

# Appendix F - 1

OPEX Estimate

**OPEX Estimate**

		VRH/D	VRH/Y	
NTD Estimated	128.91	160	46400	5,981,424
UTA Estimated	96.98	160	46400	4,500,000

**SOURCE DATA**

UTA 2012 - Table 12

UTA 2012 - Table 14

UTA 2012 - Table 24

Mode	TOS	VOMS	OPEX Costs					OP Delivered					OPEX	
			Veh Ops	Veh Mtce	NonVehMtce	GenAdmin	Total	VAMS	YR-VehMi	YR-VehRevMi	YR-VehHr	YR-VehRevHr	per VOMS	per VehHr
CB	DO	38	6,568,200	2,232,200	921,000	2,264,106	11,985,572	57	2,153,300	1,963,100	96,600	64,200	315,410	124.10
MB	DO	497	61,603,129	19,059,903	6,979,850	18,060,280	105,703,162	513	15,888,400	13,703,300	1,099,200	820,000	212,682	96.20
MB	PT	6	389,507	217,522	30,111	482,198	1,119,338	8	236,100	198,600	14,600	13,100	186,556	76.60

**CALCULATED DATA**

Mode	TOS	Cost per Revenue Mile	Cost per Revenue Hour	Cost per Vehicle Mile	Cost per Vehicle Hour
CB	DO	6.11	186.69	5.57	124.07
MB	DO	7.71	128.91	6.65	96.16
MB	PT	5.64	85.45	4.74	76.67

**Cost per Revenue Hour in 2014 Dollars \$133.11**

*Increased from 2012 cost using CPI*

# Appendix F - 2

Bus Calculations

**Bus Fleet Requirement Calculator**

Data items to enter in red.

**Modeled**

	<b>Alt A</b>	<b>Alt B</b>	<b>Comments / Instructions</b>
Round Trip Distance	<b>22.30</b>	<b>23.10</b>	<b>Enter r/t distance in miles</b>
Net Round Trip Time	<b>47.19</b>	<b>42.75</b>	<b>Enter r/t time in minutes</b>

**Assumptions**

Layover Time (Total)	<b>10.00</b>	<b>6.00</b>	Shorter for BRT due to reliable travel time / <b>Enter total layover (both ends of route)</b>
Service Frequency	<b>4</b>	<b>6</b>	<b>Enter service frequency as number of trips per hour per direction (e.g. peak headway)</b> <i>2 = 30 minute headway, 3=20 minute headway, 4=15 minute headway, 5=12-minute headway, 6=10 minute headway)</i>

**Calculated**

Total Round Trip Time	57.19	48.75	Calculated
Average Speed (mph)	28.35	32.42	Calculated
Operating Fleet	7.0	9.0	Calculated. Note: Rounds up to next higher bus requirement (no partial buses can be used)
Fleet with 20% Spare	9.0	11.0	Calculated at 20% Note: Rounds up to next higher bus requirement

	<b>Alt A</b>	<b>Alt B</b>	
<b>Calculated Fleet Required</b>	<b>9</b>	<b>11</b>	<b>Number of buses required to meet VOMS with adequate spare ratio</b>

# Appendix F - 3

O&M Cost Estimates for Alternatives A and B

SOUTH DAVIS

Operating Statistics & Costs for Alternative Service Plans

Alternative B	Peak Headway	Daily Average Hours/Day	OffPeak Headway	Evening Average Hours/Day	1-way trips per day	Deadhead Veh-Miles	Peak Vehicles	Deadhead Veh-Hours	Total Daily Veh-Hours	Daily Op. Cost per hour	Combined Op. Cost per hour	Daily Op. Cost	Oper. days per year	Annual Operating Cost Estimates
														Annual Oper. Cost
BRT	10	6	15	12	168	180	6	0.6	111.4	\$133	\$14,828	<b>\$14,828</b>	248	\$3,677,457
Weekday														
BRT	15	6	15	9.5	124	120	4	0.6	64.3	\$133	\$8,555	<b>\$8,555</b>	64	\$547,490
Saturday														
BRT	30	6	30	9.5	62	60	2	0.6	32.1	\$133	\$4,277	<b>\$4,277</b>	53	\$226,695
Sunday														
<b>Total Annual</b>														<b>\$4,451,642</b>

operating cost per revenue-hour **\$133.11**

Assuming Service 4:30 10:30 on weekdays  
7:00 to 10:30 on Saturday  
7:00 to 10:30 on Sunday

Operating Cost Inputs  
Using UTA NTD data from 2012 Tables 12 and 14 to estimate Cost per Revenue Hour  
Cost was escalated to from 2012 to 2014 dollars using CPI (\$128.91 escalated to \$133.11)

Daily Deadhead Miles per bus (two-way) **30**  
Daily Deadhead Time per bus (two-way) **34**

Cost per Trip  
3,570 weekday ridership (WFRC)  
3,570 annualized (multiply by 290) = 1,035,300  
1035300 divided by \$4,451,642 = \$4.30

SOUTH DAVIS

Operating Statistics & Costs for Alternative Service Plans

Alternative A	Peak Headway	Daily Average Hours/Day	OffPeak Headway	Evening Average Hours/Day	1-way trips per day	Deadhead Veh-Miles	Peak Vehicles	Deadhead Veh-Hours	Total Daily Veh-Hours	Daily Op. Cost per hour	Combined Op. Cost per hour	Daily Op. Cost	Oper. days per year	Annual Operating Cost Estimates
														Annual Oper. Cost
Enhanced Bus, Weekday	15	6	15	12	144	120	4	0.6	74.3	\$133	\$9,886	\$9,886	248	\$2,451,638
Enhanced Bus Saturday	30	6	30	9.5	62	60	2	0.6	32.1	\$133	\$4,277	\$4,277	64	\$273,745
<b>Total Annual</b>														<b>\$2,725,383</b>

operating cost per revenue-hour \$133.11

Assuming Service 4:30 10:30 on weekdays  
7:00 to 10:30 on Saturday  
No service on Sunday

Operating Cost Inputs  
Using UTA NTD data from 2012 Tables 12 and 14 to estimate Cost per Revenue Hour  
Cost was escalated to from 2012 to 2014 dollars using CPI (\$128.91 escalated to \$133.11)

Daily Deadhead Miles per bus (two-way)	30
Daily Deadhead Time per bus (two-way)	34

Cost per Trip.  
2,074 weekday ridership (WFRC)  
2,074 annualized (multiply by 290) = 601,460  
601460 divided by \$2,725,383 = \$4.53

Deadhead Calculations

Location	Miles One-way	Time Estimate One-way	Daily Miles per bus	Deadhead time per bus
Woods Cross - 750 S 800 W, Woods Cross	14.9	17	30	34

Assumes buses are stationed at the UTA Salt Lake Base, 3600 S 700 W, Salt Lake City.

operating cost per service-hour \$131.58



# Appendix F - 4

O&M Cost Estimates for Circulator

SOUTH DAVIS

Operating Statistics & Costs for Alternative Service Plans

Circulator	Peak Headway	Daily Average Hours/Day	OffPeak Headway	Evening Average Hours/Day	1-way trips per day	Deadhead Veh-Miles	Peak Vehicles	Deadhead Veh-Hours	Total Daily Veh-Hours	Daily Op. Cost per hour	Daily Op. Cost per mile	Combined Op. Cost per hour	Daily Op. Cost	Oper. days per year	Annual Operating Cost Estimates
															Annual Oper. Cost
Circulator Weekday	30	6	30	6	48	26	2	0.3	24.6	\$133	\$0.00	\$3,275	\$3,275	248	\$812,077
Circulator Saturday	30	6	30	4	40	26	2	0.3	20.6	\$133	\$0.00	\$2,742	\$2,742	64	\$175,492
No service Sunday															
<b>Total Annual</b>															<b>\$987,570</b>

operating cost per revenue-hour **\$133.11**  
 Assuming Service 12 hrs on weekdays  
 10 hrs on Saturday  
 no service on Sunday

Operating Cost Inputs  
 Using UTA NTD data from 2012 Tables 12 and 14 to estimate Cost per Revenue Hour  
 Cost was escalated to from 2012 to 2014 dollars using CPI (\$128.91 escalated to \$133.11)

Daily Deadhead Miles per bus (two-way) **13**  
 Daily Deadhead Time per bus (two-way) **18**

\$389,000 Gillig 2013 bus

Deadhead Calculations

	Location	Miles One-way	Time Estimate One-way	Daily Miles per bus	Deadhead time per bus
BRT	Woods Cross - 750 S 800 W, Woods Cross	14.9	17	30	34
Circulator	N 300 and W South Temple	6.4	9	13	18

Assumes buses are stationed at the UTA Salt Lake Base, 3600 S 700 W, Salt Lake City.

operating cost per service-hour \$131.58