# MOBILITY ON DEMAND (MOD) SANDBOX
## VERMONT AGENCY OF TRANSPORTATION (VTrans)
### Vermont Statewide Transit Trip Planner – Fixed and Flex

## TEAM, BUDGET, AND WAIVERS

**Key Partners:** Vermont Agency of Transportation; Trillium Solutions, Inc.; Cambridge Systematics

**Other Partners:** Massachusetts Department of Transportation; Regional Transportation District, Denver; Anaheim Resort Transportation; Oregon Department of Transportation; Bridj; Vermont Public Transit Association; Green Mountain Transit; GridWorks; Santa Clara Valley Transportation Authority; Brian Ferris – founding developer of GTFS; and Cherriots – Salem Keizer Transit

**Budget Summary:** The budget from the applicant is summarized below:

| MOD Sandbox Demonstration Federal Amount ($) | MOD Sandbox Cost Share ($) | Total Cost |
|---|---|---|
| $480,000 | $120,000 | **$600,000** |

## INNOVATION: PROJECT APPROACH

Building off previous investments in data creation and research, the Vermont Agency of Transportation (VTrans) and its partners are applying for funds to create and implement a tool that fills a well-known gap in transit public information: an online trip planner for both "fixed" and "flexible" transit services. The public transportation industry has seen a boom in third-party mobile applications for transit riders. These applications are designed for both standard web browsers, and as mobile apps for smart phones with internet access. One of the most important features of these applications is the presentation of information from multiple agencies within the same interface.

Rural transit operators provide a variety of services that help tailor transit to their areas including flag stops, deviated-fixed routes, general service area dial-a-ride, and other forms that work better in rural areas. That means trip planners built for urban areas do not present all the options that rural residents have. These flexible modes of transit are not only for rural areas though. They are also common models to provide extra service to persons with disabilities. Some business models have also sought to bring flexible transit services, such as Bridj or Ollie, to larger cities to provide trips more efficiently than public transit, and cheaper than taxis.

VTrans' goal is to develop a trip planner that provides access to mobility options while also building on a platform that can be adapted, utilized, and scaled elsewhere. This proposed trip planner will include itineraries that utilize both fixed and flexible modes of public transit. The final deliverable of this project is a mobile and desktop-accessible statewide trip planning website application. Any user will be able to define an origin and destination within the state and receive transit itineraries including those that can be found in Google, but also services like flag stops, deviated-fixed routes, and dial-a-ride. Just like the Google Maps trip planner, this web application will provide information on what trips are possible, but not book actual trips for riders.

By further developing the open-source OpenTripPlanner, this platform will leverage pre-existing technology and will be distributed back to others who can use it. After the adaptation of the OpenTripPlanner code to accept General Transit Feed Specification (GTFS)-flex data, the project team will submit that code back to the OpenTripPlanner group for incorporation into the core code. The GTFS-flex data itself is also a scalable model example. VTrans has invested in research and GTFS data formation leading to this project since FY15. Further, the development will not

cease at the implementation discussed in this application. Future extensions on the work proposed here would integrate real-time information for fixed routes, demand response trips, rail, and eventually vanpool and carpools. Rather than continuing to have separate and proprietary development define the resources available to the general public, this would create an open source program that anyone could use. By building off the previous work invested by developers, state agencies, and transit advocates in OpenTripPlanner and GTFS-flex, we will take the next big step forward in providing equity for rural and disabled Americans.

## CHALLENGES PROJECT IS DESIGNED TO ADDRESS

Nearly every transit trip planner open to public use today is based on GTFS data representations of schedules. But many transportation services provide flexible services that do not fit the GTFS model. GTFS assumes there are defined stops at certain geographical points. A large percentage of transit service does not operate that way. Transit often takes flexible forms – for example, hail-and-ride, deviated-fixed, and general dial-a-ride.

Some vendors have offered proprietary solutions that provide some degree of useful electronic information to riders of flexible services, but generally those solutions are flawed due to issues such as: use of proprietary data formats that don't communicate well with other systems; flexible trip planners that aid in the discovery of flexible trip possibilities, but do not integrate fixed route schedules; and ADA complementary paratransit and general public paratransit often the only types of flexible trip services represented in these systems.

## ANTICIPATED OUTCOMES, BENEFITS, IMPACTS

There are a number of anticipated results from this project. The first will be a website housing a statewide trip planner, which is able to accept from user's origins, destinations, time frames, and other inputs, and provide trip plans that utilize not only the standard walk, drive, bike, and fixed route transit, but also flexible transit modes. The second are changes to OpenTripPlanner for the processing of GTFS-flex data submitted back to the OpenTripPlanner code base. The final result is GTFS-flex data created for every public transit agency and many private transportation providers in the state.

The impacts of this project will be both immediate and long-term. On the day of release, a huge number of services, bus stops, and rider behaviors that could not previously be modeled in online trip planners will become available in Vermont. The most likely immediate impact will be positive responses from the transit agencies in the state, who have long complained that their services are not represented as well as they could be in Google.

The benefits will be noticed by riders soon after, and the benefit to both riders and transit agencies will be replicable across the country. Other agencies using OpenTripPlanner and operating flexible services will seek to build GTFS-flex data and adapt the changes to their local trip planners.

The software code developed for the project, after acceptance of the GitHub "pull request" back into the OTP core, will be usable by other developers for trip planning applications. The code changes are not just for public transit and not just in rural areas, but rather everywhere trip planners are used. The involvement of more of the development community will fundamentally impact a larger discussion that is already happening, but currently lacks cohesion: the need to integrate real-time information, seat availability, and booking information into common trip planning interfaces in order to provide a completely seamless rider experience.