

Beckett Bridge Replacement

Tarpon Springs, FL

B. Benefit-Cost Analysis Spreadsheets

Bridge Investment Program (BIP)
Grant Application

SEPTEMBER 2022

Contact

Pinellas County Board of County Commissioners

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Beckett Bridge Replacement

[CLIENT]






Benefit Cost Analysis Model

This model contains all calculations used in the Benefit Cost Analysis for this project. The legend below provides guidance on the role of each tab, and the meaning of different colors and shading throughout the model.

Tab Reference

-  Aqua Shading - Intro Materials
-  Lime Green Shading - Standard Input Values, reflecting guidance from USDOT and other sources
-  Orange Shading - Project Input Values and intermediate calculations, reflecting project-specific information
-  Light Pink Shading - Calculations
-  Purple Shading - Aggregated Values, Benefits, and Costs
-  Blue Shading - Output Tables and Charts

Cell Reference

-  Light Green Cell Shading - Model Owner Input Value
-  Light Yellow Cell Shading - User Input Value
-  Blue Text - Import from Another Sheet
-  Red Text - Exported to Another Sheet
-  Purple Italicized Text - Additional Model Guidance

Source: <https://www.transportation.gov/sites/dot.gov/files/2022-03/Bhttps://apps.bea.gov/iTable/iTable.cfm?reqid=19&step=3&isuri=1&1921=survey&1903=1>

Base Year of Nominal Dollar	Multiplier to Adjust to Real 2020\$	Implicit Price Deflator for GDP	
2001	1.4245	79.7830	
2002	1.4026	81.0260	
2003	1.3755	82.6250	
2004	1.3395	84.8430	
2005	1.2988	87.5040	
2006	1.2599	90.2040	
2007	1.2267	92.6420	
2008	1.2037	94.4190	
2009	1.1960	95.0240	
2010	1.1818	96.1660	
2011	1.1577	98.1640	
2012	1.1365	100.0000	
2013	1.1169	101.7510	
2014	1.0964	103.6540	
2015	1.0856	104.6910	
2016	1.0748	105.7400	
2017	1.0548	107.7470	
2018	1.0302	110.3210	
2019	1.0121	112.2940	
2020	1.0000	113.6480	
2021	0.9601	118.3710	
2022	0.8800	129.1428	9.10% https://www
2023	0.8587	132.3415	2.48% https://www
2024	0.8380	135.6195	2.48% https://www
2025	0.8177	138.9787	2.48% https://www
2026	0.7980	142.4211	2.48% https://www
2027	0.7787	145.9488	2.48% https://www
2028	0.7599	149.5638	2.48% https://www
2029	0.7415	153.2684	2.48% https://www
2030	0.7236	157.0647	2.48% https://www

	Variable	Source	Units	Constant (Likely Case)	Baseline	Low	High			
GENERAL	Scenario	User Input		BASELINE						
	Model Start Year	year		2021						
	Base Year (for valuation)	year		2020						
	Base Year (for discounting)	year		2020						
	Base Year Unit			2020S						
	Average Vehic. USDOT BCA Gi Figure			1.67						
	Average Vehic. USDOT BCA Gi Figure			1.48						
	Average Vehic. USDOT BCA Gi Figure			1.58						
	Average Vehic. USDOT BCA Gi Figure			2.02						
	Average Vehic. USDOT BCA Gi Figure			1						
FACTORS	Million			1,000,000						
	Grams to metric ton conversion Factor			0.0000100000						
	Grams to short ton conversion Factor			0.0000110231						
	Lbs to metric ton conversion Factor			0.000454						
VALUE OF TIME	Value of time | USDOT 2014	annual rate		0.00%						
	Surface Modes (except HSR) Values									
	Local Travel									
	Personal Share | USDOT BCA Gi percent			88.20%						
	Business Share | USDOT BCA Gi percent			11.80%			https://www.transportation.gov/sites/dot.gov/files/dots/2016%20Revised%20Value%20of%20Travel%20Time%20Guidance.pdf			
			LO VOT			HI VOT				
	Personal VTTs | USDOT BCA Gi | 2020S per pe	16.20	16.20	11.49	19.53	\$13.60	\$9.50	\$16.30	-30%	20%
	Business VTTs | USDOT BCA Gi | 2020S per pe	29.40	29.40	20.85	35.45	\$25.40	\$20.30	\$30.50	-20%	20%
	All Purposes | USDOT BCA Gi | 2020S per pe	17.80	17.80	12.62	21.46	\$14.10	\$10.00	\$17.00	-29%	21%
	Intercity Travel									
Personal Share | USDOT Value | percent			78.60%							
Business Share | USDOT Value | percent			21.40%							
Personal VTTs | USDOT BCA Gi | 2020S per pe	22.70	22.70	16.10	27.37						
Business VTTs | USDOT BCA Gi | 2020S per pe	29.40	29.40	20.85	35.45						
All Purposes | calc | 2020S per pe	24.13	24.13	17.12	29.10						
Bicyclists/Pedestrians/Waiting/Standing/Transfer Time										
Personal VTTs | USDOT BCA Gi | 2020S per pe	32.40	32.40	22.98	39.06						
Air and HSR Values										
Intercity Travel										
Personal Share | USDOT Value | percent			59.60%							
Business Share | USDOT Value | percent			40.40%							
Personal VTTs | USDOT BCA Gi | 2020S per pe	43.20	43.20	30.64	52.09						
Business VTTs | USDOT BCA Gi | 2020S per pe	73.20	73.20	51.91	88.26						
All Purposes | calc | 2020S per pe	55.32	55.32	39.23	66.70						
Other Values										
Truck Drivers | USDOT BCA Gi | 2020S per pe	32.00	32.00	22.70	38.58						
Bus Drivers | USDOT BCA Gi | 2020S per pe	33.60	33.60	23.83	40.51						
Transit Rail Op. | USDOT BCA Gi | 2020S per pe	50.70	50.70	35.96	61.13						
Locomotive Op. | USDOT BCA Gi | 2020S per pe	52.50	52.50	37.23	63.30						
Airline Pilots | USDOT Value | 2020S per pe	94.12	94.12	66.75	113.48						
<i>Truck Reliability</i> <small>Contact Sebastian Guerrero to discuss how best to incorporate this value into your BCA</small>										
Cost of Unreli. NCHRP 07-24: | 2020S per pe			\$165							
FUEL	From "Annual Energy Outlook 2022" Table 12: Petroleum and Other Liquids Prices. The last column includes CAGR, row 28-30									
	Dollar Year of US EIA Annual year			2021						
	EIA IEA Foreca US EIA Annual year			2050						
	From "Annual Energy Outlook 2022" Table 12: Petroleum and Other Liquids Prices. The last column includes CAGR, row 28-30									
	Motor gasolin CAGR from 20 Percent Annua			0.1%						
	Diesel price gr CAGR from 20 Percent Annua			0.3%						
	Jet fuel price gr CAGR from 20 Percent Annua			1.0%						
	Transportation Energy Efficiency Indicators, cited from "Annual Energy Outlook 2020" Table 7: Transportation Sector Key Indicators. The last column includes CAGR, rows 34, 37, 39, 41									
	Auto fuel effici CAGR from 20 Percent Annua			0.8%						
	Truck fuel effici CAGR from 20 Percent Annua			1.1%						
	Aircraft fuel ef CAGR from 20 Percent Annua			0.8%						
	Rail fuel effici CAGR from 20 Percent Annua			0.6%						
	https://www.eia.gov/content/energy-consumption-mode-transportation									
	Energy intensi Bureau of Trai thousand BTU			138.70						
EMISSIONS COSTS	Emissions Costs - CO2 (see InpR tab for forecast values)									
	Forecast End C. USDOT BCA Gi year			2050						
	Discount Rate | USDOT BCA Gi percentage			3%						
	CO2 Emissions Costs After Fo Percent Annua			0%						
	Grams of CO2 EPA, Greenho factor			8,887						
	Grams of CO2 EPA, Greenho factor			10,180						
	Emissions Costs - Non CO2 (see InpR tab for forecast values)									
	Forecast End C. USDOT BCA Gi year			2050						
	Non-CO2 Emissions Costs Aft Percent Annua			0%						
	Passenger Rail Emissions Values									
Intercity Passe | NCRRP, Comp lbs / passenge			0.122							
Commuter Pa: | NCRRP, Comp lbs / passenge			0.282							
VEHICLE OPERATING COSTS	Vehicle Opera | USDOT BCA Gi 2020S / VMT			0.450						
	Vehicle Opera | USDOT BCA Gi 2020S / VMT			0.940						
	NOISE & CONGESTION COSTS									
	Congestion									
Light-Duty Vel | USDOT BCA Gi 2020S / VMT			0.124							
Light-Duty Vel | USDOT BCA Gi 2020S / VMT			0.026							
Light-Duty | USDOT BCA Gi 2020S / VMT			0.104							
Buses and Tru | USDOT BCA Gi 2020S / VMT			0.310							
Buses and Tru | USDOT BCA Gi 2020S / VMT			0.067							
Buses and | USDOT BCA Gi 2020S / VMT			0.212							
All Vehicles - L | USDOT BCA Gi 2020S / VMT			0.138							
All Vehicles - R | USDOT BCA Gi 2020S / VMT			0.033							
All Vehicles -- | USDOT BCA Gi 2020S / VMT			0.115							
Auto Average | calc | 2020S / VMT			-							
Truck Average | calc | 2020S / VMT			-							
Noise	Light-Duty Vel | USDOT BCA Gi 2020S / VMT			0.002						
	Light-Duty Vel | USDOT BCA Gi 2020S / VMT			0.000						
	Light-Duty | USDOT BCA Gi 2020S / VMT			0.001						
	Buses and Tru | USDOT BCA Gi 2020S / VMT			0.039						
	Buses and Tru | USDOT BCA Gi 2020S / VMT			0.003						
	Buses and | USDOT BCA Gi 2020S / VMT			0.020						
	All Vehicles - L | USDOT BCA Gi 2020S / VMT			0.005						
	All Vehicles - R | USDOT BCA Gi 2020S / VMT			0.001						
	All Vehicles -- | USDOT BCA Gi 2020S / VMT			0.003						
	Auto Average | calc | 2020S / VMT			-						
	Truck Average | calc | 2020S / VMT			-						

PAVEMENT DAMAGE

Autos/Rural In FHWA 2000	20205 / VMT	0.000
Autos/Urban I FHWA 2000	20205 / VMT	0.002
40 kip 4-axle S FHWA 2000	20205 / VMT	0.014
40 kip 4-axle S FHWA 2000	20205 / VMT	0.044
60 kip 4-axle S FHWA 2000	20205 / VMT	0.080
60 kip 4-axle S FHWA 2000	20205 / VMT	0.259
60 kip 5-axle C FHWA 2000	20205 / VMT	0.047
60 kip 5-axle C FHWA 2000	20205 / VMT	0.150
Auto Average calc	20205 / VMT	-
Truck Average calc	20205 / VMT	-

MORTALITY REDUCTION BENEFITS OF ACTIVE TRANSPORTATION

Walking	USDOT BCA Gi 20205 / Inducio	7.08
Cycling	USDOT BCA Gi 20205 / Inducio	6.31

AMENITY/FACILITY VALUES

Public Transit Facility

Bus Stop

Clocks	USDOT BCA Gi 20205 / trip	0.03
Electronic Rea	USDOT BCA Gi 20205 / trip	0.29
Information/E	USDOT BCA Gi 20205 / trip	0.22
PA System	USDOT BCA Gi 20205 / trip	0.29
Platform/Stop	USDOT BCA Gi 20205 / trip	0.18
Platform/Stop	USDOT BCA Gi 20205 / trip	0.24
Restroom Ava	USDOT BCA Gi 20205 / trip	0.14
Retail/Food OI	USDOT BCA Gi 20205 / trip	0.10
Staff Availabili	USDOT BCA Gi 20205 / trip	0.07
Step-free Acce	USDOT BCA Gi 20205 / trip	0.30
Step-free Acce	USDOT BCA Gi 20205 / trip	0.39
Surveillance C.	USDOT BCA Gi 20205 / trip	0.29
Temperature (	USDOT BCA Gi 20205 / trip	0.59
Temperature (	USDOT BCA Gi 20205 / trip	0.10
Ticket Machin	USDOT BCA Gi 20205 / trip	0.22
Timetables	USDOT BCA Gi 20205 / trip	0.09
Bike Facilities	USDOT BCA Gi 20205 / trip	0.09
Car Access Fac	USDOT BCA Gi 20205 / trip	0.11
Elevator	USDOT BCA Gi 20205 / trip	0.07
Escalators	USDOT BCA Gi 20205 / trip	0.04
On-Site Ticket	USDOT BCA Gi 20205 / trip	0.09
Taxi Pickup/Dr	USDOT BCA Gi 20205 / trip	0.05
Waiting Room	USDOT BCA Gi 20205 / trip	0.19

Light Rail/Streetcar Stop

Clocks	USDOT BCA Gi 20205 / trip	0.03
Electronic Rea	USDOT BCA Gi 20205 / trip	0.14
Information/E	USDOT BCA Gi 20205 / trip	0.22
PA System	USDOT BCA Gi 20205 / trip	0.05
Platform/Stop	USDOT BCA Gi 20205 / trip	0.13
Platform/Stop	USDOT BCA Gi 20205 / trip	0.15
Restroom Ava	USDOT BCA Gi 20205 / trip	0.14
Retail/Food OI	USDOT BCA Gi 20205 / trip	0.10
Staff Availabili	USDOT BCA Gi 20205 / trip	0.03
Step-free Acce	USDOT BCA Gi 20205 / trip	0.30
Step-free Acce	USDOT BCA Gi 20205 / trip	0.07
Surveillance C.	USDOT BCA Gi 20205 / trip	0.29
Temperature (	USDOT BCA Gi 20205 / trip	0.59
Temperature (	USDOT BCA Gi 20205 / trip	0.10
Ticket Machin	USDOT BCA Gi 20205 / trip	0.09
Timetables	USDOT BCA Gi 20205 / trip	0.09
Bike Facilities	USDOT BCA Gi 20205 / trip	0.09
Car Access Fac	USDOT BCA Gi 20205 / trip	0.11
Elevator	USDOT BCA Gi 20205 / trip	0.07
Escalators	USDOT BCA Gi 20205 / trip	0.04
On-Site Ticket	USDOT BCA Gi 20205 / trip	0.09
Taxi Pickup/Dr	USDOT BCA Gi 20205 / trip	0.05
Waiting Room	USDOT BCA Gi 20205 / trip	0.19

Rail Station

Clocks	USDOT BCA Gi 20205 / trip	0.06
Electronic Rea	USDOT BCA Gi 20205 / trip	0.82
Information/E	USDOT BCA Gi 20205 / trip	0.10
PA System	USDOT BCA Gi 20205 / trip	0.09
Platform/Stop	USDOT BCA Gi 20205 / trip	0.12
Platform/Stop	USDOT BCA Gi 20205 / trip	0.12
Restroom Ava	USDOT BCA Gi 20205 / trip	0.10
Retail/Food OI	USDOT BCA Gi 20205 / trip	0.06
Staff Availabili	USDOT BCA Gi 20205 / trip	0.17
Step-free Acce	USDOT BCA Gi 20205 / trip	0.19
Step-free Acce	USDOT BCA Gi 20205 / trip	0.07
Surveillance C.	USDOT BCA Gi 20205 / trip	0.30
Temperature (	USDOT BCA Gi 20205 / trip	0.59
Temperature (	USDOT BCA Gi 20205 / trip	0.06
Timetables	USDOT BCA Gi 20205 / trip	0.45
Bike Facilities	USDOT BCA Gi 20205 / trip	0.09
Car Access Fac	USDOT BCA Gi 20205 / trip	0.11
Elevator	USDOT BCA Gi 20205 / trip	0.07
Escalators	USDOT BCA Gi 20205 / trip	0.04
On-Site Ticket	USDOT BCA Gi 20205 / trip	0.09
Taxi Pickup/Dr	USDOT BCA Gi 20205 / trip	0.05
Waiting Room	USDOT BCA Gi 20205 / trip	0.19

Public Transit Vehicle

Bus

Electronic	USDOT BCA Gi 20205 / trip	0.20
Handrails	USDOT BCA Gi 20205 / trip	0.12
Luggage Stora	USDOT BCA Gi 20205 / trip	0.08
PA System	USDOT BCA Gi 20205 / trip	0.36
Surveillance C.	USDOT BCA Gi 20205 / trip	0.21
Temperature (	USDOT BCA Gi 20205 / trip	0.30
Wheelchair Sp	USDOT BCA Gi 20205 / trip	0.04

Light Rail/Streetcar

Electronic	USDOT BCA Gi 20205 / trip	0.20
Handrails	USDOT BCA Gi 20205 / trip	0.12
Luggage Stora	USDOT BCA Gi 20205 / trip	0.08
PA System	USDOT BCA Gi 20205 / trip	0.36
Surveillance C.	USDOT BCA Gi 20205 / trip	0.21
Temperature (	USDOT BCA Gi 20205 / trip	0.12
Wheelchair Sp	USDOT BCA Gi 20205 / trip	0.04

Rail

Electronic	USDOT BCA Gi 20205 / trip	0.21
Handrails	USDOT BCA Gi 20205 / trip	0.29
Luggage Stora	USDOT BCA Gi 20205 / trip	0.08
PA System	USDOT BCA Gi 20205 / trip	0.37
Surveillance C.	USDOT BCA Gi 20205 / trip	0.59
Temperature (	USDOT BCA Gi 20205 / trip	0.45
Wheelchair Sp	USDOT BCA Gi 20205 / trip	0.04
Food Service	USDOT BCA Gi 20205 / trip	0.03
Restroom	USDOT BCA Gi 20205 / trip	0.18

Active Transportation

Cycling

Average Lengt USDOT BCA Gi miles	2.38
Cycling Path w. USDOT BCA Gi 20205 / cycle-	1.42
Cycling Path w. USDOT BCA Gi 20205 / cycle-	1.78
Dedicated Cyc USDOT BCA Gi 20205 / cycle-	1.69
Cycling USDOT BCA Gi 20205 / cycle-	0.26
Separated Cyc USDOT BCA Gi 20205 / cycle-	1.69

Pedestrian

Average Lengt USDOT BCA Gi miles	0.86
Maximum sid: USDOT BCA Gi feet	31.00
Expand	
Sidewalk (per USDOT BCA Gi 20205 / perso	\$0.10
Marked	
Crosswalk on USDOT BCA Gi 20205 / Use	\$0.18
Ped Signal on	
Roadway USDOT BCA Gi 20205 / Use	\$0.46

SAFETY

KABCO Monetized Values

			LO VSL	HI VSL
No Injury - O USDOT BCA Gi 20205 / injury	\$3,900	\$3,900	\$2,340	\$5,460
Possible Injury USDOT BCA Gi 20205 / injury	\$77,200	\$77,200	\$46,320	\$108,080
Non Incapact: USDOT BCA Gi 20205 / injury	\$151,000	\$151,000	\$90,600	\$211,400
Incapactating USDOT BCA Gi 20205 / injury	\$554,800	\$554,800	\$332,880	\$776,720
Killed - K USDOT BCA Gi 20205 / injury	\$11,600,000	\$11,600,000	\$6,960,000	\$16,240,000
Injured Sever: USDOT BCA Gi 20205 / injury	\$210,300	\$210,300	\$126,180	\$294,420
Unknown If Inj USDOT BCA Gi 20205 / incide	\$159,800	\$159,800	\$95,880	\$223,720

<https://www.transportation.gov/sites/dot.gov/files/2021-03/DO7%20VSL%20Guidance%20-%202021%20Update.pdf>
40% Pg 11 <https://www.transportation.gov/sites/dot.gov/files/2021-03/DO7%20VSL%20Guidance%20-%202021%20>

Crash Type Monetized Values

Fatal Crash USDOT BCA Gi 20205 / crash	\$12,837,400	\$12,837,400	\$7,702,440	\$17,972,360
Injury Crash USDOT BCA Gi 20205 / crash	\$302,600	\$302,600	\$181,560	\$423,640
Property Dam: USDOT BCA Gi 20205 per veh	\$4,600	\$4,600	\$2,760	\$6,440

State State Gas Tax State Diesel Tax *Note: API's data reflects a weighted average for each state, meaning that any taxes which can vary across a state's jurisdiction are averaged according to the population of the local areas subject to each particular tax rate. Where appropriate, the weighted average also takes into consideration the typical percentages of premium, midgrade, and regular fuel purchased in each state. In states where taxes vary depending upon the price of the motor fuel (for example, where the tax rate is set as a percentage of the sales price rather than a cents per gallon method), the state average listed on the chart is a snapshot based upon the price of fuel (as reported by AAA) on the date the chart is updated.*

API, Jan 2022: <https://www.api.org/-/media/Files/Statistics/State-Motor-Fuel-Taxes-Charts-january-2022.pdf?la=en&hash=F0923588C923411BBE62442732C00215EA6D271>

Alabama	31.3100	32.2500
Alaska	15.1300	14.9800
Arizona	19.0000	27.0000
Arkansas	24.8000	28.8000
California	68.1500	99.9100
Colorado	22.0000	20.5000
Connecticut	35.7500	40.1000
Delaware	23.0000	22.0000
District of Col.	33.8000	33.8000
Florida	43.5500	36.3700
Georgia	37.5500	41.3900
Hawaii	51.6900	52.4100
Idaho	33.0000	33.0000
Illinois	59.6000	67.0200
Indiana	49.7900	54.0000
Iowa	30.0000	32.5000
Kansas	24.0300	26.0300
Kentucky	26.0000	23.0000
Louisiana	20.0100	20.0100
Maine	30.0100	31.2100
Maryland	36.1000	36.8500
Massachusetts	26.5400	26.5400
Michigan	45.1700	47.1600
Minnesota	30.6000	30.6000
Mississippi	18.7900	18.4000
Missouri	19.9200	19.9200
Montana	33.2500	30.3000
Nebraska	25.7000	25.1000
Nevada	50.4800	28.5600
New Hampshire	23.8300	23.8300
New Jersey	50.7000	57.7000
New Mexico	18.8800	22.8800
New York	48.2200	46.9800
North Carolina	38.7500	38.7500
North Dakota	23.0000	23.0000
Ohio	38.5100	47.0100
Oklahoma	20.0000	20.0000
Oregon	38.8300	38.0600
Pennsylvania	58.7000	75.2000
Rhode Island	35.0000	35.0000
South Carolina		
South Dakota		
Tennessee		
Texas	20.0000	
Utah		
Vermont	32.1400	
Virginia		
Washington	49.4000	49.4000
West Virginia	35.7000	35.7000
Wisconsin	32.9000	32.9000
Wyoming	24.0000	24.0000
National Aver	38.6900	40.2400

Table with columns for speed (53 MPH to 70 MPH) and a grid of numerical values representing emissions or performance metrics.

Sco Emissions

Table with columns for speed (5 MPH to 70 MPH) and a grid of numerical values representing emissions or performance metrics.

CO2 Emissions

Table with columns for speed (5 MPH to 70 MPH) and a grid of numerical values representing CO2 emissions or performance metrics.

Build	Year	Peak Hour				AM Delay/veh	PM Delay/Veh.	No Build	Year	Peak Hour				AM Delay/veh	PM Delay/Veh.
		AM Volume	PM volume	AM Delay/veh	PM Delay/Veh.					AM Volume	PM volume	AM Delay/veh	PM Delay/Veh.		
Alternate US at Meres Boulevard	2018	2058	2058		25.9	29	Alternate US at Meres Boulevard	2018	2058	2058		32	26.7		
Alternate US at Tarpon Ave	2018	2198	2198		26.1	43.1	Alternate US at Tarpon Ave	2018	2666	2666		70.3	76.2		
Alternate US at Meres Boulevard	2038	2502	2502		49.3	36.9	Alternate US at Meres Boulevard	2038	2502	2502		79.5	35.2		
Alternate US at Tarpon Ave	2038	2576	2576		31.1	52.3	Alternate US at Tarpon Ave	2038	2576	2576		140.9094	95.93745		
							Meres Growth		1.215743	1.215743		2.484375	1.318352		
							Build/no build base diff					44.2	33.1		

Net Time Savings (seconds)- Per vehicle per day per peak hour

Volume Difference

	Year	Peak Hour				AM Delay/veh	PM Delay/Veh.	Volume Difference	
		AM Volume	PM volume	AM Delay/veh	PM Delay/Veh.			AM Volume Peak	
Alternate US at Meres Boulevard	2018	2058	2058		6.1	-2.3	0	0	
Alternate US at Tarpon Ave	2018	2198	2198		44.2	33.1	-468	-468	
Alternate US at Meres Boulevard	2038	2502	2502		30.2	-1.7	0	0	
Alternate US at Tarpon Ave	2038	2576	2576		109.809375	43.63745	0	0	

Net Time Savings (Seconds)- Per Day per peak hour total

	Year	Peak Hour				Total	
		AM Volume	PM volume	AM Delay/veh	PM Delay/Veh.	AM Delay/veh	PM Delay/Veh.
Alternate US at Meres Boulevard	2018	2058	2058		12553.8	-4733.4	7820.4
Alternate US at Tarpon Ave (adj. volume)	2018	1730	1730		76466	57263	133729
Alternate US at Meres Boulevard	2038	2502	2502		75560.4	-4253.4	71307
Alternate US at Tarpon Ave	2038	2576	2576		282868.95	112410.1	395279

Net Time Savings (Hours) - Per Day per peak hour total

Seconds-to-hours
Factor 3600
Annualization Factor 260

	Year	Total	
		AM Delay/veh	PM Delay/Veh.
Alternate US at Meres Boulevard	2018	2.172333	
Alternate US at Tarpon Ave	2018	37.14694	
Total	2018	39.31928	
Annual	2018	10,223	
Alternate US at Meres Boulevard	2038	19.8075	
Alternate US at Tarpon Ave	2038	109.7997	
Total	2038	129.6072	
Annual	2038	33,698	

Growth

	Unit	Total
Alternate US at Meres Boulevard	CAGR	11.7%
Alternate US at Tarpon Ave	CAGR	5.6%
Total	CAGR	6.1%

Input

Value	Source
6000	https://tdaappsprod.dot.state.fl.us/fto/
60	Conservative Estimate
180	Conservative Estimate

TABLE 4-1 Opening Year (2018) Signalized Intersection Peak Hour Level of Service Scenario 1							
Intersection	Approach	Approach Traffic Volume		A.M. Peak Hour		P.M Peak Hour	
		AM	PM	Delay (in sec/veh)	LOS	Delay (in sec/veh)	LOS
Alternate US 19 at Meres Boulevard	Northbound	644	1039	18.4	B	31.8	C
	Southbound	843	638	22.2	C	18.4	B
	Eastbound	427	231	35.8	D	34.0	C
	Westbound	144	150	51.4	D	46.9	D
	Overall			25.9	C	29.0	C
Alternate US 19 at Tarpon Avenue	Northbound	688	874	20.1	C	59.9	E
	Southbound	843	686	18.3	B	23.2	C
	Eastbound	221	193	47.4	D	53.1	D
	Westbound	446	445	39.2	D	36.6	D
	Overall			26.1	C	43.1	D

TABLE 4-2 Opening Year (2018) Signalized Intersection Peak Hour Level of Service Scenario 2							
Intersection	Approach	Approach Traffic Volume		A.M. Peak Hour		P.M Peak Hour	
		AM	PM	Delay (in sec/veh)	LOS	Delay (in sec/veh)	LOS
Alternate US 19 at Meres Boulevard	Northbound	644	1039	19.4	B	27.6	C
	Southbound	937	878	22.4	C	17.3	B
	Eastbound	667	325	53.7	D	38.6	D
	Westbound	144	150	49.5	D	49.6	D
	Overall			32.0	C	26.7	C
Alternate US 19 at Tarpon Avenue	Northbound	688	874	20.1	C	59.9	E
	Southbound	843	686	18.3	B	23.2	C
	Eastbound	221	193	47.4	D	53.1	D
	Westbound	446	445	39.2	D	36.6	D
	Overall			26.1	C	43.1	D

**TABLE 5-1 Design Year (2038) Signalized Intersection
Peak Hour Level of Service
Scenario 1**

Intersection	Approach	Approach Traffic Volume		A.M. Peak Hour		P.M. Peak Hour	
		AM	PM	Delay (in sec/veh)	LOS	Delay (in sec/veh)	LOS
Alternate US 19 at Meres Boulevard	Northbound	841	1218	78.4	E	45.6	D
	Southbound	995	764	23.9	C	18.0	B
	Eastbound	508	338	49.1	D	39.7	D
	Westbound	158	182	53.4	D	51.6	D
	Overall			49.3	D	36.9	D
Alternate US 19 at Tarpon Avenue	Northbound	829	1029	24.1	C	68.9	E
	Southbound	1001	826	25.3	C	39.9	D
	Eastbound	253	218	48.0	D	54.7	D
	Westbound	493	503	45.9	D	38.2	D
	Overall			31.1	C	52.3	D

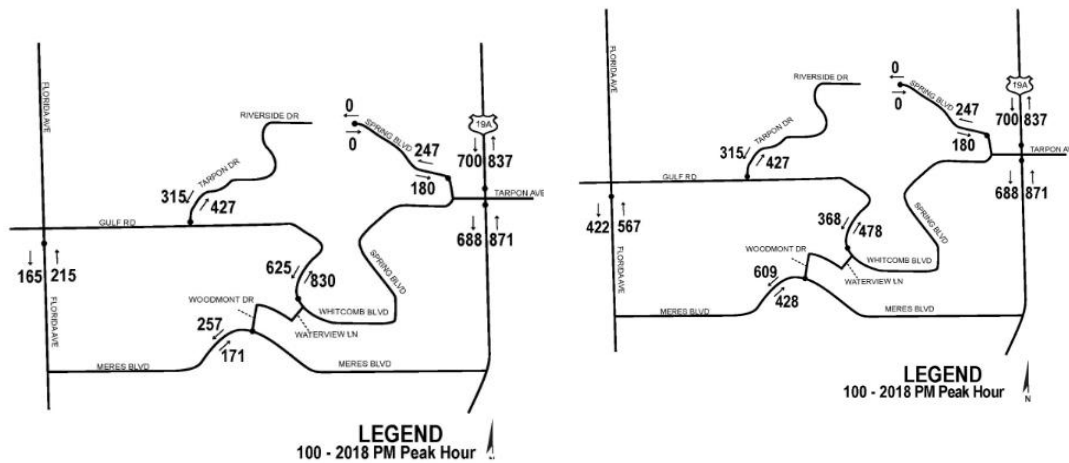
**TABLE 5-2 Design Year (2038) Signalized Intersection
Peak Hour Level of Service
Scenario 2**

Intersection	Approach	Approach Traffic Volume		A.M. Peak Hour		P.M. Peak Hour	
		AM	PM	Delay (in sec/veh)	LOS	Delay (in sec/veh)	LOS
Alternate US 19 at Meres Boulevard	Northbound	841	1218	78.4	E	43.9	D
	Southbound	1114	1062	22.6	C	18.8	B
	Eastbound	806	457	163.5	F	43.7	D
	Westbound	158	182	53.4	D	51.6	D
	Overall			79.5	E	35.2	D
Alternate US 19 at Tarpon Avenue	Northbound	829	1029	24.1	C	68.9	E
	Southbound	1001	826	25.3	C	39.9	D
	Eastbound	253	218	48.0	D	54.7	D
	Westbound	493	503	45.9	D	38.2	D
	Overall			31.1	C	52.3	D

TABLE 6-2 Whitcomb Boulevard Detour Route Signalized Intersection Peak Hour Level of Service							
Intersection	Approach	Approach Traffic Volume		A.M. Peak Hour		P.M. Peak Hour	
		AM	PM	Delay (in sec/veh)	LOS	Delay (in sec/veh)	LOS
Alternate US 19 at Tarpon Avenue	Northbound	705	902	53.5	D	91.0	F
	Southbound	984	800	97.1	F	60.3	E
	Eastbound	505	387	85.5	F	146.9	F
	Westbound	472	577	24.9	C	27.2	C
	Overall			70.3	E	76.2	E

TABLE 6-4 Meres Boulevard Detour Route Signalized Intersection Peak Hour Level of Service							
Intersection	Approach	Approach Traffic Volume		A.M. Peak Hour		P.M. Peak Hour	
		AM	PM	Delay (in sec/veh)	LOS	Delay (in sec/veh)	LOS
Alternate US 19 at Meres Boulevard	Northbound	644	1039	19.4	E	27.6	C
	Southbound	937	878	22.4	C	17.3	B
	Eastbound	667	325	53.7	D	38.6	D
	Westbound	144	150	49.5	D	49.6	D
	Overall			32.0	C	26.7	C

FIGURE 6-2
WHITCOMB BOULEVARD DETOUR ROUTE
PM PEAK HOUR DIRECTIONAL VOLUMES



Estimated Cardiac Arrest Rate

13.72%

Input	Unit	Value	Source
National Cardiac Arrest Estimate (2021)	People	356,000	https://www.sca-aware.org/about-sudden-cardiac-arrest/latest-statistics
National Population (2021)	People	331,893,745	https://www.census.gov/quickfacts/fact/table/US/PST045221
Cardiac Arrest Rate	Factor	0.06%	FEMA BCA Guidance (p. 17, formula (14)): https://files.hudexchange.info/course-content/ndrc-nofa-benefit-cost-analysis-data-resources-and-expert-tips-webinar/FEMA-BCAR-Resource.pdf
Tarpon Springs population	People	25,560	https://www.census.gov/quickfacts/fact/table/tarpon Springs city florida/AGE775221
Response Distance	miles	3	google maps - Tarpon Springs Fire to Parkside
Response Time - based on distance	minutes	13	FEMA BCA Guidance (p. 17, formula (19)): https://files.hudexchange.info/course-content/ndrc-nofa-benefit-cost-analysis-data-resources-and-expert-tips-webinar/FEMA-BCAR-Resource.pdf
Survival Rate - No Build	Factor	3.74%	FEMA BCA Guidance (p. 18, formula (24)): https://files.hudexchange.info/course-content/ndrc-nofa-benefit-cost-analysis-data-resources-and-expert-tips-webinar/FEMA-BCAR-Resource.pdf
Survival Rate -Build	Factor	9.92%	FEMA BCA Guidance (p. 18, formula (20)): https://files.hudexchange.info/course-content/ndrc-nofa-benefit-cost-analysis-data-resources-and-expert-tips-webinar/FEMA-BCAR-Resource.pdf
Tarpon Springs annual cardiac arrest incidents	People	15	Calculator

Input	Unit	Value	Source
Average US response time	minutes	8.5	https://www.ahajournals.org/doi/10.1161/JAHA.120.017048
Study response time	minutes	6	https://www.ahajournals.org/doi/10.1161/JAHA.120.017048
Tarpon Springs Emergency Response time - no Bridge access delay to response time	minutes	4.25	TSFD Letter of Support, WSP Conservative assumptions
Tarpon Springs Emergency Response Time - no bridge delay	minutes	8.5	Using National average unless another estimate can be given; https://www.ahajournals.org/doi/10.1161/JAHA.120.017048
Tarpon springs total emergency response time - Standard + 4.25 bridge delay	minutes	12.75	Calculator
Applicable Trips (% of population) for Emergency Response delay due to no bridge access	factor	0.25	Conservative estimate - 25% of population is estimated based on the location of emergency response centers and where residential communities are located
Tarpon Springs Estimated Survival Rate - No Build	people	13.70	Calculator
Tarpon Springs Estimated Survival Rate - Build	people	13.47	Calculator
Survival Rate Delta	people	0.23	Calculator

BCR

1.92

Variable	Source	Units	Constant (Likely Case)
General Project Details			
Scenario	User Defined		BASELINE
Discount Rate		percent	7.00%
Design/Construction Start Date	Project Defined	year	2020
Design/Construction Period	Project Defined	years	6
Project Opening	Project Defined	year	2026
First Year Adjustment Factor	Project Defined	Adj. for partial years	
Operations Period	User Defined	years	30
Analysis Length (Including Construction)	User Defined	years	36
Percent Rural	Project Defined	percent	
Percent Urban	Project Defined	percent	

Individual Item Details (for Residual Value Calc)

Item 1

Asset Name		words	Movable Bridge
Expected Lifespan of Asset		years	75
Last purchase year		year	2,025
Analysis End Year		year	2055
Item Capital Cost		2020\$	13,581,681

Item 2

Asset Name		words	Enter Asset Name
Expected Lifespan of Asset		years	
Last purchase year		year	
Analysis End Year		year	2055
Item Capital Cost		2020\$	

Item 3

Asset Name		words	Enter Asset Name
Expected Lifespan of Asset		years	
Last purchase year		year	
Analysis End Year		year	2055
Item Capital Cost		2020\$	

Item 4

Asset Name		words	Enter Asset Name
Expected Lifespan of Asset		years	
Last purchase year		year	
Analysis End Year		year	2055
Item Capital Cost		2020\$	

Item 5

Asset Name		words	Enter Asset Name
Expected Lifespan of Asset		years	
Last purchase year		year	
Analysis End Year		year	2055
Item Capital Cost		2020\$	

Facility Improvements

Public Transit Facility

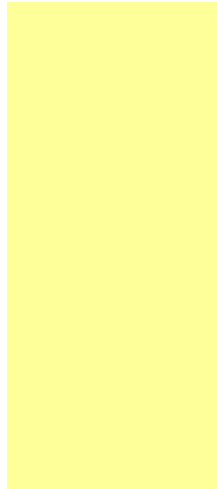
1 = project will make improvement; 0 = project will not make improvement

Bus Stop

Clocks	Project Defined	indicator	
Electronic Real-Time Information Displays	Project Defined	indicator	
Information/Emergency Button	Project Defined	indicator	
PA System	Project Defined	indicator	
Platform/Stop Seating Availability	Project Defined	indicator	
Platform/Stop Weather Protection	Project Defined	indicator	
Restroom Availability	Project Defined	indicator	
Retail/Food Outlet Availability	Project Defined	indicator	
Staff Availability	Project Defined	indicator	
Step-free Access to Station/Stop	Project Defined	indicator	
Step-free Access to Vehicle	Project Defined	indicator	
Surveillance Cameras	Project Defined	indicator	
Temperature Controlled Environment	Project Defined	indicator	
Ticket Machines	Project Defined	indicator	
Timetables	Project Defined	indicator	
Bike Facilities	Project Defined	indicator	
Car Access Facilities	Project Defined	indicator	
Elevator	Project Defined	indicator	
Escalators	Project Defined	indicator	
On-Site Ticket Office	Project Defined	indicator	
Taxi Pickup/Dropoff	Project Defined	indicator	
Waiting Room	Project Defined	indicator	

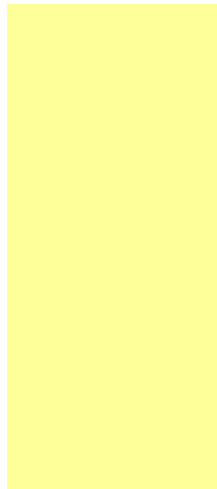
Light Rail/Streetcar Stop

Clocks	Project Defined	indicator
Electronic Real-Time Information Displays	Project Defined	indicator
Information/Emergency Button	Project Defined	indicator
PA System	Project Defined	indicator
Platform/Stop Seating Availability	Project Defined	indicator
Platform/Stop Weather Protection	Project Defined	indicator
Restroom Availability	Project Defined	indicator
Retail/Food Outlet Availability	Project Defined	indicator
Staff Availability	Project Defined	indicator
Step-free Access to Station/Stop	Project Defined	indicator
Step-free Access to Vehicle	Project Defined	indicator
Surveillance Cameras	Project Defined	indicator
Temperature Controlled Environment	Project Defined	indicator
Ticket Machines	Project Defined	indicator
Timetables	Project Defined	indicator
Bike Facilities	Project Defined	indicator
Car Access Facilities	Project Defined	indicator
Elevator	Project Defined	indicator
Escalators	Project Defined	indicator
On-Site Ticket Office	Project Defined	indicator
Taxi Pickup/Dropoff	Project Defined	indicator
Waiting Room	Project Defined	indicator



Rail Stop

Clocks	Project Defined	indicator
Electronic Real-Time Information Displays	Project Defined	indicator
Information/Emergency Button	Project Defined	indicator
PA System	Project Defined	indicator
Platform/Stop Seating Availability	Project Defined	indicator
Platform/Stop Weather Protection	Project Defined	indicator
Restroom Availability	Project Defined	indicator
Retail/Food Outlet Availability	Project Defined	indicator
Staff Availability	Project Defined	indicator
Step-free Access to Station/Stop	Project Defined	indicator
Step-free Access to Vehicle	Project Defined	indicator
Surveillance Cameras	Project Defined	indicator
Temperature Controlled Environment	Project Defined	indicator
Ticket Machines	Project Defined	indicator
Timetables	Project Defined	indicator
Bike Facilities	Project Defined	indicator
Car Access Facilities	Project Defined	indicator
Elevator	Project Defined	indicator
Escalators	Project Defined	indicator
On-Site Ticket Office	Project Defined	indicator
Taxi Pickup/Dropoff	Project Defined	indicator
Waiting Room	Project Defined	indicator



Public Transit Vehicle Amenities

1 = project will make improvement; 0 = project will not make improvement

Bus

Electronic Real-Time Information Displays	Project Defined	indicator	
Handrails	Project Defined	indicator	
Luggage Storage	Project Defined	indicator	
PA System	Project Defined	indicator	
Surveillance Cameras	Project Defined	indicator	
Temperature Control	Project Defined	indicator	
Wheelchair Space	Project Defined	indicator	

Light Rail/Streetcar

Electronic Real-Time Information Displays	Project Defined	indicator	
Handrails	Project Defined	indicator	
Luggage Storage	Project Defined	indicator	
PA System	Project Defined	indicator	
Surveillance Cameras	Project Defined	indicator	
Temperature Control	Project Defined	indicator	
Wheelchair Space	Project Defined	indicator	

Rail

Electronic Real-Time Information Displays	Project Defined	indicator	
Handrails	Project Defined	indicator	
Luggage Storage	Project Defined	indicator	
PA System	Project Defined	indicator	
Surveillance Cameras	Project Defined	indicator	
Temperature Control	Project Defined	indicator	
Wheelchair Space	Project Defined	indicator	
Food Service Availability	Project Defined	indicator	
Restroom Availability	Project Defined	indicator	

Active Transportation Facility

Pedestrian

Expand Sidewalk (added width)	Project Defined	feet	12 per USDOT guidance, anything above 31 feet v
Facility length	Project Defined	miles	0.075 per USDOT guidance, anything above 0.86 mil
Marked Crosswalk (Roadway with Volume ≥10,000)	Project Defined	indicator	1 = project will make improvement; 0 = project
Pedestrian Signal (Roadway with Volume ≥13,000 A)	Project Defined	indicator	1 = project will make improvement; 0 = project

Cycling

Type of Cycling Improvement	Project Defined	text	Dedicated Cycling Lane
Cycling Facility Length	Project Defined	miles	0.075 per USDOT guidance, anything above 2.38 mil

Vehicle Fuel Type (Emission Lookup)

Passenger Car	Project Defined	text	Gasoline
Trucks	Project Defined	text	Diesel
Bus	Project Defined	text	Gasoline

Variable	Value	Unit
B/C Ratios		
Benefit Cost Ratio	1.92	ratio
NPV		
Net Present Value	\$14,752,675	years
BENEFITS		
Operations Period	30	years
TOTAL BENEFITS	\$30,705,310	2020\$ in 2020
Average Yearly Benefits	\$1,023,510	2020\$ in 2020
COSTS		
Design/Construction Period	6	years
TOTAL COSTS	\$15,952,634	2020\$ in 2020
Average Yearly Costs	\$2,658,772	2020\$ in 2020

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Table with columns for years (2020-2063) and rows for Forecast period flag, Operations period flag, and Variable. Values include 36.00, 30.00, and 1.00 across various years.

GENERAL

If the residual value is not provided by the client use this tab to calculate the associated value for your project. Your resulting value should be incorporated in line 46 of the Input_Facility tab.

Main calculation table with columns for years (2020-2063) and rows for Base Year, Design/Construction Period, ITEM 1 (Movable Bridge), ITEM 2 (Enter Asset Name), ITEM 3 (Enter Asset Name), ITEM 4 (Enter Asset Name), ITEM 5 (Enter Asset Name), and TOTAL. Rows include Expected Lifespan of Asset, Depreciation Rate, Total Depreciation, Remaining Capital Value Total, and Discount Factor.