

MEMORANDUM

Date: January 21, 2022

To: Karina Fuentes, Florida Department of Transportation, District Six

From: Nelson Mora, PE

Project: Protected Shared-Use Path on SR 856/William Lehman Causeway from US-1/Biscayne Blvd. to SR A1A/Collins Ave.

Subject: Concept Justification Report

INTRODUCTION

Study Origin

On August 3, 2020, the City of Aventura and City of Sunny Isles Beach requested the Florida Department of Transportation (FDOT) to conduct a lane elimination and repurposing analysis of SR 856/William Lehman Causeway to accommodate a shared-use path on the southside of the causeway adjacent to the eastbound travel lanes. This request came in light of the *North-South Transportation Needs for the Coastal Communities Feasibility Study* completed in June 2020 by the Miami-Dade County Transportation Planning Organization (TPO). This study recommended the construction of a barrier-separated shared use path along the south side of SR 856/William Lehman Causeway by eliminating an eastbound travel lane from SR 5/US 1/Biscayne Boulevard to SR A1A/Collins Avenue.

On January 6, 2021, FDOT responded to the cities' request and initiated a feasibility analysis to examine if a barrier-separated shared-use path can be accommodated on SR 856/William Lehman Causeway while maintaining all existing travel lanes and outside shoulders.

Existing Conditions

In 2012, FDOT established a two-year pilot program that permits bicyclists to travel on three Limited Access (LA) facilities over water bodies, including SR 856/William Lehman Causeway from SR 5/US 1/Biscayne Boulevard to SR A1A/Collins Avenue. As part of this pilot program, FDOT installed bicycle lane markings on the eastbound and westbound outside shoulders of the causeway, and along the causeway frontage roads, from West Country Club Drive to SR A1A/Collins Avenue by March 2013. In late 2014, FDOT redesigned the bicycle lane crossings and also installed green colored pavement on areas where bicyclists and other roadway traffic have conflicting weaving or crossing movements. Figure 1 presents selected bicycle lane crossing on the causeway and how they have been modified over the years.



Figure 1: Selected Bicycle Lane Crossings on SR 856/Lehman Causeway (2013 - 2022)

FDOT published a final report for the pilot project on August 2015. The conclusion of this report states:

“During the course of the pilot project, data shows that bicycle usage increased steadily over the pilot period for the William Lehman and Julia Tuttle Causeways, and held steady for the Pineda Causeway. Bicycle usage tended to be higher on the weekends. Speed data from an independent study demonstrated that drivers reduced their speed by approximately 2.2 MPH when overtaking bicyclists on the causeway segments of the bridges. At the merge areas, both drivers and bicyclists were found to actively search for other traffic and yield appropriately.

The frequency of bicycle crashes did not significantly increase on the pilot corridors, even with the increase in bicycle activity. Overall crashes (those involving all vehicle types and crash types) increased on the Julia Tuttle Causeway and remained the same for the other two causeways.”

The final report recommends caution when implementing similar bicycle facilities on other LA corridors, especially on corridors with high speeds, high truck volumes, and narrow shoulders. The final report recommended extending the pilot project for two additional years to evaluate crash data and identify any potential trends related to the additional bicycle traffic.

Since the conclusion of the pilot project, FDOT has not removed or modified the bicycle lanes on the outside shoulder of the causeway and on the frontage roads. Provided this condition has remained relatively intact for over 8 years, and given user expectancy, this condition is assumed to be the base condition.

JUSTIFICATION OF RECOMMENDED ALTERNATIVE

Need for Two Protected Shared-Use Paths

Data collected in 2021 revealed that the causeway has a need for improved bicycle and pedestrian connections between SR 5/US 1/Biscayne Boulevard to SR A1A/Collins Avenue based on system linkage, social demand and economic development, modal interrelationship, safety, and capacity. The study area contains a substantial population of observant Jewish citizens that strictly follow Jewish laws. Under Jewish law, certain activities are prohibited on the Sabbath and major holidays (approximately 22 days per year). Among the prohibited activities relevant to this study are the prohibition against travel by motor vehicle as either a driver or passenger and against travel by bicycle or similar device (conventional scooters are generally not prohibited).

The safety and capacity needs are of particular concern since the SR 856/William Lehman Causeway is used by a high volume of diverse non-motorized users. Figure 2 explains the difference between low-stress tolerance and high-stress tolerance bicyclists. This categorization also applies to pedestrians which can be classified from low-stress tolerance (i.e., children) to high-stress tolerance (i.e., athletes). Figure 3 through Figure 5 show the various types of users observed using the causeway on field reviews conducted in 2021. Per the Florida Design Manual (FDM) 224.1:

“A shared use path may not be the best solution for all conditions. Use a separated bike lane with a sidewalk per FDM 223 and FDM 222 in Context Classifications C2T, C4, C5, or C6 when:

- Non-motorist volumes are expected to be high, or
- There may be high numbers of more vulnerable users such as elderly or people with disabilities.”

Per FDM 224.1.1:

“Exposing vulnerable road users to high-speed traffic is undesirable; therefore, shared use paths located parallel to LA Facility travel lanes are not permitted within LA right of way (R/W). However, a shared use path on causeways or bridges that span navigable waterways may be considered when the path is shielded from the high-speed traffic using a barrier or traffic railing.”

SR 856/William Lehman Causeway is a LA facility with C5 Context Classification and a design speed of 55 mph. Two protected shared-use paths are recommended for the causeway given that the existing bicycle lanes do not shield vulnerable users from high-speed traffic, the causeway has high volume of non-motorists users, and the causeway has a large mix of vulnerable, low-stress tolerance and skilled, high-stress tolerance non-motorized users.

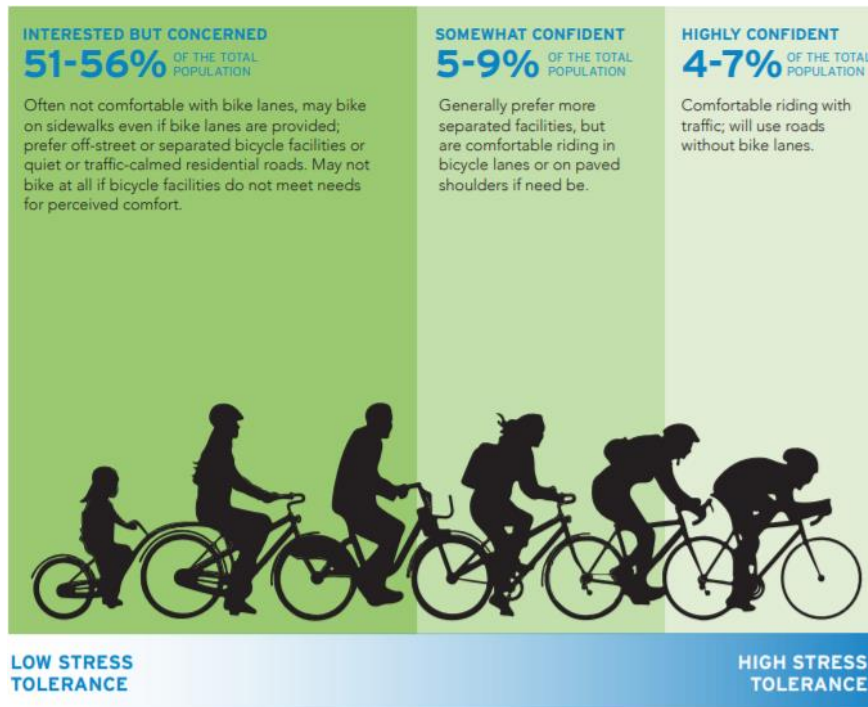


Figure 2: Bicyclists User Profiles (2045 Miami-Dade County Bicycle and Pedestrian Master Plan, Miami-Dade TPO)



Figure 3: Example of Low-Stress and High-Stress Tolerance Users on SR 856/William Lehman Causeway



Figure 4: Observed Non-Motorized Users on the SR 856/William Lehman Causeway Westbound On-Ramp from SR A1A/Collins Avenue

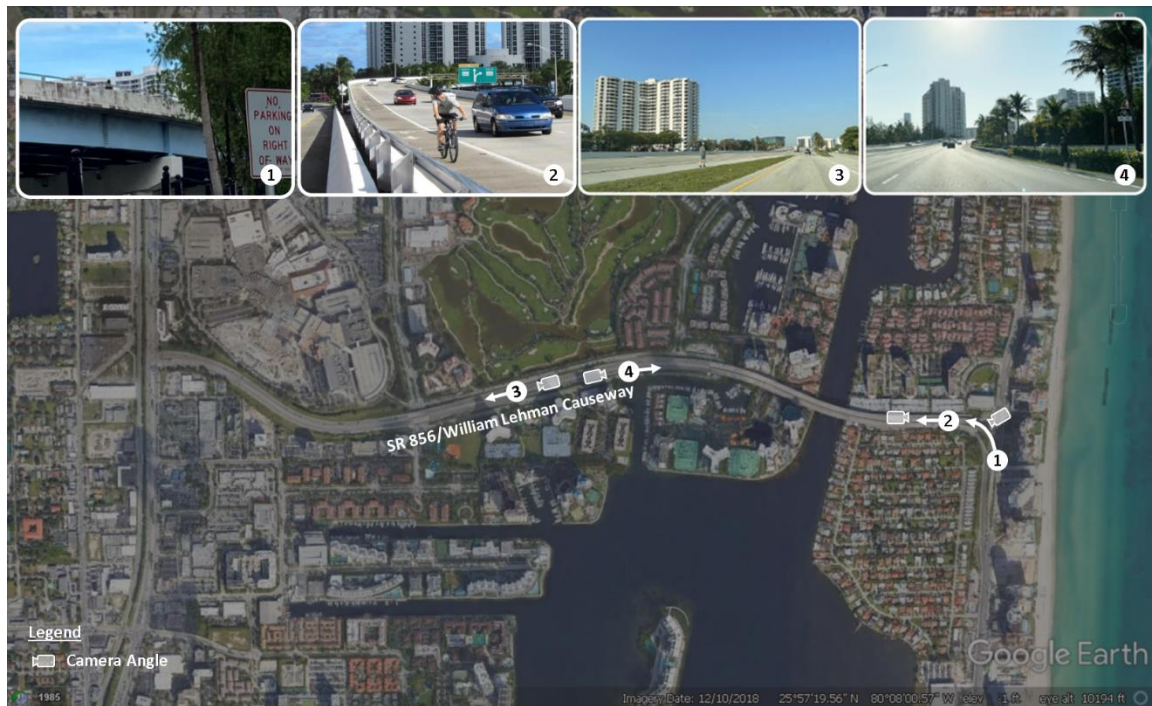


Figure 5: Observed Non-Motorized Users on SR 856/William Lehman Causeway

The logic behind providing two protected shared-use paths is to separate vulnerable non-motorized users from skilled non-motorized users while also providing enough capacity for existing and future non-motorized demand of the causeway. Given that Aventura Mall, the Don Soffer Exercise Trail, Edmond J. Safra Synagogue, Heritage Park, public parking, and beach access are important bicycle and pedestrian attractors, a shared-use path is recommended on the north side of the causeway to directly link these attractors. The second shared-use path is recommended to be located on the median of the causeway to reduce the amount of potential conflict points with adjacent land uses, vehicle turning movements, and the causeway frontage road. The north shared-use path is envisioned to be utilized by low-stress tolerance non-motorized users since it provides access to generators and conforms with existing user expectancy. The median shared-use path is envisioned to be utilized by high-stress tolerance non-motorized users that require long, uninterrupted distances for their higher riding speeds.

Alternatives Considered but Eliminated

No Build

The No Build Alternative keeps the existing bicycle lanes on the eastbound and westbound outside shoulders of the causeway, and along the causeway frontage roads, from West Country Club Drive to SR A1A/Collins Avenue. This alternative does not create an integrated transportation system with existing and future bicycle, pedestrian, and transit facilities such as the Aventura Station, SR 5/US 1/Biscayne Boulevard bicycle lanes, Don Soffer Exercise Trail, Founders Park, and Heritage Park. This alternative does not satisfy safety concerns from the City of Aventura and Sunny Isles based on the growing number of diverse non-motorized users.

Lane Repurposing

FDOT's current lane repurposing guidance is not applicable to LA facilities. Hence, in order to eliminate a lane on SR 856/William Lehman Causeway and repurpose the space for a median shared-use path and inside shoulders, the causeway must first be reclassified as an arterial roadway. Furthermore, this alternative requires analysis of traffic operations and safety impacts provided the reduced roadway capacity. This alternative does not provide a time-sensitive solution to solve the existing safety needs of cyclists and pedestrians using the causeway.

Road Widening

Widening SR 856/William Lehman Causeway has significant social and environmental impacts. This alternative also does not provide a time-sensitive solution to solve the study area needs.

Recommended Alternative

In general, the recommended alternative includes the construction of two physically protected shared-use paths. The first path is recommended along the inside shoulder of eastbound SR 856/William Lehman Causeway from SR 5/US-1/Biscayne Boulevard to SR A1A/Collins Avenue. The second path is recommended parallel to the outside shoulder of westbound SR 856/William Lehman Causeway from SR 5/US-1/Biscayne Boulevard to the existing W Country Club Drive shared-use path (MP 0.529), and on the outside shoulder of westbound SR 856/William Lehman Causeway from just west of East Country Club Drive (MP 0.968) to SR A1A/Collins Avenue. Signalized raised bicycle/pedestrian crossings are also recommended across the north and south frontage roads to connect to the existing West Country Club Drive shared-use path.

The recommended alternative also proposed elevating SR 856/William Lehman Causeway from approximately MP 0.742 to MP 0.960 to create a bicycle/pedestrian underpass connecting the West Country Club Drive shared-use path and north and south frontage roads to the recommended physically protected center shared-use path on the inside shoulder of eastbound SR 856.

The recommended alternative also includes signalized raised bicycle/pedestrian crossings across the north and south frontage roads. Other recommended improvements include:

- SR 856/William Lehman Causeway and SR 5/US-1/Biscayne Boulevard
 - Bicycle/pedestrian marked crossings with green elephant markings connecting the proposed shared-use paths to the existing bicycle lanes and sidewalks along northbound and southbound SR 5/US-1/Biscayne Boulevard.
- SR 856/William Lehman Causeway and West Country Club Drive
 - Bicycle/pedestrian marked crossings with green elephant markings connecting the proposed shared-use path along westbound SR 856/William Lehman Causeway to the existing West Country Club Drive shared-use path.
 - Extensions of the shared-use path along West Country Club Drive on the west and east side of the roadway and connecting across West Country Club Drive and the south Frontage Road via signalized bicycle/pedestrian marked crossings with green elephant markings.
 - Providing green bicycle pavement markings at the conflict points of the existing bicycle lane along the north Frontage Road.
- SR 856/William Lehman Causeway and SR A1A/Collins Avenue
 - Signalized bicycle/pedestrian marked crossing with green elephant markings across SR A1A/Collins Avenue to connect proposed shared-used paths to existing Beach access.
 - Extending the shared-use path (from the above-mentioned proposed crossing) along SR A1A/Collins Avenue to connect the center shared-use path and the shared-use path along the westbound SR 856/William Lehman Causeway on ramp to the intersection of NW 189 Street.

The benefits of the recommended alternative include:

- A focus on fatal and serious injury crash reduction by channelizing, separating and physically protecting vulnerable users (i.e., pedestrians and cyclists) on the causeway and the parallel frontage roadways.

- Separation of pedestrian and cyclist spaces via use of longitudinal barriers, both barrier wall and guardrail, thus eliminating their exposure to collisions by motor vehicles.
- Creation of slower and more uniform vehicle speeds particularly along the frontage roadways which have pedestrian and cyclist crossings and adjacent travelers.

The recommended alternative requires the approval of design exceptions for the following elements: horizontal stopping sight distance, lane width, and shoulder width. The causeway is a high-speed limited access roadway (design speed ≥ 50 mph); thus, these elements are considered controlling design elements per FDOT FDM 122.2.2.

Table 1: Horizontal Stopping Sight Distance Design Exceptions

Location	Travel Direction	Length (ft.)	FDM Standard (ft.)	AASHTO Standard (ft.)	Existing (ft.)	Proposed (ft.)
Mainline (MP 0.090 – 0.161)	WB	375	495	495	375	375
Mainline (MP 0.272 – 0.329)	EB	298	495	495	363	298
Mainline (MP 0.325 – 0.391)	WB	349	495	495	N/A (No existing above ground obstruction, i.e., no existing guardrail)	349
Mainline (MP 1.115 – 1.195)	WB	420	495	495	527	420
Mainline (MP 1.324 – 1.398)	EB	393	495	495	395	393

Table 2: Lane Width Design Exceptions

Location	Travel Direction	Length (ft.)	FDM Standard Width (ft.)	AASHTO Standard Width (ft.)	Existing Width (ft.)	Proposed Width (ft.)
Mainline (MP 0.773 – 1.425)	WB	3440	12	12	12	11
Mainline (MP 0.000 – 1.704)	EB	8997	12	12	12	11
WB On-Ramp from SB SR A1A/Collins Avenue (MP 1.536 – 1.704)	WB	850	15	15	15	12
Frontage Road Texas U-turn at W. Country Club Drive (MP 0.570)	SB (from WB Frontage Rd. to EB Frontage Rd.)	310	15	15	15	12

Table 3: Shoulder Width Design Exceptions

Location	Travel Direction	Length (ft.)	FDM Standard Width (ft.)		AASHTO Standard Width (ft.)		Existing Width (ft.)		Proposed Width (ft.)	
			Total	Paved	Total	Paved	Total	Paved	Total	Paved
Mainline (MP 0.091 – 0.424)	WB Out	1760	12	10	10	10	12	10	8 ft.	8
Mainline (MP 1.019 – 1.439)	WB Out	2220	12	10	10	10	8.5	8.5	4	4
Mainline (MP 0.133 – 0.493)	WB In	1900	12	10	10	10	9	9	9	9
Mainline (MP 0.748 – 0.774)	WB In	135	12	10	10	10	9	9	8.5	8.5
Mainline (MP 0.924 – 1.032)	WB In	570	12	10	10	10	9	9	8.5	8.5
Mainline (MP 1.042 – 1.125)	WB In	440	12	10	10	10	8.5	8.5	6.5	Avg. 6.5 (7.5 to 5.5)
Mainline (MP 1.129 – 1.269)	WB In	740	12	10	10	10	8	8	3	3
Mainline (MP 1.269 – 1.458)	WB In	1000	12	10	10	10	8	8	5	5
Mainline (MP 0.042 – 1.114)	EB In	5660	12	10	10	10	9	9	4	4
Mainline (MP 0.534 – 0.574)	EB Out	210	12	10	10	10	6.5	6.5	3.5	3.5
Mainline (MP 0.720 – 0.970)	EB Out	1320	12	10	10	10	10	10	8	8
Mainline (MP 1.080 – 1.619)	EB Out	2850	12	10	10	10	10	10	5.5	5.5
WB On-Ramp from SB SR A1A/Collins Avenue (MP 1.536 – 1.676)	WB In	740	6	2	6	2	6	6	4	4
WB On-Ramp from SB SR A1A/Collins Avenue (MP 1.458 – 1.676)	WB Out	1150	6	4	6	4	6	6	2	2

BICYCLE · PEDESTRIAN
MOBILITY IMPROVEMENT PROGRAM

Protected Bicycle/Pedestrian Facilities along SR 856/William Lehman Causeway between US-1/Biscayne Blvd. and SR A1A/Collins Ave.



PROJECT PURPOSE

C5⁺ Context Classification
* Limited Access facility with C5 surrounding context

Provide: physically separated (concrete barrier/guardrail) shared-use paths on, and parallel to, William Lehman Cswy.

To create: limited access non-motorized facilities safely connecting the communities across the intercoastal waterway.

PROJECT LOCATION

LEGEND

- Bridge Deck Water Blasting & Restriping
- Milling & Resurfacing/Widening/Reconstruction
- Proposed Shared-Use Path/Bike&Ped Facility
- Existing Bus Stops
- Existing Shared-Used Path
- Existing Right-of-Way Line

