March 1, 2011

NORTH BEACH
STREETS, WATER, AND WASTEWATER STUDY
DRAFT

PLANNING AND ENVIORNMENTAL SERVICES DEPARTMENT AND THE NORTH BEACH TASK FORCE

Summary of Recommendations and Cost Estimates

Southeast – Aquarium to Surfside Park and east of Timon Boulevard

Improve North Shoreline Boulevard three block area between the Pearl Street and Coastal Avenue – widen sidewalks, move curbs, restripe for on-street angle parking on both sides of the street.

Create a public plaza and entrance to the Breakwater Structure

Repair sidewalks, install pedestrian safety railing and lighting on the Breakwater Structure

Add an 8 foot wide sidewalk along Surfside Boulevard (east side only)

Improve three streets which terminate at beach parking lots with curb, valley gutters, and sidewalks per design concept in Figure 10: Golf Place Avenue, Breakers Avenue and Surfside Avenue (next to park)

Connect water lines to eliminate dead end loops

Upgrade undersized lines to at least 8” in size

Northeast – Surfside Park north to Nueces Bay and east of Timon Boulevard

Improve Surfside Boulevard between Surfside Park and Gulden Street; Improve Gulfspray Avenue and Gulf Breeze Avenue per design concept in Figure 10.

Improve four streets which terminate at beach parking lots with curb, valley gutters, and sidewalks per design concept in Figure 10: Surfside (next to the Park), Gulfspray Avenue, Beach Avenue and Gulden Street.

Upgrade water lines and eliminate dead end lines per concept in Figure 11

Timon – US 181 – West of Timon Boulevard to US 181

Improvements as development occurs through the City’s development process

Rincon Channel – Improvements as development occurs through the City’s development process

Cost Estimates (Draft)

	Complete Street with curb, gutter, Sidewalks	***<u>Reduced Cost Option</u> Sidewalk Only - no Street Imp.***	***Water***	***Waste water***
Southeast Area				
North Shoreline – Pearl to Coastal.	$250,000			
Breakwater Avenue Plaza		$300,000		
Breakwater Str. – railing, lighting	$300,000			
Surfside – next to the park	$ 546,612	$ 17,940		
Breakers – Surfside to beach	$190,126	$ 6,240		
Golf Place – Surfside to beach	$162,399	$ 5,330		
Looped Water Line			NA	
Southeast Total	**$1,449,137**	**$329,510**		
Northeast Area				
Surfside – Bushick to Gulden	$1,363,757	$ 27,544		
Surfside – next to Surfside Park	$ 546,612	$ 17,940		
Gulfspray – Surfside to beach	$ 253,501	$ 8,320		
Gulf Breeze – Gulfspray to Gulden	$ 683,661	$ 22,438		
Gulden – Surfside to beach	$ 245,579	$ 8,060		
Beach – Surfside to beach	$ 245,579	$ 8,060		
Looped Water Line			$600,000	
Northeast Total	**$3,338,689**	**$ 92,362**	**$600,000**	
Timon – US 181 Area	No improvement proposed			
Rincon Channel Area	No improvement proposed			

North Beach
Streets, Water and Wastewater Study

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Prepared by: Development Services Department, City of Corpus Christi and the North Beach Taskforce

Existing Conditions

Topography

North Beach is part of what is known as the Rincon Peninsula that was created in the mid 1920s when the Corpus Christi Ship Channel was dredged. Prior to construction of the ship channel, the area was connected to the mainland and the downtown area. The topography of the area is flat with an elevation of only 1 to 6 feet above sea level.

Soils and Water Table

Area soils are composed of sand and silt with an under layer of clay. The Nueces County Soil Survey describes the soils as the Lomalta Association with a water table of less than six feet. Because of the relatively soft surface soil of sand, for any building to survive even a modest hurricane construction must be built on suspended foundations or pile supported foundations.

A deep pile supported foundation can withstand the undermining and washing away of the sandy soils during a storm surge as opposed to a slab on grade which will sink or float away.

The high water table and low elevation of the area makes draining the area very difficult since there is very little opportunity to create a slope for drainage structures or pipes. Just as important is that the “force” to create stormwaters to flow is difficult to create when the drainage pipe is already partially full of water due to the high water table. For these reasons the standard drainage systems generally only have modest success at draining storm waters.

Given the high water table, street flooding after storm events will remain for a duration of several days. Several contributing factors include clogged underground storm drainage pipes. For this reason the standard curb, gutter, and underground drainage street design may need to be modified or replaced with a design more suited to the environmental constrains found in this area.

Street Flooding During Recent Rainfall Events

An example of the street flooding that has occurred during recent storm is shown on several picture in Figures 1 thru 3. The pictures were taken after the several days of heavy rains June 29 and June 30, 2010.

Figure 1: North Shoreline Blvd./Breakwater Ave. – East

Figure 2: Dolphin Park – Looking Northwest – 7/2/2010

Figure 3: Tourist Avenue – Looking East from US 181 – 7/2/2010

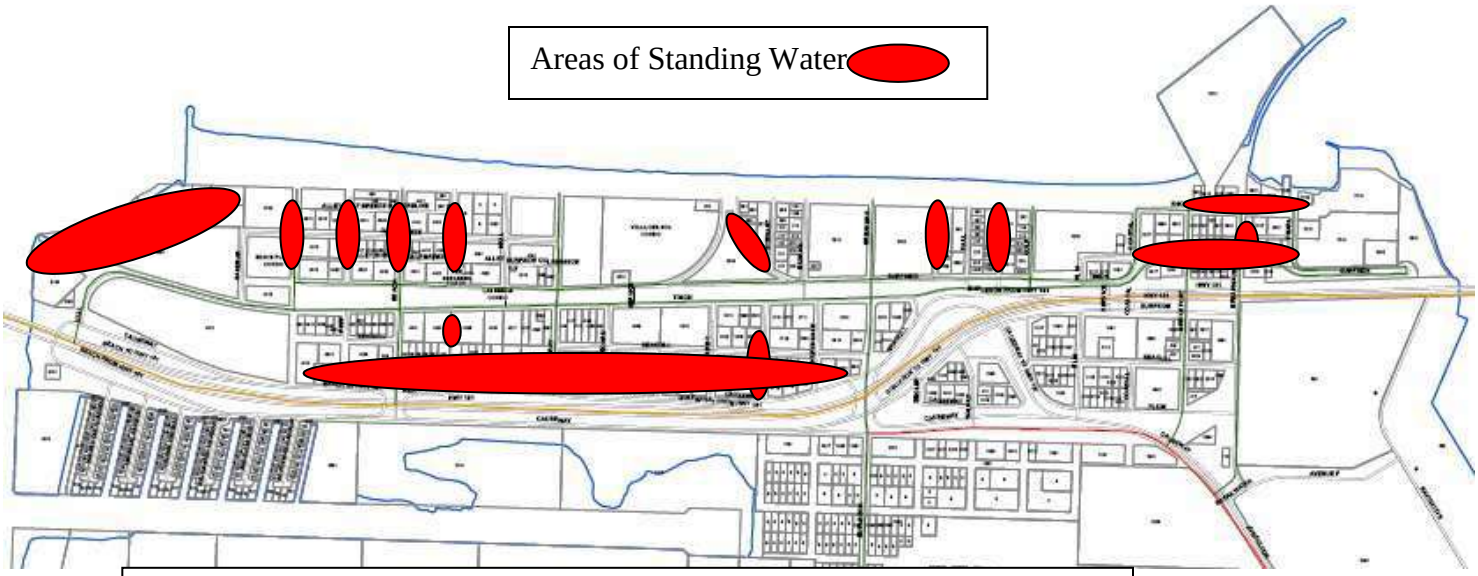


Figure 4: Storm Flooding July 2, 2010

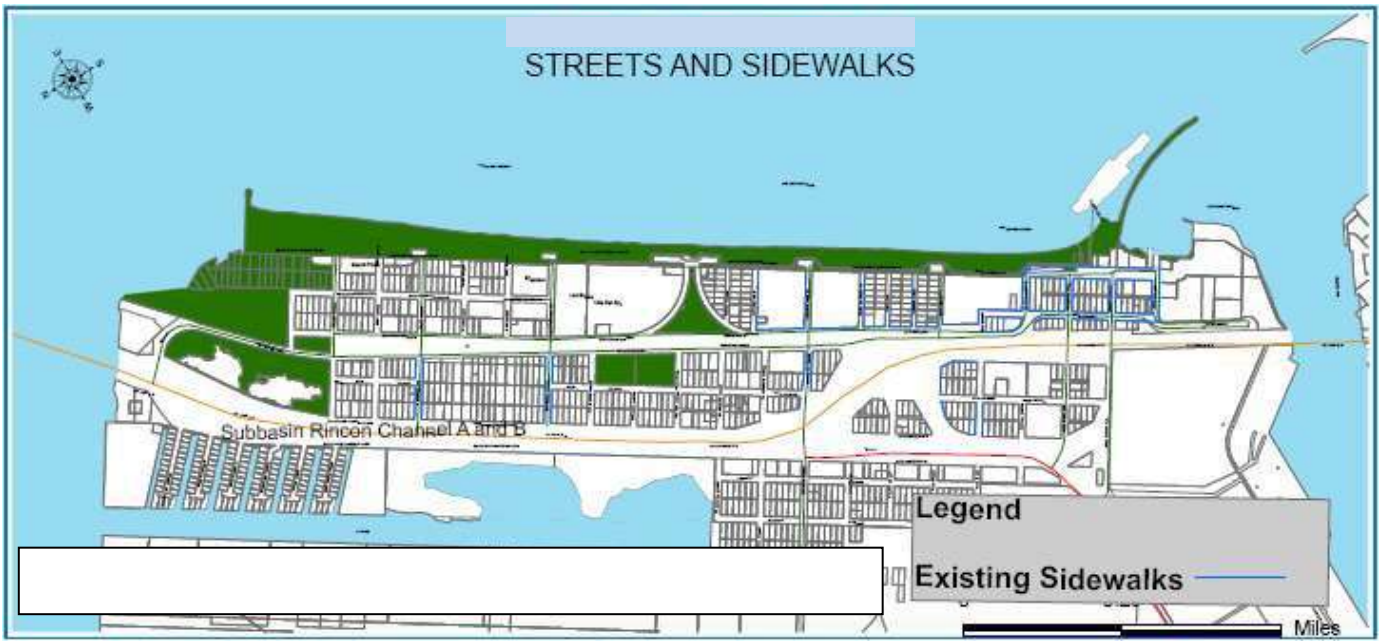
History

North Beach was platted in November 1890 as the Brooklyn Subdivision. The block and street layout, as well as the water and wastewater line layout today originates from the 1890 subdivision plat. The streets in the original subdivision were dedicated with 40 feet, 50 feet or 60 feet in width. The standard width for a street next to a high density development is at least 60 feet wide.

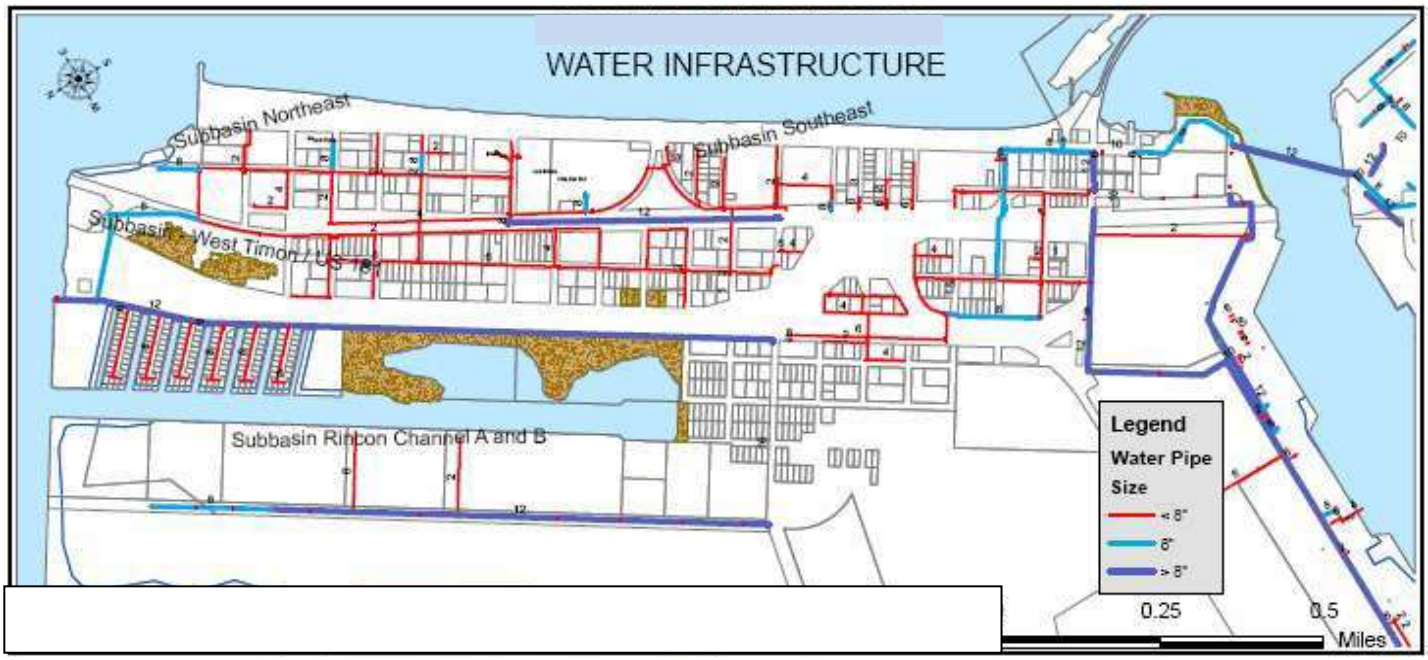
Several of the streets on North Beach are designated as collector streets in the Urban Transportation Plan. These collector streets include: Surfside/Timon Boulevard; Breakwater; Bridgeport Avenue; Burleson/Breakers; Pearl Street; North Shoreline Boulevard; Golf Place; Gulf Spray; Beach Avenue; and Gulden Street.

In 1977, when the City reached an agreement with the Corp of Engineers to re-nourish North Beach, part of the agreement required the City to stop allowing drainage to flow across the beach. A new underground drainage system was constructed on several of the existing streets to allow drainage to flow either to the existing outfall north of Dolphin Park or at the outfall located on the Ship Channel next to the Aquarium. However, the new construction did not include re-graded the existing streets to cause storm drainage to flow in a westward direction away from the beach. Consequently, streets that dead end at the beach tend to flood during storm events.

Most of the streets in the area were originally installed with a rural design of two travel lanes with roadside ditches. Curbs, gutters and sidewalks were not included. Over the years the City has improved many of the streets located near the Aquarium with curbs, gutters and sidewalks. However, many streets still remain without curbs, gutters and sidewalks. (See Figure 5)



Similarly, the water and wastewater system was originally sized for low density and not high density development. For example, the standard modern requirement for a water line to serve high density development is 8" to 12" depending on the density of the development. Water lines that are 8" or larger are of sufficient size to meet the City Fire Code requirement of 1,500 gallons per minute for multifamily developments. As can be seen in Figure 6 many of the water lines, especially north of Surfside Park are 6" or smaller.

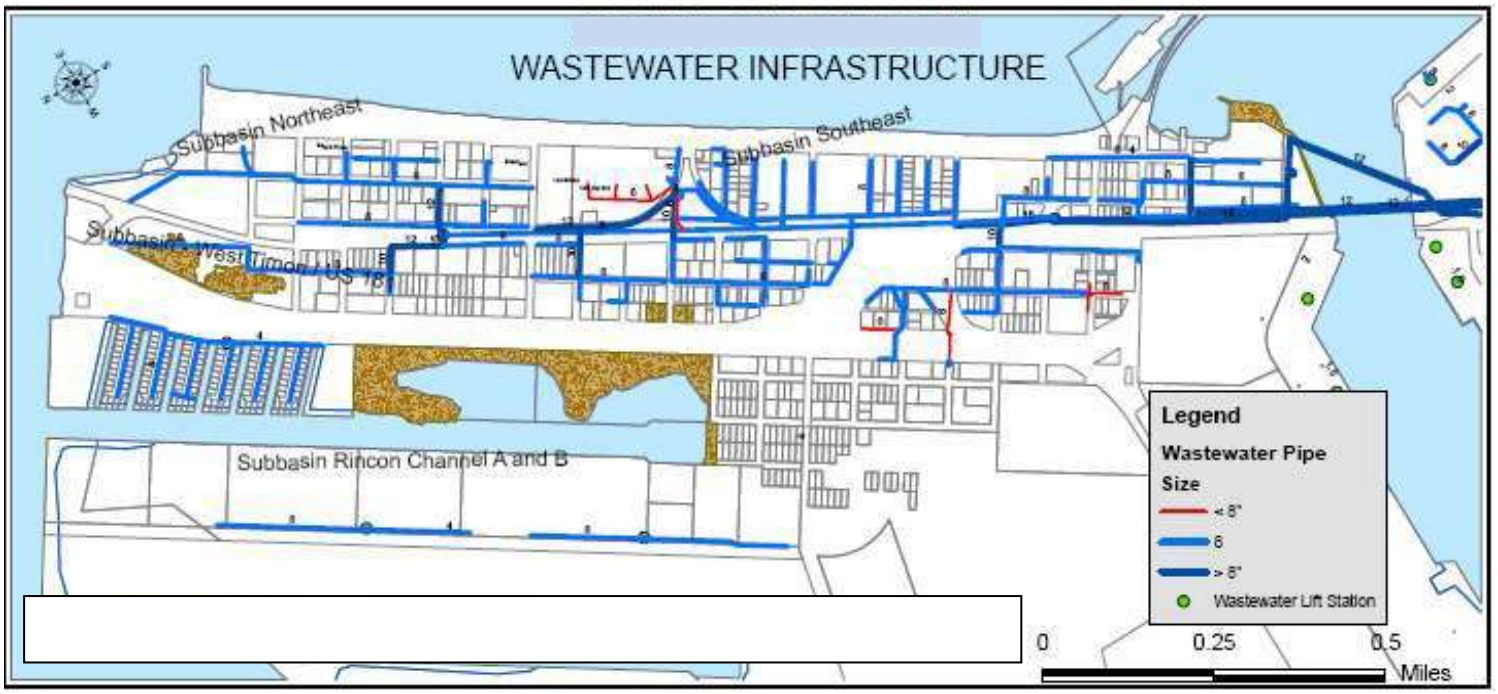


A general estimate of replacement of all of the substandard water lines with 8" lines is estimated to cost $2.98 million.

In addition to replacement of the substandard lines, the City would need to eliminate the many "dead-end" lines that are not part of a water looped system. Dead-end lines are a problem as there is no means to flush or cause regular circulation of the water to occur. Dead-end water lines must be periodically manually flush to assure safe water quality. An additional cost for looping the water lines would be at least $500,000 for a total cost of $3.48 million. See attachment 1: Water Line Replacement Costs.

While a total replacement of the water line system is likely too costly for the city to undertake in a single project, the following sections of the report will provide several less costly options targeted to existing high density developments which require larger water lines to meet fire code requirements.

Finally, not all of the wastewater (sewer) lines in the area are complete. Several gaps in service coverage exist west of Timon Boulevard for properties fronting onto the US 181 access road. From an initial review there appears to be sufficient capacity for the existing uses and for additional growth. (See Figure 7)



Southeast

The Southeast portion of the study is bounded by Surfside Park on the north, the ship channel on the south, US 181 right-of-way on the west and the Bayfront on the east. The area contains two of the area's most popular tourist attractions: Texas State Aquarium; and the USS Lexington. Considerable work has already been done by the City to provide curb, gutters, underground drainage and sidewalks to most of the streets in the area. While much of the area may meet the City minimum standard of infrastructure development, because the area is the home to two of the region's most important visitor attractions more should done beyond meeting the City minimum infrastructure standard.

Street Improvement - North Shoreline Boulevard

North Shoreline Boulevard, between Pearl Street and Breakwater Boulevard, holds the most promise for a relatively inexpensive improvement to the visitor experience. (See Figure 8) North Shoreline Boulevard contains 100 feet of right-of-way and is almost totally devoted to the automobile with only 10 feet provided for the pedestrian. (See Figure 9) The pedestrian movement between the Texas State Aquarium and the USS Lexington may contain, during the March thru August tourist season, the heaviest pedestrian movement of any sidewalk in the

City. By taking the 20 foot on-street parking isle and median, and narrowing of the travel lanes from 12 feet each to 10 feet each allow larger sidewalks and parkway areas (area between the curb and sidewalk). The existing 23 on-street parking spaces (16/45 Degree and 7 parallel spaces) could remain. An additional 8 to 10 parking spaces could be added by converting the parallel parking on the east side of the street to 45 degree angle parking. The existing pedestrian "bulb outs" at the corner should remain with only minor geometric changes.

Figure 8: North Shoreline Boulevard between Pearl and Breakwater 2009 Aerial

Expansion of the sidewalks and the parkway areas is intended to allow a free flowing pedestrian movement but just as important an area for public seating. The public seating areas should also be beneficial to the nearby restaurant uses as overflow areas for their clientele or a location for a family picnic.

Changes to the design of North Shoreline between Breakwater Avenue and Pearl Street would require similar changes to the remaining two blocks between

Breakwater Avenue and Coastal Avenue. The resulting changes would enhance pedestrian access and increase on-street parking.

Part of the street changes could include an enhance capacity surface drainage system composed of valley gutters. Should additional capacity be needed then a valley gutter modification could include a surface drainage channel with a continuous grated cover. Each of these systems would tie into the existing system of drainage inlets to the underground system. Such an improvement

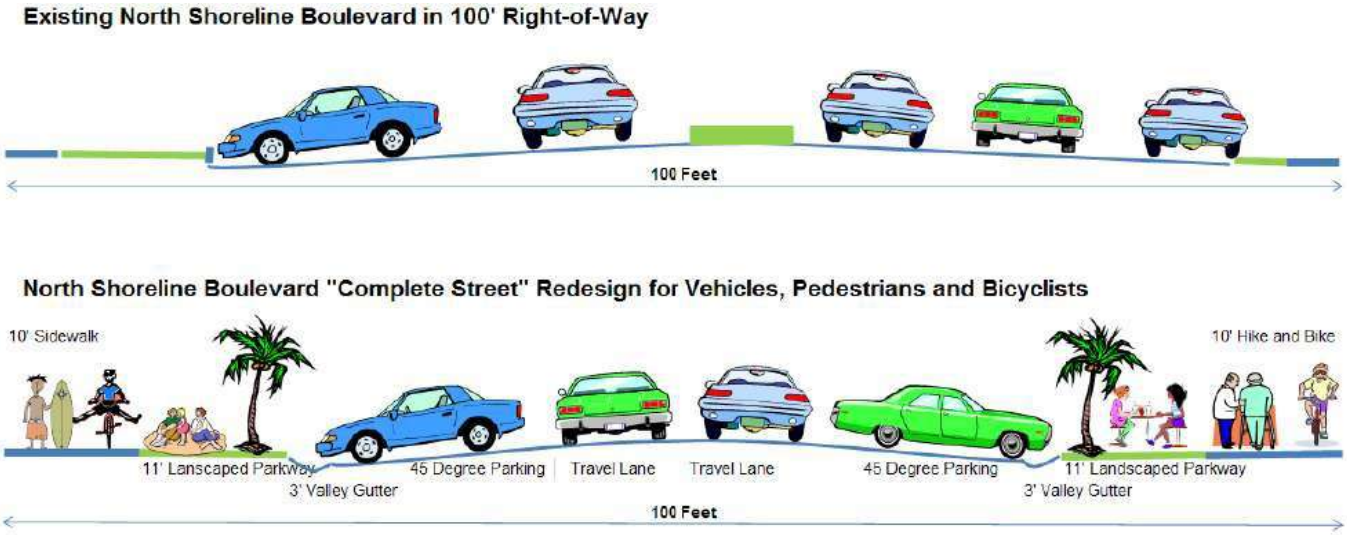


Figure 9: North Shoreline Boulevard

One-way vs Two-way Traffic

In addition to the changes mentioned above, a return to two-way traffic might be beneficial on North Shoreline Boulevard and surrounding one-way streets. A conversion from one-way to two-way has become popular in downtown redevelopment projects over the last twenty years. The City of Corpus Christi is converting Chaparral Street to a two-way street to help southbound traffic north of IH-37 to cross the freeway without the existing detour to Mesquite Street. The benefits appear clear in the Chaparral Street project.

The potential benefits to a one-way to two-way conversion on North Shoreline Boulevard, Pearl Street, Coastal Avenue, Breakwater Avenue and Surfside Avenue are less clear but warrant additional study. Some of the pro and con arguments to a one-way to two-way conversion are:

Pro arguments:

Slower traffic speeds
Increased access to businesses.
Safer for pedestrians.

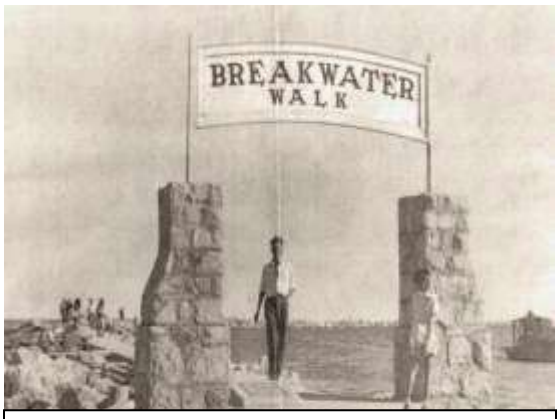
Con arguments include:

Conversion is very costly.
More on-street parking.
Safer for pedestrians.

Public Plazas/Breakwater Structure

There are at least three ideal locations for pedestrian plazas in this area:

Pearl Street and North Shoreline on the Aquarium property;
The entrance to the USS Lexington; and
The entrance to the Breakwater Structure on Breakwater Avenue.



McGreggor Collection – Corpus Christi Museum of Science and History

Some improvements have already been made by the Lexington and the Aquarium to create outdoor plaza areas next to their entrances. The City should encourage development proposals by the Lexington and the Aquarium for plazas on or next to their sites.

A third plaza could be created at the entrance to the Breakwater Structure on the beach. The Breakwater Structure was constructed in 1936 to protect the recently constructed inter harbor and to reduce beach erosion by reducing wave action caused by ships entering and exiting the port. At the entrance to the Breakwater Structure the City should take the lead in creating a new sightseeing attraction.

Breakwater Ave. facing east – Breakwater

The entrance to the Breakwater Structure is currently used for parking and located between two restaurants. At street level the entrance to the Breakwater Structure is almost hidden from public view. Use of the dead end street for parking is a missed opportunity to create a new destination on existing city property at very little expense. A plaza would help connect the commercial area to the beach and allow for public seating and shade structures. This location would provide an inviting area for people watching, impromptu picnicking (restaurants are on either side of the area) and simply a convenient location for the visitor / family to" take a rest" after a visit to the Aquarium or the Lexington.

Breakwater Structure Sidewalk

Creating this third plaza with appropriate directional signage would provide an inviting entrance to the breakwater structure. The breakwater structure is a resource to protect the beach from erosion but it also offers a location for the visiting public to take advantage of some of the best views of the Bayfront, the USS Lexington and arriving or departing ships.

On-Beach Parking Access

Three on beach parking areas are located in the southeast portion of the study area at the terminus of: Golf Place Avenue; Breakers Avenue; and where Surfside Park abuts the beach. Golf Place Avenue contains 40 feet of right-of-way, Breakers Avenue contains 50 feet of right-of-way and Surfside Drive next to the park contains 50 feet of right-of-way. The minimum standard for right-of-way for each of these streets is 60 feet. Figure 11 illustrates the desired 60 foot right-of-way and sidewalk access with on-street parking. A high priority should be to obtain the necessary right-of-way and improve each street with a sidewalk and/or hike and bike trail. For Golf Place another 20 feet of right-of-way is needed since the street is only 40 feet wide. However, on one side of the street development has already occurred so a dedication of the full 20 feet is unlikely. A dedication of at least 10 feet would provide the next best option by allowing some on street parking and the hike and bike trail and sidewalk.

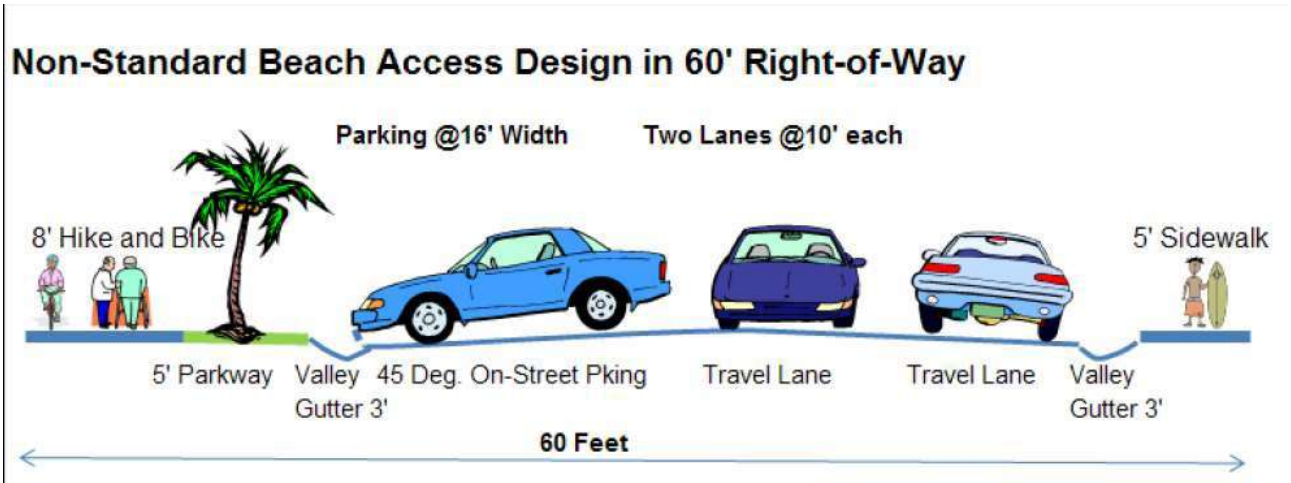


Figure 10: Beach Access Design

Both Breakers Avenue and Surfside Drive contain 50 feet of right-of-way. Vacant land abuts Breakers Avenue so obtaining an additional 10 feet of right-of-way during the development process is feasible. On Surfside Drive the since the city owns the park land on the north side of the street where obtaining an additional 10 for a total of 60 feet of right-of-way is also feasible.

Other Sidewalk and Street Improvements

Providing a continuous sidewalk on Surfside Boulevard should be a high priority for the City since Surfside Boulevard is the "main" street of North Beach and is almost continuous from the south end of the beach to the north end of North Beach. A high quality five foot sidewalk exists from Pearl Street to Breakers Avenue. Between Breakers Avenue and Bushick Place, the sidewalk is in disrepair and should be replaced. A sidewalk on the west edge of Surfside Park is non-existent and should be installed. Any new construction or reconstruction of sidewalks on Surfside Boulevard should be upgraded to a 10 foot width to allow for a hike and bike trail.

Water System Improvements

Concerning the water system, one of the city's long standing goals is to eliminate dead end water lines. Looped water lines allows the water to circulate, prevents stagnation of the water in the system and thereby increases water quality. The City should continue to pursue a goal of eliminating these dead end lines proactively and as a priority during the redevelopment of property (replatting, issuance of building permits, etc.).

Wastewater System Improvements

The wastewater system is essentially in place to serve existing uses in the Southeast portion of North Beach with adequately sized lines. Figure 7 illustrates a network of 8 inch or larger lines in the area.

Northeast Area

The Northeast Subbasin is bounded by Surfside Park on the south, Nueces Bay on the north, Timon Boulevard on the west and Corpus Christi Bay on the east.

Street and Sidewalk Improvements

Surfside Boulevard, Gulfspray Avenue and Gulf Breeze Avenue

The Northeast area contains four large multi-story condo developments. Villa Del Sol is located on Surfside Avenue while the Las Brisas, the Breakers and Beach Place front on either Gulfspray Avenue or Gulf Breeze Avenue.

Villa Del Sol, located next to Surfside Park is the largest condo development containing three, four story buildings with **411 total** units. Access to Villa Del Sol is from Surfside Boulevard, a two lane street without curb, gutter or sidewalks. Villa Del Sol is on a site of 9 acres with a density of 45.5 units per acre.

The Las Brisas condominiums are in one, ten story building with **80 total units**. The Las Brisas is located next to the north side of Villa Del Sol condominiums with access from Gulfspray Avenue. Gulfspray Avenue contains two lanes of traffic but does not have curbs, gutters or sidewalks. The Las Brisas site is 3.79 acres with a density of 21 units per acre.

The Breakers Condominiums are in a single ten story building with **54 total** units. The Breakers Condominiums are located immediately north of the Las Brisas Condominiums at the corner of Gulfspray Avenue and Gulf Breeze Avenue. Gulf Breezed Avenue only has two traffic lanes without curb, gutters or sidewalks. The Breakers site is 2 acres in size with 27 units per acre.

The Beach Place Condominiums include **39 units** in a six story building. Access to Beach Place Condominiums is from Reef Avenue and Gulden Street, both streets contain two lanes but do not have curbs, gutters or sidewalks. Beach Place is located on a 1 acre site with a density of 39 units per acre.

The overall density of each of the four condominium sites is 37 units per acre. Since this area contains the highest overall density of any area on North Beach, improvement to streets that provide access would benefit the largest portion of existing residents on North Beach. In addition, improvements to Surfside Boulevard are warranted since Surfside Boulevard is the primary north-south street extending the entire length of North Beach. Undeveloped by-passed lots along these streets would also benefit by being more attractive to develop.

Recommended Improvements

Surfside Boulevard, between Surfside Park and Gulden Street, improve with curb, gutter and a wide sidewalk of at least 8 feet in width along the east side of Surfside Boulevard.

Gulfspray Avenue, between Surfside and the Beach, install curb, gutters, sidewalks and hike and bike trail (on the south side of the street) The Beach Access Street cross section design in Figure 10 should be used for this street improvement.

Gulf Breeze Boulevard, between Gulf Spray Avenue and Gulden Avenue, install curb, gutters, sidewalks and hike and, bike trail (on the east side of the street). The Figure 10 Beach Access cross section should be used for this street improvement.

Beach Parking Access Street Improvements

Similar to the Southeast recommendations (Aquarium area), each of the four streets connecting to beach parking lots should be improved between Surfside Boulevard and the beach/parking lot. Each of these streets contains 60 feet of right-of-way. The recommended cross section for each of these streets is contained in Figure 10. These four streets are:

Surfside Boulevard (next to the north side of Surfside Park);
Gulfspray Avenue;
Beach Avenue; and
Gulden Street.

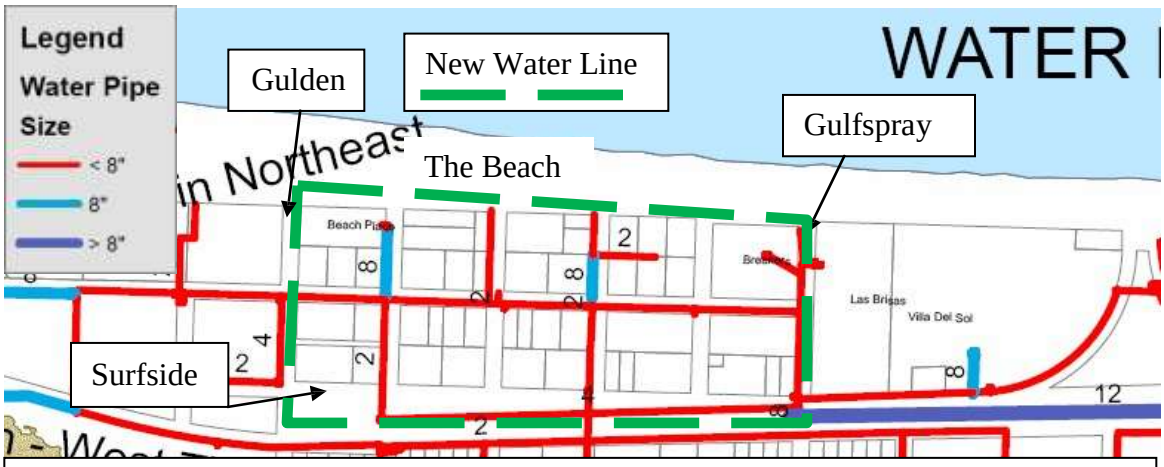


Figure 11: Water Line Improvement

Water System Improvements

Almost all of the water lines north of Surfside Park are of substandard sized (less than 8") and terminate in a dead-end at the beach. Concerning the water system, one of the city's long standing goals is to eliminate dead-end water lines. Looped water lines allows the water to circulate, prevents stagnation of the water in the system and thereby increases water quality. The City should continue to pursue a goal of eliminating these dead end lines proactively and as a priority during the redevelopment of property (replatting, issuance of building permits, etc.).

Any new upgrades to the system should address the three existing high density uses which do not have access to a looped water line system. In order to address existing high density developments the follow is proposed:

Extend the existing 12' line in Surfside Boulevard to Gulden Street (five blocks);
Extend an 8" line eastward to the beach (two blocks);
Continue the extension of the 8" line southward to Gulfspray Avenue (five blocks); and

Extend the 8’ line west ward to tie back into the 12” line in Surfside Boulevard (two blocks).

With this improvement, all four of the existing high density condominium developments would have access to an appropriate sized water line that is part of a looped system. The estimated cost for this improvement would be $660,000.

Wastewater System Improvements

The wastewater system is essentially in place to serve existing uses in the Northeast portion of North Beach with adequately sized lines. Figure 7 illustrates a network of 8 inch or larger lines in the area. Any upgrades to the existing system should be accomplished by the property owners during the development process for new development.

West Timon Boulevard / SH 181

The area is bounded by Gulden Street on the north, the ship channel on the south, US 181 on the west and Timon Boulevard on the east. This portion of North Beach is very sparsely developed without any high density developments. The street, water and sewer issues in this portion of North Beach will best be solved through the development process rather than a capital improvement process. As specific development of property is proposed, infrastructure for streets, water and the wastewater system will be identified and completed through the standard development process. If the standard development process is not sufficient to address all of the infrastructure needs then the City should consider using capital improvement funds, a public improvements district or a public private partnership agreement.

Rincon Road

No action at this time. When a specific development is proposed, a plan for streets, water and wastewater will be required through the standard development process.

Attachment 1: ALL Water Line Replacement Costs

CORPUS CHRISTI BEACH MASTER PLAN - WATER IMPROVEMENTS
CONSTRUCTION COST ESTIMATE 2/22/2011

Replacement of all <8" water lines with 8" water lines.

COST ITEM	UNITS	QUANTITY	UNIT COST	TOTAL COST
8" PVC C-900 PIPE	$/LINEAR FOOT	22,450 FEET	$48.00/LF	$1,077,600
8" GATE VALVE + BOX	$/EACH	75 EACH	$1,200.00/EACH	$990,000
8" TIE-IN	$/EACH	36 EACH	$1,300.00/EACH	$46,800
CONNECTION TO EXISTING WATER METER	$/EACH	112 EACH	$775.00/EACH	$86,800
WATER SE `	$/EACH	112 EACH	$4,200.00/EACH	$470,400
TYPE K COPPER PIPE	$/LINEAR FOOT	4,480 FEET	$24.00/LF	$107,520
FIRE HYDRANT ASSEMBLY	$/EACH	75 EACH	$4,000.00/EACH	$300,000
		TOTAL COST		$2,179,120.00

Budget As		
		Costs
Construction		$2,179,120
Construction Contingency (10%)		$217,912
Construction Subtotal		**$2,397,032**
Land Acq … Other		N/A
USACE Permitting		N/A
Other Costs:		
Design (8%)	8.0%	$191,763
Topo/Permitting (3.5%)	3.5%	$83,896
Topo/Survey		
Contract Administration (3.0%)	3.5%	$83,896
Engineering Services (3.5%)	3.5%	$83,896
Warranty Services/Insp		
Construction Inspection (3.5%)	3.5%	$83,896
Testing (Geotech & Quality) (2.0%)	2.0%	$47,941
Bond Issuance (1.0%)	0.0%	$0
Misc. (Printing, Adv., Etc.) (0.5%)	0.5%	$11,985
Other Subtotal	24.5%	$587,273
Project Total		**$2,984,305**