

**Amendment – Exhibit A-1**



**AMENDMENT NO. 1**

**CONTRACT NO. 935980**

This Amendment hereby amends the above titled contract between **Metro**, a metropolitan service district organized under the law of the State of Oregon and the Metro Charter, and **Replica, Inc.**, hereinafter referred to as "REPLICA."

This amendment is a change order to the original Scope of Work as follows:

The mutually agreed to Acceptance Criteria are formally incorporated into the above titled contract between Metro and REPLICA as Exhibit A-1 (see attached).

Both Metro and REPLICA will test Services against the mutually agreed to Acceptance Criteria listed in Exhibit A-1: Acceptance Criteria (see attached). As part of this process, Metro will provide REPLICA with Metro's Data to use in acceptance testing where Metro's Data are publicly available. Any Metro Data provided strictly for testing purposes are not to be used as inputs to develop the Services.

The Services must meet the Acceptance Criteria. Metro will have a period of 30 days from the later of the delivery of the Services or the addition of acceptance criteria to the above titled contract between Metro and REPLICA to confirm that the Services meet the Acceptance Criteria.

Except for the above, all other conditions and covenants remain in full force and effect.

IN WITNESS TO THE ABOVE, the following duly authorized representatives of the parties referenced have executed this Amendment.

**Replica, Inc.**

**Metro**

By Nick [Signature]

By [Signature]

Print Name \_\_\_\_\_

Print Name Brian Kennedy

Date \_\_\_\_\_

Date 9/23/2019



Metro will have a period of 30 days from the later of the delivery of the Services or the addition of acceptance criteria to this Agreement ("Acceptance Period" and the date of acceptance, the "Acceptance Date"), to confirm that the Services meet the following acceptance criteria. Metro will deem the Services accepted if:

- The Services:
  - pass all of the Demographic, Travel Survey, and Privacy criteria,
  - pass at least 85 percent of the total criteria in the Vehicles, Vehicle Speeds, Transit, Non-motorized, and Other categories (i.e., 24 of 28 criteria), and
  - pass a minimum of two criteria in each of the following categories: Vehicles, Vehicle Speeds, Transit, Non-motorized, and Other; or
- Metro conveys to REPLICA in writing that it deems the Services accepted; or
- Metro chooses not to conduct acceptance testing or raise no concerns within this Acceptance Period.

Both Metro and REPLICA will test Services against the acceptance criteria below. If the Services do not meet the foregoing criteria in Metro's reasonable determination Metro will advise REPLICA within the Acceptance Period, providing a reasonably detailed description of the nonconformity and allowing Us a reasonable period of time using reasonable commercial efforts to correct any such nonconformity prior to providing back to Metro for acceptance testing. The acceptance criteria and process will be re-applied until Metro deems the Services accepted, provided that if in the reasonable estimation of either Party after re-testing, the Services continue to be non-conforming to the acceptance criteria either Party may terminate the Agreement upon written notice without further obligation and any amount prepaid by Metro will be refunded as Metro's sole remedy.

As part of this process, Metro will provide REPLICA with Metro's Data to use in acceptance testing where Metro's Data are publicly available. Any Metro Data provided strictly for testing purposes are not to be used as inputs to develop the Services. Metro may elect to withhold data for up to 20 percent of the locations or data points used in testing any given criterion for the purposes of independently validating the Services. Metro safeguards the privacy of its residents and the companies with which it works, and does not intend to share personally identifiable information or other non-discoverable information with REPLICA. Metro shall withhold any of Metro's Data used in acceptance testing that are not publicly available or otherwise subject to restrictions on sharing until Metro makes a determination that Replica meets the acceptance criteria associated with those data. The criteria documented here include additional detail on processes associated with testing criteria for which Metro's Data are not publicly available. Metro shall aggregate or anonymize data that are not publicly available as necessary before sharing them with REPLICA. REPLICA will not knowingly use Metro's Data with Personally Identifiable Information.

The criteria documented here assumes that calibration/validation datasets (i.e. field data) are provided by Customer prior to Replica providing the initial validation dataset. The final criteria will depend on the quality of the field data and their natural variance and margins of error. Any area where calibration is not provided will not be included in this section.

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## General

Cat / Data Source	Vintage	Measure	Criteria	Geographic Scale/Extent
OHAS*	2008-2011	Daily Trips / Person by Purpose	Absolute (+/- .75 Trip)	Region
OHAS*	2008-2011	Average Trips / Households by Purpose	Absolute (+/- .75 Trip)	Region
OHAS*	2008-2011	Average Trip Duration / Distance by Purpose	Absolute (+/- 2 Minutes, 1.0 Mile)	Region
OHAS*	2008-2011	Trip Duration / Distance Frequency Distribution by Purpose	Absolute (+/- 2 Minutes, 1.0 Mile Per Bin)	Region
OHAS*	2008-2011	Mode Share by Purpose	Percent Totals (+/- 2 Percentage Point, excluding new modes)	Region

\* If made available to Replica by 9/15/2019.

## Origin-Destination Flows

Cat / Data Source	Vintage	Measure	Criteria	Geographic Scale/Extent
Census / CTPP	2012-2016	County-to-County worker flows	Within CTPP MOE with overall RMSE < 25%	County
Census / CTPP	2012-2016	Tract-to-Tract worker flows	Within CTPP MOE with overall RMSE < 40%	Tract
OHAS*	2011	District-District Flows by Purpose	Percent Totals (+/- 5 Percentage Point)	District
OHAS*	2011	District-District Flows by Mode (excluding new modes)	Percent Totals (+/- 5 Percentage Point)	District

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# Amendment – Exhibit A-1



**Metro**

600 NE Grand Ave.  
Portland, OR 97232-2736

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## Vehicles

Cat / Data Source	Vintage	Measure	Criteria	Geographic Scale/Extent
Counts	2018	Cutline crossings, Daily and hourly in AM/PM peak hours	10% to 40%, by volume group Appendix A	Cutlines
Counts	2018	Vehicle Volumes by Count Location, Daily and hourly in AM/PM peak hours	15% to 60%, by volume group Appendix A	All Count Locations

## Vehicle Speeds

Cat / Data Source	Vintage	Measure	Criteria	Geographic Scale/Extent
HERE*	Fall/winter 2018)	Average Time/Speed by Freeway by Time of Day	Absolute (+/- 10 Percent)	System / Corridor
HERE*	Fall/winter 2018)	Average Time/Speed by Arterial by Time of Day	Absolute (+/- 20 Percent)	System / Corridor
HERE*	Fall/winter 2018)	Average Time/Speed by Other by Time of Day	Absolute (+/- 40 Percent)	System / Corridor

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## Transit

Cat / Data Source	Vintage	Measure	Criteria	Geographic Scale/Extent
TriMet, C-TRAN, Streetcar	Relevant season	System Trips	Absolute (+/- 5 Percent)	Region
TriMet, C-TRAN, Streetcar	Relevant season	System Boardings	Absolute (+/- 5 Percent)	Region
TriMet	Relevant season	System Transfer Rate	Absolute (+/- 5 Percent)	Region
TriMet, C-TRAN, Streetcar	Relevant season	Station/Stop Boardings/Alightings	< 40% RMSE	Station/Stop
TriMet, C-TRAN, Streetcar	Relevant season	Ridership by Route	20% to 150% RMSE, by type and volume group per Appendix B	Route
TriMet	Relevant season	Passenger Race / Ethnicity and Income by Route	10% to 75% Absolute, by type and volume group per Appendix B	Route (TriMet only)

## Non-Motorized

Cat / Data Source	Vintage	Measure	Criteria	Geographic Scale/Extent
Counts	Relevant season	Bicycle Volumes by Count Location	< 50% RMSE	All Permanent Count Locations
Counts	Relevant season	Pedestrian Volumes by Count Location	<100% RMSE	Selected 2h Count Locations
OHAS*	2011	BMT / Person by Purpose	Absolute (+/- 25 Percent)	Region
OHAS*	2011	WMT / Person by Purpose	Absolute (+/- 25 Percent)	Region

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**Demographic**

Cat / Data Source	Vintage	Measure	Criteria	Geographic Scale/Extent
ACS 5-years	2017	Households by Household Size	Percent Totals (+/- 1 Percentage Point), each tract within MOE	Tract
ACS 5-years	2017	Households by Number of Workers	Percent Totals (+/- 2 Percentage Point), each tract within MOE	Tract
ACS 5-years	2017	Households by Number of Children Present	Percent Totals (+/- 5 Percentage Point), each tract within MOE	Tract
ACS 5-years	2017	Households by Household Income Range	Percent Totals (+/- 5 Percentage Point), each tract within MOE	Tract
ACS 5-years	2017	Population by Age	Percent Totals (+/- 5 Percentage Point), each tract within MOE	Tract
ACS 5-years	2017	Households by Type (SF, MF)	Percent Totals (+/- 5 Percentage Point), each tract within MOE	Tract
ACS 5-years	2017	Households by Tenure (Own, Rent)	Percent Totals (+/- 5 Percentage Point), each tract within MOE	Tract
ACS 5-years	2017	Households by Auto Ownership / Availability	Percent Totals (+/- 5 Percentage Point), each tract within MOE	Tract
ACS 5-years	2017	Population by Race	Percent Totals (+/- 5 Percentage Point), each tract within MOE	Tract
ACS 5-years	2017	Population by Ethnicity	Percent Totals (+/- 5 Percentage Point), each tract within MOE	Tract
ODOE	2017	K-12 Public / Private Enrollment by School Location	Absolute (+/- 5 Percent)	School District
ODOE	2017	Post-Secondary Enrollment by School	Absolute (+/- 5 Percent)	Campus

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### Location

LEHD	2015	Employment by Place of Work	Absolute (+/- 5 Percent)	Metroscope Ezone (72)
ACS	2017	NAICS industry sector of employment by Residence	Absolute (+/- 5 Percent), each tract within MOE	Tract
LEHD	2015	NAICS industry sector of employment by Place of Work	Absolute (+/- 15 Percent) unless noted due to LEHD specifics	Region / County / PUMA / District

### Travel Survey

Cat / Data Source	Vintage	Measure	Criteria	Geographic Scale/Extent
Metro	2011	Required Format of "Travel Survey" Data	Checklist	Region
Metro	2011	Required Attributes of "Travel Survey" Data	Checklist	Region

### Other

Cat / Data Source	Vintage	Measure	Criteria	Geographic Scale/Extent
City of Portland	2018-19	System On-Demand Transportation (TNC+taxi) Trips by Time of Day*	Absolute (+/- 25 Percent)	City of Portland
City of Portland	2018-19	On-demand Origins by Time of Day*	Absolute (+/- 25 Percent)	Census tracts (Only for tracts within Portland)
City of Portland	2018-19	On-demand Destinations by Time of Day*	Absolute (+/- 25 Percent)	Census tracts (Only for tracts within Portland and for trips originating

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City of Portland	2018-19	On-demand Origin-Destination pairs by Time of Day*	Absolute (+/- 25 Percent)	within Portland) Census tracts (Only for tracts within Portland and for trips originating within Portland)
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\* The City of Portland is unable to share on-demand ground truth data with Replica due to the confidential and trade secret nature of the data. In order to efficiently validate the on-demand criteria, we will validate Replica's estimates total system trips before validating the Census tract-level criteria. If Replica fails one of the on-demand criteria, the City of Portland will provide an explanation of the failure along with aggregate data to support its determination (i.e., the number of total system trips for the relevant time period or, for Census tract-level criteria, tract-level margins of error between Replica and the ground truth data).

### Privacy

Cat / Data Source	Vintage	Measure	Criteria	Geographic Scale/Extent
Metro / Portland / TriMet	N/A	Review of privacy documentation, including Replica methodology and results of third-party privacy audit	Qualitative	N/A
Metro / Portland / TriMet	N/A	Inability to identify known individuals	Qualitative	N/A

### Appendix A: Traffic Volume by Volume Group

Daily Count	Count Location (% RMSE)	Cutline (%RMSE)
5,000	60	40
10,000	40	30
20,000	29.5	22
30,000	26	20



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40,000	24	18
50,000	22	16
60,000	20	15
70,000	18.5	13
90,000	16	12
100,000	15	11
Areawide	40	25

## Appendix B: Transit Criteria Thresholds by Average Weekday Ridership

Avg. Weekday Ridership	Trips/day (%RMSE)		Race (%White/non-Hispanic and %Hispanic/non-white, Absolute)		Personal income (>\$40k/year and <\$40k/year, Absolute)	
	Acceptable	Preferable	Acceptable	Preferable	Acceptable	Preferable
<1,000 Trips/day	+/- 150%	+/- 100%	75%	50%	40%	30%
1k-2k Trips/day	+/- 100%	+/- 65%	35%	25%	20%	15%
2k-5k Trips/day	+/- 65%	+/- 35%	25%	20%	15%	10%
5k-10k Trips/day	+/- 35%	+/- 25%	20%	15%	15%	10%
10k-20k Trips/day	+/- 25%	+/- 20%	15%	10%	10%	5%
>20k Trips/day	+/- 20%	+/- 15%	15%	10%	10%	5%