SUBJECT: Report on the Costs and Risks of Enabling Third Party Data Sharing for Published Schedules and Real-Time Passenger Information

RECOMMENDED ACTION:

☐ Information Only ☐ Briefing Item ☒ Recommended Motion

Consider Approving Staff Recommendations for Sharing Data with Third Parties as Follows:

1. Provide Static Schedule Data in the Google Transit Feed Specification (GTFS) on the new District Website (When Available).
2. Request NextBus to Provide A Real-Time Passenger Information (RTPI) Data Feed via An Application Programming Interface (API) for Extensible Markup Language (XML) on Their Website. The District Website Will Then Provide A Web Link to This.

Fiscal Impact:

Estimated annual costs of $5,000 are assumed for the static download (website modifications and ongoing support for additional bandwidth consumed by data download). Costs for modifications to the Hastus scheduling system have been negligible to date; future costs are unknown and therefore not included in this assumption. The costs for RTPI data sharing are minimal.

Background/Discussion:

Overview
This memo is a follow up to GM Memo 09-095a, presented to the Operations Committee on June 10, 2009. Additional research was proposed in order to provide a comprehensive and balanced assessment for District data sharing. In an attempt to form a best practice review, external outreach was also conducted to determine how other agencies have approached the issue. This report gives a summary of the research, together with costs and benefits for the District depending on the approach taken.

For the purposes of this memo, “third party data sharing” is taken to mean the provision of agency data, specifically schedules and real-time passenger information, to the public, not a private party. Currently AC Transit does share this data with other private parties and public agencies, so it is important to make this distinction.
Data sharing furthers the idea of an open data environment that some agencies have adopted. Agencies such as Tri-Met (Portland), LAMTA (Los Angeles), and CTA (Chicago) are committed to data transparency, which enables them to share information with passengers to a much greater degree than was ever thought possible. With the recent growth of smart phone technology, including the iPhone and the new Droid, software developers are able to create more thoughtful phone applications and websites that can aid navigation around the transit system and encourage ridership through their convenient interface. These developers provide the applications or websites (see Attachment A for examples) to the public for free, or for a small fee. For the District, the main costs are incurred through providing and maintaining data. Engaging with the developer community and embracing new technology is something the most forward-thinking agencies have undertaken. If AC Transit does not lead in this field, it will soon be forced to follow.

**Public Debate**

In recent years, there has been increased interest in access to information and open data at public agencies. In the Bay Area, advocates of open data in transit have mobilized and established a community. Transit Camp was an event in 2008 that brought this community together, and provided a forum for software developers and transit staff to work together and provide better information to passengers.

However, problems can occur when software developers and transit agencies do not collaborate. Attachment B is an article that discusses the ownership of transit data and outlines some issues MUNI (San Francisco) faced over public access to its NextBus information.

Some software developers have accessed this data through unofficial sources, in a process known as “scraping”. Essentially, software developers copy or “scrape” the data from an existing website such as www.nextbus.com, and manipulate this data to create applications for smart phones. CTA was prompted to undertake an official data sharing policy for this reason. Unofficially sourced applications were produced, which were not problematic; however, CTA recognized the public desire and responded accordingly. CTA developed a data sharing policy and is now starting to share the data in a regulated way.

**Two Data Types**

There are two types of data that could be made available by the District through third party data sharing:

1. *Static schedule data*; currently, schedule data is provided from Hastus to the regional 511 Trip Planner, Google Transit and NextBus. This is done through a customized format according to each system that uses it.
2. **Real Time Passenger Information (RTPI)**: AC Transit uses NextBus to generate RTPI (the prediction for when the next bus will arrive) for 38 routes, with more routes coming online shortly. The service provides predictions for these routes online and at electronic signs in some shelters and kiosks. Currently MTC and NextBus are testing the capability of providing the RTPI directly to the 511 site.

It is important to understand that the data for the two data sets is generated and maintained very differently, as described in the initial Memo 09-095 from June 2009.

**Data Sharing at Other Transit Agencies**

To investigate data sharing at other agencies, staff contacted several properties and also undertook extensive internet research. Attachment C details thirty transit agencies and their degree of static schedule and RTPI data sharing. The selection represents a broad sample, ranging from large to small agencies across the US, all with different levels of technology adoption.

Nearly all these agencies are part of the Google Transit program and just under half provide the GTFS on their own website. Only three agencies provide RTPI data sharing, and a handful recognize this new arena for developers by providing a dedicated webpage for data sharing and application development.

Costs cannot be easily compared, as the technology environment at each agency is so different. For example, the cost of implementation and maintenance at BART was minimal because there is a technology infrastructure in place to host the data, and a dedicated staff member to manage the content on the website. BART’s schedule and RTPI data is also much simpler than that of a bus agency.

Similarly, Tri-Met has a dedicated IS team with the skills needed to develop and support a variety of data analysis and data sharing projects. Setup and maintenance costs are therefore shared among a number of similar technology projects.

CTA has combined expertise across the agency, using staff from the Marketing, IS and Planning departments. This team worked in concert with the Authority’s RTPI vendor, and provided input as to what data would be made available to the developer community.

**Regulations and Registrations**

Many transit agencies and legal representatives have expressed concerns regarding liability that may exist from making transit data so readily available. These concerns lie in the dynamic nature of operating a bus service, which often means daily operations deviate from planned schedules and RTPI cannot be 100% accurate.

Most agencies have determined that a disclaimer is sufficient to address the agency’s liability concerns. Terms of Use are often provided. Attachment D details the different requirements of twenty-seven other agencies, while Attachment E gives an example of the disclaimer language used by Tri-Met for its RTPI data feed.
Agencies that require third party developers to register in order to access the data do so for a variety of reasons. The registration process allows the agencies to:

1. Ensure the public meet a set of data regulations
2. Ensure the public acknowledge data disclaimers
3. Notify the public of any upcoming changes to the download or API
4. Track usage to ensure the demand for access is met, or ensures excessive requests by one person are addressed

**Potential Benefits**

For AC Transit passengers, benefits for data sharing center on the generation of convenient, more intuitive ways to navigate the AC Transit network. As shown in the examples above, it is expected that developers will create similar applications that will enhance understanding of the AC Transit network and provide convenience for all passengers with access to the web or smart phones. It is recognized that the value of this development will not aid passengers without access to these services, but this is the first step in new technology development that will eventually be available to all passengers.

The District will potentially see many benefits. Data sharing will create a streamlined process for data requests. Requests can be directed to the available data warehouse, requiring no additional staff time to create custom-made data packages for individual requests. Sharing data also demonstrates a commitment to data transparency, which public agencies are encouraged to pursue in the name of public interest.

Developers may create critical passenger information tools that will help market AC Transit at no cost to the District. These tools may be so popular that through promotion, they could help increase ridership. The public is more likely to use transit if it has the information readily available.

**Potential Problems**

None of the agencies researched for this memo experienced major problems with data sharing. However, early adopters such as BART regretted not requiring stricter registration so the sharing could be better tracked and provide more feedback on the service.

There may be concerns about data accuracy, but the data shared will be as accurate as the data generated. This is not to downplay the data accuracy issues that the District may face internally, but for the purposes of providing static schedule data to third parties, the data is checked for accuracy in the usual internal process.

Another concern voiced by some is that once the public downloads the data, the District has no control over how the data may be manipulated or reproduced. Other agencies do not see this as a major problem as they believe it is within the developer’s interest to maintain data accuracy in order for them to deliver a successful application.

In addition, as noted above, some agencies endeavor to mitigate potential liability for data inaccuracy through either a ‘terms of use’ or other type of disclaimer built into the registration process.
With respect to RTPI data generation, providers like NextBus conduct their own data accuracy checks. Although this data is more prone to errors because of its dynamic nature, sharing the data creates no additional potential for data inaccuracy for the data itself. However, developers using this data may experience “lag time” issues or other problems, depending on how they manipulate the data.

The Role of the Metropolitan Transportation Commission (MTC)
MTC plays an important role as the regional data warehouse, and as such is committed to sharing data with third parties. Attachment G is MTC’s data sharing policy. It states that MTC will “Share real-time transit data… with third party ISPs and the general public. MTC will require recipients to agree to a license agreement, which will include but not be limited to: revocable rights, data is “as is”, and trademarked/copyrighted materials from either 511 or any other participating transit agency may not be used in connection with these data.”

AC Transit static schedule data is now available to third parties through the 511 website in Google Transit Feed Specification (GTFS) and Comma Separated Values (CSV) formats. The public has to go through a registration process (Attachment F) ensuring MTC monitors the demand and who is using the data.

MTC is also in the process of developing an API which will enable RTPI data to be streamed to a third party developer. This will be available to AC Transit once an additional feed is established between NextBus and 511. This feed is the only cost at this stage, and MTC is providing the funding required. This data sharing capability could be available to the public by spring 2010.

In the future, if the District uses a vendor other than NextBus or an in-house RTPI system, this API can also be provided using the standards required by MTC. Initial setup costs would be involved to establish a new system feed, and staffing for setup and maintenance will have to be considered.

Data Sharing Options for the District
The following is a menu of options for enhancing the District’s data sharing capabilities:

1. **Static Schedule Data**
   This could be provided to third parties in the GTFS or CSV format on the District’s new website. A slight increase in bandwidth may be needed, but no additional staffing would be required. Staff estimates the cost to be less than $10,000 to design and implement this feature. Staffing time needed to maintain it is minimal.

   As noted previously, the District already provides MTC with a schedule data export at every sign-up to provide the information on the 511 website. As the transit data warehouse for the Bay Area, MTC is already providing this information on the 511 website as an available download for third parties.
Options for static schedule data sharing:

a. Continue to provide MTC with schedule data and allow them to host the data delivery for third party sharing

Costs: The static schedule data is already being delivered to MTC. MTC generates its own GTFS data download. There is no additional cost to the district

b. Provide static schedule as a GTFS download on the District website.

Costs: In-house provision will require a design and implementation cost of less than $10,000 with minimal staffing time needed for maintenance. Creating disclaimers and registration processes may require additional staff time to set up and maintain, but this would still not require a new full-time employee.

2. Dynamic RTPI – NextBus data

The original memo discussed providing GPS locations; however, this is not feasible with the current Automatic Vehicle Location (AVL) system. None of the researched agencies provides raw GPS data to the public. However, Trimet, BART and CTA are providing the RTPI data in an XML format and are the only agencies thus far that are providing this level of data sharing.

Generation of in-house RTPI will only be possible at the District with an AVL upgrade. Therefore, in the current environment any third party data sharing would necessitate collaboration with NextBus. Presently, MUNI has NextBus provide an API which allows prediction data to be accessed by the public through an XML feed. NextBus has strict terms and conditions that require third parties to agree they will create non-commercial applications, however they assume the policing onus for these terms and conditions. This feature will come at no cost to the agency, and staff is in discussions with NextBus to make this available on the NextBus website.

Options for RTPI data sharing:

a. Request NextBus to provide an API on their website which allows third party data sharing of the RTPI data.

Costs: No financial cost to the district, however it will take staff time to generate the necessary agreements and legal documentation. NextBus will handle the registration process so it is thought staff time needed for maintenance will be negligible. However, staff time will be needed to monitor the demand and feedback from users.
b. Wait for the AVL upgrade to enable in-house RTPI data generation and sharing capability.

Costs: Unknown at this point. The software costs will be funded as part of the upgrade system; however, this may take over a year to implement and staff costs are undetermined.

Conclusions
In order to support the mission of an ‘open data environment’, transit properties are faced with the challenges of securing both initial and ongoing funding, ensuring appropriate staffing, identifying liability issues and changing many internal business practices.

Transit properties have addressed these issues in a variety of ways. Informal discussions with Tri-Met, CTA and BART have provided some preliminary ideas about how data sharing activities are implemented and managed.

AC Transit is currently at a crossroads. The District makes static schedule data available directly through its Google feed and by exporting data to the MTC 511 system. The District is also working with MTC to enhance its Google Transit Feed Specification available directly as part of the 511 transit information program.

If the District decides to go further and follow the data transparency route other agencies are already pursuing, this memo identifies the options available to the District along with the relative pros and cons. As such, staff believes the following recommendations are the most practical ways to provide data sharing at the lowest cost to the District using current resources.

1. Provide static schedule data in the GTSF on the new District website when available.
2. Request NextBus to provide a RTPI data feed via an API for XML on their website. The District website will then provide a web link to this.

Prior Relevant Board Actions/Policies:
GM Memo No. 09-095: Report on the Costs and Risks of Putting all Schedules and GPS Data onto an Outside Server for Use by the Public, May 13, 2009
Memorandum: From Director Chris Peeples: Putting Schedule And GPS Information on an Outside Server, or, AC Transit Joining Web 2.0, May 13, 2009
GM Memo No. 09-095a: Report on the research on the Costs and Risks of Putting all Schedules and GPS Data onto an Outside Server for Use by the Public, June 10, 2009

Attachments:
Attachment A: Examples of Software Developers’ Use of Transit Data
Attachment B: Article on MUNI Transit Data Debate
Attachment C: Transit Agencies Degree of Third Party Data Sharing
Attachment D: Other Agencies' Legal Requirements and Disclaimers Related to Data Sharing
Attachment E: TriMet Disclaimer Language
Attachment F: 511 Data Feed Registration Process
Attachment G: MTC Data Sharing Policy

Approved by: Mary V. King, Interim General Manager
Nancy Skowbo, DGM, Service Development

Reviewed by: Operations Technology Group
Carol Babington, General Counsel
Patricia Broadbent, IS Project Manager

Prepared by: Linda Morris, Transportation Planner
Ipeleng Kgositylile, Planning Intern

Date Prepared: December 29, 2009
Examples of software developers’ use of transit data

iamCaltrain is a website that uses schedule data from the Caltrain website. The site has a very easy user interface and allows users to click on an interactive map to get scheduled train times.

![iamCaltrain website](image)

In contrast, Routesy is an application for the iPhone that provides real-time arrival information for MUNI. Users are able to buy this iPhone application which simplifies MUNI’s NextBus information. The user can also request predictions for stops based on their current location using the GPS feature.

![Displays from Routesy application](image)
Article on MUNI Transit Data Debate

August 24, 2009 4:00 AM PDT

Who owns transit data?
by Rafe Needleman

Commuters on public transit want to know two fundamental things: when can I expect the bus or train to pick me up? And when will it drop me off at my destination?

Nowadays, they may also be wondering whether their local transit agency is willing to share that data with others to put it into new and helpful formats.

How likely is it that the arrival and departure information will be available on a site or service other than the official one? That depends on how open your local agency is. In some metro areas, transit agencies make data--routes, schedules, and even real-time vehicle location feeds--available to developers to mash into whatever applications they wish. In others, the agencies lock down their information, claiming it may not be reused without permission or fee.

In local blogs and on transit sites, outrage over agencies and companies that claim ownership of the data is growing. The core argument against locking down such data is that it's collected by or paid for by public, taxpayer-funded agencies and thus should be open to all citizens, and that schedule data by itself is not protectable content. The argument against is that the agencies might be able to profit from using the data if they can maintain control of it. The counter to that is the belief that if the data is open, clever developers will create cool apps that make transit systems more usable, thus increasing ridership and helping transit agencies live up to their charters of moving people around and getting as many private cars as possible off the roads.

StationStops gives New York metro rail commuters a timetable in their iPhones.
Each city and metro area with a transit system is unique, but there are three cases in the U.S. that highlight the way the transit data drama can play out.

**New York locks down subway schedules**
As reported last week at ReadWriteWeb and elsewhere, the New York Metropolitan Transportation Agency believes its public train schedules fall under copyright law and thus applied an interpretation of the Digital Millennium Copyright Act (DMCA) to send a takedown notice to the developer of StationStops, an iPhone app that gives people access to train schedules on the Metro-North lines.

According to StationStops developer Chris Schoenfeld, the MTA claims that the StationStops iPhone app (not the Web site) infringes on MTA intellectual property. The MTA, Schoenfeld says, has sent a letter to Apple to get it to remove the app from the iTunes App Store. As of this writing, the $2.99 iPhone app is still available.

Schoenfeld does believe that he and the MTA will come to an agreement for use of the data, even though the initial communications were not promising: the MTA, he says, was asking for royalties on use of the data in arrears, at a price that would basically drive him out of business as an app developer in the category. Schoenfeld and his lawyer say that the data isn't protectable content.

Furthermore, Schoenfeld says the procedure that the MTA said it would use to update data for him and other developers is archaic: the MTA said the agency would send StationStops the schedule data on CD ROM, and that it would send him updates only after receiving paper letters requesting them--guaranteeing that Schoenfeld would never have current data.

**San Francisco writes data accessibility into contracts**

The Routesy iPhone app uses NextBus data to predict transit arrival times.
In San Francisco last week, Mayor Gavin Newsom unveiled (via TechCrunch) theDatasf.org initiative, which aims to put all the city's data online for open access. Included in the program is the San Francisco Municipal Transit Agency's schedule data. There's no question that this is a positive development for San Francisco Bay Area transit app developers and that it sets a good precedent for developers elsewhere. However, static schedule data is not the whole story for transit apps, especially on systems where route schedules are poorly adhered to (on New York's Metro-North lines, the schedules are somewhat reliable; for San Francisco's MUNI buses, they are not). The most useful new apps collect real-time vehicle location data, and access to that information is not yet available from SFData.

In many cities, a company called NextBus gathers location data from vehicles and then makes that information available to the subscribing cities as well as on its own Web site. Developers of real-time transit iPhone apps, such as San Francisco's Routesy and iCommute, have had mixed results in getting access to that data.

The drama around the NextBus data appears to be due in part to the actions of a separate company, confusingly called NextBus Information Systems, which has access to the Nextbus Inc. data and which has apparently claimed the exclusive right to license it. NBIS is run by the team that started, and then sold to Grey Island Systems, the original NextBus Inc. A claim from NBIS to the Apple iTunes store led to Routesy being taken down from the store, although it was reinstated to the store this month.

In San Francisco's recent renegotiation of the Nextbus contact, there is clear language that states that the real-time data is the SFMTA's property even though the SFMTA pays Nextbus to collect it, and that it may be made freely available to developers by the SFMTA (see last paragraph in this story). As SFMTA spokesperson Judson True says, "There were some legal loose ends from the original contract. We approved a new contract that has clear language on data ownership issues." True also says that there's a nationwide movement to make data created with public funds available to the public--and more importantly, available to entrepreneurs.

The SFMTA contract even specifically states that arrival time prediction data--information created by Nextbus based on data derived from vehicle locations--is part of the Nextbus agreement.

Visit Portland for the best in transit apps
In Portland, Ore., openness on the part of the local transit agency has been a blessing for transit app developers. There are more than 25 apps that use the public TriMet data stream. Many of the apps duplicate others' functions and features, but it's just this kind of competition that makes apps better over time. When companies control data about their services and are the only ones to provide the apps that use the data, users do not get the same benefit of rapid application evolution.

Google drives the bus
Google is the most aggressive company in the transit planning business. If you ask Google Maps for directions, by default it will route you by car, but you can also ask it to give you directions by public transit. In many metro areas, it will even direct you among different transit systems (from a local bus line to a commuter rail system, for example).
To get the data that powers the transit routing, Google became instrumental in the creation of a standard that transit agencies can use to publish schedules. The **GTFS**, or Google Transit Feed Specification, is a standard that Google has been developing in concert with transit agencies for the reporting of transit schedule data. First developed with Portland's TriMet agency, it's now being used by agencies in more than 400 cities, Google software engineer Joe Hughes says.

Google Maps gets its transit data using the GTFS spec that it helped develop.

Hughes confirmed that in recent months cities have been getting more receptive to the ideas of open and public transit data. "For a long time the default was not giving it out," he says. "I'm happy to see a change in the zeitgeist, a push for government transparency. People are putting this in their political platforms, which is helping."

Hughes says, "Agencies that lock up the data have less control over the accuracy of what's out there. It's also a false economy to charge for the data. If you put it out for free, you get great apps and more riders."

Currently, the GTFS has a spec only for schedule data. Google doesn't know where trains and buses actually *are* and thus can't tell you when you need to really get to the station to catch your train or bus--only when you should if the system you're riding respects its timetables. As city dwellers know, on many metro transit systems, timetables are fiction--hence the real value of the NextBus scheme, which predicts arrival times based on actual vehicle location. However, some agencies, like TriMet, have their own protocols for delivering real-time location data to application developers. Google is
likely to work with TriMet and NextBus to bring real-time data to its transit effort, just as it did when it built the schedule-based GTFS spec.

For the moment, the movement in transit is toward an opening up of data, for both schedules and vehicle positions. It appears unlikely that agencies that attempt to hoard their data--or sell it--will be able to withstand the increasing public and political pressure to open it up.

Rafe Needleman writes about start-ups, new technologies, and Web 2.0 products, as editor of CNET's Webware. E-mail Rafe.
## Other Transit Agencies Degree of Third Party Data Sharing

<table>
<thead>
<tr>
<th>Agency</th>
<th>GTFS on Agency Website</th>
<th>GTFS on Google Website</th>
<th>XML Schedule Data File</th>
<th>Dedicated Developer Page on Agency Website</th>
<th>Real-Time Transit Feed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin Capital Metro</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>BART</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Broward County Transit</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Caltrain</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Chicago Transit Authority</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>DART</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hampton Roads Transit</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Humboldt Transit Authority</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Island Transit</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Jefferson Transit Authority</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>LA Metro</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Massachusetts EOT</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Metro Houston</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Metrolink</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Milwaukee County Transit System</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Monroe County Transit Authority</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Mountain Line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>MUNI</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oahu Transit Services, Inc</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>RTD</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>San Diego MTS</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SEPTA</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SRTD</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Irvine Shuttle</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Tillamook County Transportation District</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tri-Met</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Unitrans</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>WMATA</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>York Region Transit</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Date Prepared: December 29, 2009
### Other Agencies’ Legal Requirements and Disclaimers Related to Data Sharing

<table>
<thead>
<tr>
<th>Legal Notice Related to Data Sharing</th>
<th>Austin Capital Metro</th>
<th>BART</th>
<th>Broward County</th>
<th>Caltrain</th>
<th>DAT</th>
<th>Hampton Roads</th>
<th>Humboldt Transit Authority</th>
<th>Island Transit</th>
<th>LA Metro</th>
<th>Massachussets EOT</th>
<th>Monroe County Transit</th>
<th>Authority</th>
<th>Oahu Transit Services, Inc.</th>
<th>RTD</th>
<th>San Diego MTS</th>
<th>SEPTA</th>
<th>SRTD</th>
<th>The Irvine Shuttle</th>
<th>Tillamook County Transportation District Unitrans</th>
<th>WMATA</th>
<th>York Region Transit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Agency trademarks and copyrighted materials, including any confusingly similar variants, may not be used in association with Data.</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2. Data is provided on an “as is” and “as available” basis. Agency makes no representations or warranties of any kind, express or implied. Agency disclaims all warranties, express or implied, but not limited to implied warranties of merchantability and fitness for a particular purpose. Agency and its employees, officers, directors and agents will not be liable for damages of any kind arising from the use of Data including but not limited to direct, indirect, incidental, punitive and consequential damages.</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>3. Agency reserves the right to institute a license fee, alter and/or no longer provide Data at any time without prior notice.</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>4. Agency maintains title, ownership, rights and interest in and to Data.</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>5. Applicable Law Clause - e.g., The laws of the State of California shall govern all rights and obligations under this Agreement, without giving effect to any principles of conflicts of laws.</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>6. Entire Agreement Clause - This Agreement constitutes the complete and exclusive agreement between Agency and Licensee with respect to the subject matter hereof and supersedes all prior oral or written understandings, communications, or agreements not specifically incorporated herein. Agency reserves the right to modify or revoke this agreement at any time.</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7. Legal Notice related to Agency not Data sharing.</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>8. Written permission required for commercial use.</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>9. Licensee Obligations - e.g., not sell, license or otherwise charge the public directly or indirectly for the Data and/or clearly acknowledge Agency as the provider of the Data.</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>10. Intellectual Property Rights Clause - See Items 1 and 4.</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>11. Term and Termination Clause - e.g., If you have not used the Services for a 60 day period, you will be deemed to have terminated the Services and Agency will be authorized to desactivate your key. Once Agency has deactivated your key, you will need to re-register to obtain the Services and the Transport Information.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>12. Disclaimer - See Item 1.</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>13. Liability - See Item 1.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>14. Waiver</td>
<td>N/A</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>15. Severability</td>
<td>N/A</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>16. Indemnity Clause</td>
<td>N/A</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>17. Privacy Clause</td>
<td>N/A</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>18. Miscellaneous</td>
<td>N/A</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>19. Website Linking Policy</td>
<td>X</td>
<td></td>
<td>N/A</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>20. Web Services API Policy</td>
<td></td>
<td></td>
<td>N/A</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
TriMet’s Disclaimer Language

These Terms of Use ("Terms") govern your use of TriMet's Web Services API (the "Data"). TriMet grants you a limited, revocable license to use, reproduce, and redistribute the Data in accordance with these terms. You must present the Data with the following legend, prominently displayed: "Route and arrival data provided by permission of TriMet" unless otherwise agreed by TriMet in writing. TriMet’s trademarks and services marks (its “Marks”) are its valuable intellectual property. TriMet retains all rights it has in these Marks. You may use the Marks “TriMet” and “TransitTracker” in connection with your use of the Data, but only to identify the goods and services specifically identified by those Marks. If you choose to use these Marks you must indicate they are the property of TriMet by marking them with an asterisk (“*”) and stating “* TriMet and TransitTracker are registered trademarks of TriMet. All rights reserved.” Other than displaying these legends, you are not authorized to make any use of any Marks of TriMet or any confusingly similar variant thereof.

THE DATA IS PROVIDED TO YOU "AS IS" AND "AS AVAILABLE" WITHOUT ANY WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY, AND NON-INFRINGEMENT.

In no event will TriMet be liable for any direct or indirect damages, even if TriMet is aware of the possibility of such damages, including without limitation loss of profits or for any other special, consequential, exemplary or incidental damages, however caused, whether based upon contract, negligence, strict liability in tort, warranty, or any other legal theory, arising out of or related to your use of the Data. The parties intend that this limitation should apply even if it causes any warranty to fail of its essential purpose.

You agree to indemnify, defend, and hold harmless TriMet and its officers, directors, and employees from and against all fines, suits, proceedings, claims, causes of action, demands, or liabilities of any kind or of any nature arising out of or in connection with your use or distribution of the Data. You agree that TriMet retains all right, title, and interest in the Data, and any intellectual property rights embodied therein, that you acquire no such rights from distribution of the Data, and that you will not attempt to restrict, limit or prevent TriMet's use of the Data or TriMet's service marks in connection therewith.

In the event of any conflict between these Terms and the terms governing general use of the developer.trimet.org site, these Terms will be controlling as to matters expressly addressed herein. These Terms constitute the entire agreement between the parties as to their subject matter.
511 Data Feed Registration Process

Introducing the 511 Transit Static Data Feed

The Transit Data Feed allows various user groups, i.e., the private sector, transit agencies, researchers, and others, to download Bay Area transit data on a regular basis to use in their applications and research efforts. The 511 Transit: "Static Data Feed" allows user groups to download Transit Data for the thirty-six Transit Agencies serving the San Francisco nine-County Bay Area and included in the Regional Transit Database. The Transit Agencies include, for example AC Transit, SF Muni, BART, Caltrain, Golden Gate Transit, Fairfield and Suisun City Transit (FAST), samTrans, and other transit agencies serving Bay Area as shown at this link transit coverage.

Types of Transit Data

The Transit Data Feed includes data types mentioned below for all the included Transit Agencies:

<table>
<thead>
<tr>
<th>Schedules</th>
<th>Stops</th>
<th>Timepoints</th>
<th>Route/Route Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pattern/Patternstop</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fares</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Format and Frequency of Transit Data Feed

The Transit Data Feed is provided in either "CSV" (Comma-Separated Values) or "GTFS" (Google Transit Feed Specification) format. CSV (also known as a comma-separated list or Comma-Separated Variable) is a text file that stores tabular data. CSV can be parsed and extracted easily into MS-Excel, MS-Access or any Relational Database Management System. A detailed transit data dictionary will be provided to the user, along with the transit data, upon acceptance of the usage agreement. For detailed information on GTFS format click here.

The Transit Data is updated on a daily basis. The user groups can automate the data download through http server or manually access the transit data through a web interface, depending on their business needs. Data can be selected for individual agencies, group of agencies, or the entire regional dataset.
Transit Data Feed Access Process

Fee Associated with 511 Transit Static Data Feed

There is no fee associated with the Transit Data Feed, but a signed usage agreement executed between the Data Feed Recipient and MTC is required for participants.

Contact Information for questions:

<table>
<thead>
<tr>
<th>Email: <a href="mailto:Transit@511.org">Transit@511.org</a></th>
<th>Attention: 511 Transit Static Data Feed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fax: 510 663-0899</td>
<td>MTC, 101 Eighth Street</td>
</tr>
<tr>
<td></td>
<td>Oakland, CA 94607-4700</td>
</tr>
</tbody>
</table>
MTC data sharing Policy
Regional Real-Time Transit Information Data Policy (Revised)

The 2006 Transit Connectivity Plan (TCP) calls for dissemination of real time transit departure information on 511 and to a network of signs at key transit hubs. The plan requires any transit agencies implementing a real-time transit information system to comply with a regional architecture and design. MTC and the transit agencies have developed a detailed requirements document, Regional Real-time Transit System Roles and Responsibilities, to confirm respective roles for delivery of this regional service. Key policies are summarized below.

MTC will:
1. Maintain the regional architecture for real time transit departure information ("Prediction Data") as stipulated in the Real-time Transit Information System Requirements document. The regional architecture includes the central clearinghouse, the data exchange formats, web and phone user interfaces, and the web interface for regional real-time signs. MTC will consult with the Real-time Transit Technical Advisory Committee (TAC) before any changes are made.
2. Develop, operate and maintain a central clearinghouse ("Regional System") to collect Prediction Data from transit agencies.
3. Disseminate Prediction Data on 511 phone, 511.org and to the network of large format signs at TCP-designated Regional Hubs.
4. Log and store Prediction Data for performance monitoring purposes, on a routine basis, not to exceed monthly. MTC agrees to store data in a server not connected to the Internet and will delete Prediction Data after performance monitoring is complete.
5. Develop, operate and maintain the necessary equipment, documentation and software to support the transfer of Prediction Data from transit agencies into the Regional System.
6. Provide regional real-time transit data feed ["Regional Data Feed"] to any participating transit agency, upon request.
7. MTC will not restrict transit agencies from providing their specific agency real-time data to third parties as long as there is no impact to the transit agency’s data transfer to the Regional System.
8. Conduct performance monitoring to ensure accurate transfer of data to the Regional System and accurate provision of Prediction Data to the public, in collaboration with transit agencies.
9. Share real-time transit data, listed in Appendix A, with third party ISPs and the general public. MTC will require recipients to agree to a license agreement, which will include but not be limited to: revocable rights, data is “as is”, and trademarked/copyrighted materials from either 511 or any other participating transit agency may not be used in connection with these data.
Transit Agencies are required to:

1. Provide Prediction Data to the Regional System by establishing and maintaining a data connection to the Regional System and operating an interface application.
2. Meet requirements, as defined in the Real-time Transit Information System Requirements Document, including the standard interface requirements.
3. Conduct on-going performance monitoring to ensure accurate transfer of data to the Regional System and accurate provision of Prediction Data to the public, in collaboration with MTC.
4. Neither store nor share with any third parties the data of partner transit agencies received from the Regional Data Feed.
5. Ensure that there is no impact to its provision of Prediction Data, in the event that the transit agency provides its specific Prediction Data to a third party.
6. Assess, in collaboration with MTC, the value of making a data feed from the Regional Real-time system available to third party ISPs and participate in development of a policy recommendation to the Commission.

Real-Time Data to be Shared with External ISPs and General Public

Configuration data:
- Agency name
- Agency type (e.g. rail/bus)
- Route names
- Route codes
- Route database IDs
- Route direction names
- Route direction codes
- Stop names
- Stop ID codes (regional IDs)
- Stop database IDs

Prediction data:
- Time stamp
- Stop database IDs
- Three predictions w/full date-time (e.g. yyyy-mm-dd hh:mm)
Regional Real-Time Transit System Roles and Responsibilities

MTC and transit agencies are jointly responsible for delivery of real-time transit information to the traveling public via 511 (e.g. phone and web), the regional real-time hub signage program, and participating transit agencies. The Real-Time Transit Information System will develop a real-time transit arrival/departure information system for the San Francisco Bay Area that does the following:

1. Provides accurate vehicle prediction arrival/departure information for every stop on routes equipped with technology to make these predictions.
2. Collects from transit agencies all related real-time transit data in a standard format that populates a regional data store for data dissemination via the 511 phone system, 511.org, MY 511, PDAs, and regional real-time signage as well as data sharing between transit operators.

There are three governing documents for the program that support each other and are supported by other documents. They include:

1. Regional Real-time Transit System Roles and Responsibilities (this document)
2. Regional Real-time Transit Information Data Policy (included in SB 1474)

MTC will gather from partner transit agencies the required data to supply the Real-Time Transit Information System. The preferred data transfer standard is Java Message Service (JMS). Under extenuating circumstances, approved by MTC, transit agencies can use Web Services as the data transfer standard. The following policies outline the high-level roles and responsibilities of data sharing and data storage for MTC and the transit agencies for the regional real-time transit program. Detailed responsibilities related to the transference of data using JMS or Web Services are included in Appendices A and B. Appendix A contains the JMS details and Appendix B includes Web Services.

MTC’s Responsibilities:
MTC agrees to:

10. Adhere to the system requirements for reliability, accuracy, performance, etc. as defined in Real-time Transit Information System Requirements document.

11. Develop, operate and maintain a central clearinghouse (“Regional System”) that will collect all real-time transit data from transit agencies.
   • Ensure Regional System meets security levels equivalent to industry standards.
   • Configure Regional System to archive configuration data no longer than 90 days.
   • The Regional System will not store real-time prediction data on an ongoing basis. On a routine basis, not to exceed monthly, MTC will log and
store prediction data for performance monitoring analysis. The process will include: (i) two to three hours of logging of transferred prediction data from a transit agency; (ii) data will be transferred to a database not connected to the Internet; (iii) prediction data will be deleted after performance monitoring analysis is completed; and (iv) MTC will refer any requests for archived prediction data, including Public Records Act requests, to the appropriate transit agency. The transit agency will decide whether or not to grant MTC permission to release the data.

- Support future recommendations from the Transit Connectivity Plan regarding archiving policies of arrived-status data for monitoring on-time arrival. Until such a plan is in place to use arrived-status data, MTC will not store it. MTC will work with the transit agencies to determine a secure data storage policy.

12. Develop, operate and maintain the necessary equipment and software from the Regional System side to support the transfer of real-time data from transit agency systems to the Regional System, as defined in the latest versions of the following data transfer documents:
   - Extensible Markup Language (XML) Document Type Definitions (DTDs) for Java Message Service (JMS) Implementation
   - Extensible Markup Language (XML) Document Type Definitions (DTDs) for Web Service Implementation

13. Provide a data feed to any transit agency that requests real-time data. The Regional System will provide data in the same formats defined in the latest versions of the following data transfer documents:
   - Extensible Markup Language (XML) Document Type Definitions (DTDs) for Java Message Service (JMS) Implementation
   - Extensible Markup Language (XML) Document Type Definitions (DTDs) for Web Service Implementation.

14. MTC may share real-time transit data, listed in Appendix C, with third party ISPs and the general public. MTC will require recipients to sign a license agreement, which will include but not be limited to: revocable rights, data is “as is”, and trademarked/copyrighted materials from either 511 or any other participating transit agency may not be used in connection with these data.

15. MTC will not restrict transit agencies from providing their real-time data to third party ISPs as long as there is no impact to the quality and maintenance of the transit agency’s data transfer to the Regional System.
Transit Agency Responsibilities:
Transit agencies agree to:

1. Adhere to the transit agency requirements as defined in the latest version of the Real-time Transit Information System Requirements document.

2. Establish a connection to the Regional System that follows the Regional System protocols outlined in the appendices to transfer all real-time transit data from the transit agency real-time prediction system to the Regional System.

3. Operate the application to transfer real-time prediction data to the Regional System.

4. Transit agencies may request a real-time data feed from the Regional System but may not redistribute the data of another transit agency to any third parties and may not store the data received from the Regional System.

5. Ensure that there is no impact to its provision of Prediction Data, in the event that the transit agency provides its specific prediction data to a third party.

Joint Responsibilities:
MTC and the transit agencies agree to:

1. Conduct on-going performance monitoring to ensure accurate transfer of data to the Regional System and accurate provision of real-time data to the public.
   a. Transit agencies shall define prediction accuracy standards specific to their real-time systems and shall monitor that these standards are being met.
   b. MTC will conduct monthly performance monitoring by comparing prediction outputs from the transit agencies with prediction inputs received in the Regional System to confirm that severe latency (i.e. more than two minutes) is not introduced. The Regional System shall continuously monitor incoming data flows from transit agencies and provide automated alarms when data is not delivered after fifteen minutes. MTC staff or contractors will work with transit agency staff to resolve data flow issues immediately.
   c. MTC will conduct monthly performance monitoring to confirm data accuracy from the rider’s perspective. Procedures will include calling 511 from stops and comparing predictions to the actual observed arrival/departure times. Data accuracy is expected to meet the following minimum requirements:
<table>
<thead>
<tr>
<th>Prediction (in minutes)</th>
<th>Must meet accuracy … (Reliability)</th>
<th>Accuracy measurement (in minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 10</td>
<td>90% of the time</td>
<td>3</td>
</tr>
<tr>
<td>11 to 25</td>
<td>85% of the time</td>
<td>4</td>
</tr>
<tr>
<td>Plus 25</td>
<td>85% of the time</td>
<td>6</td>
</tr>
</tbody>
</table>

If these minimum standards are not met, MTC and the transit agency will work to improve accuracy and agree on a remediation plan. MTC reserves the right to not display data that does not meet these minimum accuracy requirements.
Appendix A

JMS Data Transfer Requirements

MTC requires that all transit agencies use the JMS data transfer standards to transfer all real-time transit data from their real-time transit systems to the Regional System. Under extenuating circumstances, MTC may allow agencies to use the Web Services standards outlined in Appendix B. The following policies address the roles and responsibilities specific to JMS as defined in the latest version of the Extensible Markup Language (XML) Document Type Definitions (DTDs) for Java Message Service (JMS) Implementation.

MTC Responsibilities:
MTC agrees to:

1. Supply each transit agency with a JMS interface application (including sample data) that performs the following functions:
   a. Logs into MTC’s data transfer server;
   b. Publishes prediction data from the transit agency’s real-time system;
   c. Responds to requests from the Regional System for transit route and stop inventory (see item 2 for an optional way to provide configuration data);
   d. Responds to requests from the Regional System for arrived status.

Transit Agency Responsibilities:
Transit agencies agree to:

1. Establish and maintain a connection to the Regional System by performing the following tasks:
   a. Install the JMS interface application, provided by MTC, on a server with access to the Internet within the transit agency’s or their designated vendor’s secure network (i.e. behind the firewall).
   b. Modify the interface application by:
      I) Replacing the sample data from the MTC’s interface application with live data from the transit agency’s prediction system;
      II) Changing out the hard-coded data in the interface application that responds to transit route and stop inventory with current configuration data from the transit agency’s internal systems (see item 3 for an optional way to provide configuration data);
      III) Replacing the hard-coded data in the interface application that responds to “arrived” status requests with current arrived status data from the transit agency’s internal systems.
   c. Grant the interface application access to the transit agency real-time prediction system to enable the application to collect and publish real-time data.
2. Operate the application to publish real-time prediction data to the Regional System.
   a. Publish the real-time predictions to the regional data transfer server;
   b. Accept and respond to requests from the regional data transfer server for transit agency real-time configuration data and arrived-status data unless using the configuration option defined in item 3;
   c. Maintain the interface application and data feed to the regional data transfer server.
Appendix B
Web Services Data Transfer Requirements

Under extenuating circumstances, MTC may grant transit agencies the authorization to use the Web Services standards to transfer all real-time transit data from their systems into the Regional System. The following policies address the roles and responsibilities specific to Web Services as defined in the latest version of the Extensible Markup Language (XML) Document Type Definitions (DTDs) for Web Service Implementation.

MTC Responsibilities:
MTC agrees to:

1. Supply each authorized transit agency with 1) the Extensible Markup Format (XML) document type definitions (DTDs) for the messages exchanged between the transit agency web services and the 511 system and 2) the Web Service Description Language (WSDL).

Transit Agency Responsibilities:
Transit agencies agree to:

1. Establish and maintain a connection to the Regional System by performing the following tasks:
   a. Maintain a web services server with access to the Internet. The server location is at the discretion of the transit agency.
   b. Based on the document type definitions provided in the latest version of the Extensible Markup Language (XML) Document Type Definitions (DTDs) for Web Service Implementation, write software code to reply to requests from the Regional System for configuration data (unless using the configuration option defined in item 3), prediction data, and arrived status data.
   c. Maintain the data feed to the regional data transfer server.

2. Operate the application to accept and respond to requests from the Regional System for:
   a. real-time predictions;
   b. real-time configuration data unless using the configuration option defined in item 3; and
   c. arrived-status data.
Appendix C
Real-Time Data to be Shared with External ISPs and General Public

Configuration data:
- Agency name
- Agency type (e.g. rail/bus)
- Route names
- Route codes
- Route database IDs
- Route direction names
- Route direction codes
- Stop names
- Stop ID codes (regional IDs)
- Stop database IDs

Prediction data:
- Time stamp
- Stop database IDs
- Three predictions w/full date-time (e.g. yyyy-mm-dd hh:mm)