

Tools for building on-line trip plans with standardized

General Transit Feed Specification – GTFS Builder



Funded through an agreement with



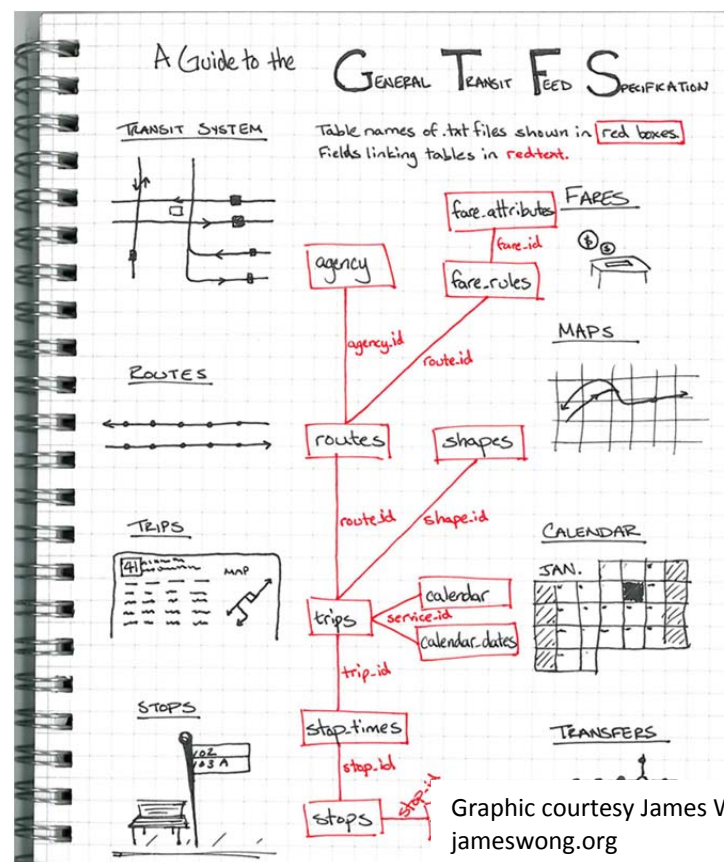
888-529-6821

<http://nationalrtap.org>

<http://nationalrtap.org/supportcenter/Builder-Apps/GTFS-Builder>

support@nationalrtap.org

v20151001



Graphic courtesy James Wong
jameswong.org

GTFS Builder Schedules_V3 Workbook Data Elements Color Coded

GTFS_Schedules_20150930 - Version 3

This workbook is intended to use typical schedule data to generate GTFS records.

Sample data is supplied to help with the learning curve. You will need to replace all the data on most of the sheets to match your agency.

Follow the format in the sample:

Schedule "regions" are bounded by blank rows

The first column, "Column A" (Routes), should be blank except when a new route (schedule region) is begun New route e.g. Bus Route:R1a

First row of region:

Bus Route{:Unique Route Name or Number} aka TripPrefix

TripPrefix + the time column name (e.g. T01) defines the trip_id

Enter a shape_id (if any) to be used with each trip on the first row in each time column

You may use different shape_id values in the time columns (trips) - useful for partial routes for day begin and day end

Enter wheelchair and bike flags in first row - applies to all trips

If a block_id is needed add it as a suffix to the shape_id: e.g. R1a:R1a-T02 uses shape_id R1a and assigns 'R1a-T02' to the block_id for the trip

Second+ row of region

Clear data

MANDATORY before building
dataset - every time

GENERATE STOP_TIMES, TRIPS
Creates data in the rows and
columns formatted as required
into separate tabs.

ctrl-1) - Time: 13:30:50 or Custom [h]:mm:ss
region must have time values entered.

to 1 unless timepoint column is populated
one (calculated by GT)
date

e 1/1/1900 e.g. 1/1/1900 12:15:00 AM

wait_times that result in a departure past mid-night are not supported, manual edit will be required in stop_times
Last Row: a blank row should follow the last row

Enter your schedule data in the Schedules V3 sheet then use the Generate stop_times and trips macro

When you have generated the stop_times and trips records you can copy/paste to the ImportExport XLS tool.

You can use ImportMergeXLS feature of the ImportExport tool to transfer the generated data - only the matching sheet names will transfer

Macros: (CLICK ON BUTTON to invoke macro)

	check stop_id on Schedules tab against local_stops tab - QA test, optionally copies names from Local_stops tab
	Generate stop_time, trips, and timed_stops data (replaces existing data)
	Generate Timed Stops Schedule Use for desk check QA to balance Schedules tab against published data

Worksheets:

Notes	this sheet
Schedules V3	User entered schedule data - Version 2 Format
stop_times	generated data to be transferred to the GT feed spreadsheet, ImportExport XLS
trips	generated data to be transferred to the GT feed spreadsheet, ImportExport XLS
local_routes (opt)	User entered route data in GT format - should be an Identical copy of the main GT file - not need to generate stop_times and trips
local_calendar (opt)	User entered calendar data in GT format - should be an Identical copy of the main GT file - not need to generate stop_times and trips
local_stops (opt)	User entered stops data in GT format - should be an Identical copy of the main GT file - not need to generate stop_times and trips, used for QA
timed_stops (report)	Generated schedule in typical layout for only the timed stops - not need to generate stop_times and trips, very helpful to QA the schedules data

Utility:

	Import data from other Schedules.xls (V2 or V3) or ImportExport.xls file
	Clear calculated data from stop_times, trips, and timed_stops (done automatically on each use of Generate stop_times and trips)



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Notes (20151001)

<http://nationalrtap.org> GTFS Builder

The screenshot displays a Google Slides presentation with a spreadsheet titled "Bus Routes" and various explanatory text boxes. The spreadsheet columns are: Routes, route_id, service_id, direction_id, trip_headsign, stop_id, stop_desc, stop_headsign, pickup_type, drop_off_type, timed_stop, wait_time, timepoint, wheelchair_accessible, bikes_allowed, T01, T02, and T03. The data rows show trip patterns for "GreenA" with specific stop names and times. Annotations include: "MANDATORY DATA (column A): Name the group of trips (trip pattern) by route", "Route_id is required, internal identifier", "Direction_id is optional but highly encouraged", "stop_id is internal, unique identifier", "pickup_type for stops (optional)", "drop_type for stops (optional)", "wait_time (optional) allows for lay-over", "timed_stop is optional for building schedules", "timepoint is optional", "wheelchair_accessible trips are not guaranteed empty", and "bikes_allowed (not guaranteed) empty = no info".

Routes	route_id	service_id	direction_id	trip_headsign	stop_id	stop_desc	stop_headsign	pickup_type	drop_off_type	timed_stop	wait_time	timepoint	wheelchair_accessible	bikes_allowed	T01	T02	T03
Bus Route	GreenA														GreenA ga_01	GreenA ga_02	GreenA ga_03
	4	mtwtf	0	Mall to Eastport	5129	West St. at Somerville	Eastport Shop. Ctr.			1		1		1	12:36:00	13:00:00	13:36:00
	4	mtwtf	0	Mall to Eastport	5131	West St. opp. Library	Eastport Shop. Ctr.			1		1		1	12:38:00	13:02:00	13:38:00
	4	mtwtf	0	Mall to Eastport	5127	Trip_headsign is required and must not contain 'on Ave.'	Eastport Shop. Ctr.			1		1		1	12:38:00	13:02:00	13:38:00
	4	mtwtf	0	Mall to Eastport	5124	route_long_name (see routes.tab for details)	Eastport Shop. Ctr.			1		1		1	12:42:00	13:12:00	13:42:00
	4	mtwtf	0	Mall to Eastport	5122	route details (see routes.tab for details)	Eastport Shop. Ctr.			1		1		1	12:44:00	13:14:00	13:44:00
	4	mtwtf	0	Mall to Eastport	5175	Duke of Gloucester St. at C	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137	Compromise St. at St. Mary's Ch	Eastport Shop. Ctr.			1		1		1	12:47:00	13:17:00	13:47:00
	4	mtwtf	0	Mall to Eastport	5137</												

National RTAP: GTFS Builder ImportExport Workbook Annotated

Code version: 20151005

Run Macro Name

Import:

<input type="button" value="ImportAppendGoogleFeed"/>	ImportAppendGoogleFeed - appends to existing data - you are asked if you want to keep existing data
<input type="button" value="ImportMergeXLS - Import"/>	ImportMergeXLS - Import files; options to delete existing data from all GTFS sheets, or just imported sheets. matching columns names, will import. Note that a copy of the workbook being imported will be op easy to confuse this sheet and the one being imported.

If building shapes,
Optional: build
shape distance
traveled for each
shape

Maintenance:

<input type="button" value="Calculate shape_dist_traveled for shapes (required for for Calc shape_dist_traveled for stops_times)"/>	Calculate shape_dist_traveled for shapes (required for for Calc shape_dist_traveled for stops_times)
<input type="button" value="Calculate shape_dist_traveled for stop_times - limit to a specific shape_id or all shape_ids or all trips (will take a while: see status bar for progress)"/>	Calculate shape_dist_traveled for stop_times - limit to a specific shape_id or all shape_ids or all trips (will take a while: see status bar for progress)
<input "="" in="" schedules="" type="button" value="Interpolate missing stop_times; optionally clears all approximate times (entered as " workbook)"=""/>	Interpolate missing stop_times; optionally clears all approximate times (entered as "" in schedules workbook)
<input type="button" value="Stops where used - add where used column to stops tab that reports which routes use each stop"/>	Stops where used - add where used column to stops tab that reports which routes use each stop
<input type="button" value="BuildShapesFromTrip - for a given trip turns the stop records into shape records (first pass at shape records) (replaced by dbl click on trips tab)"/>	BuildShapesFromTrip - for a given trip turns the stop records into shape records (first pass at shape records) (replaced by dbl click on trips tab)

Map Support:

<input type="button" value="ExportAllShapesKML - sends shape and stop records to KML file or clipboard"/>	ExportAllShapesKML - sends shape and stop records to KML file or clipboard
<input type="button" value="ExportTripShapesKML - QAs distances for single trip; builds KML files for trip for Google Maps/Earth"/>	ExportTripShapesKML - QAs distances for single trip; builds KML files for trip for Google Maps/Earth

Export:

<input type="button" value="ExportGoogleFeedFiles - exports GT data from XLS to .txt files - some QA on export"/>	ExportGoogleFeedFiles - exports GT data from XLS to .txt files - some QA on export
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***Generate all GTFS required (text/.txt) files from this macro to your "feed" folder.

When optional shapes are in shapes.tab, this macro tests that the shape matches the stop order of the trip and route and that each node (shape_lat/long) along the route is <30 meters distance from the stop. Highly recommended

Interpolate missing times requires shapes. This fills-in non-timed stops with estimated travel times.

Please submit

GTFS Home Page:

<https://developers.google.com/transit/>

Feed Specification:

<https://developers.google.com/transit/gtfs/reference>

Select any field "[name.txt](#)" for link to GTFS specification

Field Definitions

[agency.txt](#) Required. This file contains information about one or more transit agencies that provide the data in this feed.
[stops.txt](#) Required. This file contains information about individual locations where vehicles pick up or drop off passengers.

Notes (20151001)

National RTAP: GTFS Builder ImportExport Workbook Annotated

agency_id	agency_name	agency_url	agency_timezone	agency_lang	agency_phone	agency_fare_url
Annapolis	Annapolis Transit	http://www.annapolis.gov/government/city-departments/transportation/buses-routes-and-schedules	America/New_York	en	(410) 263-7964	http://www.annapolis.gov/government/city-departments/transportation/adot-transit-fares

agency_id (internal) matches route_id in (routes.tab) any name or # is OK	agency_name (public/ required) matches name (commonly used) for your agency.	agency_url (public/required) full URL matches public website. Allows rider to link back to your website	agency_timezone (required) from this list: http://en.wikipedia. org/wiki/List_of_ tz_database_time_ zones	agency_lang (required) is likely "en" for English	agency_phone (public/ optional) ten digits	agency_fare_url (public/optional) Offers rider a chance to learn more about fare options, passes, etc.
--	---	---	--	--	--	---

National RTAP: GTFS Builder ImportExport Workbook Annotated

service_id	monday	tuesday	wednesday	thursday	friday	saturday	sunday	start_date	end_date
mtwtf	1	1	1	1	1	0	0	20150101	20151231
mtwtfs	1	1	1	1	1	1	0	20150101	20151231
ss	0	0	0	0	0	1	1	20150101	20151231
sat	0	0	0	0	0	1	0	20150101	20151231
sun	0	0	0	0	0	0	1	20150101	20151231

service_id

(internal) Expresses which days of the week for the trips on a specific route. Service_id is used in Schedules workbook to generate trips and must match exactly, , e.g. "sat" vs. "Sat", with what is used here.
OK to use numeric code.

1 = yes, 0 = no

(internal) Which days of the week?

Do not leave cell blank

start_date and end_date

(internal)

Must start today or earlier.

Use YYYYMMDD.

Be certain calendar_dates.tab are within this date range

National RTAP: GTFS Builder ImportExport Workbook Annotated

service_id	date	exception _type
------------	------	--------------------

mtwtf	20150101	2
mtwtf	20150119	2
mtwtf	20150216	2

service_id exactly matches
calendar.tab

Do not duplicate entries

Dates within range for
calendar.tab

date

YYYYMMDD

exception_type

2 cancels service
1 adds service

Do not leave blank if you enter a date and
service_id
"2" for holidays with no service, and
1 adds service (e.g. run sat on a holiday, enter 2 to
remove all mtwtf on that date, e.g. 20161224 and
then add sat=1)

National RTAP: GTFS Builder ImportExport Workbook Annotated

fare_id	price	currency_ type	payment_ method	transfers	transfer_ duration
AT_out	2.00	USD	0		0
daypass	4.00	USD	0		
AT_circ	1.00	USD	0		0

fare_id

(internal / optional) matches fare_rules.tab. In this example, the maximum fare of \$4.00 is the "Day Pass" with unlimited transfers.

price

(public) is the *one-way adult fare* that will be collected. The agency.tab offers a link (URL) to the agency's fares page for monthly passes, senior discounts, etc.

currency_ type

(internal / optional) likely, "USD" for United States Dollar.

payment_method

(public/optional)
0 is pays on board. 1 payment ahead (data omitted at this time and not published).

transfers

(internal/optional)
0 = no transfers permitted
1 = one transfer
2 = two transfers
blank = unlimited

transfer_duration

(internal/optional)
time, in seconds, for valid transfer, e.g. 90 minutes would show as $90 \times 60 = 5400$ as time in seconds

National RTAP: GTFS Builder ImportExport Workbook Annotated

	route	origin_	destination	contains
	_id	id	_id	_id
fare_id				
AT_out		4		
daypass		4		

fare_id
(internal)
Matches
fare_attributes.tab.

route_id
(internal) Matches
route_id from
routes.tab.

origin/destination/contains_id
(internal) viewing fare examples by zone_id are detailed
<https://code.google.com/p/googletransitdatafeed/wiki/FareExamples>

National RTAP: GTFS Builder ImportExport Workbook Annotated

trip_id start_time end_time headway_secs exact_times

GTFS Builder does not (yet) recommend using this expedited tab for frequencies based on display for trip plans.

"Use at your own risk"

National RTAP: GTFS Builder ImportExport Workbook Annotated

route_id	agency_id	route_short_name	route_long_name	route_desc	route_type	route_url	route_color	route_text_color
1	Annapolis	Orange	Downtown Annapolis to Forest Drive		3	http://www.annapolis.gov/docs/default-source/transportation-pdf/printable-orange-route-schedule.pdf?sfvrsn=4	FFA500	000000
2	Annapolis	Gold	Edgewater to Arnold/AACC		3	http://www.annapolis.gov/docs/default-source/transportation-pdf/printable-gold-route-schedule.pdf?sfvrsn=2	FFD700	000000

route_id (internal) Matches route_id in schedules_V3 in the Schedules workbook	agency_id (internal) matches in agency.tab, any name or # is OK	route_short_name (public/ optional) likely "3", "5A" Less than six characters or leave blank	route_long_name (public/ not optional, if short name is blank) Does not contain route number Is posted and matches identically to "route name" on the agency website	route_desc (optional) not published at this time; suggest you leave blank	route_type (required) 3 = bus	route_url (optional) valid http: or https: URL/ address	route_color & route_text_color (optional) HTML colors as six characters Text is either white FFFFFFF black = "000000" not blank
---	--	---	--	--	--	--	---

National RTAP: GTFS Builder ImportExport Workbook Annotated

shape_id	shape_pt_lat	shape_pt_lon	shape_pt_ sequence	shape_dist_ traveled
GreenA	38.988174	-76.543898	1	0
GreenA	38.988104	-76.544105	2	0.02
GreenA	38.988042	-76.54425	3	0.034
GreenA	38.987994	-76.544359	4	0.045
GreenA	38.987927	-76.544487	5	0.058
GreenA	38.987845	-76.544572	6	0.07
GreenA	38.987807	-76.544606	7	0.075

shape_id

(internal) Matches trips.tab output from schedules_V3 tab in the Schedules workbook where shape_id is entered above trip times

shape_pt_lat

(internal)
associates a shape point's latitude with a shape_id.
WGS 84
Minimum six decimals

shape_pt_lon

(internal)
associates a shape point's longitude with a shape_id.
WGS 84
Minimum six decimals

shape_pt_ sequence

(internal)
must be non-negative integers, and they must increase along the trip.

shape_dist_traveled

(internal)
represents a real distance traveled along the route in units such as feet or kilometers. Often starts at 0 matching start of shape with first stop along the route.

National RTAP: GTFS Builder ImportExport Workbook Annotated

trip_id	arrival_time	departure_time	stop_id	stop_sequence	stop_headsign	pickup_type	drop_off_type	shape_dist_traveled	timepoint
GreenA_T01	12_30_00	12_30_00	5255		1 Eastport Shop. Ctr.				1
GreenA_T01	12_34_00	12_34_00	5129		2 Eastport Shop. Ctr.				1
GreenA_T01	12_38_00	12_38_00							1
GreenA_T01									
GreenA_T01									

REMINDER re: stop_times

All these columns of data are generated from Schedules_V3 and not modified here

trip_id
(internal) unique number or character; groups trip by trip pattern, T01, T02, T03...

arrival_time
(public/required)
time the bus arrives at the stop, generated from schedules_V3
DO NOT CHANGE FORMAT; publishes as 12:30:00

departure_time
(public/required)
time the bus departs the stop, generated from schedules_V3
DO NOT CHANGE FORMAT; publishes as 12:30:00

stop_id
(internal / required)

stop_sequence
(internal / required)
integers increasing for order of stops along a trip pattern.

stop_headsign
(internal/optional)
allows for change in headsign along the route. Highly recommended. MUST not contain route number or route name.

pickup_type
(internal / optional)
0 = regular pick-up (default, if blank)
1 = No pick-up
2 = Must phone agency to arrange pick-up

drop_off_type
(public/ optional)
0 = regular drop-off (default, if blank)
1 = No drop-off
2 = Must phone agency to arrange drop-off

shape_dist_traveled
(internal / optional, unless shapes are added; then required)
represents a real distance traveled along the route in units such as feet or kilometers.

timepoint
(internal / optional)
value of "1" for exacted timed stops along the route, where bus will wait and match schedule

National RTAP: GTFS Builder ImportExport Workbook Annotated

stop_id	stop_code	stop_name	stop_desc	stop_lat	stop_lon	zone_id	stop_url	location_type	parent_station	stop_timezone	wheelchair_boarding
5255		Westfield Mall		38.9882510	-76.5439700						
5129		West St. at Somerville		38.9834790	-76.5382870						
5137		West St. opp. Library		38.9824900	-76.5337840						
5127		West St. at Parole St.		38.9811830	-76.5286640						
5270		West St. at Admiral Dr.		38.9798000	-76.5214270						

stop_id
(internal / required)
unique number or character

stop_code
(public/optional) Stop codes are often used in phone-based transit information systems or printed on bus stop signage

stop_name
(public/required)
Matches website exactly with name of the stop including typos!

stop_desc
(public/optional)
not published; can be used for side of the street, if helpful

stop_lat
(internal / required)
WGS84 for latitude with at least six decimals precision.

stop_lon
(internal / required)
WGS84 for latitude with at least six decimals precision.

zone_id
(internal/ optional)
required for fares based on distance.

stop_url
(public/optional)
contains the URL of a web page about a particular stop.

location_type
(internal)
identifies if the stop is within a station.

parent_station
(internal) for stops inside a station.

stop_timezone
(internal/ optional)
contains the timezone in which this stop or station is located.

wheelchair_boarding
(public/optional)
identifies whether wheelchair boarding is possible from the specified stop or station.

National RTAP: GTFS Builder ImportExport Workbook Annotated

from_stop _id	to_stop _id	transfer _type	min_transfer_ time
5255	5255	1	

from_stop_id

(internal / optional) identifies pair of stops that allow guaranteed transfers, or not

to_stop_id

(internal / optional) identifies pair of stops that allow guaranteed transfers, or not

transfer_type

(internal/ optional)
1 guarantees transfer
2 amount of time, in seconds, noted in next column
3 transfers are not possible

min_transfer_time

(internal/ optional)
e.g. 3 minutes would show as $3 \times 60 = 180$ as time, in seconds

National RTAP: GTFS Builder ImportExport Workbook Annotated

route_id	id	service_id	trip_id	trip_headsign	direction_id	block_id	shape_id	wheelchair_accessible	bikes_allowed
4	mtwtf	GreenA	T01	Mall to Eastport	0	ga_01	GreenA	1	1
4	mtwtf	GreenA	T02	Mall to Eastport					
4	mtwtf	GreenA	T03	Mall to Eastport					

REMINDER re: trips

All these columns of data are generated from Schedules_V3 and not modified here

route_id

(internal/required)
Matches route_id
routes.tab

service_id

(internal/required)
Expresses which days
of the week for the
trips on a specific
route in calendar.tab

trip_id

(internal/required)
unique number
assigned to group of
trips, e.g. T01, T02

trip_headsign

(public /
required)
identifies the
trips'
destination to
passengers

direction_id

(internal / required)
0 for outbound or loop
1 for inbound; while technically
not required, direction_id helps
to proof the data and pass QA
testing

block_id

(internal/ optional)
Allows for "stay on-board"
where trips and routes
connect, as in a trip paddle

shape_id

(internal/ optional)
for displaying route
on the road

wheelchair_accessible

(public/optional)
empty not known
1 at least one wheelchair can be
on-board
2 cannot accommodate a
wheelchair

bikes_allowed

(public/optional)
empty = not known
1 at least one bike can be
transported on the rack or in-
vehicle (e.g. train)
2 cannot accommodate a bike

National RTAP: GTFS Builder ImportExport Workbook Annotated

feed_publisher_name	feed_publisher_url	feed_lang	feed_start_date	feed_end_date	feed_version	feed_contact_email	feed_contact_url
National RTAP	http://www.nationalrtap.org	en	20151001	20160301	20151001		

feed_publisher_name
(required)
replace with your agency name

feed_publisher_url
(required) replace with your agency URL

feed_lang
(required) is likely "en" for English

feed_start_date
feed_end_date
(internal / required) might identify different dates to "refresh" data than calendar.tab but must make sense as ending after calendar.tab

feed_contact_email
feed_contact_url
(public for app developers /optional)
If application developers use the feed and identify concerns they can reach you directly.

feed_info (20151001)