existing road system to create a pathway between 2 nodes.

Detour Management

The *Detours* main screen is accessed from the AVL Web Portal via the *Maintain-> Daily Schedule-> Detours* menu item. Detour functionality is managed from this screen, including adding, deleting, modifying, and copying detours.

The *Detours* screen is divided into two sections. The upper pane shows all detours and their associated properties in a tabular format. To select a detour, click on a row in the table. The selected detour will be highlighted once it is selected. The bottom pane displays the properties of the selected detour along with a map of the associated road closure. The Upper Pane and Lower Pane can be resized by clicking and dragging the middle bar to a desired location.

Alerts & Notifications

Our system provides real-time alerts that are pushed to dispatchers and transit administrators via on screen pop-ups, or email. These urgent advisories provide dispatchers with required information when they need it most and without having to review traditional reports. The Strategic Mapping System exemplifies the term “management by exception”.

You may define what exception events should trigger alerts; such as excessive vehicle idling and/or speeding, off routes, schedule adherence, harsh braking etc., and then define the method of communication for the alert; desktop pop-up, email etc. or traditional tabular report. Strategic Mapping’s proactive alerts are used to automatically identify a variety of exception conditions within the System and notify the appropriate users. This methodology reduces the time that users spend looking for exception conditions in the System and reduces response time to calls for assistance. Dispatchers can now change the focus of their work, knowing that the System has already defined what “Exception Events” will trigger alerts and what method of reporting communication will be deployed.

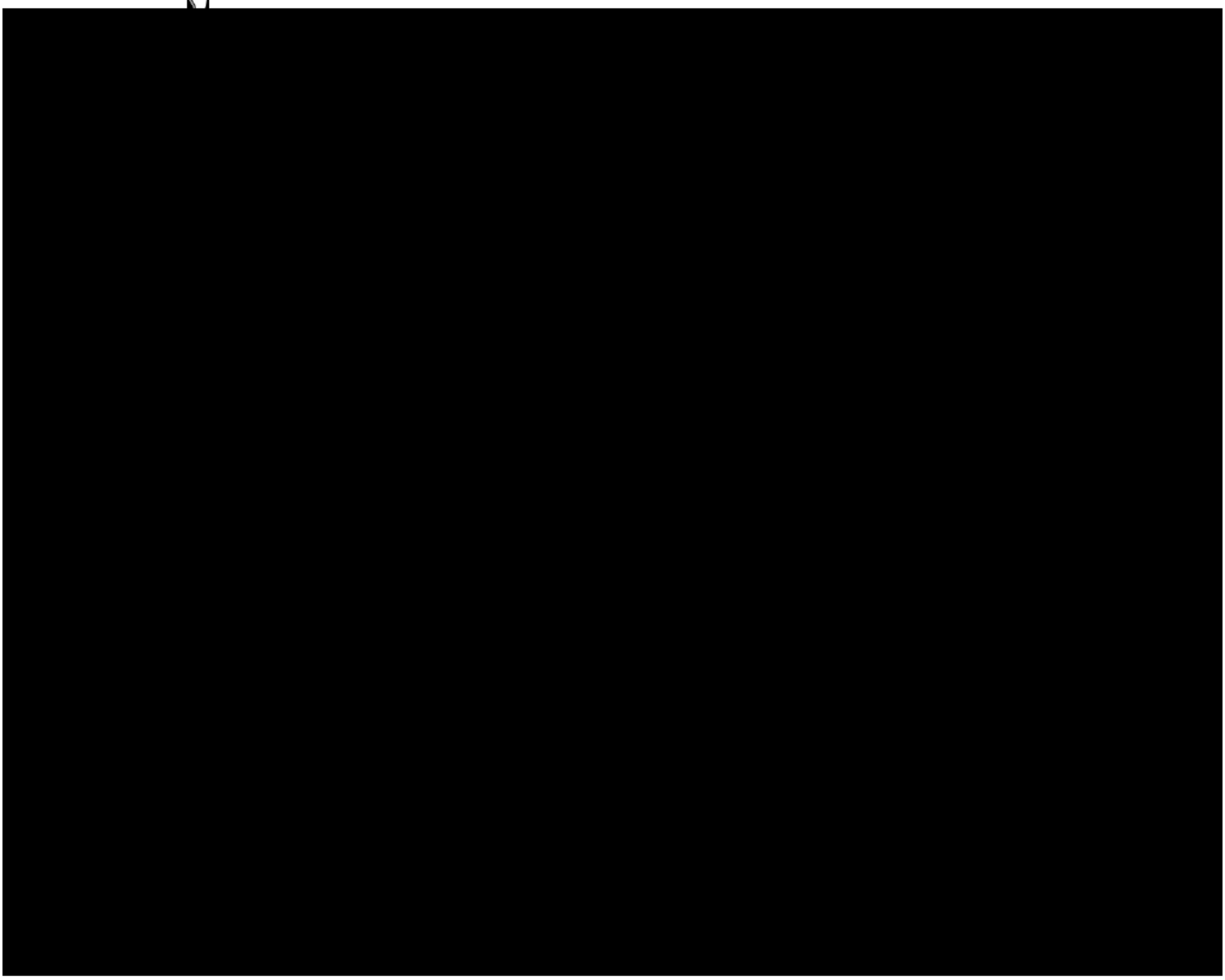
Incident Management & Reporting

Strategic Mapping has a powerful solution for incident management within the AVL System. Incidents are used to identify, record and manage specific events. Our System simplifies and automates incident management from the start of an incident until it is closed.

Our incidents are configurable and include manual or auto generation. The table below highlights key features of the incident module:

Creating a New Incident Report

To **manually** create a new report, simply click on the "New Incident Report" tab within the



Clicking the “New Incident Report” button while in a real-time AVL view will allow a user to create a new incident and auto populate the system fields with the values from the selected vehicle. When the add new incident button is pressed, a screen shot of the user’s current window will be taken and placed into the incident as the first attachment.

Selecting the "New Incident Report" button while in a historical playback view will allow a user to create a new incident and auto populate the system fields with the values from the selected vehicle. When the add new incident button is pressed a screen shot of the user's current window will be taken and placed into the incident as the first attachment.

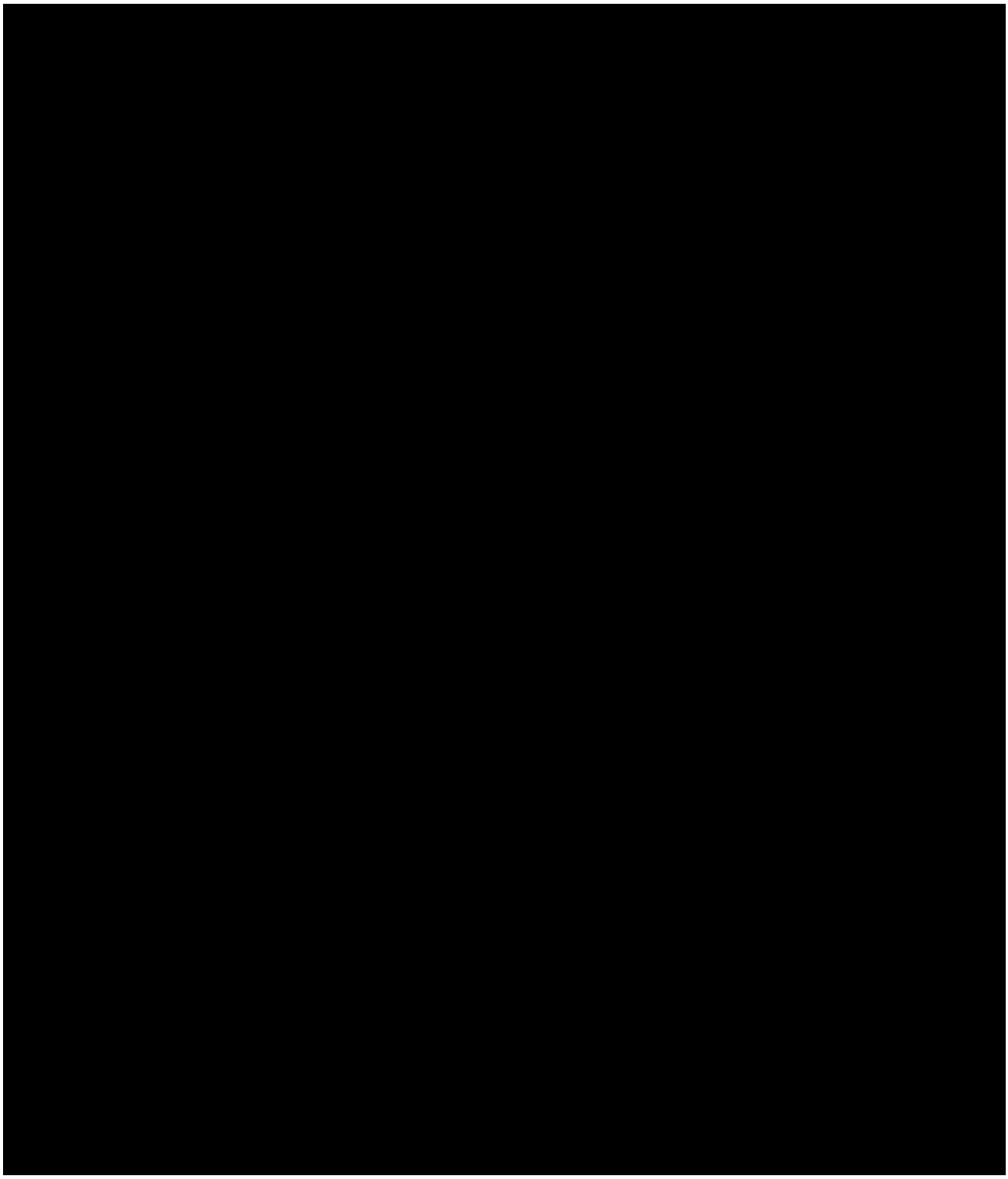
[redacted]

Viewing Incident Forms – Map View

[redacted]

Viewing Incident Forms – Report View

Using a role/permission-based system, users are able to view, edit and share incidents based on their access. The system administrator controls the user roles.



Editing Incident Forms

[redacted]

Geo-Fencing & Zones

Geo-fences and zones are used in several parts of the system for different reasons. The main reasons to use of zones is for notification of when vehicles arrive or exit a zone, to take the place of a stop radius, or set the speed limit in a location. Zone types are a way of categorizing different types of geo fences. A zone type also defines the group of vehicles that are affected by it. Zone types can be used to notify the dispatcher is a vehicle has entered an area that it should not go, or when vehicles return to the garage.

The screen below displays the Zone Type screen. Zones have a name, entry rules, exit rules, and vehicles that are assigned to the type.

Creating and Editing Zones - Zones have 2 main properties which are shape and type. The shape is the physical dimensions of the zone. A zone type is a grouping of parameters that describe the zone's functionality. One zone can be assigned several zone types.

- Click on the map to create/add a new zone
- Fill in the form fields for the new zone and update the colour.
- Edit the Shape of the zone.

- Continue placing vertices until you are satisfied with the shape.
- Optionally one can use this geo-fence to represent a stop's arrival threshold. To do this click the add stop button and select the stop that you wish to use the geo fence to represent.
- Click the save button to make all the changes permanent.

Business Intelligence & Reporting

Our system includes several interactive and static reports. Our reports disseminate data created by system events, management exceptions, standard business operations, and client defined business rules.

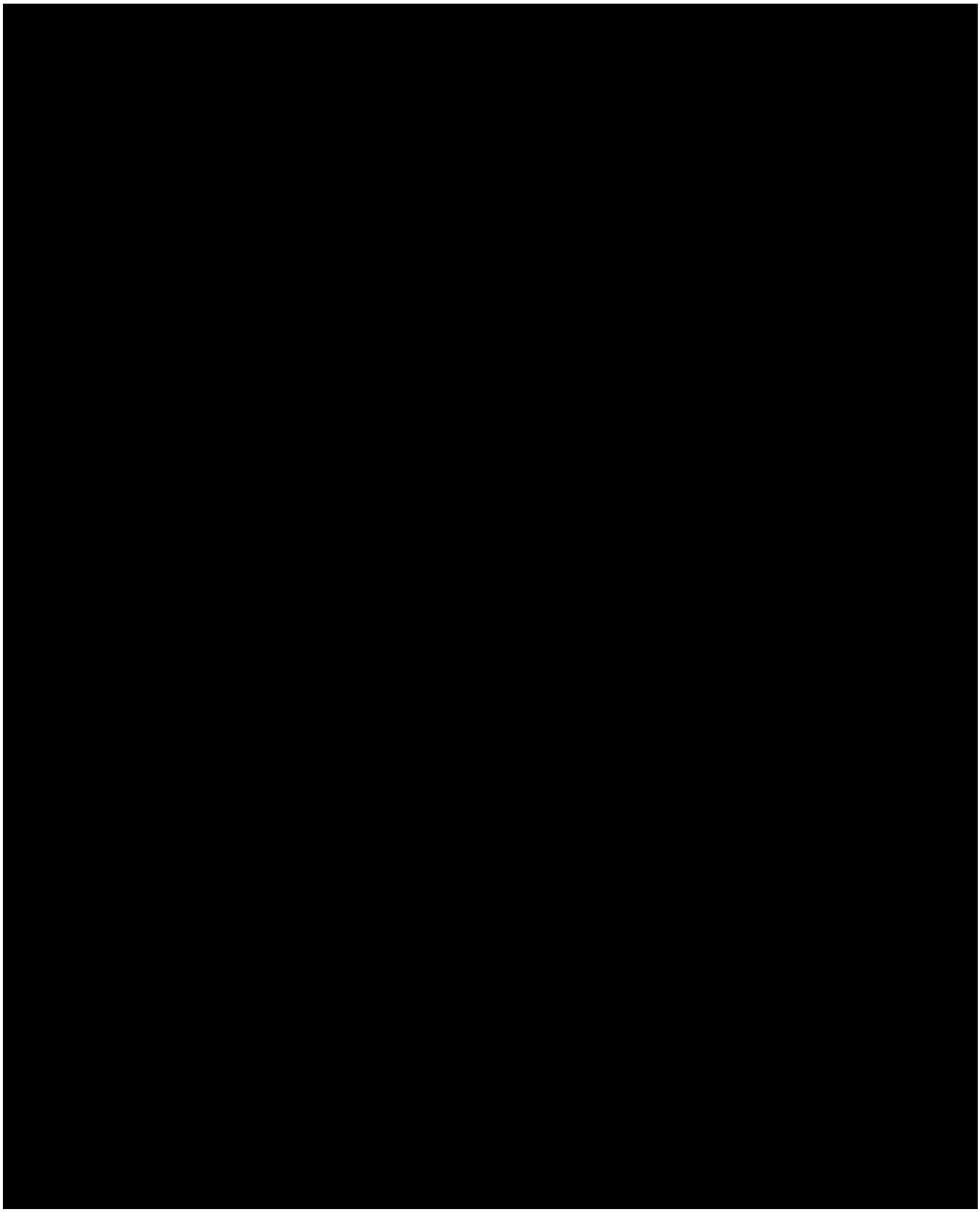
All reports are designed to be easy to read and understand. Reports are all fully integrated into the Strategic Mapping System, though they are exportable in formats such as PDF, MS Excel. These reports offer the opportunity to use archived data for analysis, which is more time efficient and cost effective than manual data collection.

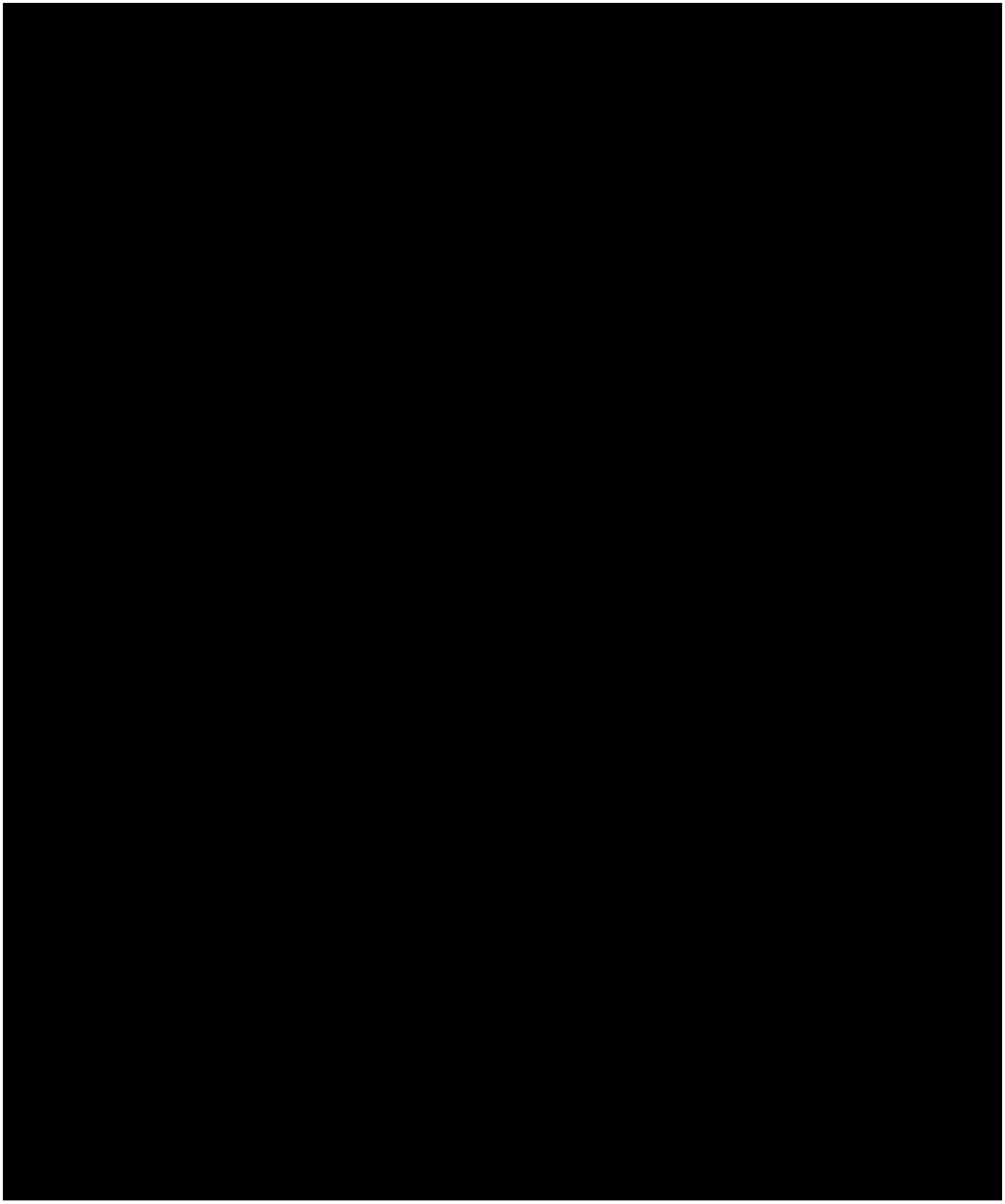
[redacted]

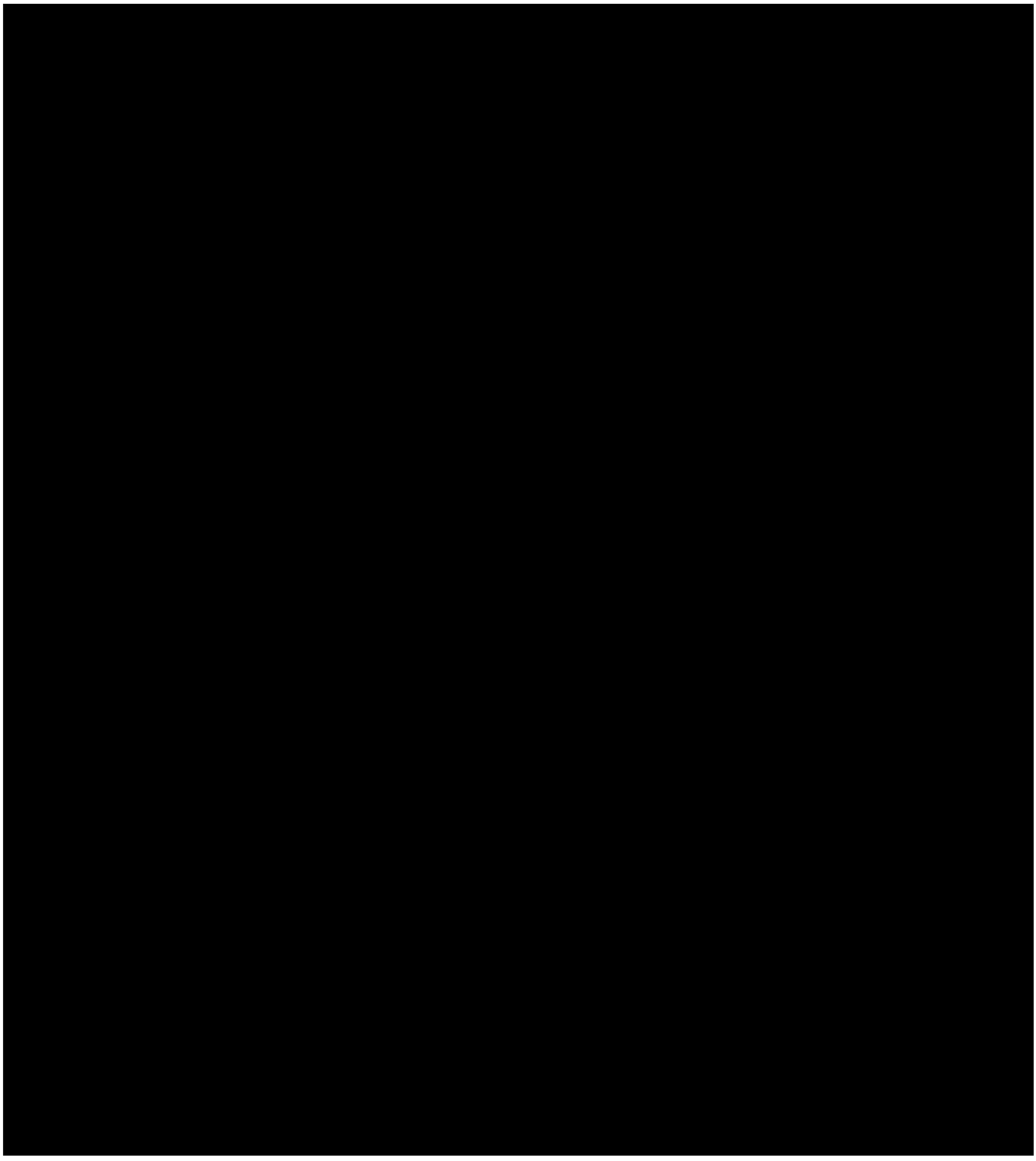
Our integrated BI enables users to quickly and easily generate custom reports utilizing data points within the system. The system also includes a “Push” based daily email report delivery service which is configurable.

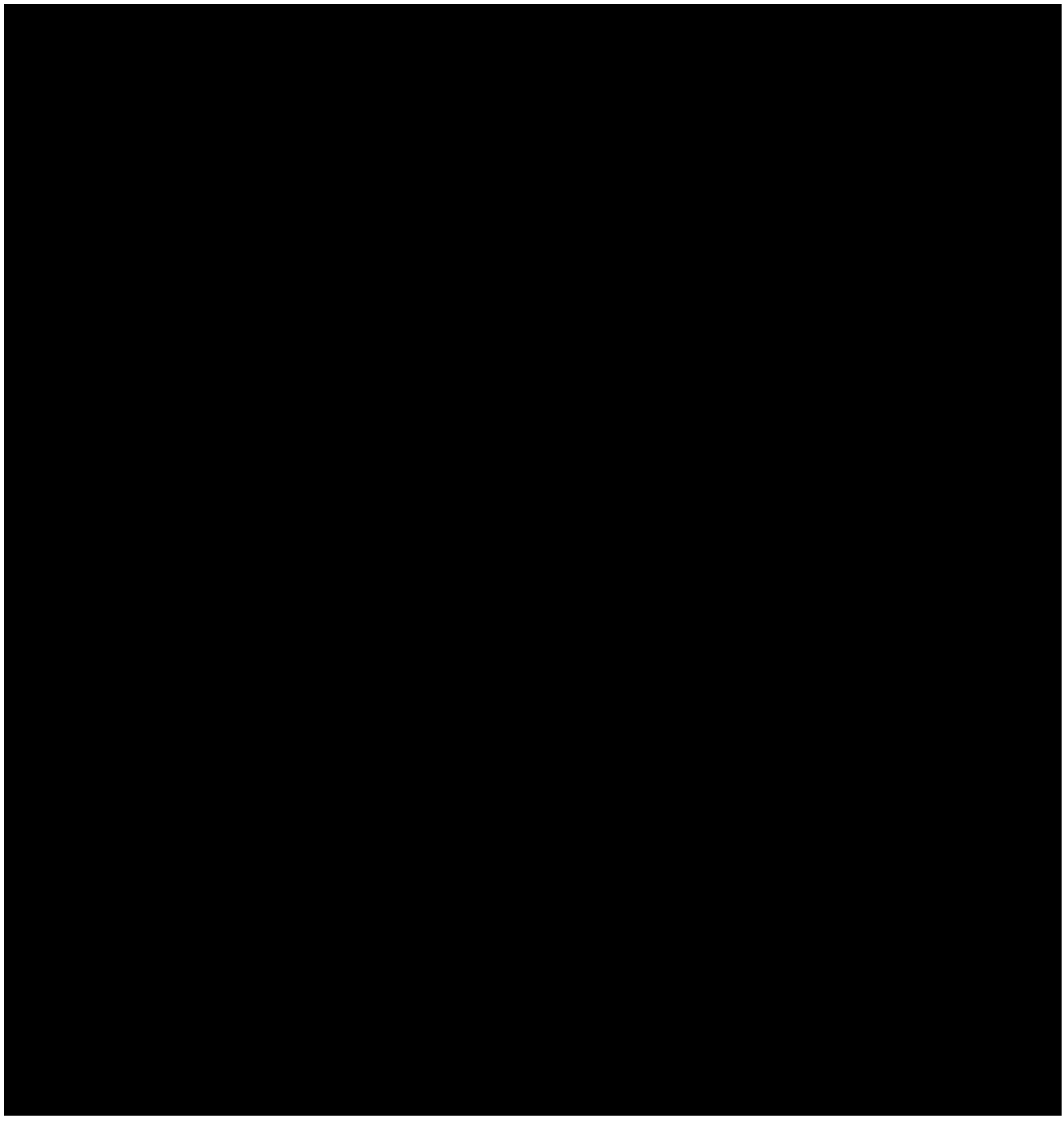
The following section provides report examples.

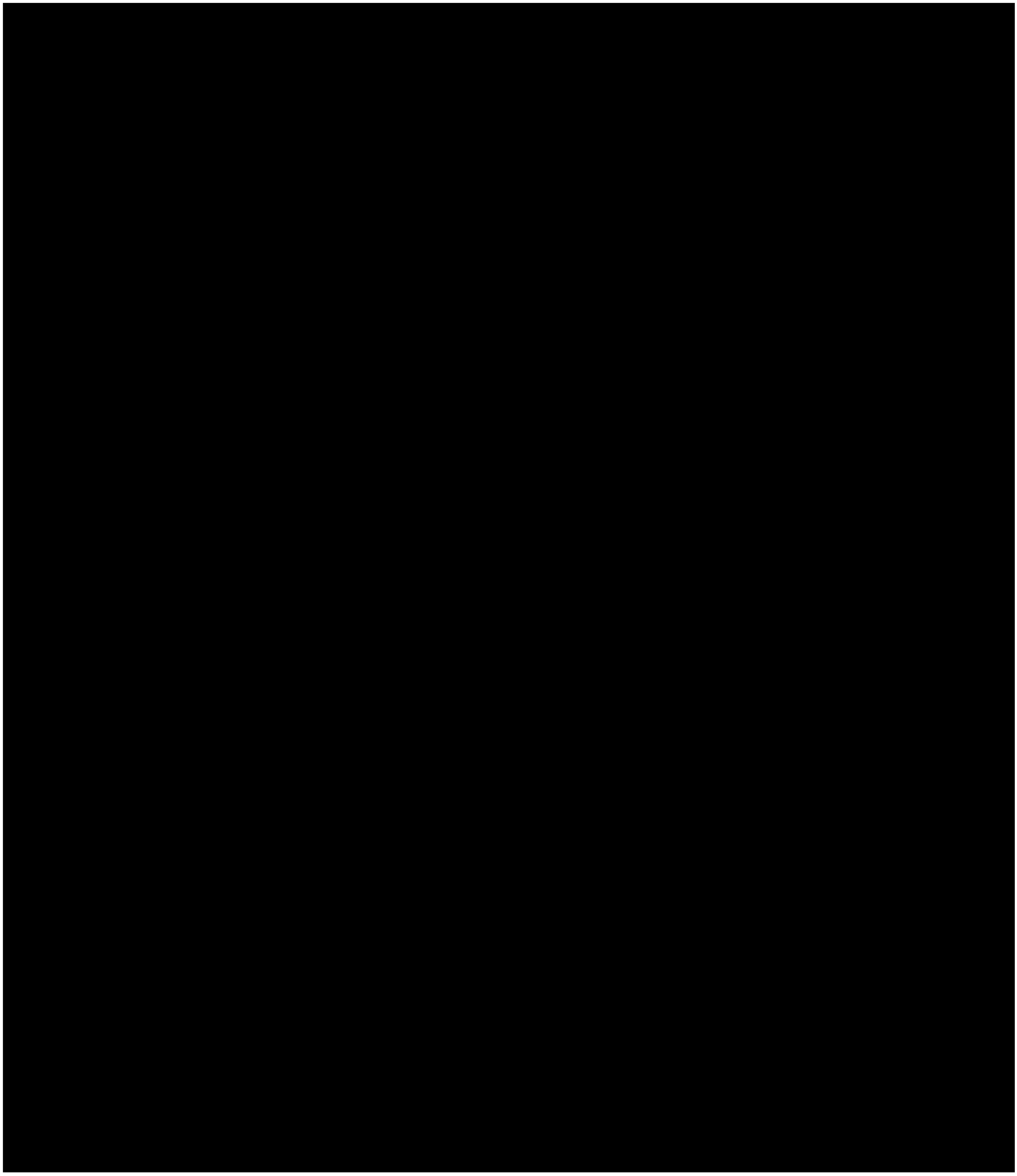
[redacted]

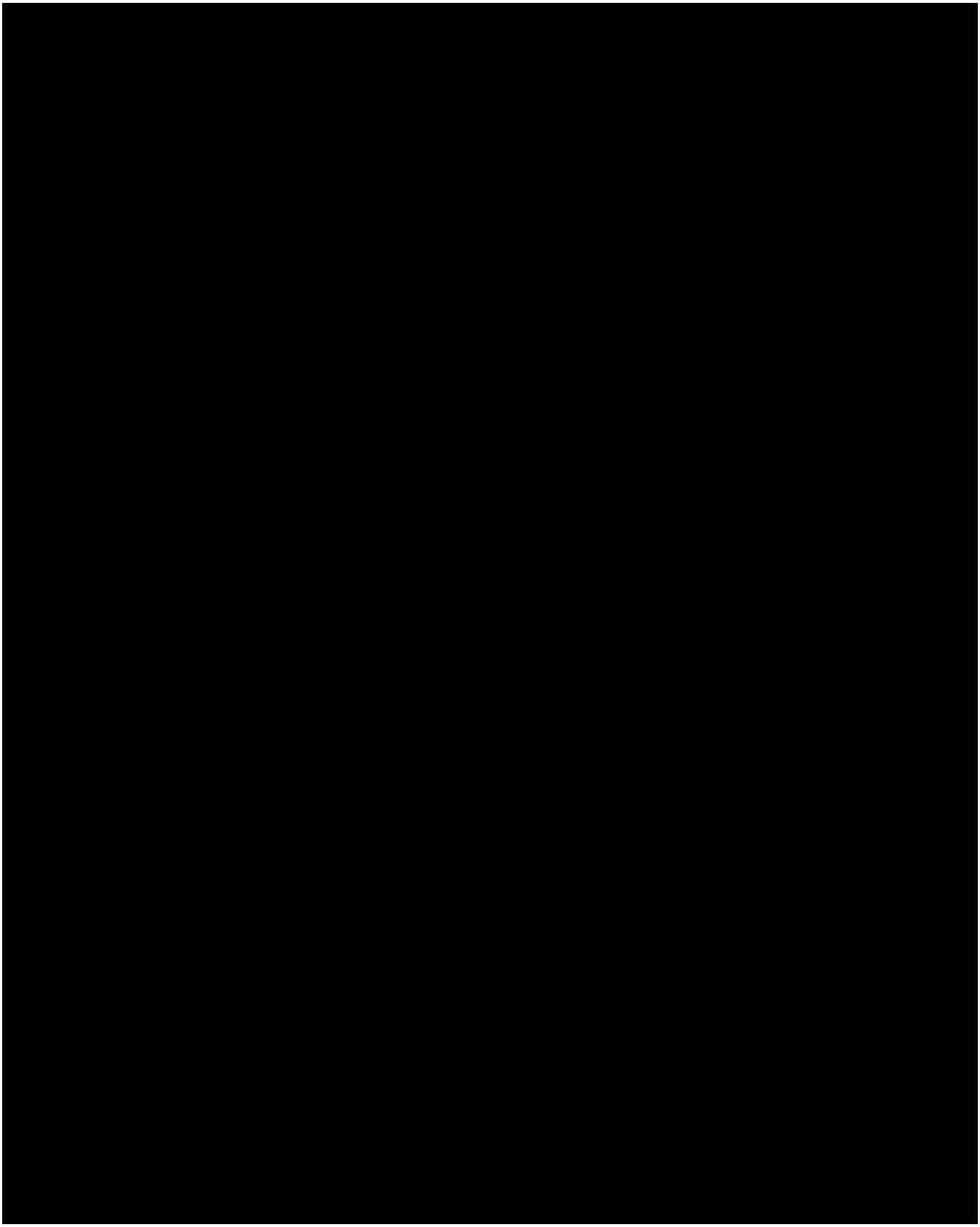


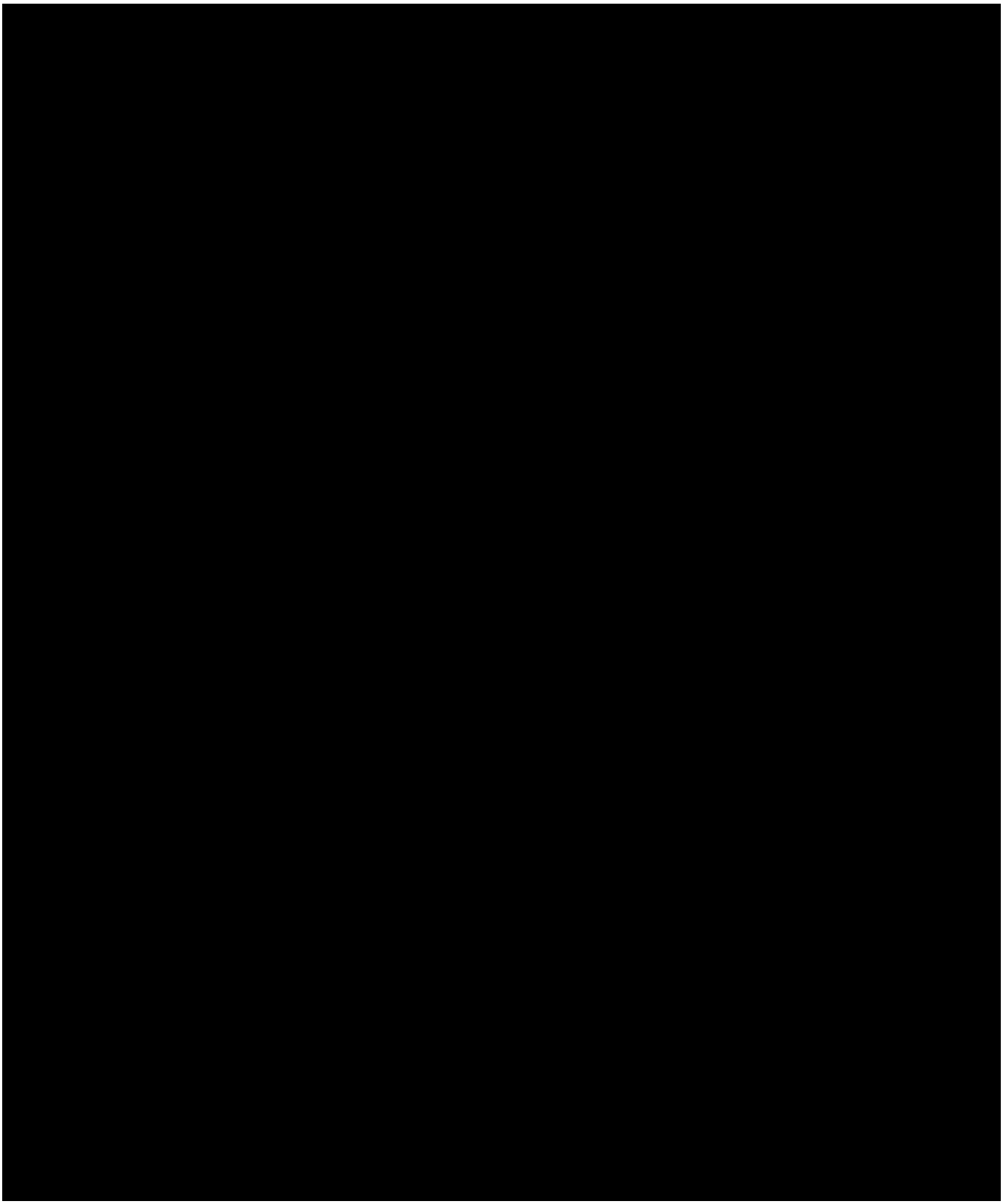












Destination Sign Interface

Strategic Mapping has extensive experience interfacing our system with destination sign providers such as Hanover, Luminator, Twin Vision, and Axion. We typically utilize J1708 or RS485 interface protocols. The interface from Strategic Mapping to the sign controller will pass which sign code to display at the point of log-in on the driver MDT. The Destination sign will be set based on route / pattern that the vehicle is currently performing. When the vehicle goes out of service the unit will send a defined out of service code. Strategic Mapping will provide the required interface cable.

45 TOWN CENTER MALL

Farebox Interface

Strategic Mapping's system has integrated fareboxes from Genfare (Cents-a-bill, Fast Fare and Odyssey), and BEA/Payment In Motion. Our system utilizes the J1708 or RS485 interface protocol to export GPS location and route data and import ridership data from fare solutions. Strategic Mapping will provide the required interface cable.

Cloud Hosting

Since our inception over seventeen years ago, Strategic Mapping has provided cloud-hosted Central System hardware, software and maintenance for our customers with the exception of one project where the customer chose to host on-site. Strategic Mapping's hosted solution is a full featured "Cloud" solution providing all of the functions provided by an installed customer solution. It is not a pared down or limited solution.

The advantage of our cloud-hosted solution is that all hardware, set-up, maintenance and monitoring is our responsibility, and of course the cost savings on server infrastructure, and related software. Our hosting services provide the most up to date safety, monitoring, and security protocols available in the industry.

Our robust back-end service with its high-performance and security-oriented database platform can manage thousands of vehicles and hundreds of users concurrently. All critical components are in high availability environments.

[redacted]

Experience and Qualifications of the Firm

There are numerous aspects to what we believe differentiates Strategic Mapping (both corporately and technologically) from others in our industry. The following section presents an abbreviated summary of how we have remained a transit technology leader for the past 18 years.

Stable Company - Strategic Mapping is a privately held, owned and operated company. Strategic Mapping is a financially strong corporation that is profitable and debt free. Our financial stability has allowed us to remain a privately held corporation, while growing our team and investing significant resources in product enhancements and customer support.

Strong Industry Presence - Strategic Mapping is a long-time member of APTA and several other industry associations. We are actively involved with national and local conferences, trade shows, roundtable workshops and are often requested to present on industry panels which focus on accessibility, current market trends and innovative transit technologies.

Innovation - Our system provides all the ease of an off-the-shelf solution, with the benefits of a custom-tailored solution. Strategic Mapping continually enhances our existing products while simultaneously developing new ones. Our advanced solutions are created as a direct result of our end-users (both transit agencies and passengers) requirements and their desire for progressive and user-friendly technologies. Strategic Mapping is known for developing several leading-edge products well ahead of our competitors.

Modular Design - As discussed previously, our technologies have been developed on a foundation of modular expansion. This theme is consistent in both our hardware components and software modules. This enables our customers to seamlessly incorporate desired future technology enhancements at their preferred pace and at a reduced price. In contrast to our competitors, Strategic Mapping's modular architecture enables us to respond quickly to modifications requested by our customers. Many of our competitors simply cannot offer this type of flexibility and substantially up-charge their customers for custom development, project change orders and add-on components.

Intuitive Interfaces - Intuitiveness and the user experience are driving forces behind our product development. Strategic Mapping prides itself on having an extremely user-friendly solution. This accelerates user adoption with new systems and drastically reduces the need for unnecessary follow-up training. This also minimizes the number of stakeholder complaints that commonly occur when incorporating new technology and users are presented with complicated applications.

Web-based - Our web-based System provides anytime, anywhere user access from Internet/browser capable devices, instead of using an application that has been installed locally. This provides incredible convenience to authorized transit personnel and the riding public. Another important benefit is software installation and maintenance become less complicated. Once a new version or upgrade is installed on the host server, all users have immediate access. There is no need to perform an application upgrade on each user-device or workstation.

Robust & Expandable Hardware - From the cold Canadian North to the sweltering Southern United States, our battle tested hardware is proven and reliable. Strategic Mapping equipment continues to provide a significant return-on-investment for our customers. Our plug-and-play-design makes installations and maintenance seamless. Our on-board hardware is expandable and future proof to accommodate future technology and interface requirements.

Strong Collaborator - We are strong believers that collaboration has a direct impact on success. Working closely with our customers and their third-party vendors, Strategic Mapping prides itself on having positive long-term partnerships based on respect, open communication, trust and robust technologies.

Experienced Project Team - A successful project implementation is always attributed to having the proper resources. Strategic Mapping's team consists of experienced management and technical personnel who have decades of hardware and software experience and a proven track record working together to deliver projects on-time and on budget.

Exceptional Customer Service - Strategic Mapping uses a hands-on, and personal approach with our customers. We guarantee exceptional service and responsive support throughout our project lifecycle and post-deployment. Our knowledgeable and courteous support team is comprised of highly skilled service, installation and client care industry professionals with extensive experience supporting our technologies.

Since 2006, Strategic Mapping has demonstrated technical and professional expertise in the following areas of CAD/AVL Intelligent Transportation Systems:

- ✓ **Providing CAD/AVL Hardware:** Vehicle Logic Unit (VLU), Router/Gateway, Mobile Display Terminal (MDT), In-Vehicle Variable Message Sign (LED and LCD), Outdoor Passenger Information Displays, Terminal/Station Signage, Automatic Passenger Counters (APC), Emergency Alarm (EA), Interior Vehicle Speaker, External Vehicle Speaker, Mobile Radio, Roof Mounted Antenna, Bus-in-a-Box, Test Bench, Garage Wi-Fi, Related Cabling and Mounts.

- ✓ **Providing CAD/AVL Software:** CAD/AVL, Real-Time Mapping, Grid, and Ladder, Daily Schedule Management, Headway Management, Detours and Route Management, Vehicle Management, Real-Time Performance Monitoring and Visualization, Vehicle History Playback, Broadcast Messaging, Emergency Alarm and Management, Two-Way Communication (Driver/Dispatch), Stop Announcement Management, Business Intelligence for All Modules and NTD Reporting, User Role/Permission Maintenance, Engine/Vehicle Diagnostics, Pre/Post trip Inspection, Real-Time Exception Alerts, Incident Creation and Management, Geo-Fence/Zone Management, Content Management System, Passenger Information Mobile and Web App., Passenger Information IVR and SMS, System Monitoring.

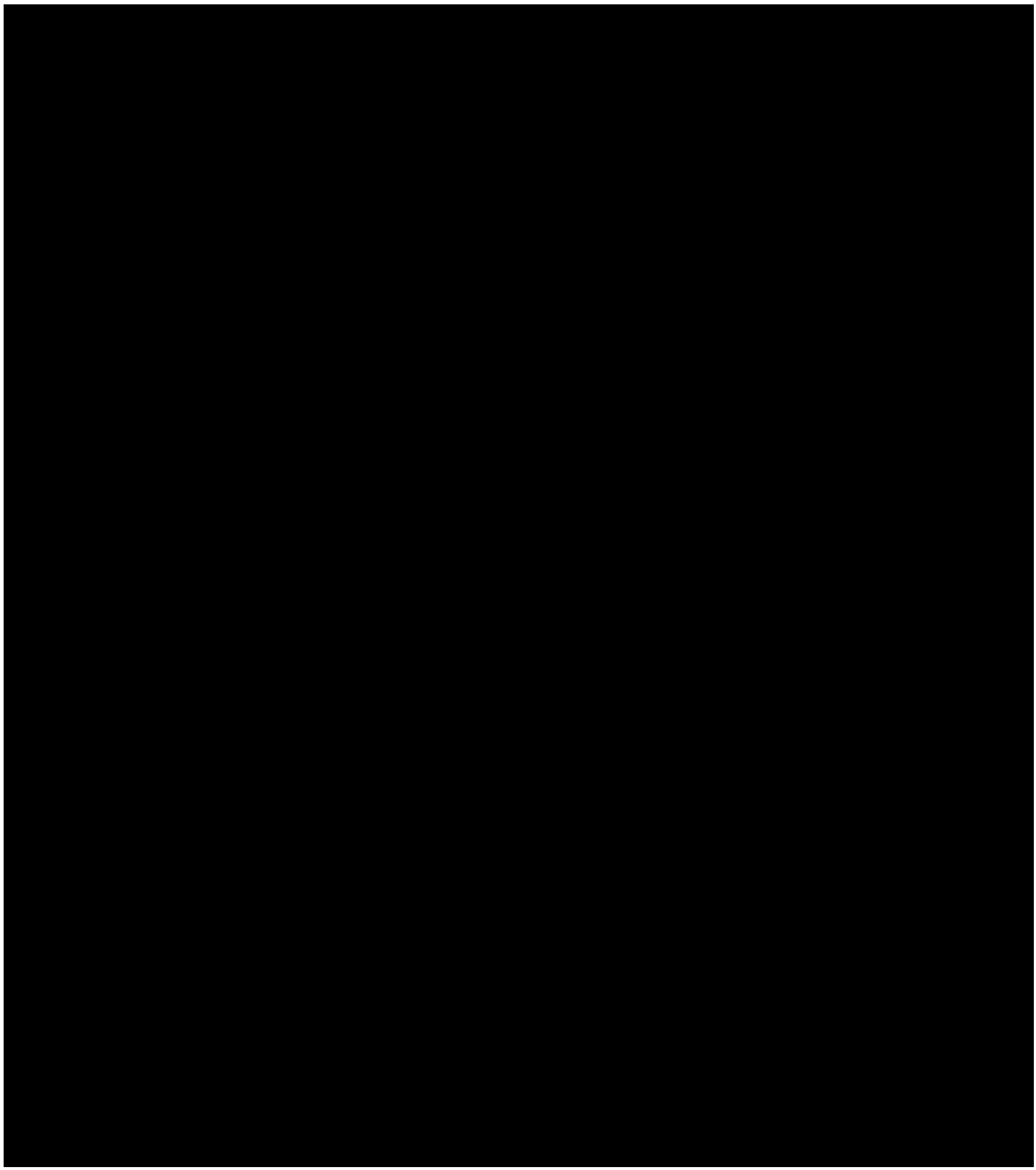
- ✓ **Providing and Supporting CAD/AVL Interfaces:** Scheduling and Run Cutting, Bi-Directional w/ Giro *HASTUS* Suite, Schedule Masters' TMS, Trapeze FX, OPS, INFO, Enghouse Sched21 and TeleDriver, Maintenance Management Systems (Web Fleet Assist), Payroll Systems (JD Edwards), Cellular and Radio Communication (AT&T, Verizon, Sprint, Motorola,), Destination Sign (Hanover, Luminator , Axion), Automatic Passenger Counters (Infodev, Hella, Dilax, Iris) Security Camera/DVR (Apollo, REI, Safe Fleet/Seon) Farebox (Genfare - Odyssey, Fast Fare, BEA, Payment-in-Motion), Fare Validators (Cubic, Genfare, Init, moovel), Transit App, One-Bus-Away, Metropia, Moovit, Google Transit Feed Specification, Google Trip Planner, TSP (GTT, EMTRAC).

- ✓ **Providing Professional CAD/AVL Services:** Hardware Installation - Testing and Support, Software Implementation - Testing and Support, Integration Services, APIs, Program and Project Management, Documentation, Testing, Training, System Support, Warranty, Maintenance and Hosting.

Our innovative CAD/AVL technologies have been utilized by agencies as large as the MTA in New York City, Minneapolis Metro, the Toronto Transit Commission (TTC) and BC Transit to smaller/mid-sized agencies such as Everett Transit, Central Midlands Regional Transit Authority (COMET) and Martha's Vineyard (VTA).

Additionally, Strategic Mapping was awarded the Florida Department of Transportation (FDOT) state-wide RFP #TRIPS-21-APTA for CAD/AVL Systems.

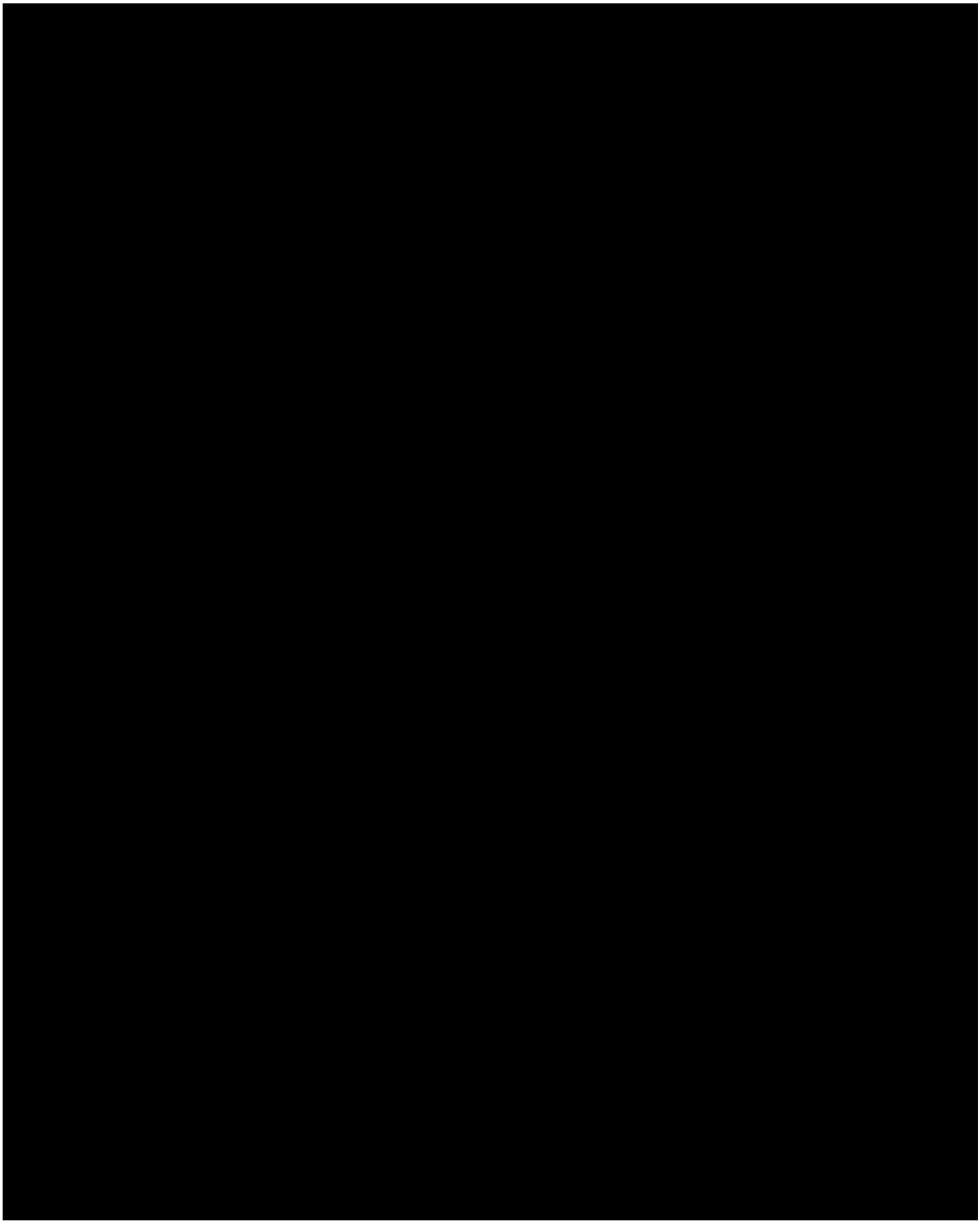
[redacted]

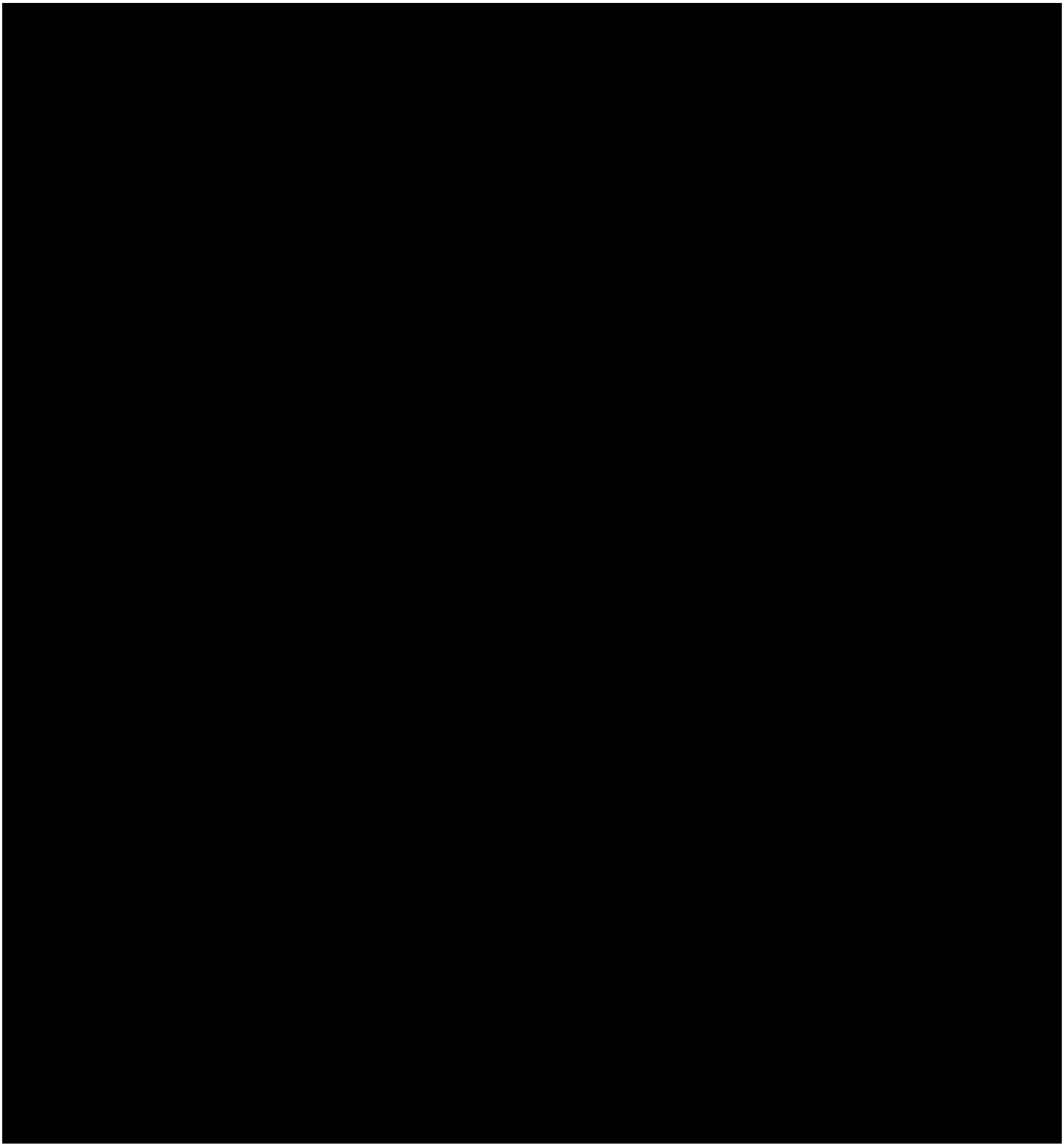


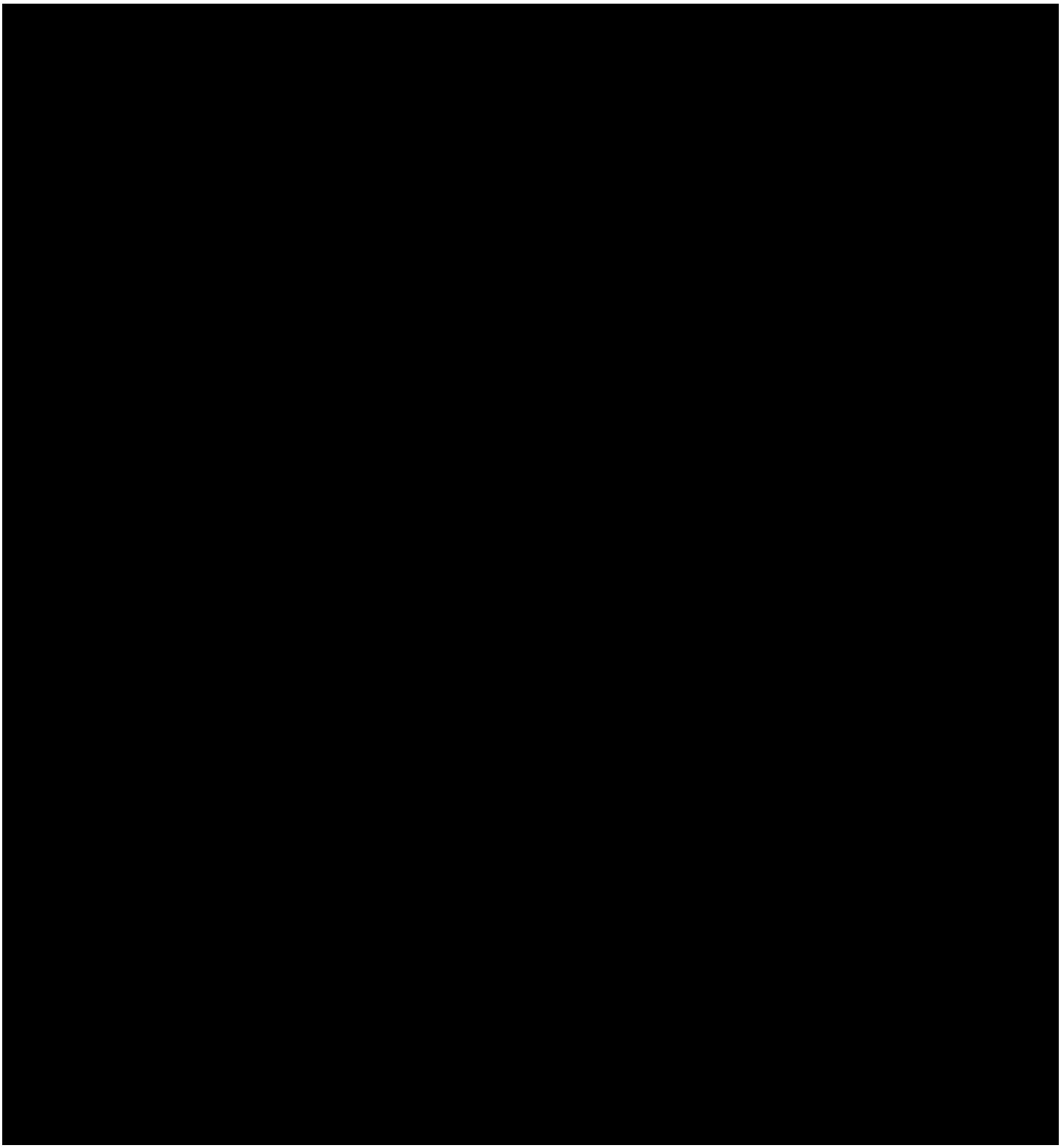
Project Team and Delivery Plan

Our team consists of experienced management and technical personnel who have decades of experience and a proven track working together to deliver and support projects of similar size and scope.

Assigned Personnel Organizational Chart







Installation and Training

Strategic Mapping implements our projects in distinct phases. These phases break the project into smaller, more manageable pieces and help assess the project's progress through milestones. In the detailed implementation plan that would be created following the kickoff and design review meetings, the project phases would be further broken down into specific tasks and responsibilities.

The purpose of our project plan is to define the process that will be followed to install all of the proposed system phases. The implementation plan divides the project into sub-phases with clearly stated objectives and tasks that must be met to successfully implement each requirement. Along with defining tasks and individual responsibilities for each party involved in the implementation, the implementation plan is also useful for planning and as a tracking tool for measuring the progress of the project. Strategic Mapping will provide the professional services to guarantee an orderly and successful implementation of the various hardware and software modules, and their integration with existing and complimentary third-party systems. A draft plan is outlined in this section and will be defined in greater detail with Metro personnel at the beginning of the project.

Strategic Mapping`s typical activities related to the project include the following:

✓ Participate in the Kick-off Meeting	✓ QA Testing
✓ Project Planning	✓ Pre-Factory Testing
✓ Conduct Site Survey	✓ Factory Acceptance Testing
✓ Progress Meetings	✓ Delivery of Training
✓ Progress Reports	✓ Shipping
✓ Establish Subcontracts (as needed)	✓ Mini-fleet Installation & Testing
✓ Preliminary and Final Design	✓ Complete System Installation
✓ Project Documentation	✓ System Acceptance Testing
✓ Hardware Configuration/Procurement	✓ Project Closure
✓ Software Design and Implementation	✓ Warranty
✓ System Integration	✓ Support, Maintenance

Some of the high-level tasks required of **Metro** include:

✓ Assign Project Manager	✓ Provide Basic Infrastructure for Installation
✓ Participate in Project Meetings/Calls	✓ Support Staff Scheduling
✓ Review Documentation	✓ Provide General Operational Information
✓ Documentation Comment and Approval	✓ Participate in Training
✓ Participate in Testing	✓ Provide Required Technical Data
✓ Provide Access to Vehicles	✓ Support Obtaining Permits, Permissions etc.
✓ Provide Staff for Vehicle Movements	✓ Logistical Coordination of Equipment

The following subsections summarize our project implementation. These stages are the foundation to ensure a successful deployment and provide Metro with a clear understanding of the process we follow to mitigate risk.

Project Managers Meeting

Following formal award and issuance of a Notice to Proceed (NTP), we recommend an informal meeting of the Project Managers. This meeting takes place ahead of the formal kick-off team meeting to enable the respective team managers to get acquainted as they will be working closely together for the duration of the project and as long-term partners.

Full Kick-off Meeting

The kick-off meeting is the opportunity for the project teams to meet, review the scope and discuss the schedule and expectations for the project. Strategic Mapping attendees typically include the Project Manager, Technical Leads, Customer Relationship Manager and Systems Engineers.

Site Surveys

Strategic Mapping will perform thorough surveys of both the installation location and wiring terminations for each vehicle type in the fleet. A detailed analysis and inventory of actual on-vehicle systems will be compared to what Metro has documented. This procedure has proved valuable in order to assist our customers with getting their vehicles prepared for installation of the new system. The information obtained from the surveys is then incorporated into the installation and maintenance documentation. Additional site visits may be required to help finalize equipment placement. During this phase, the optimum positioning will be decided on and the required cable lengths will be measured for the creation of sized cable harnesses. The result will be detailed documents that detail to Metro where equipment will be placed, how cabling will be run, and how power, will be sourced. Drawings and photos will be included in the documentation to clearly identify installation requirements. Metro will be consulted on the component placement especially with regards to safety and visibility requirements to ensure that there will be no obstruction of sightlines for vehicle operators.

IT Services

The Strategic Mapping System Engineer(s) will work closely with IT staff to determine the best method for integrating the system network and hosted Central System into Metro's existing environment. A complete analysis of existing infrastructure will be performed. Our team will document current procedures and best practices into the network design. Following the site survey, a complete set of design drawings will be produced.

Engineering and Design

Engineering and Design are paramount to the success of the project. In the engineering and design phase, Metro and Strategic Mapping will work together to define the final solutions look and feel. All deliverables will be detailed along with a detailed understanding of how it will be accomplished. The main activities of this phase are to:

- Attend meetings that are directly or indirectly related to the project and its key deliverables
- Provide timely responses to Metro's inquiries and feedback
- Review Metro's prepared documentation
- Prepare and provide documentation, plans, and specifications for Metro's review and acceptance

The primary deliverables for Engineering and Design will be included in the Preliminary System Design Document and Final Design Document. As noted, a complete functional review of system processes, general requirements and integration points will be detailed and documented. Strategic Mapping will also work with Metro to define how these will be implemented with the least disruption to personnel.

The result will be detailed drawings and specifications, process flows, charts and general system documentation. This content will become the basis for the Preliminary System Design Document which will be created and submitted to Metro for approval.

Once the Preliminary System Design document is approved, Strategic Mapping will continue to create greater detail on the agreed upon deliverables. Together with Metro, the work that will be required to produce the Final Draft System Design Document will begin.

Preliminary Design Review

Strategic Mapping will present the design approach for the system and all major subsystems, including the systems functional description, software system overview and preliminary design, computer system configuration, communications interfaces, vehicle equipment design and functions, external system interfaces, and implementation.

Final Design Review

Once Strategic Mapping has finalized the PDR and Metro staff have signed off, we will begin work on the Final Design Review (FDR). The FDR meeting will include an update of all of the design activity to date. Approval of the FDR and associated documentation will allow the coding effort, integration, and other final designs to be completed.

In addition to the submission of previous documentation, updated to reflect the results of any design changes since the PDR, the submittals will include, but not be limited to, the following: Updated and approved versions of previously submitted design documents, detailed plans and schedule for the installation and commissioning of the system, a complete list of hardware/Bill of Materials, installation and wiring diagrams and all testing plans.

The Build

After the approval of the FDR documentation, the project will move into the build/execution phase. During this phase Strategic Mapping will apply the design documentation and follow our proven process to procure the required equipment, and configure the applicable systems. It is at this point that any requirements not met by our base system, we will complete development for any required customizations.

Testing & Quality Control

Once the system has been configured and staged per the final design, a series of tests are performed and documented. Strategic Mapping has a proven testing approach and methodology that follows an iterative approach which has proved to be successful for our customers.

As required, we will collaborate with third parties to create and combine testing strategies targeting project requirements. Our team will execute a comprehensive testing plan which validates functionality of the system, data integrity and application performance levels.

Strategic Mapping incorporates test procedures to ensure compliance with all requirements. Each test procedure will outline the function and requirements to be tested, the purpose of each test segment, and step by step procedures to be followed with expected results. For all projects, our team will review and test any customizations in addition to their usual focus on core components; this will ensure that any variations to the application are rigorously tested.

Strategic Mapping performs tests in a multi-layered approach. Each layer of tests confirms that a product has passed prerequisite tests and is ready for the next level of testing or integration. Any changes to an approved procedure as necessitated by changes in such things as setups, testing equipment or procedure errors, will be submitted as part of a final report.

Our test engineers will document tests passed or failed, any necessary corrective actions, and any subsequent retesting of the product. Required changes to an existing procedure would be identified and dated by the responsible test engineer. The appropriate representative will be notified in advance of testing activity. Strategic Mapping's Program Management will notify customer representatives well in advance of planned testing activities.

The mandate of our QA team is to evaluate the performance, interoperability and reliability of all software and hardware and ensure that product specifications and customer requirements are met. Strategic Mapping uses a variety of approaches to testing both software and hardware. Each of these tests are carried out with great care and will be well documented irrespective of the testing results.

The following section further explains our testing and quality control methodology.

Unit Testing

Unit testing focuses on detailed design compliance of a single application, hardware or software module. Unit testing involves validation of the lowest level of the development object or system component. It includes testing of application configuration, programs and interface components.

Point-to-Point Integration Testing

This type of testing validates that the business logic, translations, mappings are in place and stand-alone functionality for each interface is working as expected.

High Availability / Disaster Recovery Testing

This thread consists of infrastructure and application tests. Failover testing validates the capability of the Failover system to provide fail-safe service in case of server/service /application failures. Disaster Recovery test is carried out to simulate the loss of different services and the restoration of the services at a different Disaster site.

Regression Testing

Regression testing is a means of identifying unintentional errors introduced because of code enhancements or defect fixes. It typically involves re-running previously successful tests to demonstrate that changes made to other areas of the system have not caused unexpected changes. Regression testing is performed after code deployments are made to the system, to test the new version against the base line code.

Performance Testing

Performance testing assesses system performance under a particular workload. System performance can be characterized using metrics such as response time, throughput and resource utilization at different application and system workload. Stress testing is also performed during this phase; this form of testing is used to determine the stability of the system. It involves testing beyond normal operational capacity, often to a breaking point, in order to observe the results.

System Integration Testing

This involves end-to-end testing of business process scenarios across multiple functional modules and systems. The focus of system integration testing is to test the features and functionality of the software and ensure that the delivered system meets the business specifications integration testing is intended to prove that critical business processes work and production data does not cause errors. In depth testing of each software release as well as interfaces to third party systems (both software and hardware) are also performed.

Deployment Testing

Following Integration testing, our team begins additional testing of the hardware and software using actual transit data. Once the deployment team has tested all interfaces and functionality, Strategic Mapping software is deployed to the system hardware that has been staged for the Factory Acceptance Test (FAT).

Factory Acceptance Testing

Once the components of the system have been configured and staged, Strategic Mapping will host the Factory Acceptance Test (FAT) at our office. We recommend representation from Metro project team during the test. The FAT will include functional testing, and a demonstration. The FAT utilizes the Factory Acceptance Test Plans that were previously approved by Metro during the design phase. This test will be completed prior to the delivery of any hardware and software.

Field Equipment Testing

Following the completion of the FAT, Strategic Mapping will package and ship the necessary equipment to Metro. Strategic Mapping staff will put together a detailed installation agenda and work with Metro staff closely to ensure a successful integration. All documentation will be notated for actual as-built conditions and updated as necessary. Once the computer and network equipment are installed and tested the Field Equipment Test (FET) will take place with the project teams. The FET is performed in accordance with the test procedures as approved during the design review. During the FET, the newly installed infrastructure is tested to ensure interoperability and communication within Metro's environment.

Training (Train-the Trainor)

Strategic Mapping's training is an essential part of the overall project management process. The quality of the training program can be the difference between user buy-in and enthusiasm versus negativity and doubt. We will provide a train-the-trainer program and direct training for maintenance staff and others as needed. References below relate to both programs of training.

Strategic Mapping has the experience and transit knowledge to provide a level of training that ensures true adoption which maximizes the benefits of our system. Training, related documentation and training videos will be provided for all aspects of the system. We will be providing Metro personnel with a quality and motivating program and assist in a *train-the-trainer* approach. Training begins prior to full deployment to provide system users with an understanding of the systems and the positive effect it will have on their work. The training plan is submitted during the design phase and coordination with Metro's team is required to ensure the program meets the projects unique requirements. Strategic Mapping's program supports a train-the-trainer for applicable material/courses. Training for this project will primarily occur on-site at a location determined by Metro at times that are convenient to transit staff. The principal instructors provided by Strategic Mapping will have had previous formal classroom instructor training and relevant experience with the proposed systems hardware and software. Our training and support staff are available after onsite training has been completed via conference call, video conferencing, and on-site if refresh is requested.

Our training team will introduce the proposed training instructors and provide training documentation and detailed agendas to staff for review and approval prior to the start of classroom instruction. Materials used for training will be tailored to reflect all proposed hardware, software, terminology, and user requirements. Our training specialists will provide suitable staff training for Metro personnel including but limited to:

- ✓ Dispatcher/Operations
- ✓ System Administrators
- ✓ Drivers/Operators
- ✓ IT
- ✓ Maintenance
- ✓ Customer Service
- ✓ Supervisors
- ✓ Managers

During the sessions stakeholders will receive detailed training on how the system operates, troubleshooting and general administration and maintenance. Our training sessions are effective, straightforward and fun! Strategic Mapping utilizes several different methods for delivering training, and typically uses a combination of the following methods:

- ✓ **Individual Hands-on Training**—our trainers walk each user individually through the process of performing common solution tasks and answer questions.
- ✓ **Hands-on Classroom Style Training**—our trainers show users how the software/hardware works and how to perform common system tasks, with users performing the tasks themselves in a classroom/lab setting. Each user or pair of users has a computer on which to practice.
- ✓ **Seminar Style Group Demonstration**—our trainers show users how the software/hardware works and how to perform common system tasks in a live demonstration.
- ✓ **Train-the-Trainer**

Basic Hardware Maintenance Training

Audience: Mechanics, Field Service Technicians
Suggested Duration: 3x 4hr. Sessions

Hardware maintenance training courses will be provided for all equipment. The basic hardware maintenance training will provide Metro personnel with a working knowledge of system hardware including its control, operation, interfaces with third party systems and devices, interfaces with data communications hardware, and the operation of diagnostic tools. The courses will provide relevant personnel with an overall knowledge of the installation, preventive maintenance, and troubleshooting. The courses will provide sufficient understanding in the above topics so that trained Metro personnel may perform basic maintenance tasks and assist maintenance contractors with more detailed troubleshooting, as well as oversee the work performed by maintenance contractors.

Advanced Vehicle Equipment Maintenance Training

Audience: Mechanics, Field Service Technicians
Suggested Duration: 3x 4hr. Sessions

Advanced vehicle equipment maintenance courses will be provided that enable qualified maintenance personnel to troubleshoot, replace, and configure vehicle equipment at the replaceable module level. Removed equipment would be returned to the maintenance contractor for component level repair. Equipment covered by the courses will include the vehicle hardware, data communications equipment, vehicle wiring, and other associated equipment and sub-systems. The vehicle training course will include theory of operation, vehicle configuration, vehicle wiring and interfaces, diagnostics, and special procedures that must be observed, such as device/module replacement procedures and disconnection of power or fuses when other vehicle maintenance could affect the system.

CAD/AVL Portal Training

Audience: Dispatchers, Planners, Supervisors, Customer Service
Suggested Duration: 5x Full Day Sessions

Strategic Mapping will separately train in the functional and reporting capabilities of the CAD/AVL system and in the operation of the system workstations. Each course will provide a thorough understanding of the UI, communication and operation of all system functions, and will familiarize the participants with general system design concepts and features. It will include hands-on training using the actual hardware and software being delivered.

Revenue and Non-Revenue Vehicle Operator Instructor Training

Audience: Trainers, Ops Supervisors
Suggested Duration: 2x Full Day Session

Strategic Mapping will train Metro training personnel to be qualified instructors in the operation of the system fixed-route revenue vehicle equipment supplied by Strategic Mapping. This course will provide a thorough and clear presentation of the UI of the vehicle equipment and will include hands-on training using the actual vehicle hardware and software being delivered. This course will also instruct Metro's instructor personnel on the setup, operation, and configuring of the Operator training hardware and any simulation hardware and software provided for Operator training including Bus-in-a-Box.

Management Training

Audience: TBD
Suggested Duration: 3x 4hr. Sessions

Strategic Mapping will provide a course for transit management personnel. The course will provide an overview of the system configuration, functions, UI and reports. The course will include a discussion of the types of data the system will acquire and store and the full accessibility of that data to Metro personnel.

System Administration Training

Audience: Sys. Admin(s)
Suggested Duration: 5x Full Day Sessions

The system administration training course will provide training on the procedures necessary to configure, operate, and maintain the system in an efficient, controlled, well-documented manner. This training course will include, but not be limited to, the following:

- ✓ The structure, interfaces, and functions of the system software and databases.
- ✓ The configuration settings and maintenance of operating systems, third party software, and network devices using the operating system(s).
- ✓ Managing system security and user access.
- ✓ Generating, deleting, modifying, and installing reports in the real-time environment, including the use of adhoc queries.
- ✓ Linkages to the database and application software will be described. Generation and modification of typical reports will be included in this course.
- ✓ Generating, deleting, modifying, and installing displays in the real-time environment.
- ✓ Linkages to the database and application software will be described. Generation and modification of typical displays will be included in this course.

- ✓ Installing software updates provided by Strategic Mapping and third-party software suppliers.
- ✓ Using the software configuration management and administration tools
- ✓ Interpreting and responding to error and warning messages generated by system and device monitoring software.
- ✓ Configuring and modifying the data set sent/received over links to external systems.
- ✓ Performing updates to the destination signs, including recommended guidelines for properly defining destination sign codes.
- ✓ System troubleshooting procedures.

Training Schedule

Strategic Mapping will conduct training in a timely manner that is appropriate to the overall schedule. One session of the System Administrator and Dispatcher training courses will be conducted prior to the start of the Functional Performance Test so that these trained personnel may more effectively participate in the System Functional Acceptance Testing (FAT). The System Administrator and Dispatcher training courses will be repeated, as necessary, so that Metro -selected personnel receive training prior to the start of the FAT. Revenue Vehicle Operator Instructor training will be completed at the start of the Field Performance Test. All other training will be completed prior to the phase-over to revenue operations.

[redacted]

Training Documentation

All training material including reference guides, manuals and videos are all easily accessible through our web-based customer portal. This is a convenient way of having all material in one place for the user. Access to online material is role/permission based. Hard and electronic copies of training material will also be included.

Mini-Fleet and Full Fleet Installation

Our installation methodology follows a proven process for ensuring installations are performed on-time and with as little disturbance to the customer's existing service. Strategic Mapping typically performs a three-stage installation, a mini-fleet pilot, subset cutover then the full fleet deployment. The final installation details for each type of vehicle will be determined once the physical dimensions, mounting requirements, and other details are determined. As a part of Strategic Mapping's installation plan, we will provide vehicle equipment installation procedures for each type of vehicle. Metro will work jointly with our installation personnel to ensure that the vehicle installations are acceptable and signed-off. To meet the implementation schedule typical vehicle installation requirements are as follows:

- Installations will be performed at days/times which have minimal impact on the existing service.
- All installations will be completed in the same manner within a type of vehicle.
- Installation of vehicle equipment will minimize the exposure to and possibility of damage due to abuse, vandalism, and theft. Theft resistant fasteners and mountings will be used. Cables will be run in hidden and protected spaces to the degree possible.
- Strategic Mapping's installation managers will be present onsite during the entire period of vehicle equipment installations to coordinate installation activities and needed resources with Metro, and to supervise the installation work. Installation managers will also coordinate with transit management so as to be aware of the local safety plan and safety rules.
- Cut-Over Procedure

System Acceptance Testing

System Acceptance Testing is performed once training is complete and all vehicles are installed with the equipment. Strategic Mapping's team will monitor the system and document any issues. All issues will be addressed before approval of the System Acceptance Test. The focus is primarily verifying system reliability and availability over a measured time period. The testing will be mutually conducted by Metro with support from Strategic Mapping. The final outcome of this stage will be a fully installed system, successfully tested in Metro's operational environment.

Support Plan

Strategic Mapping's support program is in place from project completion into warranty and maintenance. We understand that responsive service during production use of the System is critical. Our support team works closely with our development and product departments to ensure any issues are resolved promptly. Support may be obtained by email, and/or phone (landline, cell and toll-free). Support is available during business hours and after hours. The definitions, response and resolution times will be finalized by Metro and Strategic Mapping.

[redacted]

[redacted]

[redacted]

[redacted]

Price

The following attachment provides our price quotation.

PRICE QUOTE

Proposer Strategic Mapping Inc.

RFP Number – TM-24-01 Technology for Buses

Please provide a price quote for each of the items listed below. Metro will select items based on the amount of money available for this project.

AVL/CAD *	$ $298,000 (includes six spares)
APC	$ $21,000
DMS	$ $12,000
Total Contract Price	$ $331,000

Installation & Training Start Date June 18, 2024 Complete Date July 1, 2024

Annual Maintenance, Support and Updates	Year 1 $ 26,000
Note: You may quote dollar amounts for years 2-5, or maximum percentage increases. If there is no cost, enter $0 on each line.	Year 2 $ 28,000
	Year 3 $ 30,000
	Year 4 $ 32,000
	Year 5 $ 34,000

What would Topeka Metro need to provide in order for you to complete this project?

Provide current transit data - routes, stops, timing points, etc. Documentation sign-offs, project meeting and training participation, bus availability for installations, sign-offs on installation.

Metro is exempt from all taxes – do not include sales tax in your bid pricing. A project exemption certificate will be provided upon request. Price quoted must be the total cost of the contract, including (but not limited to) materials, labor, installation, training and travel expenses.

*** Includes headsign update, annunciator update, customer facing app, and customer service support.**

Equipment and Warranty

[redacted]

Subcontractors and DBE Participation

[redacted]

Attachments

_____*Intentionally Left Blank*_____

ACKNOWLEDGEMENT

Corporation

STATE OF Ontario (Province))
)
COUNTY OF Canada (Country))
)

I, Gregory Bergman, a Notary Public in and for said County, in the State aforesaid, do hereby certify that Jordan Brock, and _____, of Strategic Mapping Inc. (a corporation),

who are each personally known to me, appeared before me this day in person and severally acknowledged that they signed, sealed and delivered the foregoing instrument as their free and voluntary act as officers of the corporation identified above as the Proposer, and as the free and voluntary act of said corporation, for the uses and purposes therein set forth.

Given under my hand and notary seal, this 11th day of December, 2023.

My Commission Expires:

N/A

Notary Public

(SEAL)

ACKNOWLEDGEMENT OF ADDENDA

The following form shall be completed and included in the proposal. Failure to acknowledge receipt of all addenda may cause the proposal to be considered unresponsive to the solicitation. Acknowledged receipt of each addendum must be clearly established and included with the Proposal. Make copies of this form if more than five (5) addenda were issued.

ACKNOWLEDGEMENT OF ADDENDA

The undersigned acknowledges receipt of the following addenda to RFP TM-24-01:

Addendum Number 1 Dated: November 17, 2023

Addendum Number 2 Dated: November 17, 2023

Addendum Number _____ Dated: _____

Addendum Number _____ Dated: _____

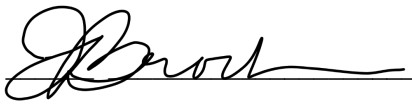
Addendum Number _____ Dated: _____

Proposer Strategic Mapping Inc.

Street Address 4830 West Kennedy Blvd., Suite 600,

Street Address _____

City, State, Zip Code Tampa, FL 33609

Authorized Signature 

Name Jordan Brock

Title Vice President of Global Sales

Telephone Number (416) 483-7522 ext: 230

Facsimile Number (FAX) (416) 483-9074

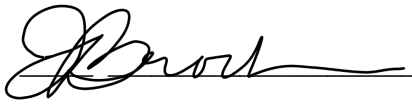
E-Mail Address jbrock@mapstrat.com

BUY AMERICA CERTIFICATION

Proposer will certify either compliance or non-compliance, not both. This certification must be submitted with the proposer's response.

Certificate of Compliance with 49 USC 5323(j)

The bidder hereby certifies that it will meet the requirements of 49 USC 5323(j), and the applicable regulations in 49 CFR Part 661 and any amendments thereto.

Signature: 

Name & Title: Jordan Brock, Vice President of Global Sales

Company: Strategic Mapping Inc.

Date: December 11, 2023

Certificate of Non-Compliance with 49 USC 5323(j)

The bidder hereby certifies that it cannot comply with the requirements of 49 USC 5323(j) and 49 CFR 661.5, but it may qualify for an exception pursuant to 49 USC 5323(j)(2)(A), 5323(j)(2)(B), or 5323(j)(2)(D), and 49 CFR 661.7.

Signature: _____

Name & Title: _____

Company: _____

Date: _____

DISADVANTAGED BUSINESS ENTERPRISES (DBE) CERTIFICATION

This contract is subject to the requirements of Title 49, Code of Federal Regulations, Part 26, *Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs*. The national goal for participation of Disadvantaged Business Enterprises (DBE) is 10%. Metro's overall 2022-2024 goal for DBE participation is 1.62%; the race neutral goal is 1.25%, and the race conscious goal is 0.37%. There is no contract goal for this procurement.

The contractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of this DOT-assisted contract. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as Metro deems appropriate. Each subcontract the contractor signs with a subcontractor must include the assurance in this paragraph (see 49 CFR 26.13(b)).

The contractor is required to pay its subcontractors performing work related to this contract for satisfactory performance of that work no later than 30 days after the contractor's receipt of payment for that work from Metro.

The contractor may not hold retainage from its subcontractors.

The contractor must promptly notify Metro, whenever a DBE subcontractor performing work related to this contract is terminated or fails to complete its work, and must make good faith efforts to engage another DBE subcontractor to perform at least the same amount of work. The contractor may not terminate any DBE subcontractor and perform that work through its own forces or those of an affiliate without prior written consent of Metro.

Signature: 

Name and Title: Jordan Brock, Vice President of Global Sales

Company Name: Strategic Mapping Inc.

Date: December 11, 2023

FLY AMERICA CERTIFICATION

The Contractor agrees to comply with 49 U.S.C. 40118 (the "Fly America" Act) in accordance with the General Services Administration's regulations at 41 CFR Part 301-10, which provide that recipients and sub-recipients of Federal funds and their contractors are required to use U.S. Flag air carriers for U.S Government-financed international air travel and transportation of their personal effects or property, to the extent such service is available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. The Contractor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S. flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the Fly America requirements. The Contractor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

Signature: 

Name and Title: Jordan Brock, Vice President of Global Sales

Company Name: Strategic Mapping Inc.

Date: December 11, 2023

LOBBYING CERTIFICATION

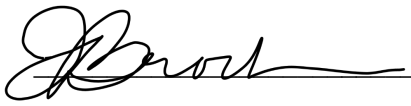
The undersigned contractor certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan or cooperative agreement, the undersigned shall complete and submit Standard Form LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions. See 49 CFR 20.100.

(3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 USC. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure. [Note: Pursuant to 31 USC 1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such expenditure or failure. See 49 CFR 20.400.]

The undersigned contractor certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 USC 3801, et seq, apply to this certification and disclosure, if any.

Signature: 

Name and Title: Jordan Brock, Vice President of Global Sales

Company Name: Strategic Mapping Inc.

Date: December 11, 2023

NON-COLLUSION CERTIFICATION

This is my sworn statement to certify that this proposal was not made in the interest of or on behalf of any undisclosed entity. This proposal is not collusive.

This proposer has not been a party to any agreement or collusion in restraint of freedom of competition by agreement to bid a fixed price, to refrain from bidding, or otherwise. This proposer has not, directly or indirectly, by agreement, communication or conference with anyone, attempted to induce action prejudicial to the interest of Topeka Metropolitan Transit Authority, or of any proposer, or anyone else interested in the proposed contract.

Signature: 

Name and Title: Jordan Brock, Vice President of Global Sales

Company Name: Strategic Mapping Inc.

Date: December 11, 2023

POWER OF EXECUTION

Authorization of Bidder

The undersigned, an Officer of
(officer, partner, proprietor, etc.)

Strategic Mapping Inc.,
(name of company)

a Corporation
(corporation, partnership, proprietorship)

having its principal office or registered agent at 4830 West Kennedy Blvd., Suite 600, Tampa, FL 33609 hereby certifies that the Company has duly authorized by appropriate action and/or hereby does

nominate, constitute, appoint and authorize Jordan Brock
(name of individual signing document)

with full power to act alone, on behalf of
(alone or in conjunction with another person)

Strategic Mapping Inc.,
(name of company)

and thereby to make, execute, seal and deliver on its behalf as CONTRACTOR and as its act and deed any and all proposals, contract proposals, contracts, change orders, monthly and final payment certificates and other like instruments. Such proposals, contract proposals, contracts, change orders, monthly and final payment certificates and other like instruments shall be binding upon said company as fully and to all intents and purposes as if such instruments had been duly executed, acknowledged and delivered by the authorized officers of the company when executed, by the aforementioned person(s).

Strategic Mapping Inc.
Company

Vice President of Global Sales
Signature, Title

December 11, 2023
Date

ATTEST: Roni Pinhasov

Notary Public (if proprietorship)
Secretary of Corporation (if corporation)
Partner (if Partnership)

PROPOSAL CHANGE REQUEST

Complete this form for each condition, exception, reservation, or understanding (i.e., change) in the proposal. See PROPOSAL SCHEDULE, page 5 of this RFP, for the due date of all requested Proposal Changes.

Change Number N/A

Proposer _____

RFP Number – TM-24-01 Page: _____ Section: _____

Metro's Current Requirement:

Proposer's Requested Change:

SUSPENSION / DEBARMENT CERTIFICATION

In regard to 2 CFR Parts 180 and 1200

In accordance with 2 CFR Parts 180 and 1200, the contractor is required to verify that none of its principals or affiliates:

1) is included on the federal government's suspended and debarred list;
2) is proposed for debarment, declared ineligible, voluntarily excluded or disqualified;
3) within three years preceding this proposal, has been convicted of or had a civil judgment rendered against them for (a) commission of fraud or criminal offense pertaining to performing a public transaction, (b) violation of any federal or state antitrust statute, or (c) embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property;
4) is indicted or charged by a governmental entity for any of the charges in 3) above; and
5) has had any public transaction terminated for cause or default within three years preceding this proposal.

The contractor is required to include this requirement in any subcontracts related to this contract.

By signing and submitting its proposal, the proposer certifies that the certification in this clause is a material representation of fact relied upon by Metro. If it is later determined that the proposer knowingly rendered an erroneous certification, in addition to remedies available to Metro, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment. The proposer agrees to verify that none of its principals or affiliates is included on the federal government's suspended and debarred list at any time throughout the period of this contract. The proposer further agrees to include a provision requiring the same compliance in its subcontracts related to this contract.

Signature: 

Name and Title: Jordan Brock, Vice President of Global Sales

Company Name: Strategic Mapping Inc.

Date: December 11, 2023