



THE STATE OF TEXAS §
COUNTY OF BRAZORIA §
CITY OF MANVEL §

LARRY AKERY, COUNCIL PLACE 1
LORRAINE HEHN, COUNCIL PLACE 2
NICCOLE TYSON, COUNCIL PLACE 3
ED PERRY, COUNCIL PLACE 4
JASON ALBERT, COUNCIL PLACE 5
JEROME HUDSON, COUNCIL PLACE 6

DEBRA DAVISON, MAYOR
KYLE JUNG, CITY MANAGER
TAMMY BELL, CITY SECRETARY

**NOTICE OF A CITY COUNCIL MEETING
OF THE CITY OF MANVEL
October 17, 2022**

**NOTICE IS HEREBY GIVEN
5:00 P. M. WORKSHOP
6:00 P.M. REGULAR SESSION**

Pursuant to Chapter 551, Title 5 of the Texas Government Code, the Texas Open Meetings Act, notice is hereby given that the Manvel City Council will convene a regular meeting at the Manvel City Hall, located at 20031 Hwy 6, Manvel Tx 77578 for the purpose of discussing and if appropriate, take action with respect to the following items:

NOTE: The City Council of the City of Manvel reserves the right to discuss any items in Closed Session whenever authorized under the Texas Open Meetings Act, Chapter 551, of the Texas Government Code. The City Council may discuss the items on this agenda in any order.

This facility is wheelchair accessible and accessible parking spaces are available. Requests for accommodations or interpreter services must be made 48 hours prior to this meeting. Please contact the City Secretary at 281-489-0630 X6 for further information.

Workshop Session – 5:00 P.M.

Discussion on Manvel Code of Ordinances, Chapter 53, Signs

Discussion on the Street Maintenance Program.

Regular Session

Call To Order

Inspirational Reading - Council Member Albert

Pledge

Pledge of Allegiance and Texas Pledge: "Honor the Texas flag; I pledge allegiance to thee Texas, one state under God, one and indivisible.

Public Comments: "Comment Card" Required

o Members of the public with business before the board, NOT scheduled on the agenda as a public hearing (that have submitted a public comment card) may have three (3) minutes to address the board. o The board may not participate in any discussion and cannot vote on the subject you present unless it is listed on the agenda as an action item.

City Manager Update

Update on current events and city issues.

Consent Agenda

All Consent Agenda items listed are considered to be routine by the City Council and will be approved by one motion. There will be no separate discussion of these items unless a City Council Member so requests, in which event the item will be removed from the Consent Agenda and considered in sequence on the Agenda.

1. Approve the second and final reading of Ordinance 2022-O-27;
AN ORDINANCE OF THE CITY OF MANVEL, TEXAS, PROVIDING FOR THE DISANNEXATION OF A ± 5.8 ACRE TRIANGULAR AREA OF LAND LOCATED IN THE COLONY WEST SUBDIVISION IN THE CITY OF MANVEL, CONTAINING THE PORTIONS IN THE CITY LIMITS OF SECTION 1, (ABSTRACT 286 H T & B R R), LOTS 15, 16, 17, 18 AND 24A(EAST HALF), BRAZORIA COUNTY, TEXAS; DISANNEXING AND DISCONTINUING SAID PROPERTY FROM THE CORPORATE BOUNDARIES OF THE CITY; CONTAINING CERTAIN FINDINGS; AND PROVIDING OTHER MATTERS RELATED TO THE SUBJECT.
2. Approve the second and final reading of Ordinance 2022-O-28;
AN ORDINANCE OF THE CITY OF MANVEL, TEXAS, PROVIDING FOR THE DISANNEXATION OF A ± 11.8 ACRE TRIANGULAR AREA OF LAND LOCATED IN THE COLONY WEST SUBDIVISION IN THE CITY OF MANVEL, CONTAINING THE PORTIONS IN THE CITY LIMITS OF SECTIONS 2, 3, AND 4, (ABSTRACT 286 H T & B R R), LOTS 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 39A, 40, AND 41, BRAZORIA COUNTY, TEXAS; DISANNEXING AND DISCONTINUING SAID PROPERTY FROM THE CORPORATE BOUNDARIES OF THE CITY; CONTAINING CERTAIN FINDINGS; AND PROVIDING OTHER MATTERS RELATED TO THE SUBJECT.
3. Approve the meeting minutes to date.

Regular Agenda

1. Consideration and possible action to approve a Subdivision variance request seeking to vary Chapter 62, Section 62-111, Additional Street Requirements and Section 62-113, Sidewalks for an approximate 4.9997-acre tract of land located at 3927 Shamrock Lane. The subject site abuts the southernmost property along the eastern side of Shamrock Lane, and authorize the Mayor to execute the Development Agreement.

2. Consideration and possible action to approve Resolution 2022-R-16;
A RESOLUTION OF THE CITY OF MANVEL, TEXAS ADOPTING A REVISED DESIGN CRITERIA MANUAL CONTAINING SUBDIVISION IMPROVEMENT STANDARDS FOR ALL DEVELOPMENT WITHIN THE CITY OR ITS EXTRATERRITORIAL JURISDICTION, PURSUANT TO AUTHORITY CONTAINED IN CHAPTER 62, SUBDIVISION ORDINANCE, OF THE CODE OF ORDINANCES OF THE CITY OF MANVEL, TEXAS, CHAPTER 212 OF THE TEXAS LOCAL GOVERNMENT CODE, AND OTHER PROVISIONS OF THE CODE OF ORDINANCES OF THE CITY OF MANVEL, AS AMENDED OR TO BE AMENDED; AND CONTAINING OTHER MATTERS ON THE SUBJECT.
3. Consideration and possible action to approve Resolution 2022-R-17;
A RESOLUTION OF THE CITY OF MANVEL, TEXAS ADOPTING A STREET MAINTENANCE PROGRAM FOR THE CITY OF MANVEL; PROVIDING THAT THIS RESOLUTION SHALL BECOME EFFECTIVE FROM AND AFTER ITS PASSAGE AND ADOPTION.
4. Consideration and possible action to direct staff on the following as requested by Council Member Hehn and Council Member Perry;
*Special Events Policy,
*Code of Ordinances, Chapter 33 Food and Food Handlers, and
*Code of Ordinances, Chapter 35 -Article X - Mobile Food Vendors.
(Requested by Council Member Hehn and Council Member Perry)

Mayor and Council Comments

Update on current events and city issues.

Additionally, pursuant to Texas Government Code § 551.0415, City Council Members and city staff may make a report about items of community interest during a meeting of the governing body without having given notice of the report.

Items of community interest include:

- Expressions of thanks, congratulations, or condolence;
- Information regarding holiday schedules;
- An honorary or salutary recognition of a public official, public employee, or other citizen, except that a discussion regarding a change in the status of a person's public office or public employment is not an honorary or salutary recognition for purposes of this subdivision;
- A reminder about an upcoming event organized or sponsored by the governing body;
- Information regarding a social, ceremonial, or community event organized or sponsored by an entity other than the governing body that was attended or is scheduled to be attended by a member of the governing body or an official or employee of the municipality; and
- Announcements involving an imminent threat to the public health and safety of people in the municipality that has arisen after the posting of the agenda.

Adjourn

CERTIFICATION

I, Tammy Bell, City Secretary for the City of Manvel, do hereby certify that the foregoing Agenda of the Manvel City Council is true and correct and that I posted such notice on the bulletin board at the Manvel City Hall; a place convenient and readily accessible to the public on October 14, 2022 in accordance with the Texas Open Meetings Act (Tex. Gov't. Code §551.001 et.seq). Said notice remained posted for at least 72 hours preceding the scheduled time of the meeting.


TAMMY BELL, CITY SECRETARY
CITY OF MANVEL, TEXAS



Chapter 53 SIGNS¹

Sec. 53-1. Purpose.

The purpose of this chapter is to establish reasonable regulations for the design, construction, installation, and maintenance of all exterior signs within the city and its extraterritorial jurisdiction in order to:

- (1) Balance the right of individuals to identify their businesses and convey their messages and the right of the public to be protected against the unrestricted proliferation of signs;
- (2) Further the objectives of the city's comprehensive plan;
- (3) Protect the public health, safety, and welfare of the citizens of the city;
- (4) Reduce traffic hazards;
- (5) Facilitate the creation of an attractive and harmonious community;
- (6) Protect property values;
- (7) Promote economic development; and
- (8) Preserve the right of free speech exercised through the use of signs containing non-commercial messages.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-2. Definitions.

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Advertising means to seek the attraction of or to direct the attention of the public to any goods, services, business, activity, or merchandise of any kind or type.

Amateur ball park signs means those signs constructed, attached, hung, placed, suspended, affixed, or painted upon a structure in an amateur ball park which seek the attention of or direct the attention of patrons of the ball park to any goods, services, business, activities, or merchandise of any kind or type.

Billboard or *billboard sign* means an off-premises sign.

Business establishment means any property, building, or structure, permanent or temporary, used for the purpose of conducting in said building or structure, or on said property, a commercial enterprise in compliance with all ordinances and regulations of the city governing such activity. The term "business establishment" shall not include any property, building, or structure used for the primary purpose of securing a permit to erect a sign.

¹Editor's note(s)—Ord. No. 2017-O-35, § 1, adopted Nov. 6, 2017, amended Ch. 53 in its entirety to read as herein set out. Former Ch. 53, §§ 53-1—53-22, pertained to similar subject matter and derived from Ord. No. 2006-O-11, §§ 1—20, 22, 6-16-2006; Ord. No. 2015-O-13, § 2, 4-27-2015.

State law reference(s)—Municipal regulation of signs, V.T.C.A., Local Government Code § 216.003; regulations of political signs by municipality, V.T.C.A., Local Government Code § 216.903.

Business purposes means the erection or use of any property, building, or structure, permanent or temporary, used for the purpose of conducting in said building or structure, or on said property, a commercial enterprise in compliance with all ordinances and regulations of the city governing such activity. The term "business purpose" shall not include any property, building, or structure erected or used for the primary purpose of securing a permit to erect a sign.

Column sign means any sign supported by two or more columns, uprights, or braces anchored in or on the ground and not attached to any building.

Electronic changeable message sign means any sign with a fixed or changing display/message composed of a series of lights that may be changed through electronic means.

Erect means to build, construct, attach, hang, place, suspend, affix, or paint a sign.

Facing or surface means the surface of the sign upon, against, or through which a message is displayed or illustrated.

Illuminated sign means any sign that has characters, letters, fixtures, designs, or outlines illuminated externally by electric lights or internally by luminous tubes or other internal illumination device.

Incombustible material means any material that will not ignite at or below a temperature of 1,200 degrees Fahrenheit and will not continue to burn or glow at that temperature.

Monument sign means any sign mounted on the ground or supported by one or more columns, uprights, or braces anchored in the ground, but not elevated above the ground by any device that holds the sign off the ground and not attached to any building, including reader panels. A message board or electronically displayed date, time, and temperature may not occupy more than 24 square feet of the area of sign face.

Multifamily dwelling complex means a townhouse, condominium, or apartment complex of one or more buildings or portions thereof located on a single tract of land which contain three or more separate dwelling units which share means of egress and other essential facilities.

Off-premises sign means any sign advertising a business, person, activity, goods, products, or services not usually located on the premises where the sign is installed and maintained, or which directs persons to any location not on the premises.

On-premises sign means any sign identifying or advertising the person, activity, goods, business, products, or services primarily sold or offered for sale on the premises or property where the sign is installed and maintained when such premise is used for business purposes.

Permittee means a person receiving a sign permit pursuant to the provisions of this chapter.

Person means an individual, company, corporation, partnership, association, or any other entity.

Pole sign means any sign supported by only one column, pole, upright, or brace anchored in or on the ground and not attached to any building.

Portable sign means any sign designed or constructed to be easily moved from one location to another and which is mounted upon or designed to be mounted upon a wheeled carrier or other framed structure.

Public service sign means a sign that provides a service or message to the public, such as time, temperature, and charity appeals.

Residential purposes means property devoted to use as a single-family or multifamily residence. Residential purposes shall include, but not be limited to, property used for houses, apartments, duplexes, condominiums, townhouses, townhomes, and patio homes; property used for hotels, motels, and boardinghouses shall not be considered as used for residential purposes.

Right-of-way means that property or right-of-way owned by the city, county, or state and used for the purposes of roads, highways, drainage, and public utilities.

Shopping center or integrated business development means a commercial development, such as a strip center, mall, multitenant office building, commercial center, or industrial complex, in which two or more separate businesses occupy a single or multiple structure which share on-site parking facilities and common driveways.

Sign means any writing (including letter, word, or numeral), pictorial representation (including illustration or decoration), ~~illustration~~, emblem (including device, symbol, or trademark), flag (including banner or pennant), symbol, design, or any other figure of similar character which is a structure or a part thereof, or is attached to, painted on, or in any manner represented on a building or other structure, is placed out of doors in view of the general public from public rights-of-ways or abutting property, and is used for purposes of advertisement, announcement, declaration, demonstration, display, identification, direct attention or expression. The term "sign" shall include the sign structure.

Sign, Abandoned means any sign which does not display any advertisement, copy or message or any sign which identifies or advertises a business, lessor, service, owner, product, or activity, which is no longer available at the indicated location or no longer available on the premises for which no legal owner can be found.

Sign administrator means the city building official.

Sign Area means the entire advertising area of a sign, excluding any framing, trim or molding and the supporting structure, with wording in either permanent or removable letter form. This definition also includes the LED portion of an electronic changeable message sign.

Sign, Attention-Getting Device means devices that are erected, placed, or maintained outdoors so as to attract attention to any business, or any goods, products, or services available on the premises of a business, including but not limited to the following items or devices: banners, cut out figures; discs; festooning, including tinsel, strings of ribbons, and pinwheels; inflatable objects or inflatable characters, including balloons; air animated objects, non-governmental flags; pennants; propellers; steam or smoke-producing devices; streamers, whirligigs; wind devices; blinking, rotating, moving, chasing, flashing, glaring, strobe, scintillating, search, flood or spot lights; or similar devices or items, and of which are located or employed in connection with the conduct of business.

Sign, Banner means a type of temporary sign that is made or composed of a flexible piece of fabric, plastic, canvass, vinyl, paper, or another non-rigid material that does not include any enclosing framework and which is commonly mounted to a building, structure, fence, railing, or wall with rope, or mounted to the ground with stakes.

Sign, Damaged or Dilapidated means a sign where elements of the sign face or structure are visibly cracked, corroded, bent, broken, torn, or dented, or where the message can no longer be read under normal viewing conditions.

Sign, Directional/Information means any attached or freestanding sign on premise sign giving directions, instructions, or facility information, i.e., entrance or exit signs, one-way location of parking, etc. which may contain the name or logo of an establishment but no other advertising copy.

Sign, Double-Faced means any sign with sign area on two faces that are back to back, facing in opposite directions.

Sign, Electronic Changeable Message means an electronic sign or portion of a sign that uses Light Emitting Diode (LED) technology to form a sign message or messages in text form, with or without fixed images, wherein the sequence of messages and the rate of change is electronically programmed and can be modified by electronic processes.

Sign, Flashing means any directly or indirectly illuminated sign which contains an intermittent flashing light source. This does not include electronic changeable message or time/temperature signs.

Sign, Home Business means any unlighted sign not over two square feet in area attached flat against the dwelling and displaying only the occupants name and/or address and/or occupation.

Sign, Illuminated means any sign with an artificial light source incorporated internally or externally (directly or indirectly) for the purpose of illuminating the sign.

Sign permit means a permit issued by the city to erect a sign. Additionally, a sign permit refers to the continuing authorization by the city for the permit holder to maintain and operate a sign within the city while such sign conforms with the provisions of this chapter.

Sight distance triangle means the triangle formed on any corner lot measured from the point of intersection of the front and exterior side lot lines a distance of 25 feet along said front and side lot lines and connecting the points so established to form a sight triangle on the area of the lot adjacent to the street intersections. Except for single-family residential accessways, a sight triangle at the intersection of a public street and a private access way shall have sides of 15 feet along the accessway and 25 feet along the public street. In order to minimize sight obstructions, no parking, wall, fence, sign, structure or any plant growth other than grasses shall be placed or maintained within the sight distance triangle so as not to impede vision between a height of two feet six inches, and ten feet above the center line grades of the intersecting streets and/or drives.

Sign structure means any structure, device, or system, which supports or is capable of supporting a sign.

Snipe signs or bandit signs means signs which are tacked, nailed, posted, pasted, glued, or otherwise attached to stakes, utility poles, or other like objects, the advertising on which is not applicable to the premises or property on which it is located.

Temporary business sign means any sign, banner, pennant, or other advertising display constructed of cloth, canvas, light fabric, cardboard, or other light materials, with or without frames, with or without words, intended to be displayed for a limited period of time on the property of the business.

Wall sign means any sign mounted parallel to a wall of any building extending 18 inches or less horizontally from the structure to which it is affixed.

Window sign means a temporary business sign placed on, affixed to, painted on or located within the frame of a transparent opening in the wall of a building.

~~*Wind device sign* means any flag, banner, pennant, streamer, balloon, or similar sign made of cloth, canvass, plastic, or other flexible material, with or without a frame or other supporting structure, that moves or is designed or intended to move or blow in the wind.~~

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-3. Sign districts.

There are hereby created the following sign districts:

- (1) *Sign district A.* Sign district A shall include all property located in the city limits ~~and extra territorial jurisdiction (unless prohibited or restricted by Local Government Code § 216.902)~~ within 200 feet of the right-of-way of State Highway 288 and its frontage roads.
- (2) *Sign district B.* Sign district B shall include all property located ~~in the city limits and extra territorial jurisdiction (unless prohibited or restricted by Local Government Code § 216.902)~~ with frontage on State Highway 6 zoned ~~within the city's~~ light commercial (LC ~~and LC-SUP~~), heavy commercial (HC ~~and HC-SUP~~), highway mixed use (HMU ~~and HMU-SUP~~) and PUD districts as defined by the city's zoning ordinance and is not located within sign district A.
- (3) *Sign district C.* Sign district C shall include all property in the city limits that is not located within sign district A or sign district B.

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- (4) *Sign district D.* Sign district D shall include all property within the city's extraterritorial jurisdiction unless prohibited or restricted by Local Government Code § 216.902 **not located in sign district A, sign district B, or sign district C.**

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-4. Permit required.

Except as provided in section 53-10, it shall be unlawful for any person to erect, relocate, or structurally alter, any sign or other advertising structure as defined in section 53-2, without first obtaining a sign permit from the sign administrator and paying the permit fee required by section 53-7. No permit is required for change of copy or message or for repair, repainting, or maintenance that does not entail structural change.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-5. Application for sign permit.

An application for a sign permit shall be made upon a form provided by the sign administrator and shall contain and have attached the following information:

- (1) The name, address, **email address**, and telephone number of the applicant;
- (2) The location of the building, structure, or lot to which or upon which the sign or other advertising structure is to be attached or erected;
- (3) **A site plan illustrating** ~~The location of the sign or other advertising structure in relation to nearby~~ buildings, structures, and/or rights-of-way, **easements**, sidewalks and driveways;
- (4) Two blueprints or drawings of the plans and specifications of the sign and a description of the proposed method of construction and attachment to the building or on the ground;
- (5) A certification and/or calculations showing that the sign is designed to meet the wind pressure and dead load requirements of the International Building Code and all other laws and ordinances of the city. The building official may require such certification and calculation to be made by a registered professional engineer if the sign is in excess of six feet in height or 50 square feet in area.
- (6) The name of the person erecting the sign;
- (7) The written consent of the owner of the building, structure, or land to which or on which the sign is to be erected if the owner of such property is different from applicant;
- (8) Any required electrical permit; and
- (9) Such other information as the sign administrator shall require to show full compliance with this and all other laws and ordinances of the city.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-6. Permit issuance.

Upon the filing of an application for a sign permit, the sign administrator shall:

- (1) Examine the plans and specifications and the premises upon which the proposed sign shall be erected; and

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- (2) Issue a permit if the proposed sign complies with the requirements of this chapter and all other laws and ordinances of the city. If the work authorized under a sign permit is not completed within six months after the date of issuance, the permit shall become null and void.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-7. Permit fee.

Every applicant, prior to issuance of a permit pursuant to section 53-6, shall pay to the city a nonrefundable fee. Such fees shall be adopted by resolution and may be revised as often as the city council deems necessary.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-8. Revocation of permit.

The sign administrator may revoke any permit where there has been a violation of the provisions of this chapter or a misrepresentation of fact on the permit application.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-9. Number, date, and voltage.

- (a) Every permitted sign or other advertising structure shall display in a conspicuous place on such sign or structure, in letters no less than one inch in height, the date of erection, the permit number, and the voltage of any electrical apparatus used.
- (b) The top of all signs and sign structures shall have a minimum vertical clearance from any other structure of 14 feet, and shall have a clearance equal to its height from any transmission line carrying 750 volts or greater.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-10. Permitted signs.

The following signs are allowed in all districts ~~and are exempt from the permit requirements of this chapter:~~

- (1) Temporary real estate signs not exceeding 16 square feet in area that advertise the sale, rental, or lease of the premises upon which the sign is located. Such signs shall be removed not later than ten days following the sale, rental, or lease of the subject property. Such signs shall only be located on private property;
- (2) Temporary political signs concerning candidates for public office and ballot issues and not exceeding 36 square feet in area. Such signs shall be erected not more than 30 days preceding the first day early voting commences for the election or referendum to which they pertain and removed not later than ten days after the date of the election or referendum. Such signs shall only be located on private property;
- (3) Temporary signs advertising the date, time, and location of a garage or yard sale and not exceeding four square feet in area. Such signs shall be erected not more than three days prior to and removed not later than one day after the date of the sale;
- (4) Signs which are an integral part of the historical character of a designated historic district or a building that has been designated a landmark;

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- (5) Public signs regulating vehicular or pedestrian traffic or designating or giving direction to streets, schools, hospitals, historical sites, or public facilities;
 - (6) Flags of any government or governmental agency or any patriotic, religious, charitable, civic, educational, or fraternal organization and not exceeding 40 square feet in area;
 - (7) Temporary signs advertising special community events or other community activities sponsored by nonprofit organizations, governmental entities, or churches. Such signs shall not exceed 32 square feet in area, shall not be erected more than 30 days in advance of the event and shall be removed within ten days after such event. Temporary signs shall be securely anchored and shall not exceed seven feet in height from ground level;
 - (8) Temporary displays or decorations customarily associated with any national, state, local, or religious holiday or celebration. Such signs shall be erected not more than 45 days before the holiday or celebration and removed not later than ten days after such holiday or celebration;
 - (9) Hand-held signs of a noncommercial nature not set on or affixed to the ground and not exceeding ten square feet in area;
 - (10) Temporary signs identifying the architect, engineer, developer or contractor when placed upon construction sites and not exceeding 64 square feet in area. Such signs shall not be erected prior to approval of a site plan and shall be removed not later than ten days after completion of the project;
 - (11) Signs identifying the name and profession of the occupant of a business establishment and not exceeding two square feet in area;
 - (12) Memorial or commemorative plaques or tablets denoting a building name and/or date of erection or a location of historic significance and not exceeding four square feet in area;
 - (13) Any sign for informational (non-advertisement) purposes not exceeding one square foot in area with letters not exceeding four inches in height;
 - (14) Property identification signs indicating address and/or name and not exceeding two square feet in area located on property used for residential purposes or five square feet in area located on property used for business purposes;
 - (15) Temporary business signs shall be permitted; provided, that:
 - a. Temporary business signs of combustible material shall not exceed 60 square feet in area;
 - b. Temporary business signs weighing in excess of 50 pounds must conform to the safety requirements of the building code of the city and must be approved by the sign administrator;
 - c. Temporary business signs shall not extend over or into any street right-of-way, alley, sidewalk, or other public thoroughfare;
 - d. Temporary business signs shall be attached with wire or steel cables. Strings, ropes, or wood slats for anchorage or support purposes shall not be permitted;
 - e. Temporary business signs shall not be allowed to remain for a period exceeding 15 days in a six-month period;
 - f. Temporary business signs must be on-premise signs; and
 - g. Only one temporary business sign may be displayed at any given time.
 - (16) Amateur ball park signs;
 - (17) Signs erected by the city, the state (including its political subdivisions, such as school districts), or the United States government, or otherwise required by federal, state, or local laws;

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- (18) ~~Directional Directory signs, menu boards and the like, which are designed to be read from a distance no greater than ten feet~~ shall be no more than four feet in height with a maximum area per side of six square feet; ~~and~~
- (19) Notwithstanding any other provision of this chapter, any sign that may display a commercial message may also display any noncommercial message, either in place of or in addition to the commercial message, so long as the sign complies with other requirements of this chapter.
- (20) An electronic changeable message sign may be allowed, provided that:
- a. The size of the changeable area is no larger than 25 percent of the overall permitted sign.
 - b.
 - i. For sign districts A and B, the message is displayed for a minimum of 15 seconds without changing, flashing, or scrolling; and the sign does not conflict with section 53-11(9); or
 - ii. For sign districts C and D, the message is displayed for a minimum of 15 seconds without changing, flashing, or scrolling; and the sign does not conflict with section 53-11(9).
 - c. No internal or external illumination of the LED screens will be allowed between the hours of 10:00 p.m. and 6:00 a.m.
 - d. Maximum illumination will be determined by the difference between ambient light and full wattage and this difference cannot be more than .2 footcandles at 75 feet. The owner will provide annual reports certifying illumination does not exceed stated limits and will conduct tests in response to any complaints received by the city concerning the light from the sign.
 - e. Maximum nit wattage is 6,500.
- (21) Each business establishment is allowed wall signage not exceeding ~~in the~~ total square feet of the ~~non-fenestrated~~ facade to which it is affixed:
- a. ~~15~~ 20 percent of the business frontage for the side with the principal entrance;
 - b. ~~Ten~~ 15 percent of the business frontage for the side(s) fronting on a public street;
 - c. Ten percent of the business frontage for all other sides;
 - d. Ten percent per side for canopies related to a business;
 - e. A maximum of 32 square feet for freestanding menu boards in addition to wall signs; or
 - f. Wall signage may not project above the lower edge of the roof line or parapet of a building.
- (22) A home business may have one non-illuminated sign with a maximum area of two square feet; ~~and~~
- (23) ~~Menu Board signs shall be designed to be read from a distance no greater than ten feet.~~

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-11. Prohibited signs.

Signs prohibited in all districts by this chapter include, but are not limited to, the following:

- (1) Signs which are inadequately maintained so as to show evidence of deterioration, including peeling, rust, dirt, fading, discoloration, loss of illumination, or holes. Damaged signs shall be repaired or removed within 30 days of receipt of notice from the city;
- (2) Signs which advertise a business or product, which is no longer in existence. Abandoned or outdated signs shall be replaced or removed within 30 days of receipt of notice from the city;

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- (3) Signs which are erected, relocated, or maintained so as to prevent free ingress to or egress from any door, window, or fire escape. No sign of any kind shall be attached to a stand pipe or fire escape;
 - (4) Signs which obstruct free and clear vision at any street intersection;
 - (5) Signs which interfere with, obstruct the view of, or may be confused with any authorized traffic sign, signal, or device because of its position, shape, or color;
 - (6) Signs which use the words "stop," "look," "go slow," "caution," "danger," "warning," or any other word, phrase, symbol or character in a manner that interferes with, misleads, or confuses traffic;
 - (7) Signs which constitute a hazard to safety or health by reason of inadequate design, construction, repair, or maintenance;
 - (8) Signs which are illuminated with lights that cause a glare into or upon the surrounding area or any property used for residential purposes or which distract operators of vehicles or pedestrians on a public right-of-way;
 - (9) Signs which contain reflectors or lights or illuminations or messages that flash, move, rotate, scintillate, blink, flicker, vary in intensity or color, or use intermittent electrical pulsation;
 - (10) Signs which display any matter in which the dominant theme of the material taken as a whole appeals to a prurient interest in sex, or is patently offensive because it affronts contemporary community standards relating to the description or representation of sexual matters, and is utterly without redeeming social value;
 - (11) Signs which are painted on or attached to a motor vehicle used primarily for the display of such sign. This section shall not prohibit the identification of a business or its products or services on a vehicle operated and parked in a manner appropriate to the normal course of business;
 - (12) Signs which have visible moving, revolving, or rotating parts or visible mechanical movement of any kind, achieved by electrical or mechanical means, except for time-temperature-date signs;
 - (13) Signs attached to or located upon outdoor exposed amenities such as trees, street signs, utility poles, or fences, which are visible from any street;
 - (14) Signs which are off-premises signs;
 - (15) Signs or portions thereof which are located on, or project or extend over, any public right-of-way, any public sidewalk, street, alley, or other public property;
 - (16) ~~Attention-getting device~~ ~~Wind device~~ signs;
 - (17) Snipe signs or bandit signs except as pre-permitted between the hours of 5:00 p.m. on Friday and 7:00 a.m. on Monday, provided no such sign shall be located less than 100 feet from another such sign; and
 - (18) Pole signs.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-12. Additional signs allowed in sign district A.

Business establishments within sign district A shall be allowed signage in accordance with section 53-10 and the provisions of this section. If, however, such business establishment is part of a shopping center or an integrated business development, the signage allowed shall be as provided in section 53-16. A permit is required for the signs allowed under this section.

- (1) *Column signs.*

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- a. Each business establishment in sign district A is permitted one column sign, which shall be supported by not less than two columns, with the depth of the column not less than the depth of the sign; provided, however, that the width of the column shall not be less than three feet. The message area of such column sign shall not exceed 550 square feet in area. The height of such column shall not exceed 40 feet in height, including the supporting structure, above the surrounding finished grade level. Additionally, each monument sign shall not exceed 22 feet in width. The bottom of such sign message area shall not be less than 15 feet above the surrounding finished grade level. Such column sign shall not exceed 22 feet in width. Such column sign may have a reader panel attached to it, however, a reader panel shall be included in the calculation of total sign area. Each column sign shall be positioned perpendicular to the roadway on which the property on which the sign is located faces. The support structure shall be visibly marked if such column sign is located in a parking area. Each business establishment in sign district A with more than 200 feet of frontage on State Highway 288 or its frontage road shall be permitted one additional sign as described in this section. No single business shall exceed 20 square feet of sign space on any one column sign.
 - b. A column sign shall be located such that all parts of such sign are a minimum of ten feet from all property lines.
- (2) *Monument signs.*
- a. In lieu of, and not in addition to, a column sign, each business establishment is permitted one single or double-faced monument sign not exceeding 50 square feet in area and not exceeding 12 feet in height above the surrounding finished grade level.
 - b. The location of a monument sign is subject to the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-13. Additional signs allowed in sign district B.

Business establishments within sign district B shall be allowed signage in accordance with section 53-10 and the provisions of this section. If, however, such business establishment is part of a shopping center or an integrated business development, the signage allowed shall be as provided in section 53-16. A permit is required for the signs allowed under this section.

- (1) *Column signs.* Column signs are prohibited.
- (2) *Monument signs.*
 - a. Each business establishment with frontage on State Highway 6 is permitted one single or double-faced monument sign not exceeding 50 square feet in area and not exceeding 12 feet in height above the surrounding finished grade level.
 - b. The location of a monument sign is subject to the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection. In addition, monument signs in sign district B shall have a minimum distance of 200 feet between them when possible.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-14. Additional signs allowed in sign district C.

Business establishments within sign district C shall be allowed signage in accordance with section 53-10 and the provisions of this section. If, however, such business establishment is part of a shopping center or an integrated business development, the signage allowed shall be as provided in section 53-16. A permit is required for the signs permitted under this section.

- (1) *Column signs.* Column signs are prohibited.
- (2) *Monument signs.*
 - a. Each business establishment is permitted one single or double-faced monument sign not exceeding 24 square feet in area and not exceeding six feet in height above the surrounding finished grade level.
 - b. The location of a monument sign is subject to approval by the sign administrator to ensure that such location does not cause an obstruction to the view of traffic or create a hazard to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection. **In addition, monument signs in sign district C shall have a minimum distance of 200 feet between them when possible.**

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-15. Additional signs allowed in sign district D.

Business establishments within sign district D shall be allowed signage in accordance with the provisions of section 53-10 and this section. If, however, such business establishment is part of a shopping center or an integrated business development, the signage allowed shall be as provided in section 53-16. A permit is required for the signs permitted under this section.

- (1) *Column signs.* Column signs are prohibited.
- (2) *Monument signs.*
 - a. Each business establishment is permitted one single or double-faced monument sign not exceeding 24 square feet in area and not exceeding six feet in height above the surrounding finished grade level.
 - b. The location of a monument sign is subject to approval by the sign administrator to ensure that such location does not cause an obstruction to the view of traffic or create a hazard to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection. **In addition, monument signs in sign district D shall have a minimum distance of 200 feet between them when possible.**

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-16. Shopping center and integrated business developments.

Shopping centers and integrated business developments shall be allowed signage in accordance with section 53-10 and the provisions of this section. A permit is required for the signs allowed under this section.

- (1) *Sign district A.*
 - a. Each shopping center or integrated business development with more than 200 feet of frontage on State Highway 288, or its frontage road is permitted one column sign not exceeding 550

square feet in area. Such column sign shall not exceed 40 feet in height, including the supporting structure, above the surrounding finished grade level. Additionally, each monument sign shall not exceed 22 feet in width. The bottom of such sign shall not be less than 15 feet above the surrounding finished grade level. Such column sign may have a reader panel attached to it, however, a reader panel shall be included in the calculation of total sign area. The support structure shall be visibly marked if such column sign is located in a parking area.

- b. A column sign shall be located such that all parts of such sign are a minimum of ten feet from all property lines.
 - c. In lieu of a column sign, a shopping center or integrated business development is permitted one single or double-faced monument sign not exceeding 50 square feet in area and not exceeding 12 feet in height above the surrounding finished grade level.
 - d. The location of a monument sign is subject to the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.
- (2) *Sign district B.*
- a. Each shopping center or integrated business development is permitted one single or double-faced monument sign not exceeding 50 square feet in area and not exceeding 12 feet in height above the surrounding finished grade level. Additionally, each monument sign shall not exceed 22 feet in width.
 - b. The location of a monument sign is subject to the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.
 - c. An additional monument sign may be permitted for each shopping center or integrated business development that is on the corner of an intersection of two public streets. One sign shall face each adjacent street. Such additional sign shall not exceed four feet in height above the surrounding finished grade level. Such additional sign shall not exceed 16 square feet in area plus an additional five square feet for each business establishment located in such shopping center or integrated business development. The total sign area of both signs combined shall not exceed 100 square feet plus an additional five square feet for each business establishment located in such shopping center or integrated business development.
- (3) *Sign district C.*
- a. Each shopping center or integrated business development is permitted one single or double-faced monument sign not exceeding 24 square feet in area plus an additional three square feet in area for each business establishment located in such shopping center or integrated business development and not exceeding six feet in height above the surrounding finished grade level.
 - b. The location of a monument sign is subject to the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.
 - c. An additional monument sign may be permitted for each shopping center or integrated business development that is on the corner of an intersection of two public streets. One sign shall face each adjacent street. Such additional sign shall not exceed four feet in height above the surrounding finished grade level. Such additional sign shall not exceed 16 square feet in area plus

three square feet for each business establishment located in such shopping center or integrated business development. The total sign area of both signs combined shall not exceed 40 square feet plus an additional three square feet for each business establishment located in such shopping center or integrated business development.

(4) *Sign district D.*

- a. Each shopping center or integrated business development is permitted one single or double-faced monument sign not exceeding 24 square feet in area plus an additional three square feet in area for each business establishment located in such shopping center or integrated business development and not exceeding six feet in height above the surrounding finished grade level.
- b. The location of a monument sign is subject to the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.
- c. An additional monument sign may be permitted for each shopping center or integrated business development that is on the corner of an intersection of two public streets. One sign shall face each adjacent street. Such additional sign shall not exceed four feet in height above the surrounding finished grade level. Such additional sign shall not exceed 16 square feet in area plus three square feet for each business establishment located in such shopping center or integrated business development. The total sign area of both signs combined shall not exceed 40 square feet plus an additional three square feet for each business establishment located in such shopping center or integrated business development.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-17. Permanent identification signs.

- (a) *Single-family residential subdivisions.* Single-family residential subdivisions are permitted permanent monument signs at each major entrance to the subdivision. The total sign surface area at each entrance shall not exceed 32 square feet in area and shall not exceed six feet in height above the surrounding finished grade level. The location of the monument sign shall be outside of the sight distance triangle corresponding to the nearest street intersection and is subject to approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians. Subdivisions which consist of more than one platted section are allowed an additional monument sign of not more than 16 square feet in area and not exceeding six feet in height for each major entrance to each section therein; however, in the case where the major entrance to the subdivision is also a major entrance to a section of the subdivision, that entrance shall be limited to a monument sign of not more than 32 square feet.
- (b) *Multifamily dwelling complexes.* A townhouse, condominium, or apartment complex is permitted one single or double-faced monument sign on the premises, not exceeding 50 square feet in area and not exceeding 12 feet in height above the surrounding finished grade level. The location of the monument sign is subject to the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection. In addition to a monument sign, each multifamily dwelling complex is permitted one wall sign not exceeding in total square feet ten percent of the facade to which it is affixed. A wall sign may not project above the roof line of a building, except for buildings with parapet walls, in which case the signage shall be flush with the wall and shall not project above the parapet.
- (c) *Permit required.* A permit is required for the signs allowed under this section.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-18. Religious institution, private school, or governmental agency signs.

- ~~(a) A religious institution, private school, or governmental agency shall be allowed to erect one single or double-faced monument sign on the property on which the religious institution, school, or governmental agency is located. Such sign shall not exceed 50 square feet in area and shall not exceed 12 feet in height above the surrounding finished grade level. One additional single or double-faced monument sign is allowed to identify a secondary use (such as a school) on the same property. Such sign shall not exceed 28 square feet in area and shall not exceed eight feet in height above the surrounding finished grade level. A permit is required for the signs allowed under this section.~~
- ~~(b) A sign that exceeds the height and/or area requirements of this section may be permitted by the city council. Such sign must be located on property where the main structure on the property lies within 2,000 feet of the S.H. 288 right-of-way. Additionally, the sign must be approved by approval of a specific use permit. An applicant shall be required to obtain a specific use permit through the regular rezoning process and a site plan and drawings of the proposed sign shall be required.~~

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-189. Portable signs.

- (a) *Portable signs for business establishment.* An on-premises portable sign shall be permitted for use by a business establishment for the initial opening of such business for a period not exceeding 30 days. An on-premises portable sign may also be permitted for use by a business establishment for a maximum period of 30 days per calendar year.
- (b) *Portable signs for nonprofit organization.* On-premises portable signs shall be permitted for use on a temporary basis by nonprofit organizations for a maximum period of 15 days per calendar year.
- (c) *Permit required.* A permit is required for any portable sign allowed under subsections (a) and (b) of this section. The location of a portable sign must be approved by the sign administrator to ensure that such location does not create hazards to traffic or pedestrians.
- (d) *Maximum area.* The maximum area per side of a portable sign shall not exceed 32 square feet.
- (e) *Conformance to city building code and electrical code.* Portable signs shall be securely anchored and constructed and erected in accordance with the city's building code and electrical code.
- (f) *Location; property lines and intersections.* Portable signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-1920. Nonconforming signs.

A permanent sign erected within the city prior to the effective date of the ordinance from which this section is derived, which does not conform to the regulations of this chapter, shall be deemed to be a nonconforming sign which shall be allowed to continue, with normal maintenance and repair only; provided, however, a nonconforming sign may not be enlarged upon, expanded, or extended. It is not the intent of this section to encourage the survival of nonconforming signs; to the contrary, nonconforming signs are discouraged and contrary to the intent and purpose of this chapter.

- (1) *Obsolescence or destruction.* A nonconforming sign shall not be enlarged, expanded, extended, replaced, or rebuilt in case of obsolescence or total destruction by any means or cause.

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- (2) *Repair or reconstruction if damaged.* In the event a nonconforming sign is damaged by any means or cause and the repair or reconstruction cost, whichever is applicable, equals or exceeds 50 percent of the fair market value of the sign at the time of the damage, it must be removed or brought into compliance with this chapter.
 - (3) *Removal of unlawful signs.* In case any nonconforming sign is enlarged, expanded, extended, replaced, or rebuilt in violation of any of the terms of this chapter, the sign administrator shall give written notice by personal service or by certified mail, return receipt requested, to the owner, lessee, or person responsible for said sign, to remove the sign or bring the sign into compliance with this chapter. If such order is not complied with within ten days, the sign administrator shall revoke the sign permit.
 - (4) *Placement and removal of signs.* All signs shall be placed by the owner or the party in control of the property or with the permission of such owner or party in control, and the owner or party in control shall be responsible for the prompt removal of any sign in accordance with the provisions of this chapter.
 - (5) *Additional removal of specified signs.* Signs identified and described in section 53-11 shall be removed within 30 days after the effective date of the ordinance from which this section is derived.
 - (6) *Conformance.* Nonconforming temporary business signs and portable signs shall be removed or made to conform with the provisions of this chapter within 30 days after the effective date of the ordinance from which this section is derived.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-201. Periodic inspection.

The sign administrator shall inspect periodically, or whenever deemed necessary, each sign or other advertising structure regulated by this chapter for the purpose of ascertaining whether the sign structure is unsafe, in need of repair, not in conformance with the permit application, or otherwise in violation of the provisions of this chapter.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-212. Reserved.

Sec. 53-223. Penalty.

Any person who shall intentionally, knowingly, recklessly, or with criminal negligence violate any provision of this chapter shall be deemed guilty of a misdemeanor and, upon conviction, shall be fined in an amount not to exceed \$2,000.00. Each day of violation shall constitute a separate offense.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Chapter 53 SIGNS¹

Sec. 53-1. Purpose.

The purpose of this chapter is to establish reasonable regulations for the design, construction, installation, and maintenance of all exterior signs within the city and its extraterritorial jurisdiction in order to:

- (1) Balance the right of individuals to identify their businesses and convey their messages and the right of the public to be protected against the unrestricted proliferation of signs;
- (2) Further the objectives of the city's comprehensive plan;
- (3) Protect the public health, safety, and welfare of the citizens of the city;
- (4) Reduce traffic hazards;
- (5) Facilitate the creation of an attractive and harmonious community;
- (6) Protect property values;
- (7) Promote economic development; and
- (8) Preserve the right of free speech exercised through the use of signs containing non-commercial messages.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-2. Definitions.

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Advertising means to seek the attraction of or to direct the attention of the public to any goods, services, business, activity, or merchandise of any kind or type.

Amateur ball park signs means those signs constructed, attached, hung, placed, suspended, affixed, or painted upon a structure in an amateur ball park which seek the attention of or direct the attention of patrons of the ball park to any goods, services, business, activities, or merchandise of any kind or type.

Billboard or *billboard sign* means an off-premises sign.

Business establishment means any property, building, or structure, permanent or temporary, used for the purpose of conducting in said building or structure, or on said property, a commercial enterprise in compliance with all ordinances and regulations of the city governing such activity. The term "business establishment" shall not include any property, building, or structure used for the primary purpose of securing a permit to erect a sign.

¹Editor's note(s)—Ord. No. 2017-O-35, § 1, adopted Nov. 6, 2017, amended Ch. 53 in its entirety to read as herein set out. Former Ch. 53, §§ 53-1—53-22, pertained to similar subject matter and derived from Ord. No. 2006-O-11, §§ 1—20, 22, 6-16-2006; Ord. No. 2015-O-13, § 2, 4-27-2015.

State law reference(s)—Municipal regulation of signs, V.T.C.A., Local Government Code § 216.003; regulations of political signs by municipality, V.T.C.A., Local Government Code § 216.903.

Business purposes means the erection or use of any property, building, or structure, permanent or temporary, used for the purpose of conducting in said building or structure, or on said property, a commercial enterprise in compliance with all ordinances and regulations of the city governing such activity. The term "business purpose" shall not include any property, building, or structure erected or used for the primary purpose of securing a permit to erect a sign.

Column sign means any sign supported by two or more columns, uprights, or braces anchored in or on the ground and not attached to any building.

Electronic changeable message sign means any sign with a fixed or changing display/message composed of a series of lights that may be changed through electronic means.

Erect means to build, construct, attach, hang, place, suspend, affix, or paint a sign.

Facing or surface means the surface of the sign upon, against, or through which a message is displayed or illustrated.

Illuminated sign means any sign that has characters, letters, fixtures, designs, or outlines illuminated externally by electric lights or internally by luminous tubes or other internal illumination device.

Incombustible material means any material that will not ignite at or below a temperature of 1,200 degrees Fahrenheit and will not continue to burn or glow at that temperature.

Monument sign means any sign mounted on the ground or supported by one or more columns, uprights, or braces anchored in the ground, but not elevated above the ground by any device that holds the sign off the ground and not attached to any building, including reader panels. A message board or electronically displayed date, time, and temperature may not occupy more than 24 square feet of the area of sign face.

Multifamily dwelling complex means a townhouse, condominium, or apartment complex of one or more buildings or portions thereof located on a single tract of land which contain three or more separate dwelling units which share means of egress and other essential facilities.

Off-premises sign means any sign advertising a business, person, activity, goods, products, or services not usually located on the premises where the sign is installed and maintained, or which directs persons to any location not on the premises.

On-premises sign means any sign identifying or advertising the person, activity, goods, business, products, or services primarily sold or offered for sale on the premises or property where the sign is installed and maintained when such premise is used for business purposes.

Permittee means a person receiving a sign permit pursuant to the provisions of this chapter.

Person means an individual, company, corporation, partnership, association, or any other entity.

Pole sign means any sign supported by only one column, pole, upright, or brace anchored in or on the ground and not attached to any building.

Portable sign means any sign designed or constructed to be easily moved from one location to another and which is mounted upon or designed to be mounted upon a wheeled carrier or other framed structure.

Public service sign means a sign that provides a service or message to the public, such as time, temperature, and charity appeals.

Residential purposes means property devoted to use as a single-family or multifamily residence. Residential purposes shall include, but not be limited to, property used for houses, apartments, duplexes, condominiums, townhouses, townhomes, and patio homes; property used for hotels, motels, and boardinghouses shall not be considered as used for residential purposes.

Right-of-way means that property or right-of-way owned by the city, county, or state and used for the purposes of roads, highways, drainage, and public utilities.

Shopping center or integrated business development means a commercial development, such as a strip center, mall, multitenant office building, commercial center, or industrial complex, in which two or more separate businesses occupy a single or multiple structure which share on-site parking facilities and common driveways.

Sign means any writing, pictorial representation, illustration, emblem, symbol, design, or other figure of similar character which is a structure or a part thereof, or is attached to or in any manner represented on a building or other structure, is placed out of doors in view of the general public, and is used for purposes of advertisement, announcement, declaration, demonstration, display, identification, or expression. The term "sign" shall include the sign structure.

Sign administrator means the city building official.

Sign permit means a permit issued by the city to erect a sign. Additionally, a sign permit refers to the continuing authorization by the city for the permit holder to maintain and operate a sign within the city while such sign conforms with the provisions of this chapter.

Sight distance triangle means the triangle formed on any corner lot measured from the point of intersection of the front and exterior side lot lines a distance of 25 feet along said front and side lot lines and connecting the points so established to form a sight triangle on the area of the lot adjacent to the street intersections. Except for single-family residential accessways, a sight triangle at the intersection of a public street and a private access way shall have sides of 15 feet along the accessway and 25 feet along the public street. In order to minimize sight obstructions, no parking, wall, fence, sign, structure or any plant growth other than grasses shall be placed or maintained within the sight distance triangle so as not to impede vision between a height of two feet six inches, and ten feet above the center line grades of the intersecting streets and/or drives.

Sign structure means any structure, device, or system, which supports or is capable of supporting a sign.

Snipe signs or bandit signs means signs which are tacked, nailed, posted, pasted, glued, or otherwise attached to stakes, utility poles, or other like objects, the advertising on which is not applicable to the premises or property on which it is located.

Temporary business sign means any sign, banner, pennant, or other advertising display constructed of cloth, canvas, light fabric, cardboard, or other light materials, with or without frames, with or without words, intended to be displayed for a limited period of time on the property of the business.

Wall sign means any sign mounted parallel to a wall of any building extending 18 inches or less horizontally from the structure to which it is affixed.

Window sign means a temporary business sign placed on, affixed to, painted on or located within the frame of a transparent opening in the wall of a building.

Wind device sign means any flag, banner, pennant, streamer, balloon, or similar sign made of cloth, canvass, plastic, or other flexible material, with or without a frame or other supporting structure, that moves or is designed or intended to move or blow in the wind.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-3. Sign districts.

There are hereby created the following sign districts:

- (1) *Sign district A.* Sign district A shall include all property located in the city limits within 200 feet of the right-of-way of State Highway 288 and its frontage roads.

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- (2) *Sign district B.* Sign district B shall include all property located within the city's light commercial (LC and LC-SUP), heavy commercial (HC and HC-SUP), highway mixed use (HMU and HMU-SUP) and PUD districts as defined by the city's zoning ordinance and is not located within sign district A.
 - (3) *Sign district C.* Sign district C shall include all property in the city limits that is not located within sign district A or sign district B.
 - (4) *Sign district D.* Sign district D shall include all property within the city's extraterritorial jurisdiction unless prohibited or restricted by Local Government Code § 216.902.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-4. Permit required.

Except as provided in section 53-10, it shall be unlawful for any person to erect, relocate, or structurally alter, any sign or other advertising structure as defined in section 53-2, without first obtaining a sign permit from the sign administrator and paying the permit fee required by section 53-7. No permit is required for change of copy or message or for repair, repainting, or maintenance that does not entail structural change.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-5. Application for sign permit.

An application for a sign permit shall be made upon a form provided by the sign administrator and shall contain and have attached the following information:

- (1) The name, address, and telephone number of the applicant;
- (2) The location of the building, structure, or lot to which or upon which the sign or other advertising structure is to be attached or erected;
- (3) The location of the sign or other advertising structure in relation to nearby buildings, structures, and/or rights-of-way, sidewalks and driveways;
- (4) Two blueprints or drawings of the plans and specifications of the sign and a description of the proposed method of construction and attachment to the building or on the ground;
- (5) A certification and/or calculations showing that the sign is designed to meet the wind pressure and dead load requirements of the International Building Code and all other laws and ordinances of the city. The building official may require such certification and calculation to be made by a registered professional engineer if the sign is in excess of six feet in height or 50 square feet in area.
- (6) The name of the person erecting the sign;
- (7) The written consent of the owner of the building, structure, or land to which or on which the sign is to be erected if the owner of such property is different from applicant;
- (8) Any required electrical permit; and
- (9) Such other information as the sign administrator shall require to show full compliance with this and all other laws and ordinances of the city.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-6. Permit issuance.

Upon the filing of an application for a sign permit, the sign administrator shall:

- (1) Examine the plans and specifications and the premises upon which the proposed sign shall be erected; and
- (2) Issue a permit if the proposed sign complies with the requirements of this chapter and all other laws and ordinances of the city. If the work authorized under a sign permit is not completed within six months after the date of issuance, the permit shall become null and void.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-7. Permit fee.

Every applicant, prior to issuance of a permit pursuant to section 53-6, shall pay to the city a nonrefundable fee. Such fees shall be adopted by resolution and may be revised as often as the city council deems necessary.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-8. Revocation of permit.

The sign administrator may revoke any permit where there has been a violation of the provisions of this chapter or a misrepresentation of fact on the permit application.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-9. Number, date, and voltage.

- (a) Every permitted sign or other advertising structure shall display in a conspicuous place on such sign or structure, in letters no less than one inch in height, the date of erection, the permit number, and the voltage of any electrical apparatus used.
- (b) The top of all signs and sign structures shall have a minimum vertical clearance from any other structure of 14 feet, and shall have a clearance equal to its height from any transmission line carrying 750 volts or greater.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-10. Permitted signs.

The following signs are allowed in all districts and are exempt from the permit requirements of this chapter:

- (1) Temporary real estate signs not exceeding 16 square feet in area that advertise the sale, rental, or lease of the premises upon which the sign is located. Such signs shall be removed not later than ten days following the sale, rental, or lease of the subject property. Such signs shall only be located on private property;
- (2) Temporary political signs concerning candidates for public office and ballot issues and not exceeding 36 square feet in area. Such signs shall be erected not more than 30 days preceding the first day early voting commences for the election or referendum to which they pertain and removed not later than

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- ten days after the date of the election or referendum. Such signs shall only be located on private property;
- (3) Temporary signs advertising the date, time, and location of a garage or yard sale and not exceeding four square feet in area. Such signs shall be erected not more than three days prior to and removed not later than one day after the date of the sale;
 - (4) Signs which are an integral part of the historical character of a designated historic district or a building that has been designated a landmark;
 - (5) Public signs regulating vehicular or pedestrian traffic or designating or giving direction to streets, schools, hospitals, historical sites, or public facilities;
 - (6) Flags of any government or governmental agency or any patriotic, religious, charitable, civic, educational, or fraternal organization and not exceeding 40 square feet in area;
 - (7) Temporary signs advertising special community events or other community activities sponsored by nonprofit organizations, governmental entities, or churches. Such signs shall not exceed 32 square feet in area, shall not be erected more than 30 days in advance of the event and shall be removed within ten days after such event. Temporary signs shall be securely anchored and shall not exceed seven feet in height from ground level;
 - (8) Temporary displays or decorations customarily associated with any national, state, local, or religious holiday or celebration. Such signs shall be erected not more than 45 days before the holiday or celebration and removed not later than ten days after such holiday or celebration;
 - (9) Hand-held signs of a noncommercial nature not set on or affixed to the ground and not exceeding ten square feet in area;
 - (10) Temporary signs identifying the architect, engineer, developer or contractor when placed upon construction sites and not exceeding 64 square feet in area. Such signs shall not be erected prior to approval of a site plan and shall be removed not later than ten days after completion of the project;
 - (11) Signs identifying the name and profession of the occupant of a business establishment and not exceeding two square feet in area;
 - (12) Memorial or commemorative plaques or tablets denoting a building name and/or date of erection or a location of historic significance and not exceeding four square feet in area;
 - (13) Any sign for informational (non-advertisement) purposes not exceeding one square foot in area with letters not exceeding four inches in height;
 - (14) Property identification signs indicating address and/or name and not exceeding two square feet in area located on property used for residential purposes or five square feet in area located on property used for business purposes;
 - (15) Temporary business signs shall be permitted; provided, that:
 - a. Temporary business signs of combustible material shall not exceed 60 square feet in area;
 - b. Temporary business signs weighing in excess of 50 pounds must conform to the safety requirements of the building code of the city and must be approved by the sign administrator;
 - c. Temporary business signs shall not extend over or into any street right-of-way, alley, sidewalk, or other public thoroughfare;
 - d. Temporary business signs shall be attached with wire or steel cables. Strings, ropes, or wood slats for anchorage or support purposes shall not be permitted;

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- e. Temporary business signs shall not be allowed to remain for a period exceeding 15 days in a six-month period;
 - f. Temporary business signs must be on-premise signs; and
 - g. Only one temporary business sign may be displayed at any given time.
- (16) Amateur ball park signs;
 - (17) Signs erected by the city, the state (including its political subdivisions, such as school districts), or the United States government, or otherwise required by federal, state, or local laws;
 - (18) Directory signs, menu boards and the like, which are designed to be read from a distance no greater than ten feet; and
 - (19) Notwithstanding any other provision of this chapter, any sign that may display a commercial message may also display any noncommercial message, either in place of or in addition to the commercial message, so long as the sign complies with other requirements of this chapter.
 - (20) An electronic changeable message sign may be allowed, provided that:
 - a. The size of the changeable area is no larger than 25 percent of the overall permitted sign.
 - b. i. For sign districts A and B, the message is displayed for a minimum of 15 seconds without changing, flashing, or scrolling; and the sign does not conflict with section 53-11(9); or
 - ii. For sign districts C and D, the message is displayed for a minimum of 15 seconds without changing, flashing, or scrolling; and the sign does not conflict with section 53-11(9).
 - c. No internal or external illumination of the LED screens will be allowed between the hours of 10:00 p.m. and 6:00 a.m.
 - d. Maximum illumination will be determined by the difference between ambient light and full wattage and this difference cannot be more than .2 footcandles at 75 feet. The owner will provide annual reports certifying illumination does not exceed stated limits and will conduct tests in response to any complaints received by the city concerning the light from the sign.
 - e. Maximum nit wattage is 6,500.
 - (21) Each business establishment is allowed wall signage not exceeding in total square feet of the non-fenestrated facade to which it is affixed:
 - 20 percent for the side with the principal entrance;
 - 15 percent for the side(s) fronting on a public street;
 - Ten percent for all other sides;
 - Ten percent per side for canopies related to a business;
 - A maximum of 32 square feet for freestanding menu boards in addition to wall signs;
 - Wall signage may not project above the lower edge of the roof line or parapet of a building.
 - (22) A home business may have one non-illuminated sign with a maximum area of two square feet.
- (Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-11. Prohibited signs.

Signs prohibited in all districts by this chapter include, but are not limited to, the following:

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- (1) Signs which are inadequately maintained so as to show evidence of deterioration, including peeling, rust, dirt, fading, discoloration, loss of illumination, or holes. Damaged signs shall be repaired or removed within 30 days of receipt of notice from the city;
 - (2) Signs which advertise a business or product, which is no longer in existence. Abandoned or outdated signs shall be replaced or removed within 30 days of receipt of notice from the city;
 - (3) Signs which are erected, relocated, or maintained so as to prevent free ingress to or egress from any door, window, or fire escape. No sign of any kind shall be attached to a stand pipe or fire escape;
 - (4) Signs which obstruct free and clear vision at any street intersection;
 - (5) Signs which interfere with, obstruct the view of, or may be confused with any authorized traffic sign, signal, or device because of its position, shape, or color;
 - (6) Signs which use the words "stop," "look," "go slow," "caution," "danger," "warning," or any other word, phrase, symbol or character in a manner that interferes with, misleads, or confuses traffic;
 - (7) Signs which constitute a hazard to safety or health by reason of inadequate design, construction, repair, or maintenance;
 - (8) Signs which are illuminated with lights that cause a glare into or upon the surrounding area or any property used for residential purposes or which distract operators of vehicles or pedestrians on a public right-of-way;
 - (9) Signs which contain reflectors or lights or illuminations or messages that flash, move, rotate, scintillate, blink, flicker, vary in intensity or color, or use intermittent electrical pulsation;
 - (10) Signs which display any matter in which the dominant theme of the material taken as a whole appeals to a prurient interest in sex, or is patently offensive because it affronts contemporary community standards relating to the description or representation of sexual matters, and is utterly without redeeming social value;
 - (11) Signs which are painted on or attached to a motor vehicle used primarily for the display of such sign. This section shall not prohibit the identification of a business or its products or services on a vehicle operated and parked in a manner appropriate to the normal course of business;
 - (12) Signs which have visible moving, revolving, or rotating parts or visible mechanical movement of any kind, achieved by electrical or mechanical means, except for time-temperature-date signs;
 - (13) Signs attached to or located upon outdoor exposed amenities such as trees, street signs, utility poles, or fences, which are visible from any street;
 - (14) Signs which are off-premises signs;
 - (15) Signs or portions thereof which are located on, or project or extend over, any public right-of-way, any public sidewalk, street, alley, or other public property;
 - (16) Wind device signs;
 - (17) Snipe signs or bandit signs except as pre-permitted between the hours of 5:00 p.m. on Friday and 7:00 a.m. on Monday, provided no such sign shall be located less than 100 feet from another such sign; and
 - (18) Pole signs.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-12. Additional signs allowed in sign district A.

Business establishments within sign district A shall be allowed signage in accordance with section 53-10 and the provisions of this section. If, however, such business establishment is part of a shopping center or an integrated business development, the signage allowed shall be as provided in section 53-16. A permit is required for the signs allowed under this section.

(1) *Column signs.*

- a. Each business establishment in sign district A is permitted one column sign, which shall be supported by not less than two columns, with the depth of the column not less than the depth of the sign; provided, however, that the width of the column shall not be less than three feet. The message area of such column sign shall not exceed 550 square feet in area. The height of such column shall not exceed 40 feet in height, including the supporting structure, above the surrounding finished grade level. Additionally, each monument sign shall not exceed 22 feet in width. The bottom of such sign message area shall not be less than 15 feet above the surrounding finished grade level. Such column sign shall not exceed 22 feet in width. Such column sign may have a reader panel attached to it, however, a reader panel shall be included in the calculation of total sign area. Each column sign shall be positioned perpendicular to the roadway on which the property on which the sign is located faces. The support structure shall be visibly marked if such column sign is located in a parking area. Each business establishment in sign district A with more than 200 feet of frontage on State Highway 288 or its frontage road shall be permitted one additional sign as described in this section. No single business shall exceed 20 square feet of sign space on any one column sign.
- b. A column sign shall be located such that all parts of such sign are a minimum of ten feet from all property lines.

(2) *Monument signs.*

- a. In lieu of, and not in addition to, a column sign, each business establishment is permitted one single or double-faced monument sign not exceeding 50 square feet in area and not exceeding 12 feet in height above the surrounding finished grade level.
- b. The location of a monument sign is subject to the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-13. Additional signs allowed in sign district B.

Business establishments within sign district B shall be allowed signage in accordance with section 53-10 and the provisions of this section. If, however, such business establishment is part of a shopping center or an integrated business development, the signage allowed shall be as provided in section 53-16. A permit is required for the signs allowed under this section.

(1) *Column signs.* Column signs are prohibited.

(2) *Monument signs.*

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- a. Each business establishment with frontage on State Highway 6 is permitted one single or double-faced monument sign not exceeding 50 square feet in area and not exceeding 12 feet in height above the surrounding finished grade level.
 - b. The location of a monument sign is subject to the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection. In addition, monument signs in sign district B shall have a minimum distance of 200 feet between them when possible.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-14. Additional signs allowed in sign district C.

Business establishments within sign district C shall be allowed signage in accordance with section 53-10 and the provisions of this section. If, however, such business establishment is part of a shopping center or an integrated business development, the signage allowed shall be as provided in section 53-16. A permit is required for the signs permitted under this section.

- (1) *Column signs.* Column signs are prohibited.
- (2) *Monument signs.*
 - a. Each business establishment is permitted one single or double-faced monument sign not exceeding 24 square feet in area and not exceeding six feet in height above the surrounding finished grade level.
 - b. The location of a monument sign is subject to approval by the sign administrator to ensure that such location does not cause an obstruction to the view of traffic or create a hazard to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-15. Additional signs allowed in sign district D.

Business establishments within sign district D shall be allowed signage in accordance with the provisions of section 53-10 and this section. If, however, such business establishment is part of a shopping center or an integrated business development, the signage allowed shall be as provided in section 53-16. A permit is required for the signs permitted under this section.

- (1) *Column signs.* Column signs are prohibited.
- (2) *Monument signs.*
 - a. Each business establishment is permitted one single or double-faced monument sign not exceeding 24 square feet in area and not exceeding six feet in height above the surrounding finished grade level.
 - b. The location of a monument sign is subject to approval by the sign administrator to ensure that such location does not cause an obstruction to the view of traffic or create a hazard to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-16. Shopping center and integrated business developments.

Shopping centers and integrated business developments shall be allowed signage in accordance with section 53-10 and the provisions of this section. A permit is required for the signs allowed under this section.

(1) *Sign district A.*

- a. Each shopping center or integrated business development with more than 200 feet of frontage on State Highway 288, or its frontage road is permitted one column sign not exceeding 550 square feet in area. Such column sign shall not exceed 40 feet in height, including the supporting structure, above the surrounding finished grade level. Additionally, each monument sign shall not exceed 22 feet in width. The bottom of such sign shall not be less than 15 feet above the surrounding finished grade level. Such column sign may have a reader panel attached to it, however, a reader panel shall be included in the calculation of total sign area. The support structure shall be visibly marked if such column sign is located in a parking area.
- b. A column sign shall be located such that all parts of such sign are a minimum of ten feet from all property lines.
- c. In lieu of a column sign, a shopping center or integrated business development is permitted one single or double-faced monument sign not exceeding 50 square feet in area and not exceeding 12 feet in height above the surrounding finished grade level.
- d. The location of a monument sign is subject to the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.

(2) *Sign district B.*

- a. Each shopping center or integrated business development is permitted one single or double-faced monument sign not exceeding 50 square feet in area and not exceeding 12 feet in height above the surrounding finished grade level. Additionally, each monument sign shall not exceed 22 feet in width.
- b. The location of a monument sign is subject to the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.
- c. An additional monument sign may be permitted for each shopping center or integrated business development that is on the corner of an intersection of two public streets. One sign shall face each adjacent street. Such additional sign shall not exceed four feet in height above the surrounding finished grade level. Such additional sign shall not exceed 16 square feet in area plus an additional five square feet for each business establishment located in such shopping center or integrated business development. The total sign area of both signs combined shall not exceed 100 square feet plus an additional five square feet for each business establishment located in such shopping center or integrated business development.

(3) *Sign district C.*

- a. Each shopping center or integrated business development is permitted one single or double-faced monument sign not exceeding 24 square feet in area plus an additional three square feet in area for each business establishment located in such shopping center or integrated business development and not exceeding six feet in height above the surrounding finished grade level.

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- b. The location of a monument sign is subject to the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.
 - c. An additional monument sign may be permitted for each shopping center or integrated business development that is on the corner of an intersection of two public streets. One sign shall face each adjacent street. Such additional sign shall not exceed four feet in height above the surrounding finished grade level. Such additional sign shall not exceed 16 square feet in area plus three square feet for each business establishment located in such shopping center or integrated business development. The total sign area of both signs combined shall not exceed 40 square feet plus an additional three square feet for each business establishment located in such shopping center or integrated business development.
- (4) *Sign district D.*
- a. Each shopping center or integrated business development is permitted one single or double-faced monument sign not exceeding 24 square feet in area plus an additional three square feet in area for each business establishment located in such shopping center or integrated business development and not exceeding six feet in height above the surrounding finished grade level.
 - b. The location of a monument sign is subject to the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.
 - c. An additional monument sign may be permitted for each shopping center or integrated business development that is on the corner of an intersection of two public streets. One sign shall face each adjacent street. Such additional sign shall not exceed four feet in height above the surrounding finished grade level. Such additional sign shall not exceed 16 square feet in area plus three square feet for each business establishment located in such shopping center or integrated business development. The total sign area of both signs combined shall not exceed 40 square feet plus an additional three square feet for each business establishment located in such shopping center or integrated business development.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-17. Permanent identification signs.

- (a) *Single-family residential subdivisions.* Single-family residential subdivisions are permitted permanent monument signs at each major entrance to the subdivision. The total sign surface area at each entrance shall not exceed 32 square feet in area and shall not exceed six feet in height above the surrounding finished grade level. The location of the monument sign shall be outside of the sight distance triangle corresponding to the nearest street intersection and is subject to approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians. Subdivisions which consist of more than one platted section are allowed an additional monument sign of not more than 16 square feet in area and not exceeding six feet in height for each major entrance to each section therein; however, in the case where the major entrance to the subdivision is also a major entrance to a section of the subdivision, that entrance shall be limited to a monument sign of not more than 32 square feet.
- (b) *Multifamily dwelling complexes.* A townhouse, condominium, or apartment complex is permitted one single or double-faced monument sign on the premises, not exceeding 50 square feet in area and not exceeding 12 feet in height above the surrounding finished grade level. The location of the monument sign is subject to

the approval of the sign administrator to ensure that such location does not create hazards to traffic or pedestrians; provided, however, all monument signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection. In addition to a monument sign, each multifamily dwelling complex is permitted one wall sign not exceeding in total square feet ten percent of the facade to which it is affixed. A wall sign may not project above the roof line of a building, except for buildings with parapet walls, in which case the signage shall be flush with the wall and shall not project above the parapet.

- (c) *Permit required.* A permit is required for the signs allowed under this section.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-18. Religious institution, private school, or governmental agency signs.

- (a) A religious institution, private school, or governmental agency shall be allowed to erect one single or double-faced monument sign on the property on which the religious institution, school, or governmental agency is located. Such sign shall not exceed 50 square feet in area and shall not exceed 12 feet in height above the surrounding finished grade level. One additional single or double-faced monument sign is allowed to identify a secondary use (such as a school) on the same property. Such sign shall not exceed 28 square feet in area and shall not exceed eight feet in height above the surrounding finished grade level. A permit is required for the signs allowed under this section.
- (b) A sign that exceeds the height and/or area requirements of this section may be permitted by the city council. Such sign must be located on property where the main structure on the property lies within 2,000 feet of the S.H. 288 right-of-way. Additionally, the sign must be approved by approval of a specific use permit. An applicant shall be required to obtain a specific use permit through the regular rezoning process and a site plan and drawings of the proposed sign shall be required.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-19. Portable signs.

- (a) *Portable signs for business establishment.* An on-premises portable sign shall be permitted for use by a business establishment for the initial opening of such business for a period not exceeding 30 days. An on-premises portable sign may also be permitted for use by a business establishment for a maximum period of 30 days per calendar year.
- (b) *Portable signs for nonprofit organization.* On-premises portable signs shall be permitted for use on a temporary basis by nonprofit organizations for a maximum period of 15 days per calendar year.
- (c) *Permit required.* A permit is required for any portable sign allowed under subsections (a) and (b) of this section. The location of a portable sign must be approved by the sign administrator to ensure that such location does not create hazards to traffic or pedestrians.
- (d) *Maximum area.* The maximum area per side of a portable sign shall not exceed 32 square feet.
- (e) *Conformance to city building code and electrical code.* Portable signs shall be securely anchored and constructed and erected in accordance with the city's building code and electrical code.
- (f) *Location; property lines and intersections.* Portable signs shall be located outside of the sight distance triangle corresponding to the nearest street intersection.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-20. Nonconforming signs.

A permanent sign erected within the city prior to the effective date of the ordinance from which this section is derived, which does not conform to the regulations of this chapter, shall be deemed to be a nonconforming sign which shall be allowed to continue, with normal maintenance and repair only; provided, however, a nonconforming sign may not be enlarged upon, expanded, or extended. It is not the intent of this section to encourage the survival of nonconforming signs; to the contrary, nonconforming signs are discouraged and contrary to the intent and purpose of this chapter.

- (1) *Obsolescence or destruction.* A nonconforming sign shall not be enlarged, expanded, extended, replaced, or rebuilt in case of obsolescence or total destruction by any means or cause.
- (2) *Repair or reconstruction if damaged.* In the event a nonconforming sign is damaged by any means or cause and the repair or reconstruction cost, whichever is applicable, equals or exceeds 50 percent of the fair market value of the sign at the time of the damage, it must be removed or brought into compliance with this chapter.
- (3) *Removal of unlawful signs.* In case any nonconforming sign is enlarged, expanded, extended, replaced, or rebuilt in violation of any of the terms of this chapter, the sign administrator shall give written notice by personal service or by certified mail, return receipt requested, to the owner, lessee, or person responsible for said sign, to remove the sign or bring the sign into compliance with this chapter. If such order is not complied with within ten days, the sign administrator shall revoke the sign permit.
- (4) *Placement and removal of signs.* All signs shall be placed by the owner or the party in control of the property or with the permission of such owner or party in control, and the owner or party in control shall be responsible for the prompt removal of any sign in accordance with the provisions of this chapter.
- (5) *Additional removal of specified signs.* Signs identified and described in section 53-11 shall be removed within 30 days after the effective date of the ordinance from which this section is derived.
- (6) *Conformance.* Nonconforming temporary business signs and portable signs shall be removed or made to conform with the provisions of this chapter within 30 days after the effective date of the ordinance from which this section is derived.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

Sec. 53-21. Periodic inspection.

The sign administrator shall inspect periodically, or whenever deemed necessary, each sign or other advertising structure regulated by this chapter for the purpose of ascertaining whether the sign structure is unsafe, in need of repair, not in conformance with the permit application, or otherwise in violation of the provisions of this chapter.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

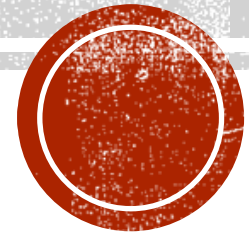
Sec. 53-22. Reserved.

Sec. 53-23. Penalty.

Any person who shall intentionally, knowingly, recklessly, or with criminal negligence violate any provision of this chapter shall be deemed guilty of a misdemeanor and, upon conviction, shall be fined in an amount not to exceed \$2,000.00. Each day of violation shall constitute a separate offense.

(Ord. No. 2017-O-35, § 1, 11-6-2017)

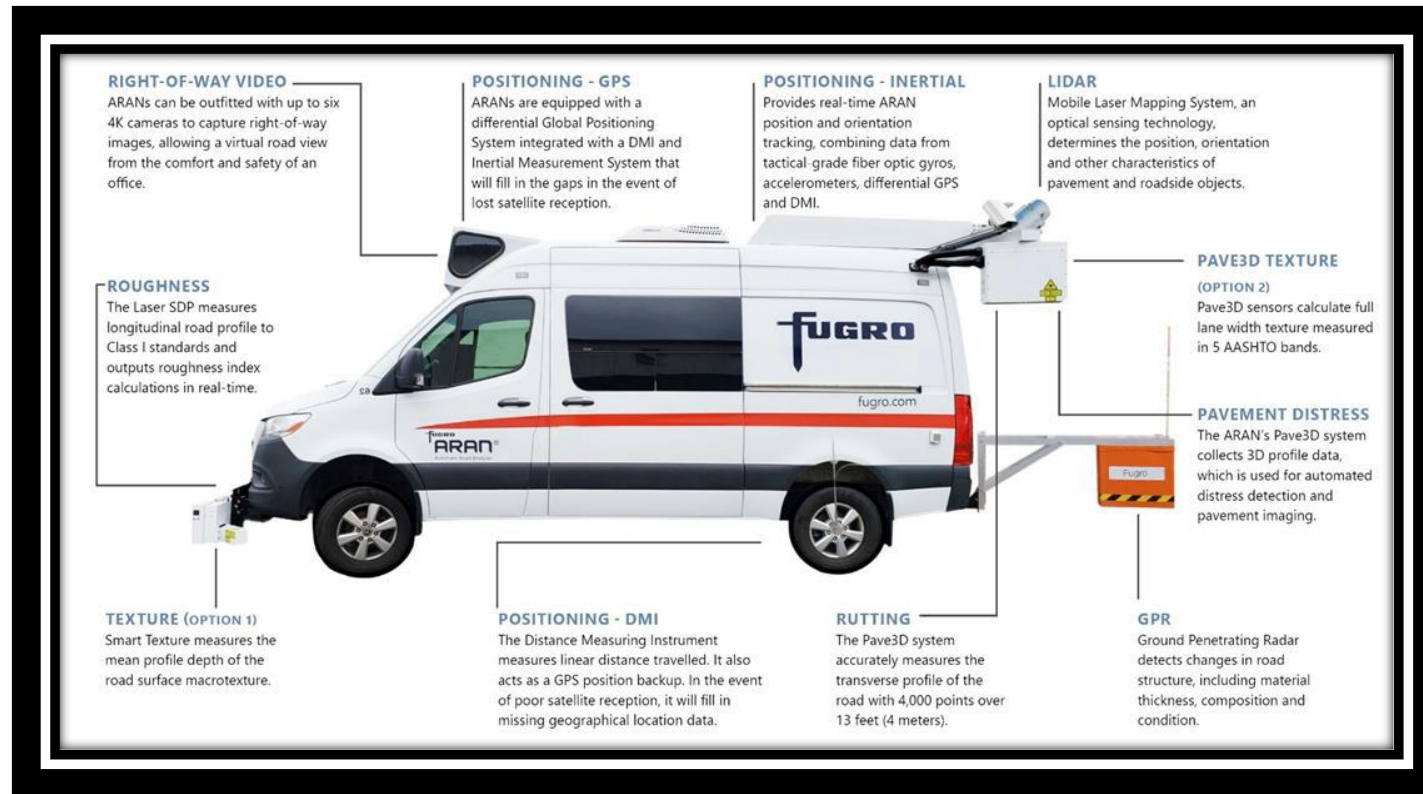
STREET MAINTENANCE AND PAVEMENT PRESERVATION



Community and Development Services

10/17/2022

SELECTION



Fugro selected 11/16/2021



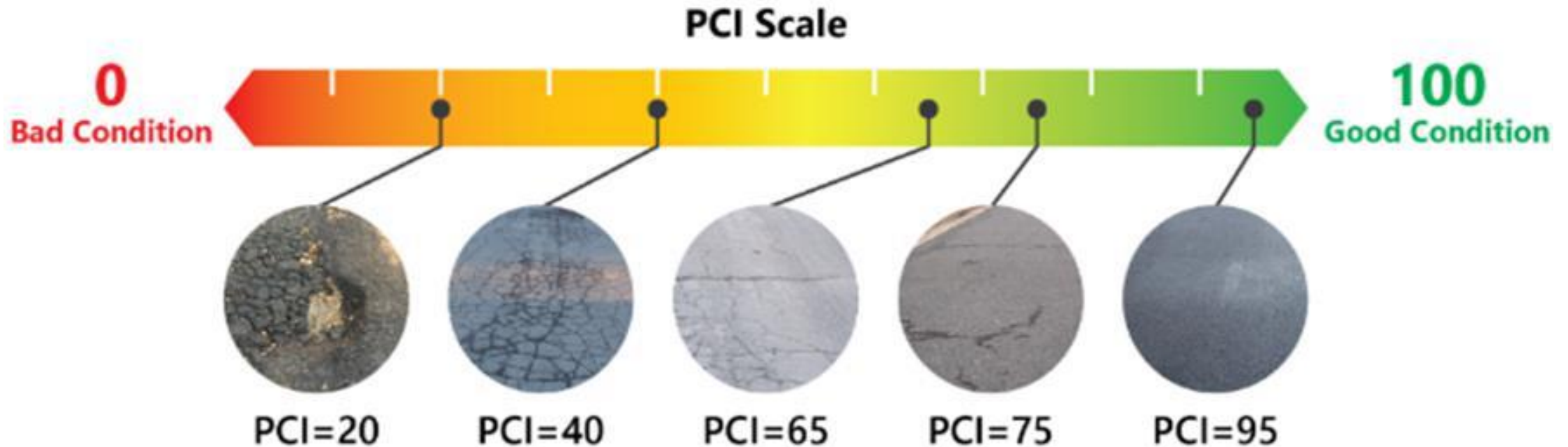
OBJECTIVES AND AREAS OF INTEREST

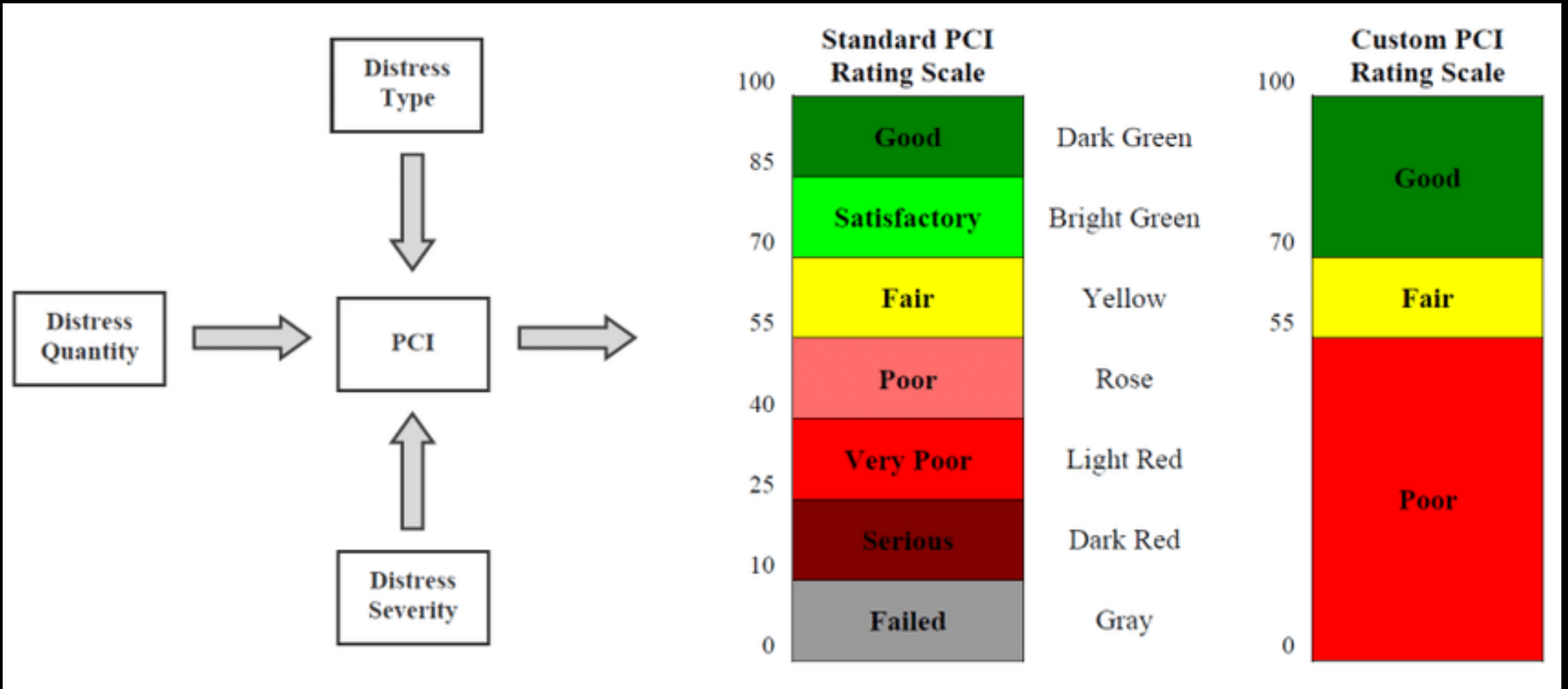
- Highlight narrow roadways
- Automatic measurement of pavement condition
- Integration with City's Geographic Information System (GIS)
- Pavement management data analysis



PAVEMENT CONDITION INDEX (PCI)

- The collected pavement distresses were used to calculate PCI values for the City's road network.
- PCI is based on the type, severity, and extent of surface distresses.
- The City's average PCI for asphalt is 42 (45 overall).

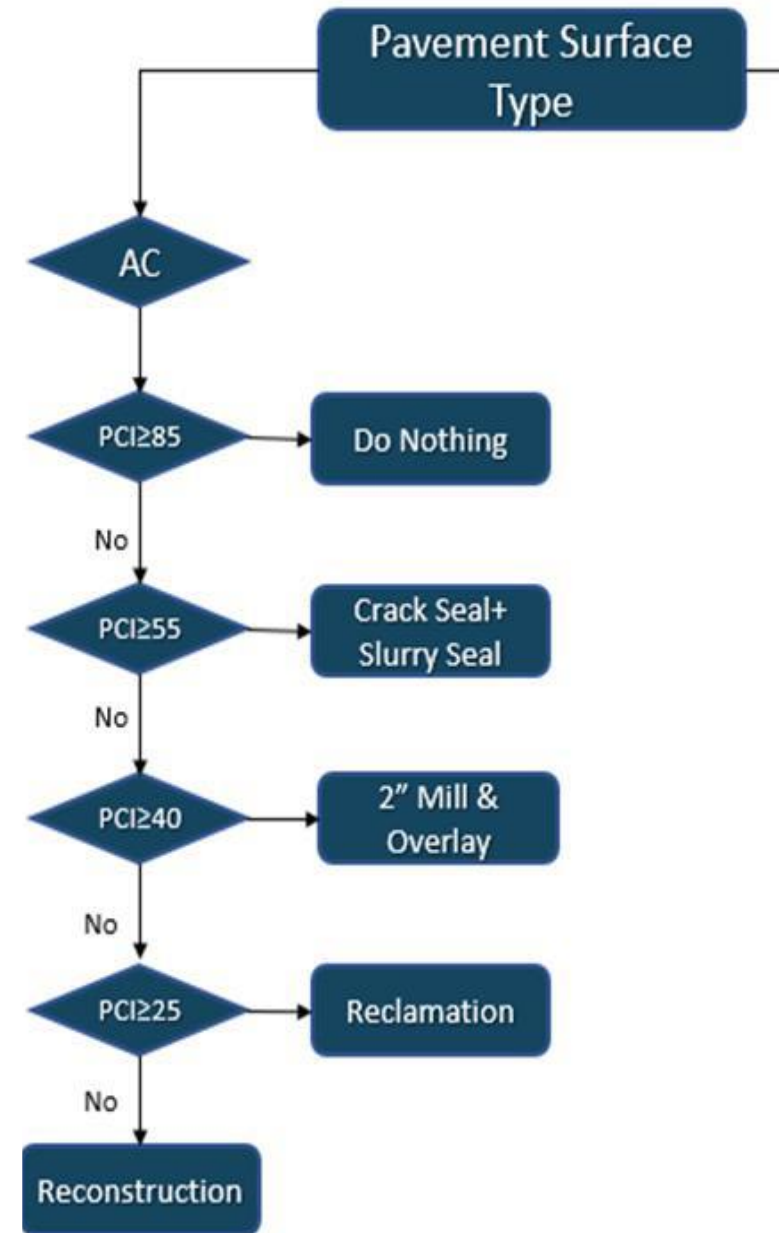




REHAB PLAN

Four approaches depending on pavement age, traffic, and condition.

1. **Preventive maintenance** - *applied at the early stage of pavement life to maintain the functional condition of pavements without increasing the structural capacity.*
2. **Minor rehabilitation** - *introduced to address the top-down surface cracking, aging of pavements, and functional deficiencies without increasing the structural capacity.*
3. **Major rehabilitation** - *Major rehabilitation activities increase the structural capacity of the existing pavements and extend the pavement life.*
4. **Reconstruction** – *For the lowest PCI roadways.*



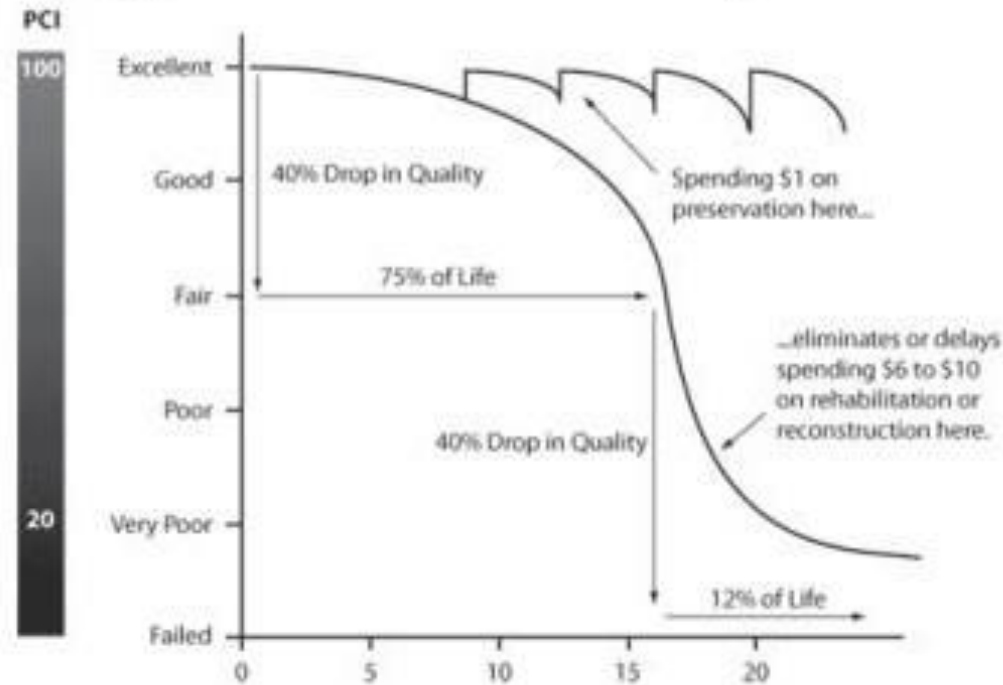
MAINTENANCE TECHNIQUES AND COST ESTIMATES

Type	Treatment	PCI Impact	Unit Cost (Per ft ²)	12ft Cross Section	Cost per Lane Mile
Asphalt	Crack Seal + Slurry Seal (Preventive Maintenance)	Increase by 25 points	\$0.30	\$ 3.60	\$ 19,008
	Mill & 2" Overlay (Minor Rehabilitation)	Reset to 100	\$3.50	\$ 42.00	\$ 221,760
	Reclamation (Major Rehabilitation)	Reset to 100	\$4.50	\$ 54.00	\$ 285,120
	Reconstruction	Reset to 100	\$15.00	\$ 180.00	\$ 950,400
Concrete	Crack Seal & Joint Seal (Preventive Maintenance)	Increase by 10 points	\$0.17	\$ 2.04	\$ 10,771
	Partial Depth Repair (Minor Rehabilitation)	Increase by 20 points	\$9.00	\$ 108.00	\$ 570,240
	Panel Replacement (Major Rehabilitation)	Reset to 100	\$12.00	\$ 144.00	\$ 760,320
	Reconstruction	Reset to 100	\$25.00	\$ 300.00	\$ 1,584,000



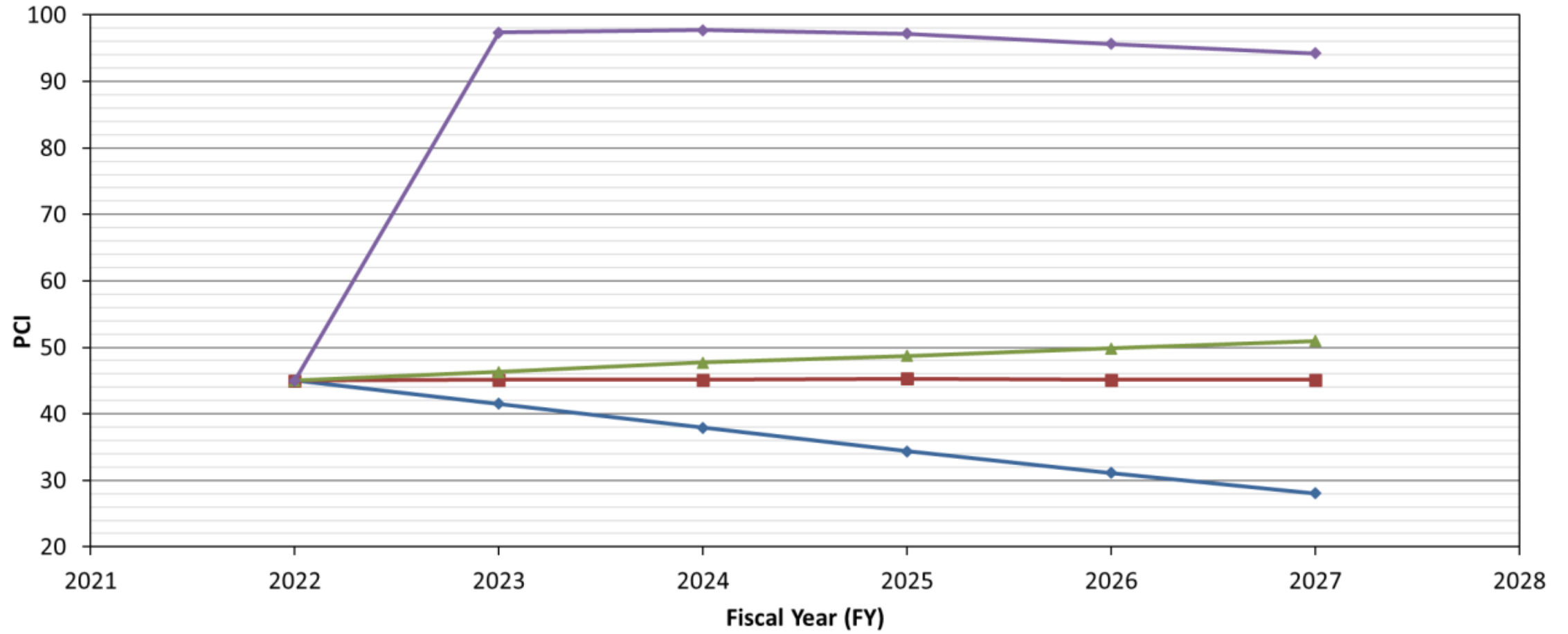
Every \$1 spent to keep a road in good condition avoids \$6-14 needed later to rebuild the same road once it has deteriorated significantly. *American Association of State Highway and Transportation Officials*

Pavement option curve (example). (PCI = Pavement Condition Index.) Pavement Preservation Compendium II



Principles of Pavement Preservation, Definitions, Benefits, Issues, and Barriers
by Larry Galehouse, James S. Moulthrop, and R. Gary Hicks





◆ No Funding

■ Scenario 1 - Maintain PCI 45

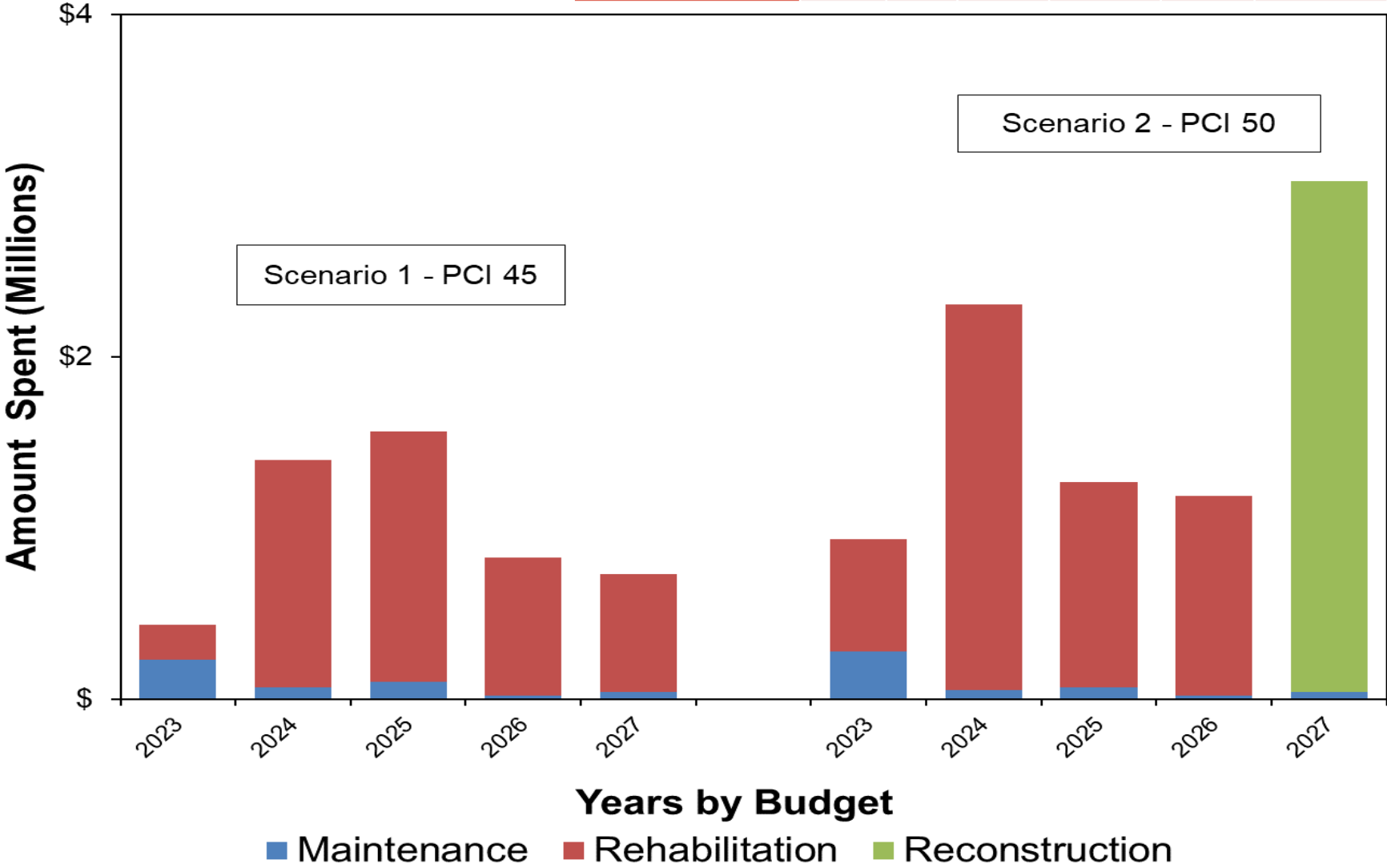
▲ Scenario 2 - Increase PCI 50

◆ Unlimited

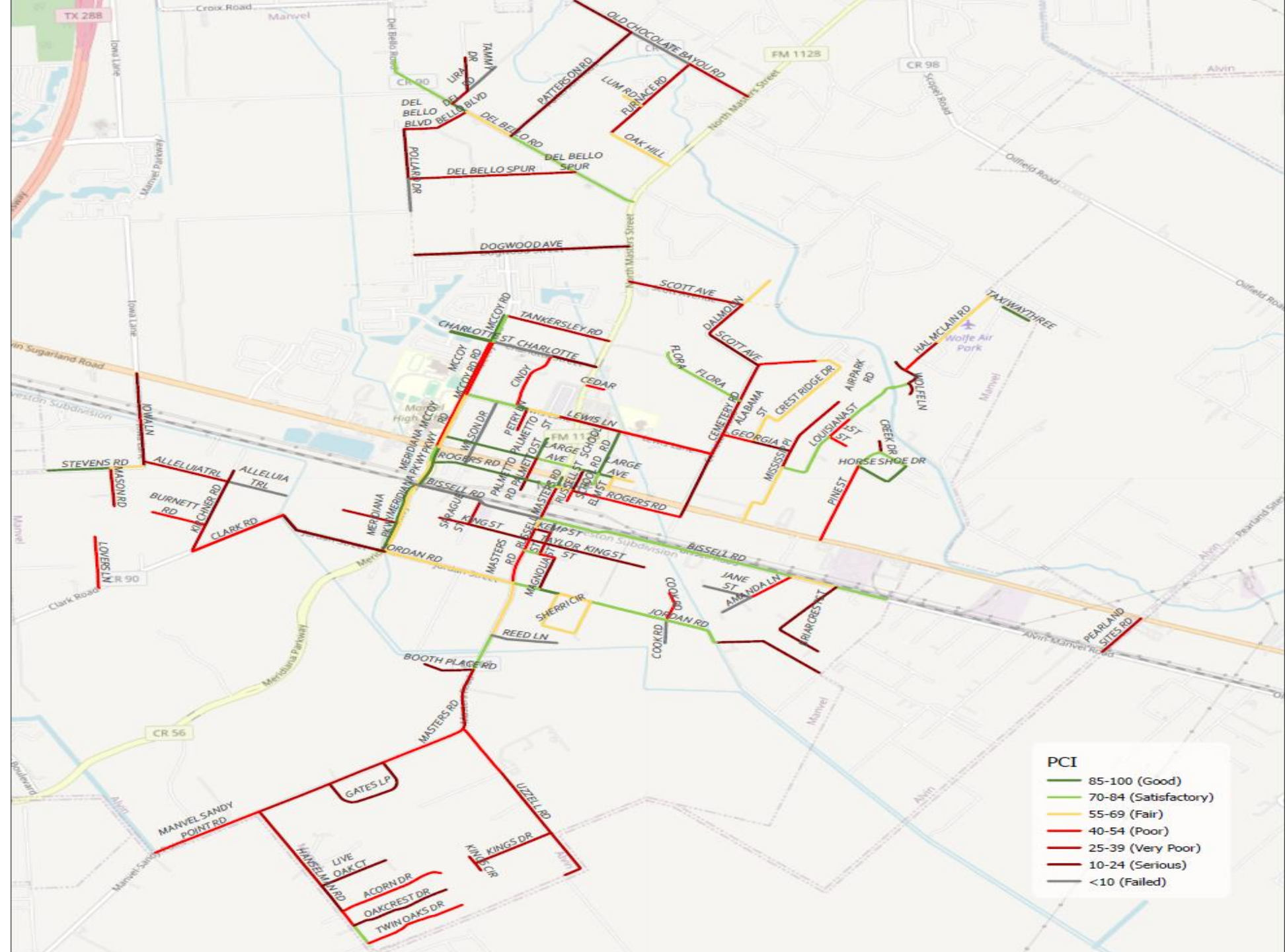


SCENARIOS

Scenario	2023	2024	2025	2026	2027	Total
Scenario 1 Maintain (PCI 45)	0.44	1.4	1.56	0.83	0.73	4.96
Scenario 2 Increase by 5 (PCI 50)	0.93	2.31	1.27	1.19	3.03	8.72

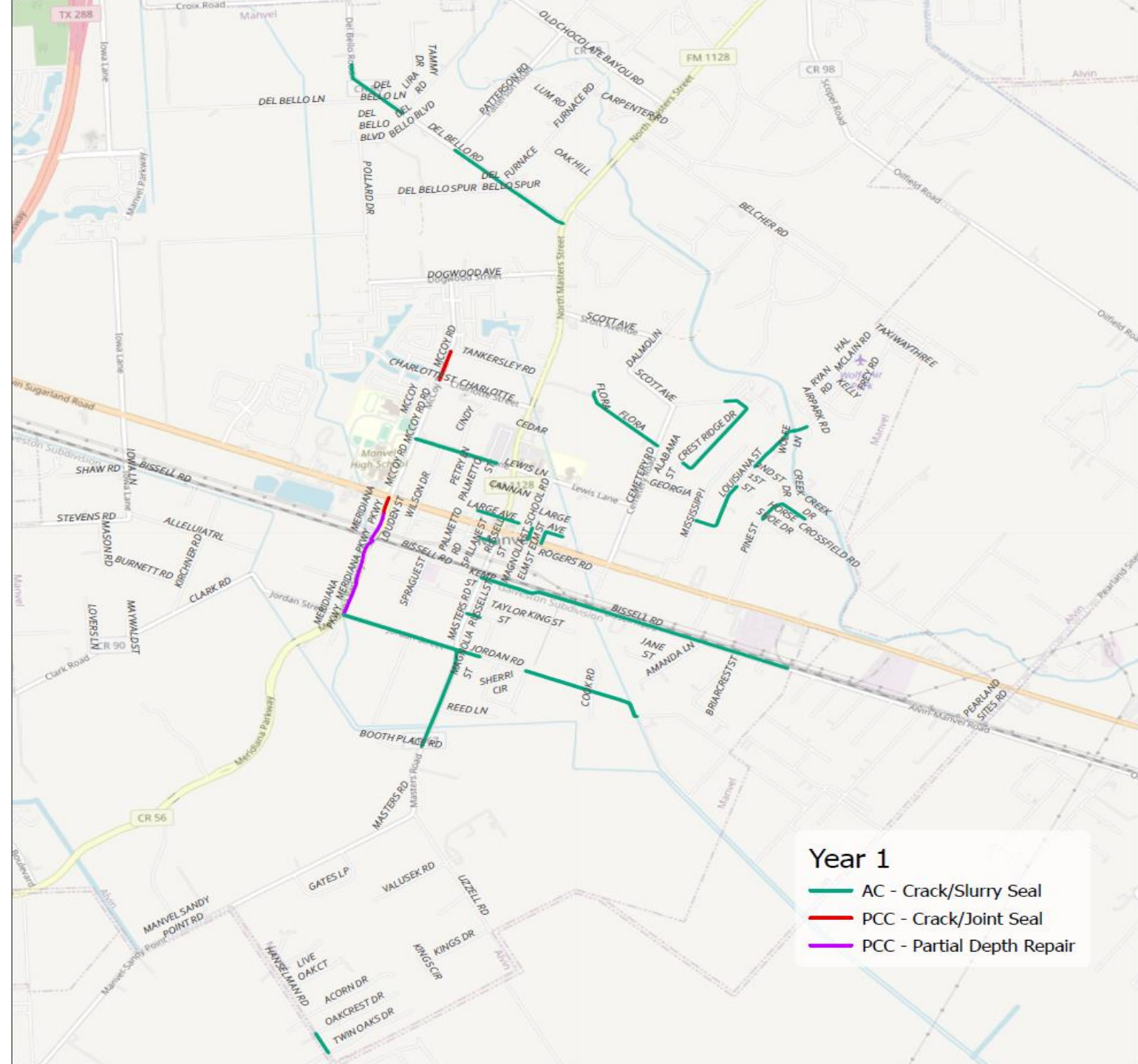


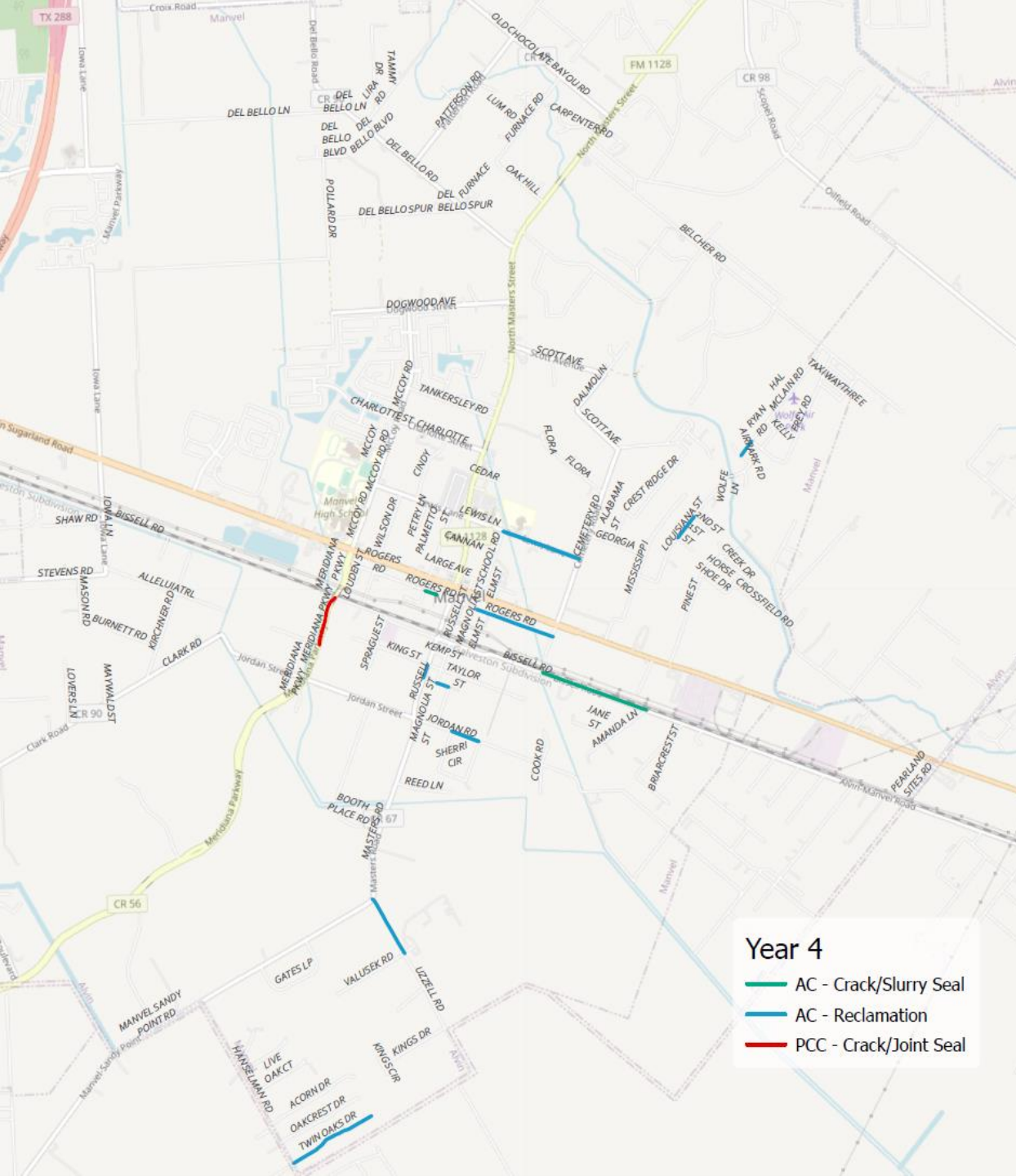
**A large portion of our
roadways are below
Satisfactory condition.**



PRESERVATION

- 5 Year plan to improve overall PCI 5 points.
- Primary focus is to rehab
- Secondary is to focus on Arterial
- Work plan will be adjusted to consider the throughfare plan.
- Reclaim as option for only the sever damaged and moderate traffic.





GILBERT SALAS

FY 2022-23 DEPARTMENT GOALS

- Rehabilitate at least 2 miles of asphalt streets using data collected from street assessment.
- \$300k for rehabilitation per year.

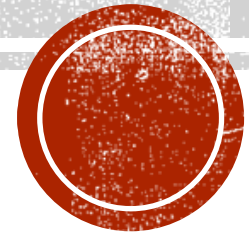


Brazoria County Interlocal

	STREET	LIMITS FROM / TO	LENGTH (FT)	WIDTH (FT)
1	Alabama	FROM: Crestridge Dr TO: Georgia	900	26
2	Cemetery Road	FROM: Georgia TO: End	5,000	26
		FROM: SH6 TO: Georgia Street	2,400	26
3	Crestridge Drive	FROM: Cemetery Rd TO: Alabama	3,000	26
4	Georgia	FROM: Cemetery Rd TO: Mississippi	1,600	26
5	Wilson	FROM: SH6 TO: Lewis Lane	1,800	26



STREET MAINTENANCE AND PAVEMENT PRESERVATION



Community and Development Services

10/17/2022



Pavement Management Services

Final Report | 04.00199212

May 24, 2022

Submitted to:

City of Manvel, Texas

Submitted by:

Fugro USA Land, Inc.
8613 Cross Park Drive
Austin, Texas 78754





Fugro USA Land, Inc.
8613 Cross Park Drive
Austin, Texas 78754

May 24, 2022

Mr. Adewale Taiwo
Capital Projects Manager

City of Manvel
20025 Highway 6
Manvel, Texas 77578

Subject: Report for Roadway Network Inventory and PMS

Dear Mr. Taiwo,

Fugro USA Land, Inc. (Fugro) is pleased to submit this report on the pavement management services performed for the City of Manvel, Texas. The report provides detailed information on various project activities including pavement distress data collection, data processing, network level pavement condition, treatment cost, current backlog, budget analysis, the 5-year network level maintenance and rehabilitation treatment work plans, and the road widening projects.

Fugro appreciates the opportunity to serve the City and looks forward to providing additional pavement management services in the future.

Kind Regards,
Fugro USA Land, Inc.
TBPE Firm Registration No. F-299

A handwritten signature in blue ink, appearing to read 'Farhang Jalali'.

Farhang Jalali, Ph.D.
Project Manager

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1. Executive Summary

Fugro is pleased to provide this report to the City of Manvel (City) as part of the pavement management services performed for the City. The report provides detailed information on various project activities including pavement distress data collection, data processing, network level pavement condition, treatment cost, current backlog, budget analysis, a 5-year network level maintenance and rehabilitation treatment work plan, and road-widening projects.

The pavement condition survey was conducted in February 2022 using Fugro's automated data collection system for the roadway inventories received from the City. The City provided an ArcGIS shapefile for the entire roadway network, which contained the list of City-maintained roads to be surveyed. From the City's shapefile, the estimated total mileage was 50.7 centerline miles which was equivalent to a total of 109.2 lane miles. Per the City's request and following the standard practice, one lane was collected for local roads and two lanes (one lane in each direction) were collected for collectors and arterials. This collection method ensured more than 50% sampling rate, which far exceeds the 10% sampling rate requirement set by ASTM D6433, *Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys*. Using this methodology, the final total collection length was approximately 51 test miles. Please note that some sections were not collected due to encountering private roads, gravel roads, and other exceptions. See Appendix A for field comments on the roads that were not collectable or collected with shortened lengths.

The collected distress data was processed in accordance with ASTM D6433. In addition, Pavement Condition Index (PCI) scores were calculated for the City's roadway network. The overall network PCI was 45 at the time of the survey, which falls into the "Poor" condition category. Since 93% of the network is asphalt concrete pavements, the overall PCI score mostly reflects the condition of the asphalt concrete pavements. Almost 67% of the entire surveyed network falls into the "Poor", "Very Poor", "Serious", and "Failed" condition categories. Also, the analysis showed that the arterial roads were in slightly better condition than the collector and local roads.

Based on the collected pavement distress condition data, Fugro investigated the impact of several scenarios on the future PCI scores for the City's network. A decision tree representing common maintenance strategies along with their unit costs was developed to implement in the Pavement Management System (PMS). Next, using the known PCI scores, decision tree, and performance models, a 5-year work plan was developed to improve the City's pavement condition. A full network treatment backlog analysis was also developed considering the "Unlimited" budget scenario. This report includes Fugro's recommendations for maintaining and improving the City's pavement network condition in the upcoming years.

Fugro has also discussed the need for future monitoring and necessary updates to the City's PMS database to maintain the validity of its analysis and reports. Periodic updates to the City's PMS are required to include additions to the pavement network, reflect changes in the maintenance budgets and policies, and change in pavement conditions with time. The implementation of an effective PMS is an ever-evolving process requiring feedback and continuous fine-tuning to keep the system up to date to meet the City's needs.

2. Introduction

The City contracted Fugro to perform a pavement condition survey and pavement management analysis for the City's maintained road network. The objectives of the project were twofold. The first objective was to develop maintenance and rehabilitation (M&R) strategies for improving the existing pavement infrastructure and provide an estimate of the needed budget. The second objective was to provide the City with a list of streets that need to be widened to 26 feet (ft).

Fugro conducted a pavement condition survey for the City using the automated distress data collection system to collect pavement distress information and ride quality measurements. This information was converted to ratings or indices for the City's road network. Additionally, those indices were used to report the health of the road network in terms of the Pavement Condition Index (PCI). The PCI score facilitates decision making for selecting appropriate treatments and timing for maintenance, rehabilitation, and reconstruction strategies.

The PMS software provides pavement management functions for reporting pavement condition, selecting projects in multi-year planning horizons, and developing estimated projections of treatment types and costs on a project-by-project basis. The PMS software is compliant with ASTM D6433.

2.1 Project Objectives

The objectives for this project include the following:

- Automatic and continuous measurement of pavement cracking, texture, rutting (both wheel path ruts), digital images, and dual-wheel path roughness data according to International Roughness Index (IRI) standards.
- Calculation of PCI for each surveyed road segment.
- Delivery of PCI data in a format compatible with the City's Geographic Information System (GIS) database.
- Pavement management data analysis and reporting. This includes multi-year budget driven and target driven M&R Work Plans.
- Prioritizing the road-widening projects based on road width, functional classification, and pavement condition information.

The report includes information on the pavement condition data collection and analysis efforts, which will assist the City personnel to update the City's PMS as their road network grows. This report also summarizes the existing pavement condition and network-level M&R recommendations. The following sections provide detailed information on completed project tasks.

3. Field Data Collection and Analysis

This section contains detailed information on project data collection and analysis activities.

3.1 Network Integration

Before initiating the data collection, the City's road network along with the existing inventory information was reviewed. The City provided a geographic information system (GIS) database of their road inventory, which was used for developing the PMS database and for developing our routing (navigation) package for automated data collection. Fugro personnel reviewed the GIS database and resolved discrepancies before data collection, thus allowing for a more efficient field data collection process. The estimated total mileage in the City network was approximately 51 centerline miles.

3.2 Automated Distress and Pavement Data Collection

Fugro's Automatic Road Analyzer (ARAN) was utilized to collect the pavement information including distress and ride quality, pavement type, geometrics (e.g., pavement length and width), and other roads' attributes (e.g., shoulder and curb length). ARAN has a global positioning system (GPS) coupled with a distance measuring instrument (DMI) to record the collection location continuously. The ARAN collects right of way (ROW) images using the front facing high-definition camera on top of the vehicle and downward pavement images from the backside of the vehicle, covering approximately 14 feet wide pavement in one pass at prevailing speeds up to 70 miles per hour (mph). Each downward image is processed to provide pavement distress summaries that are tabulated for the entire road length. Distresses extracted from the images and sensors are used to calculate PCI values in accordance with the ASTM D6433 standard. A summary of the ARAN features is shown in Figure 3.1.

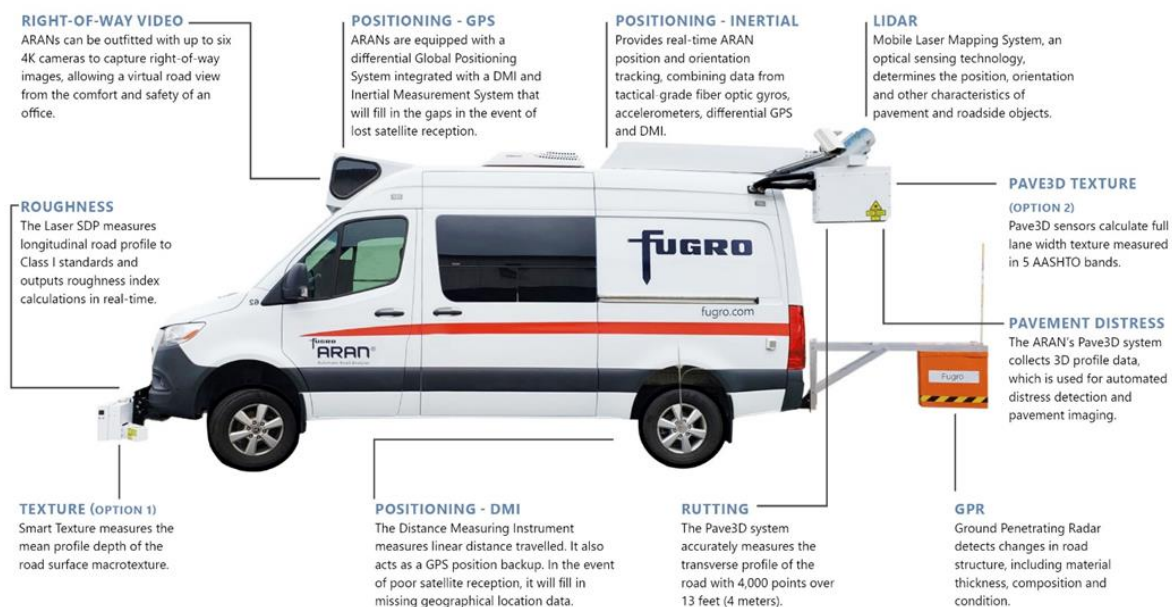


Figure 3.1: Fugro ARAN

The City provided an ArcGIS shapefile for the entire roadway network and designated the list of the City-maintained roads to be surveyed by Fugro. Fugro surveyed one lane in each direction for collectors and arterials and a single lane for local streets in February 2022. The total collection length was approximately 51 test miles, which was used to represent the City's road network of 109.2 lane miles. Appendix A provides a list of observations made by the field crew for roads that could not be surveyed due to various reasons such as private ownership, construction, traffic, and other constraints.

Table 3.1 shows the breakdown of the entire network by functional class, including arterial, collector, and local, and by pavement type, including Asphalt Concrete Pavement (ACP) and Portland Cement Concrete Pavement (PCC). In addition, the network distributions by pavement type and functional class are presented in Figure 3.2.

Table 3.1: Network Distribution by Pavement Type and Functional Class (Collected and Analyzed)

Category	Functional Class	Centerline Miles	Lane-Miles	Percentage of the Entire Network (By Pavement Area)
ACP	Arterial	1.1	2.2	2.5%
	Collector	5.0	9.7	11.4%
	Local	34.8	70.2	79.4%
PCC	Arterial	1.5	4.4	5.3%
	Collector	0.2	0.4	0.6%
	Local	0.3	0.7	0.8%
Network	All	42.9	87.7	100%

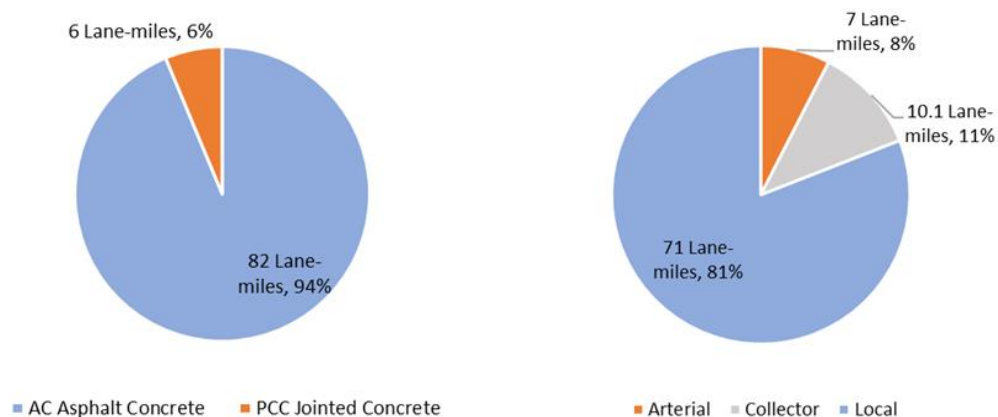


Figure 3.2: Network Distribution by Pavement Type and Functional Class

3.3 Profile Data Collection

As part of our automated pavement data collection, Fugro collected longitudinal profile data, which was used to provide ride quality information for the surveyed road network. Fugro calculated the International Roughness Index (IRI) in accordance with the ASTM E950 standard entitled *Standard Test Method for Measuring Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference*. Longitudinal profile data was collected at 1-inch intervals and summarized at 0.001-mile intervals. IRI was computed from the profile elevation data and an average value for each road segment, in inches per mile, was determined. The larger the IRI value is, the rougher the road “feels”.

In addition to the longitudinal profile collection, Fugro collected the transverse profiles for the surveyed road network. Transverse profile data was collected using a laser line system to accurately measure the transverse profile of the lane and determine rutting characteristics and irregularities in cross slope. The transverse profile was collected every 0.002 miles (10.56 feet) and summarized as an average “rut depth” for each wheel path. The rut depth data was rated in accordance with the ASTM D6433 standard and used in the calculation of PCI values.

IRI values and rut depth information were summarized by pavement sections and submitted to the City electronically along with the processed distress data.

3.4 Data Analysis and Quality Control

Fugro has long recognized the value of quality data and has developed various quality control measures to ensure the collecting of accurate and reliable data. These procedures, called Standard Operating Procedures (SOPs), were developed by Fugro for controlling quality both in the field and office. Road Survey Quality Control/Assurance SOPs and Post Processing and Reporting Control/Assurance SOPs are examples of procedures that Fugro has developed to ensure that our data collection and processing meet and exceeds the data quality required by our clients.

Road Survey Quality Control/Assurance SOPs include Fugro’s standard procedure for ARAN certification, real-time quality monitoring, ARAN Collection Software (ACS) verification, and daily quality assurance cycle. The real-time quality monitoring is accomplished by using quality control subsystems built into ARAN vehicles. Those subsystems alert ARAN operators if a sensor is recording out-of-range. The ACS interface controls all ARAN subsystems independently to ensure maximum flexibility and robustness during data collection and allows automated and manual review of the digital images to further ensure accuracy. In addition, a quality assurance cycle is performed daily on all subsystems to ensure each is operating properly. The data collected at the end of the day is also checked for completeness against log sheets and routing schedules.

Post Processing and Reporting Control/Assurance SOPs include Fugro’s standard procedure for data handling, data audits, and spot checks. The data handling SOP covers the control of all data collected and ensures that all original ARAN files are copied from the ARAN to removable hard drives, creating the redundancy necessary to safeguard the original field data. The data is then shipped to Fugro’s processing team. Also, Fugro ensures that accuracy is maintained by

performing audits and spot checks on a continuous and random basis throughout the overall data process workflow including incoming data, processing, and reporting.

Processing and analyzing the collected data are completed through Vision software, which was developed by Fugro to ensure a simple and accurate process for analyzing ARAN data and incorporating QC methodologies. Vision software is considered a customized digital condition rating system that can be configured based on user defined distress severity/extent and pertinent roadway attributes. The processed data can then be exported to a PMS or asset management system (AMS). Figure 3.3 shows an example of the Vision software window. For this project, Fugro exported the information into the PMS software to perform various analyses of the City's road network.

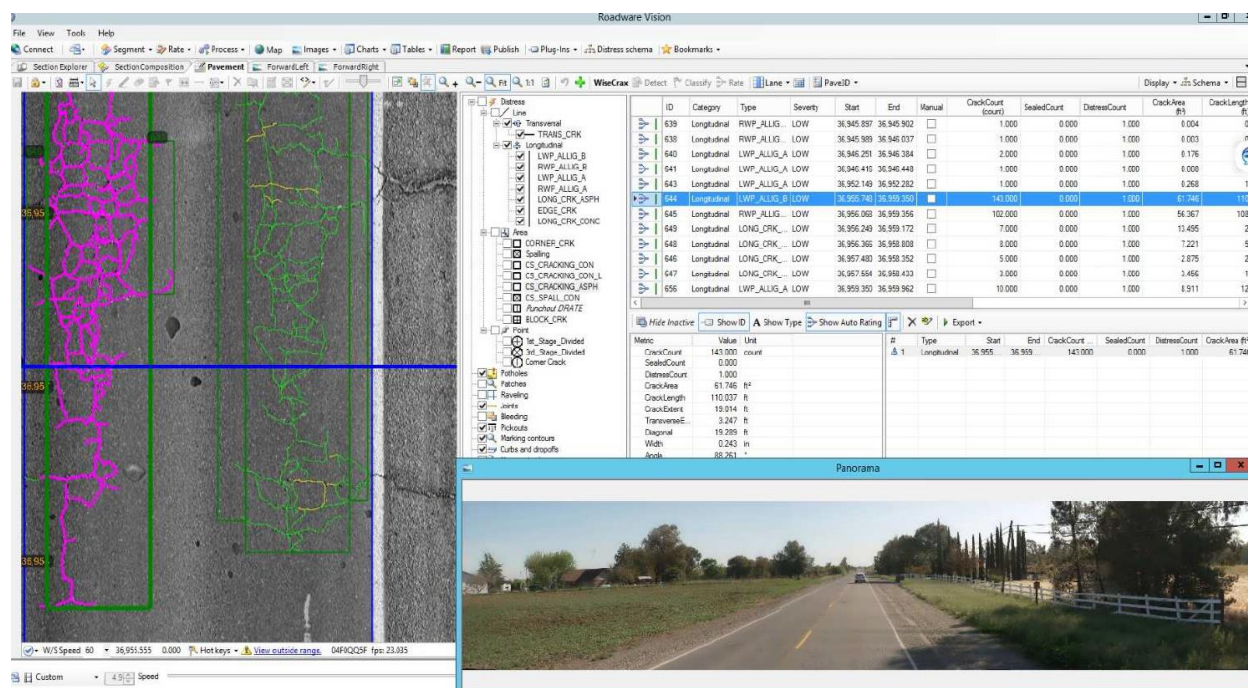


Figure 3.3: Vision Software Showing Pavement Distresses and Graphs

3.5 Calculation of Pavement Condition Indices

As mentioned previously, the collected pavement distresses were used to calculate PCI values for the City's surveyed road network. PCI is calculated based on the type, severity, and extent of surface distresses. PCI uses a scale from 0 to 100, where 0 represents a completely failed pavement and 100 represents a pavement in perfect condition. The types of pavement distress that are collected and utilized for the determination of PCI values are described in ASTM D6433.

Each distress type includes a severity level (i.e., low, medium, and high) and has a different impact or "deduct" value for pavement condition, depending on its quantity (i.e., extent). Since each distress type has a different impact on pavement performance, deduct values are specific to individual distresses in accordance with the ASTM D6433 standard. High severity distresses and/or

high distress quantities result in more reductions in PCI scores. In general, deduct values for fatigue cracking are higher than deduct values of other types of cracking. Presence of load related fatigue cracking results in lower PCI scores, when compared with similar severities and extents for cracking associated with environmental conditions such as transverse cracking.

Appendix B contains the PCI values for pavement sections surveyed in February 2022. Appendix C contains the color-coded PCI and IRI maps for the surveyed sections.

3.6 Discussion of Pavement Condition Indices

In ASTM, pavement condition is defined using descriptive ratings such as Good, Satisfactory, Fair, Poor, Very Poor, Serious, and Failed. These descriptive ratings are tied to PCI ranges. Table 3.2 shows the pavement condition categories and their associated PCI ranges. The overall PCI score was 45 for the entire road network of the City at the time of the survey in February 2022, which falls in the “Poor” condition category.

Table 3.2: Pavement Condition Categories with their associated PCI Ranges

Condition	Failed	Serious	Very Poor	Poor	Fair	Satisfactory	Good
Range	< 10	10 - 24	25 - 39	40 - 54	55 - 69	70 - 84	85 - 100

Figure 3.4 illustrates the relationship between PCI scores and pavement distresses. As shown in this figure, an increase in distress quantities and severity levels results in a decrease in PCI scores.

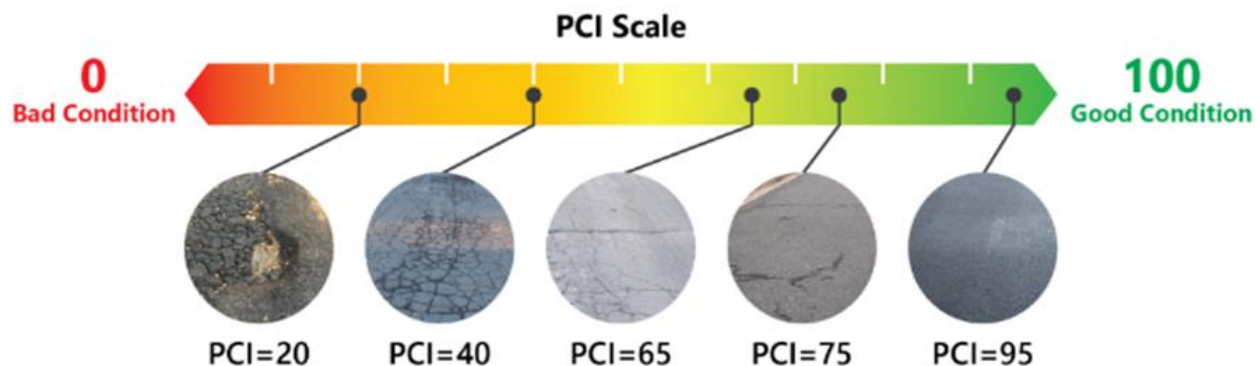


Figure 3.4: Relation between PCI Scores and Pavement Distresses

Table 3.3 contains the overall PCI scores for the surveyed network and by pavement type and functional class. ACP sections, with an average PCI of 42, are in the “Poor” condition category while PCC sections, with an average PCI of 79, fall in the “Satisfactory” condition category. It should be noted that the PCI scores in Table 3.3 are the weighted average PCI scores over the pavement section area.

Table 3.3: PCI Scores by Pavement Types and Functional Class

Category	Functional Class	PCI
ACP	Arterial	56
	Collector	44
	Local	42
	Overall	42
PCC	Arterial	74
	Collector	98
	Local	98
	Overall	79
Network	Arterial	68
	Collector	47
	Local	42
	Overall	45

3.6.1 Distribution of Pavement Condition Scores

Figure 3.5 displays the road network PCI score distribution for each pavement type, as well as the overall surveyed road network as of February 2022. As shown in the figure, approximately 15%, 10%, and 8% of pavement sections are in the Fair, Satisfactory, and Good condition categories, respectively. About 67% of the surveyed roads fall into the Poor, Very Poor, Serious, or Failed condition categories with PCI scores below 55.

Figure 3.6 shows the PCI score distribution for each functional class. Arterial and collector roads are in a better condition than local roads. For local roads, approximately a third of the roads have a PCI score greater than 55.

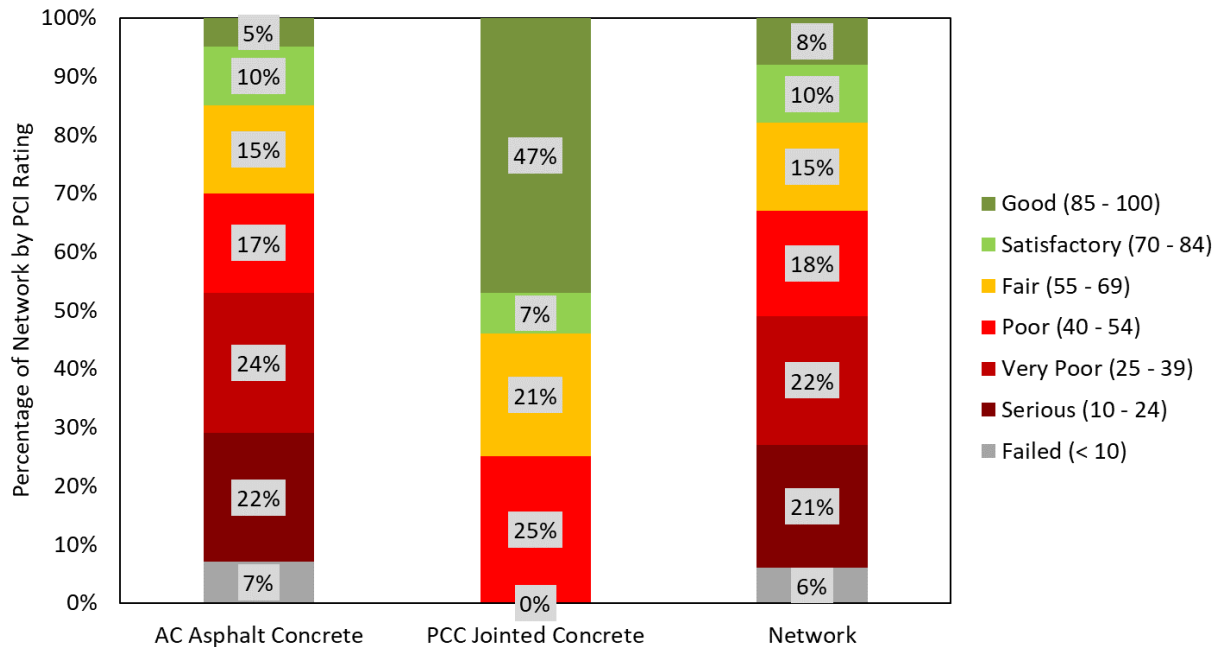


Figure 3.5: PCI Score Distribution by Pavement Type

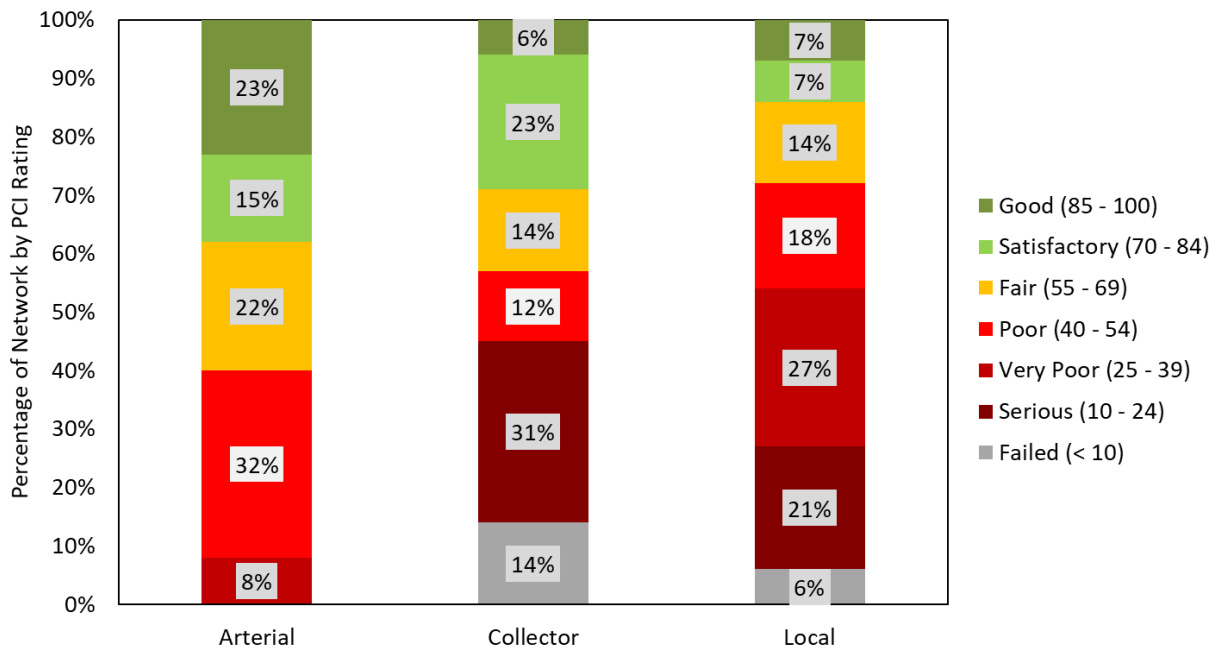


Figure 3.6: PCI Score Distribution by Functional Class

3.6.2 Distribution of IRI Scores

Figure 3.7 displays the road network IRI distribution by pavement type and for the overall road network surveyed in 2022. The threshold values used for each condition category are selected in

accordance with ASTM E1926 – *Standard Practice for Computing International Roughness Index of Roads from Longitudinal Profile Measurements*.

Approximately, 41% of the network exhibits an IRI value less than 200 in/mi. The acceptable IRI values for newly constructed pavements vary by agency as well as the type of facility and equipment used to collect the smoothness data. Typical IRI ranges for newly constructed ACP and PCC pavements are 52-66, and 57-72 in/mi, respectively; while roadways in poor conditions typically have IRI values over 250 in/mi.¹ About only 3% of the entire network exhibits IRI values greater than 400 in/mi, which is indicative of rough roads at vehicle speeds up to 56 mph (90 km/h). IRI values over 600 in/mi are indicative of very rough roads and comfortable driving on such roadways is hard to achieve even at slow speeds.

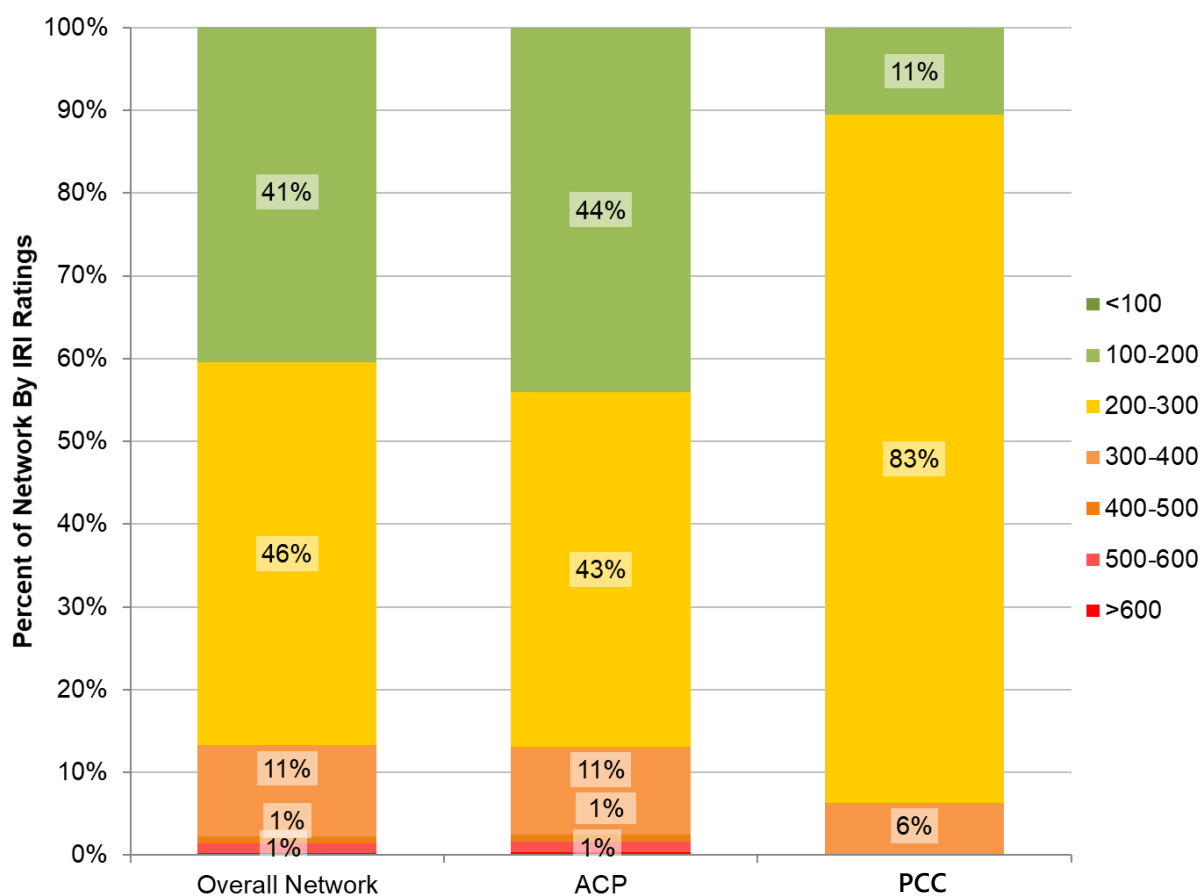


Figure 3.7: IRI Score Distribution by Pavement Type

Figure 3.8 shows the IRI score distribution by functional class and for the overall road network. Approximately, 96%, 95%, and 85% of the arterial, collector, and local roads, respectively, have an IRI value less than 300 in/mi.

¹ Measuring and Specifying Pavement Smoothness, Tech Brief, FHWA-HIF-16-032, June 2016
Source: <https://www.fhwa.dot.gov/pavement/pubs/hif16032.pdf>

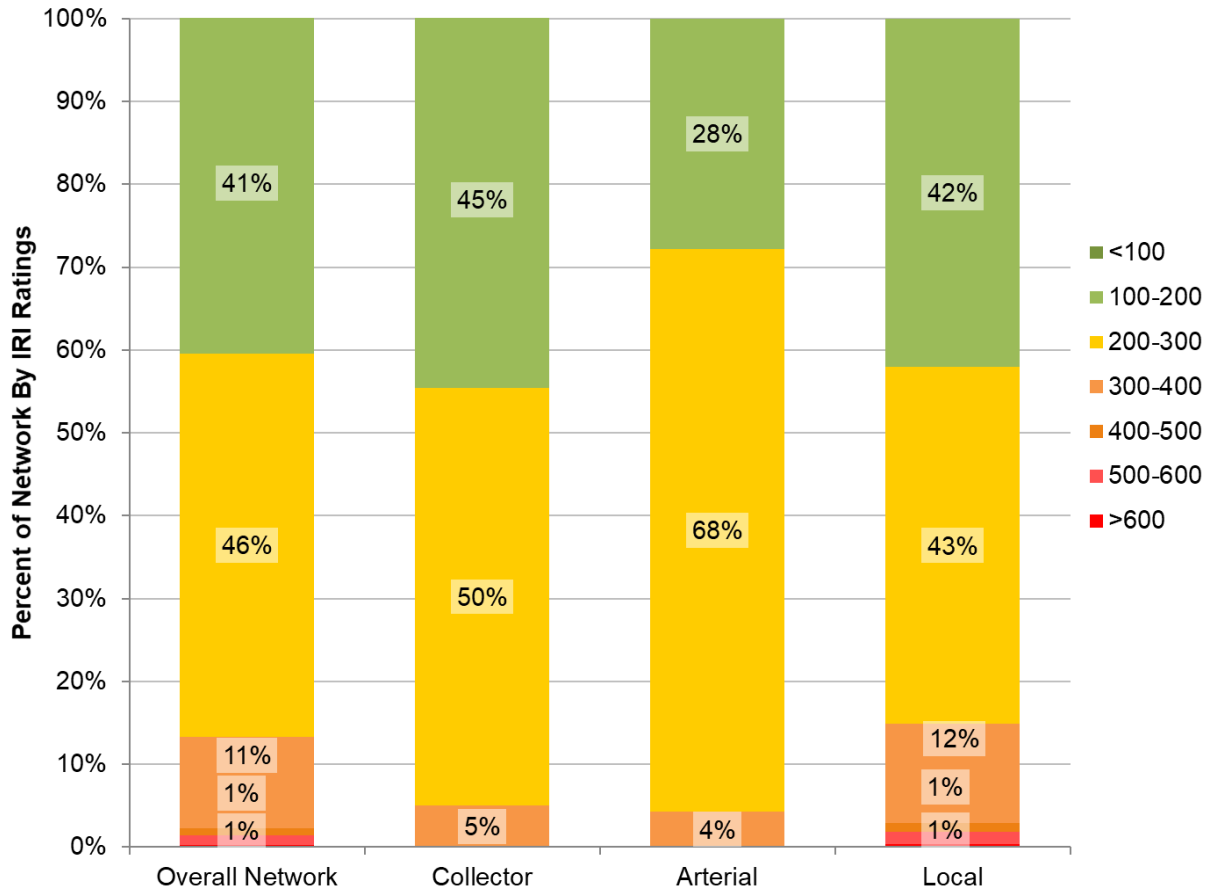


Figure 3.8: IRI Score Distribution by Functional Class

In accordance with ASTM E950, pavement ride quality information should be considered invalid when the collection speed is less than 12 mph due to stop signs, stop lights, traffic calming devices, and isolated traffic and construction activities. At speeds below approximately 12 miles per hour, modern vehicle suspension systems diminish minor pavement roughness before it can be translated to the vehicle chassis, thus affecting pavement ride. Such IRI values were flagged as invalid during the data collection for the City network, indicating that no valid data could be collected per ASTM E950. Fugro did not include sections with invalid data in the IRI information presented in Figures 3.7 and 3.8. The IRI value for the sections with invalid IRI is set to -1 in Appendix B.

3.6.3 PCI Cumulative Frequency Distribution Over Pavement Types

A cumulative frequency distribution plot is a convenient way to quickly review the overall network health and the condition of network subsets such as pavement types. A cumulative frequency distribution is developed by calculating the percent of the network in each condition rating, and then accumulating the percent from 0 to 100. The further the data is to the right side of the graph; the higher percentage of the network is in better condition. For example, in Figure 3.9, the curve for PCC roads (green curve) is to the right of the curve for ACP roads (red curve), which indicates that the PCC roads are in better condition than ACP roads. Approximately 64% of the ACP roads have a PCI score of less than 50. In contrast, there are no PCC roads with a PCI of less than 50. It should be noted that the PCI distributions of ACP roads (red curve) and overall network (blue curve) are closely correlated because of the high percentage of ACP sections (93%) within the surveyed roads.

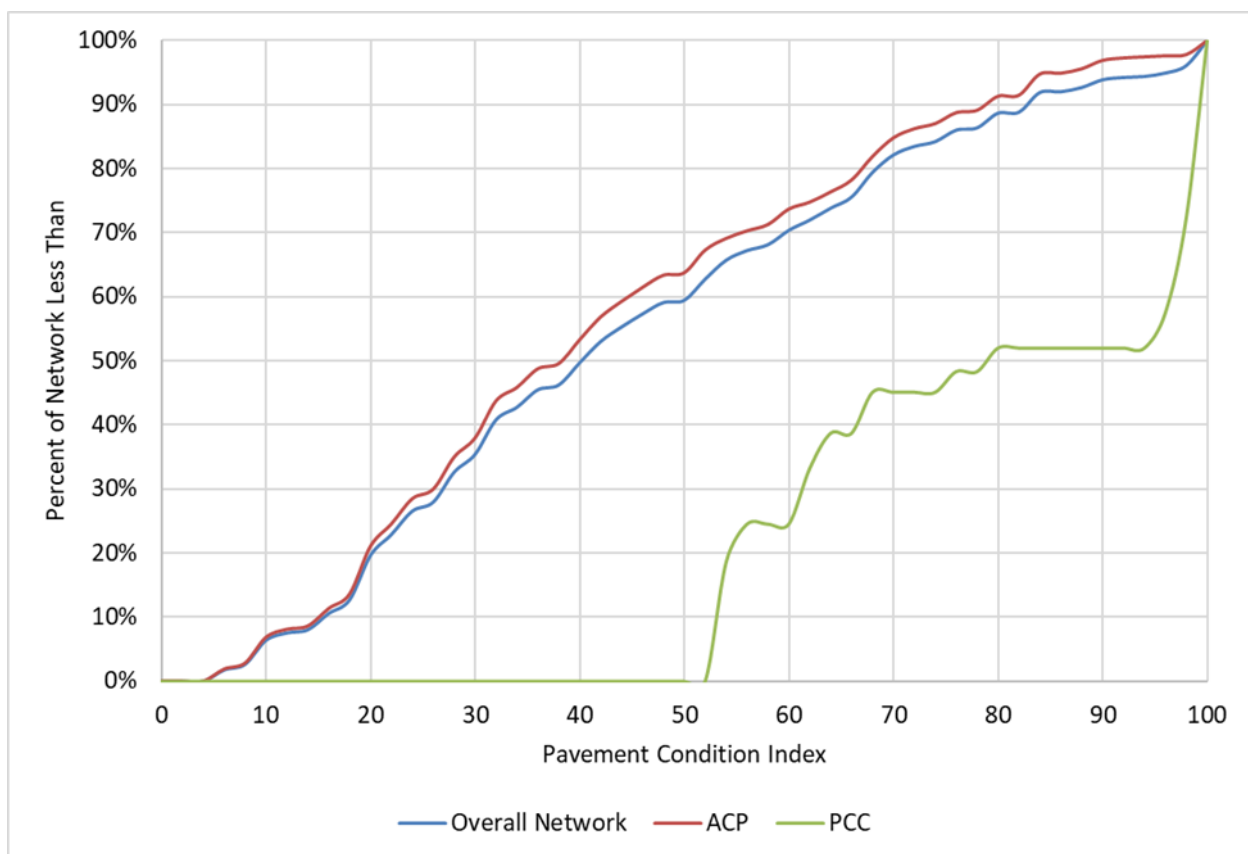


Figure 3.9: PCI Cumulative Frequency Distribution of Overall Network, ACP & PCC Roads

3.6.4 PCI Cumulative Frequency Distribution Over Functional Classification

Figure 3.10 shows the PCI cumulative frequency distribution plots for each functional classification as well as the overall network. It can be observed that the distribution curves for the local roads (red curve) and overall road network (blue curve) are almost identical as about 80% of the network consists of local roads. This implies that the condition of local roads has a great impact on the overall condition of the network. The distribution curve for the collector roads (green curve) shows that 35% of the roads have a PCI less than 30. The distribution curve for the arterial roads (purple curve) is on the right side of the other curves, which indicates a better condition of arterial roads compared to others.

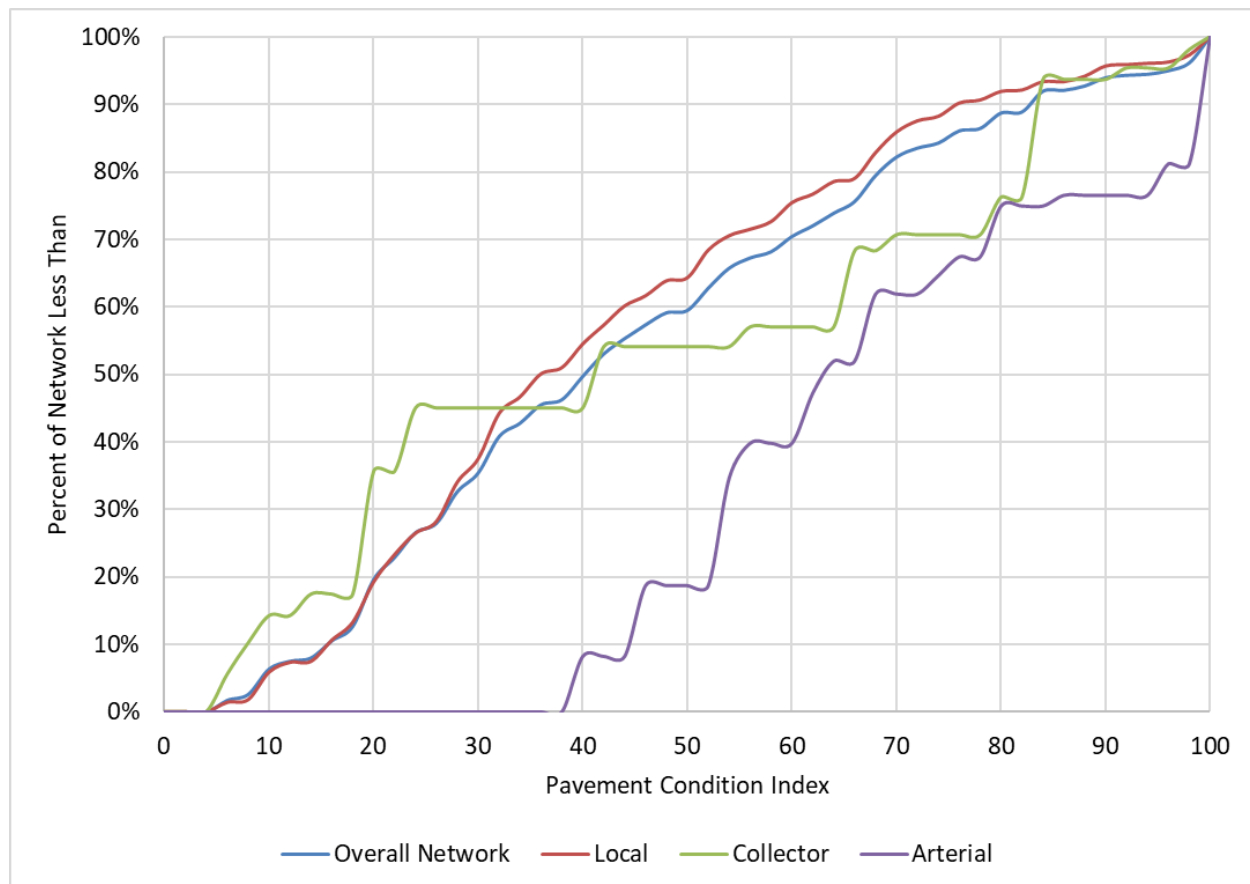


Figure 3.10: PCI Cumulative Frequency Distribution of Overall Network and Functional Classes

4. Treatment Work Plan

This section contains a detailed description of activities performed for developing a 5-year M&R work plan.

4.1 Treatment Policy

Pavement structures deteriorate like all other types of infrastructure with time. An appropriate multi-year M&R treatment work plan can reduce the pavement deterioration rate and extend its life. The objective of developing a multi-year M&R treatment plan is to apply the right treatment, at the right time, and for the right pavement condition.

Four types of treatments are applied to pavements depending on the pavement age and condition. The first type is preventive maintenance (e.g., crack seal, slurry seal, joint repair, etc.), which is applied at the early stage of pavement life to maintain the functional condition of pavements without increasing the structural capacity. Maintenance treatments stop water infiltration through pavement surfaces and negate the damage to the top surface and underlying layers (i.e., base and subgrade).

The second type is minor rehabilitation (e.g., thin overlay, full depth patching, dowel bar retrofit, etc.), which is introduced to address the top-down surface cracking, aging of pavements, and functional deficiencies without increasing the structural capacity.

The third type is major rehabilitation (e.g., thick mill and AC overlay, bounded PCC overlay, panel replacement, etc.), which is performed when pavement starts to deteriorate, not only functionally but also structurally. Major rehabilitation activities increase the structural capacity of the existing pavements and extend the pavement life.

When preventive maintenance, minor rehabilitation, and major rehabilitation activities become ineffective to address the pavement deteriorating conditions, the fourth type of treatment, reconstruction, is recommended to fix the poor pavement condition of the roadway.

Fugro considered the above treatment strategies along with the existing pavement conditions to develop a realistic M&R decision tree that City can implement. Based on these considerations, Fugro developed the decision tree shown in Figure 4.1 and discussed it thoroughly with the City before the start of PMS analyses. As shown in Figure 4.1, the recommended M&R strategies depend on pavement types and PCI values.

For the PMS analysis, treatments were applied to the sections with higher PCI values first (i.e., best first approach). This approach ensures optimum use of funds by keeping roads in a good state of repair.

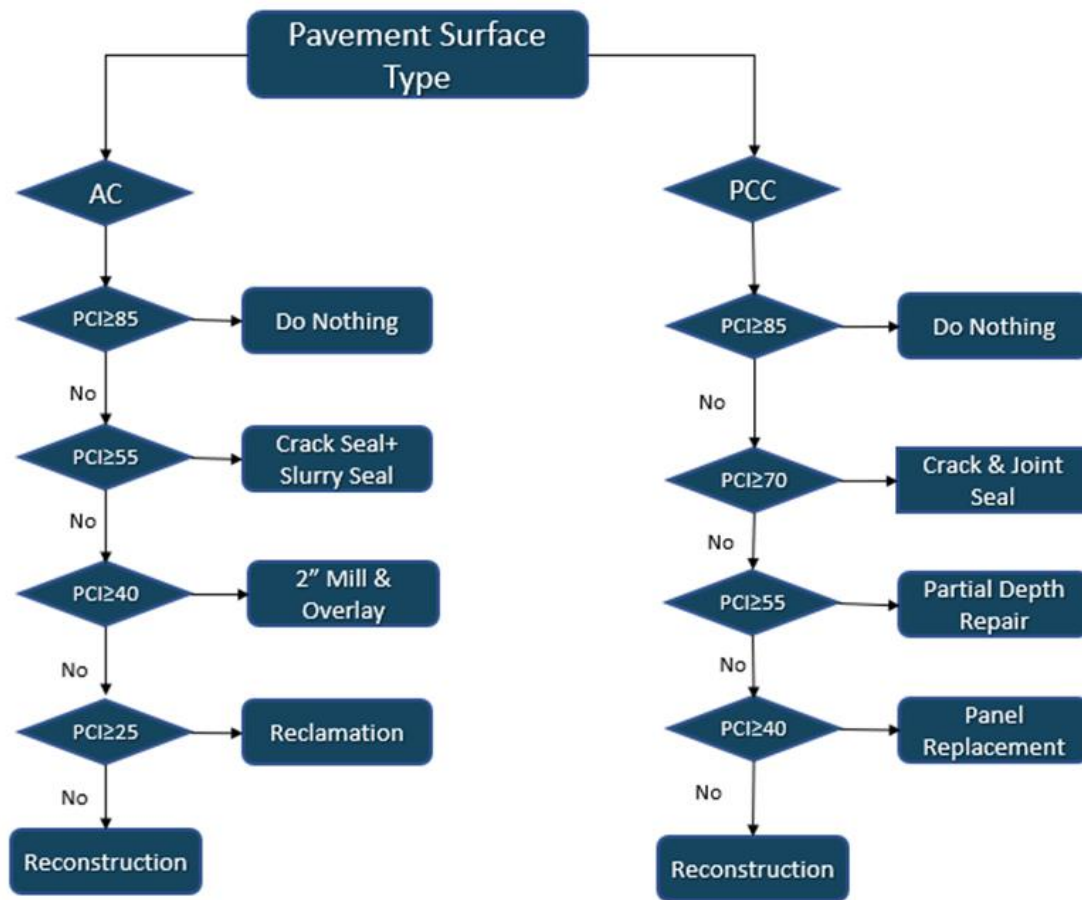


Figure 4.1: Recommended Decision Tree for the City of Manvel

Treatment types, PCI impacts of various treatments, and unit costs are summarized in Table 4.1. The impact of each pavement M&R action on improving PCI score varies by treatment type. Some treatments such as “crack seal” will show nominal improvements to the PCI scores for a relatively short period of time; while other treatments such as “2 inch Mill AC Overlay” will reset the PCI to 100 and have a much more significant impact on enhancing pavement life.

The treatment unit costs were determined based on the information provided by the City and Fugro’s experience with other local municipalities. An annual inflation rate of 3% was used in the PMS analysis.

Table 4.1: PCI Impacts and Unit Cost of Treatment Activities

Pavement Type	Treatment Type	PCI Impact	Unit Cost
ACP	Crack Seal + Slurry Seal (<i>Preventive Maintenance</i>)	Increase by 25 points	\$0.3 per sq. ft.
	Mill & 2" Overlay (<i>Minor Rehabilitation</i>)	Reset to 100	\$3.5 per sq. ft.
	Reclamation (<i>Major Rehabilitation</i>)	Reset to 100	\$4.5 per sq. ft.
	Reconstruction	Reset to 100	\$15 per sq. ft.
PCC	Crack Seal & Joint Seal ¹ (<i>Preventive Maintenance</i>)	Increase by 10 points	\$0.17 per lin. ft.
	Partial Depth Repair (<i>Minor Rehabilitation</i>)	Increase by 20 points	\$9 per sq. ft.
	Panel Replacement (<i>Major Rehabilitation</i>)	Reset to 100	\$12 per sq. ft.
	Reconstruction	Reset to 100	\$25 per sq. ft.

¹Crack seal & joint seal cost includes only the cost of material applied to 30% length of the section.

4.2 Deterioration Curves

Deterioration curves illustrate the decrease in PCI scores over time if a road is left without any treatment until failure. With this information, the future road condition can be predicted based on the current state and age of the pavements. Three deterioration curves were used for the analysis of the City's road network. One for asphalt pavements located in arterials and collectors, one for asphalt pavements for local roads, and a performance curve for concrete pavements. The deterioration curves shown in Figure 4.2 are the customized deterioration curves based on similar networks, historical data, and engineering judgment.

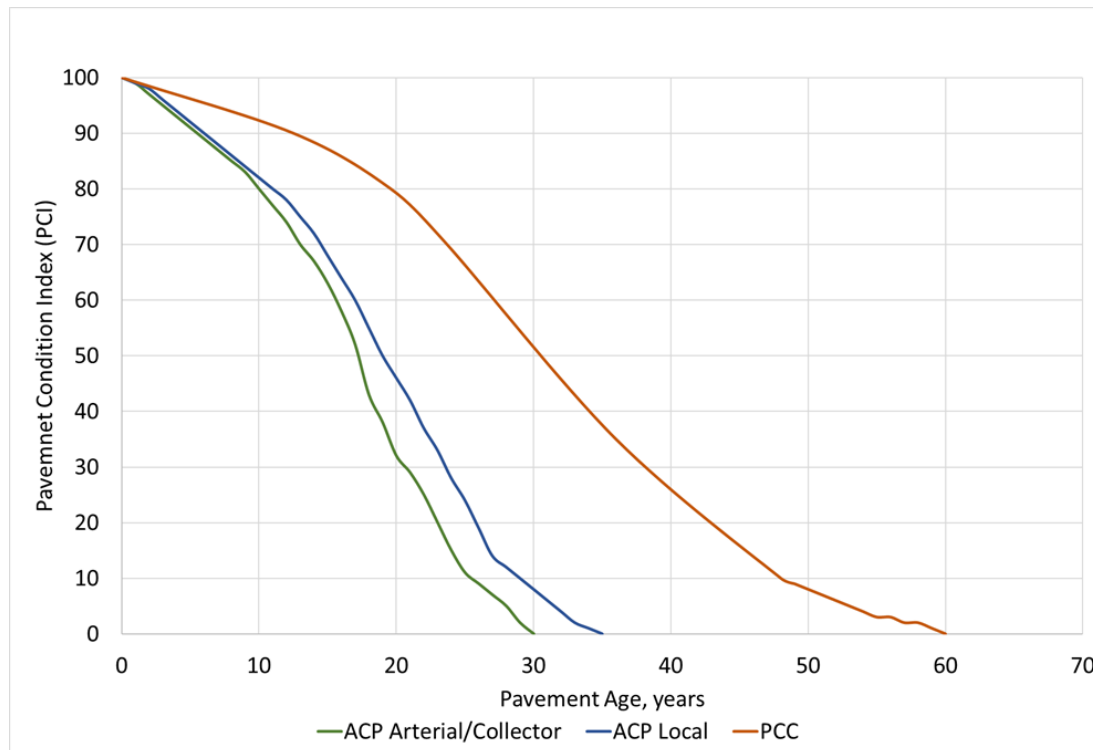


Figure 4.2: Deterioration Curves for ACP and PCC

4.3 Budget Needs Analysis (Unconstrained)

An unconstrained budget analysis provides the current budget needs for the network. The budget needs analysis represents the "ideal world" or unconstrained funding levels. Using an unlimited budget, a budget needs analysis was conducted by determining all the required M&R activities starting on January 1, 2023, which was the starting date of the PMS analysis in the software. An inflation factor of 3% was used to project the costs for the next five years.

Table 4.2 summarizes the approximate budget needs for the City's surveyed network. Unit costs used in this analysis were summarized in Table 4.1. The full budget needs analysis with unlimited budget is provided in Appendix D.

Table 4.2: Budget Needs of the City Network

Pavement Type/Treatment Type	2023 Budget Needs	Percentage of Total Budget
ACP - Crack Seal + Slurry Seal	\$348,643	1%
ACP - Mill & 2" Overlay	\$2,143,668	6%
ACP - Reclamation	\$5,184,906	15%
ACP - Reconstruction	\$25,214,051	73%
PCC - Crack/Joint Seal	\$244	0%
PCC - Partial Depth Repair	\$1,041,521	3%
PCC - Panel Replacement	\$654,842	2%
PCC - Reconstruction	\$0	0%
Grand Total	\$34,587,874	100%

4.4 Multi-Year Planning Development

Based on discussions with the City and the City's review of the initial budget scenario results, the City requested Fugro to analyze two scenarios: Scenario 1 - maintain the current PCI (45) for the next five years and Scenario 2 - increase the overall PCI by 5 points over the next 5 years from 45 to 50. The total estimated cost for each scenario is discussed in the following sections. The results of these scenarios are also compared with unlimited and do nothing (no fund) scenarios.

The following items were discussed with the City before the start of the analysis:

- The No Fund scenario and Unlimited budget scenario were performed for budget need analysis and backlog analysis.
- The PCC crack sealing is done in-house and only the cost of materials has been considered in the calculations.
- The City requested Fugro to incorporate road widening in the work plan. The City would like to widen roads narrower than 26 ft that are also in need of major M&R work. This item is discussed further in Section 4.8.

4.5 Five-Year Treatment Plan

A 5-year treatment plan was developed to estimate the cost of maintaining the current PCI (Scenario 1) and increasing PCI by 5 (Scenario 2). For the PMS analysis, the start date was set as January 1, 2023. Table 4.3 shows the annual cost for each scenario.

Table 4.3: Annual Cost of Treatment Plans for Each Scenario (in million dollars)

Scenario	2023	2024	2025	2026	2027	Total
Scenario 1 (PCI 45)	0.44	1.4	1.56	0.83	0.73	4.96
Scenario 2 (PCI 50)	0.93	2.31	1.27	1.19	3.03	8.72

The cost distribution for Scenario 1 and Scenario 2 with the policy of “best first” is shown in Figure 4.3. For the first four years in both scenarios, the primary treatments are preventive maintenance and rehabilitation. However, for year 5, Scenario 2 (Increase PCI by 5) has almost all the funding for reconstruction. Scenario 1 (Maintain Current PCI) continues with preventive maintenance and rehabilitation for year 5.

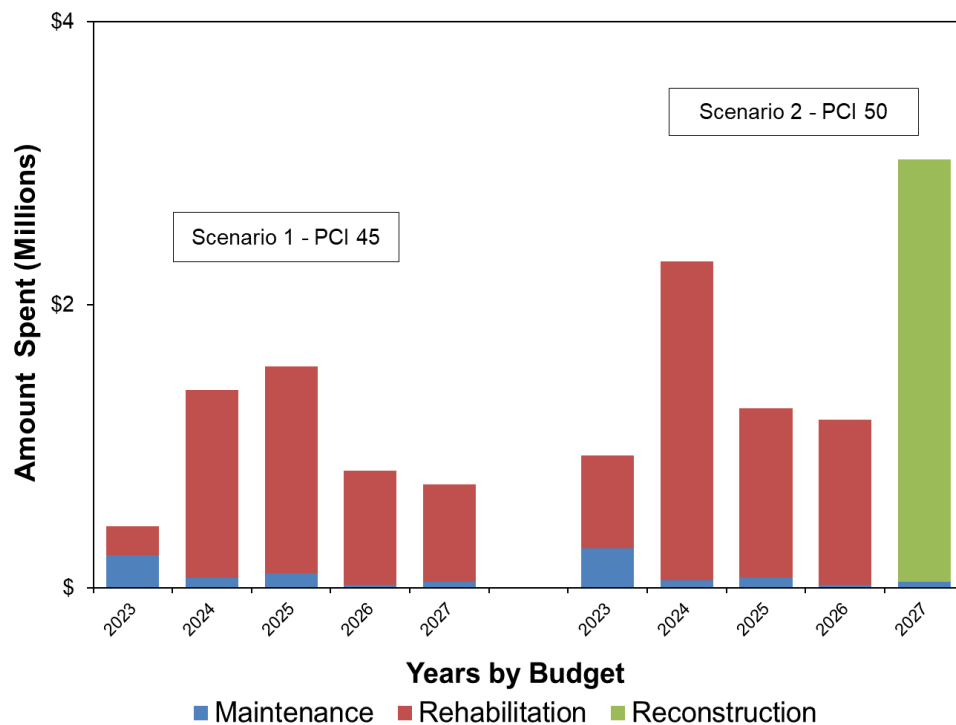


Figure 4.3. Distribution of Cost by Treatment Type and Year

As part of the PMS analysis, the distribution of PCI scores through the 5-year work plan was estimated for the scenarios. Figure 4.4 shows the PCI distribution by segment area for the “No Fund” scenario. Under this scenario, the total area percentage below the Fair condition category (i.e., Poor, Very Poor, Serious, and Failed) increases during the 5-year planning horizon as the sections with better conditions are deteriorating and fall into lower condition categories over time. The percentage of the Poor, Very Poor, Serious, and Failed condition categories will increase from 68% in year 1 to 84% in year 5.

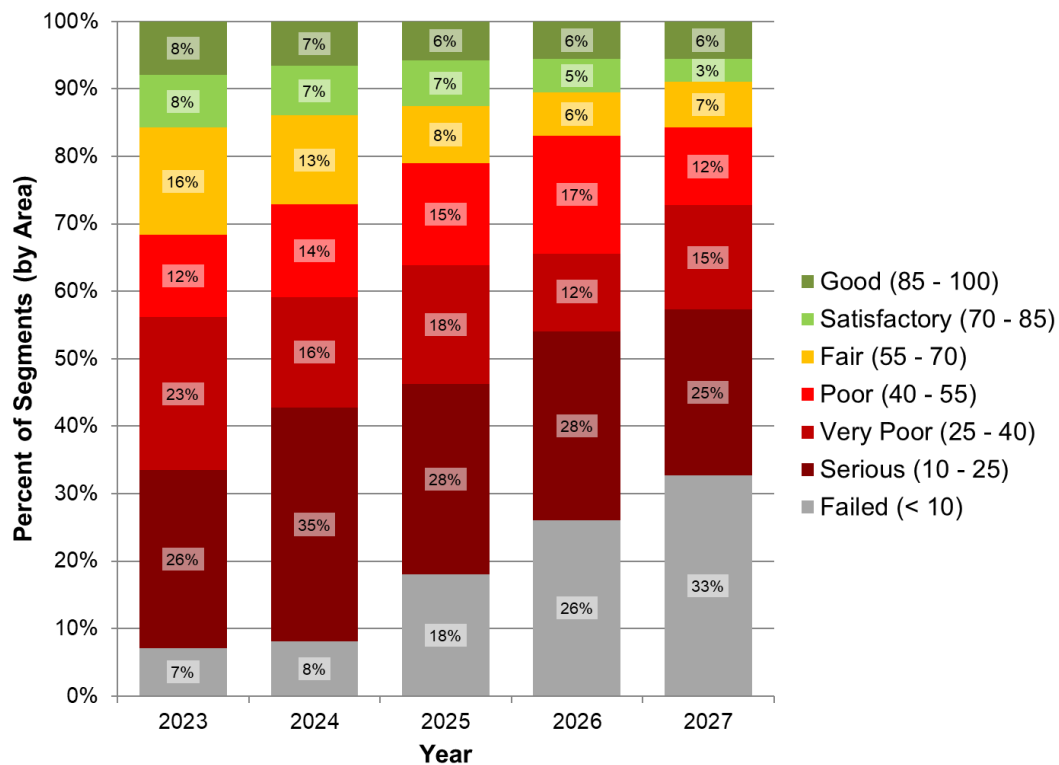


Figure 4.4: PCI Distribution for “No Fund” Scenario

Figures 4.5 and 4.6 show the PCI distribution by segment area for Scenario 1 and Scenario 2, respectively. In general, the combined percentage of the sections in Good and Satisfactory condition increases over the years. A comparison between Figure 4.5 and Figure 4.6 shows that the area percentage below the Fair condition category (i.e., Poor, Very Poor, Serious, and Failed) under Scenario 2 is less than those under Scenario 1 in all years. Also, the percentage of “Good” and “Satisfactory” roads under Scenario 2 is greater than in Scenario 1. This is an expected observation given that the final objective of PCI for each scenario (i.e., PCI equal to 45 for Scenario 1 and PCI equal to 50 for Scenario 2).

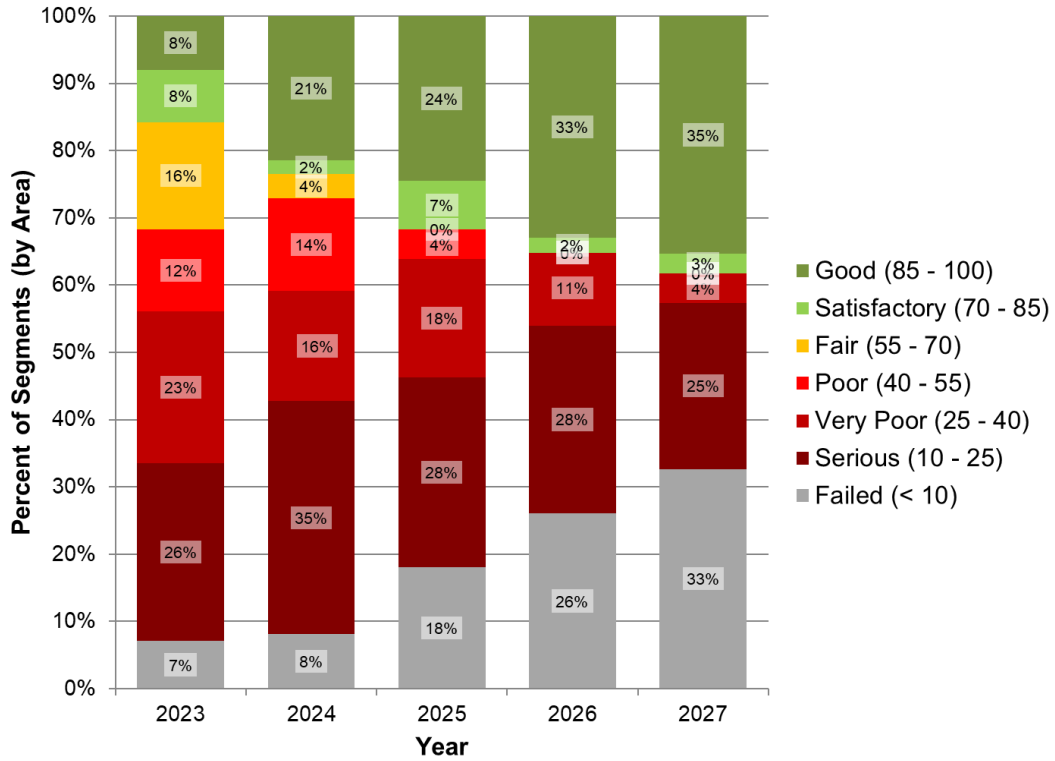


Figure 4.5: PCI Distribution for 10-Year Work Plan (Scenario 1)

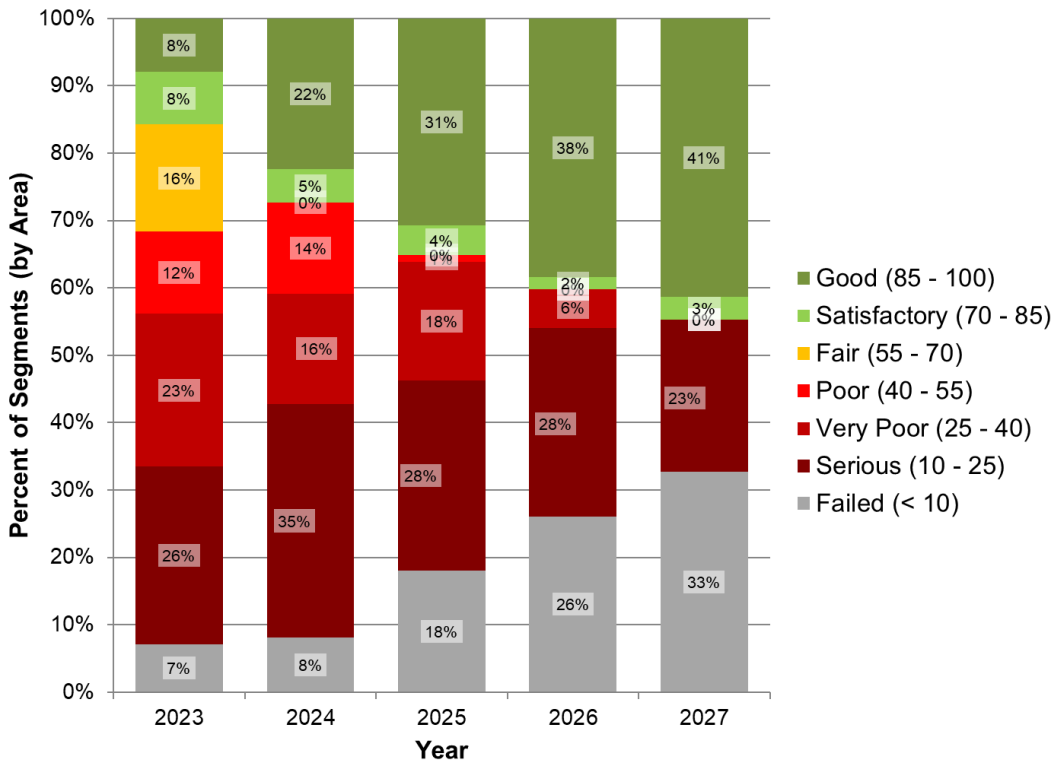


Figure 4.6: PCI Distribution for 10-Year Work Plan (Scenario 2)

As requested by the City, treatment activities for the 5-year work plan based on the budget Scenario 2 are presented in Table 4.3. Appendix E presents the same information with more details including pavement type, pavement area, and PCI conditions before and after applying the treatment. Likewise, Appendix F presents this information visually using maps.

Table 4.3 Scenario 2 Workplan

Functional Class/Street Name	Plan Year					Grand Total
	2023	2024	2025	2026	2027	
Arterial	\$671,518	\$1,073,716	\$5,837	\$212,366	\$165	\$1,963,603
LEWIS LN from CINDY DR to PETRY LN	\$1,979					\$1,979
LEWIS LN from MCCOY DR to WILSON RD	\$5,471					\$5,471
LEWIS LN from PETRY LN to PALMETTO ST	\$5,564		\$5,743			\$11,307
LEWIS LN from SCHOOL RD to CEMETRY RD				\$212,105		\$212,105
LEWIS LN from WILSON RD to CINDY DR	\$3,419					\$3,419
MCCOY RD from CHARLOTTE DR to LEWIS LN		\$280,396				\$280,396
MCCOY RD from CHARLOTTE DR to TANKERSLEY RD	\$155	\$164				\$320
MCCOY RD from LEWIS LN to CHARLOTTE DR		\$282,232				\$282,232
MCCOY RD from LEWIS LN to MORRIS AVE		\$250,169				\$250,169
MCCOY RD from MORRIS AVE to LEWIS LN		\$260,181				\$260,181
MERIDIANA PKWY from JORDAN RD to KREUZER RD	\$203,186	\$177				\$203,363
MERIDIANA PKWY from KREUZER RD to BISSELL RD	\$276,933	\$248		\$262		\$277,443
MERIDIANA PKWY from MORRIS AVE to ROGERS RD	\$89		\$94			\$183
MERIDIANA PKWY from ROGERS RD to BISSELL RD	\$174,722	\$148			\$165	\$175,035
Collector	\$69,797	\$22,189	\$3,330	\$89,885	\$965,849	\$1,151,050
BISSELL RD from MASTERS RD to RUSSELL ST	\$2,542					\$2,542
BISSELL RD from RUSSELL ST to 2952 FT W/O AMANDA LN	\$17,032					\$17,032
CLARK RD from KIRCHNER RD to JORDAN RD					\$960,913	\$960,913

Functional Class/Street Name	Plan Year					Grand Total
	2023	2024	2025	2026	2027	
JORDAN RD from COOK RD to 1400 SE/O COOK RD	\$10,611					\$10,611
JORDAN RD from MAGNOLIA ST to SHERRI CIR			\$3,330			\$3,330
JORDAN RD from MASTERS RD to MAGNOLIA ST	\$4,501				\$4,936	\$9,437
JORDAN RD from MERIDIANA PKWY to MASTERS RD	\$21,495	\$22,189				\$43,684
JORDAN RD from SHERRI CIR EAST to COOK RD	\$13,616					\$13,616
JORDAN RD from SHERRI CIR WEST to SHERRI CIR EAST				\$89,885		\$89,885
Local	\$192,464	\$1,211,676	\$1,258,265	\$884,369	\$2,061,489	\$5,608,263
1ST ST from LOUISIANA ST to 485 FT E/O LOUISIANA ST			\$68,034			\$68,034
ACORN DR from HANSELMAN RD to EAST END			\$320,759			\$320,759
ALABAMA ST from GEORGIA ST to CREST RIDGE DR		\$81,029				\$81,029
BISSELL RD from 2952 FT W/O AMANDA LN to AMANDA LN	\$17,137			\$18,243		\$35,381
BISSELL RD from AMANDA LN to BRIARCREST ST	\$6,194	\$6,394				\$12,588
BISSELL RD from BRIARCREST ST to 1187 FT E/O BRIARCREST ST	\$7,001					\$7,001
BURNETT RD from CUL DE SAC W/O KIRCHNER RD to 1379 FT E/O KIRCHNER			\$151,719			\$151,719
CEDAR from MASTERS RD to 420 FT E/O MASTERS RD					\$162,392	\$162,392
CEMETERY RD from SCOTT ST to CEMETERY RD			\$149,023			\$149,023
CREEK DR from PINE ST to HORSE SHOE DR	\$5,671					\$5,671
CREST RIDGE DR from CEMETERY RD to CEMETERY RD	\$21,955		\$22,663			\$44,618
DALMOLIN from SCOTT AVE to 1000 FT N/O SCOTT AVE		\$81,494				\$81,494

Functional Class/Street Name	Plan Year					Grand Total
	2023	2024	2025	2026	2027	
DEL BELLO LN from 4589 ft west of Del Bello RD to Del Bello RD	\$12,438		\$12,839			\$25,277
DEL BELLO RD from DEL BELLO BLVD to LIRA ROAD		\$2,580				\$2,580
DEL BELLO RD from Del Bello LN to 1290 ft North of Del Bello LN	\$8,555					\$8,555
DEL BELLO RD from DEL BELLO SPUR to PATTERSON RD	\$10,955					\$10,955
DEL BELLO RD from LIRA RD to DEL BELLO LN	\$3,561				\$3,905	\$7,466
DEL BELLO RD from MASTERS RD to DEL BELLO SPUR	\$9,353					\$9,353
DEL BELLO RD from PATTERSON RD to DEL BELLO BLVD		\$90,925				\$90,925
ELM ST from MORRIS AVE to LARGE AVE	\$2,777		\$2,867			\$5,644
FLORA from 2300 FT W/O CEMETERY RD to CEMETERY RD	\$10,617				\$11,644	\$22,261
HAL MCLAIN RD from AIRPARK RD to FREY RD				\$43,932		\$43,932
HAL MCLAIN RD from KELLY ST to 1910 FT N/O KELLY ST		\$164,353				\$164,353
Hanselman RD from OAKCREST DR to ACORN DR					\$171,688	\$171,688
Hanselman RD from TWIN OKAS DR to OAKCREST DR	\$3,955					\$3,955
HORSE SHOE DR from CROSSSHEILD RD to CREEK RD		\$2,291				\$2,291
HORSE SHOE DR from PINE ST to CROSSSHEILD RD		\$8,372				\$8,372
LARGE AVE from ELM ST to 456 FT E/O ELM ST	\$3,115	\$3,215				\$6,330
LARGE AVE from PALMETTO ST to RUSSELL ST	\$8,568					\$8,568
LARGE AVE from RUSSELL ST to SCHOOL RD			\$2,587			\$2,587
LOUISIANA ST from 1ST ST to 2ND ST				\$92,863		\$92,863
LOUISIANA ST from 2ND ST to WOLFE LN	\$14,255				\$15,635	\$29,890

Functional Class/Street Name	Plan Year					Grand Total
	2023	2024	2025	2026	2027	
LOUISIANA ST from MISSISSIPPI ST to 1ST ST	\$14,254					\$14,254
LOVERS LN from CLARK RD to 1667 FT N/O CLARK RD					\$676,325	\$676,325
LUM RD from FURNACE RD to 527 FT N/E OF FURNACE RD		\$43,980				\$43,980
Manvel Sandy Point RD from MASTERS RD to Hanselman RD			\$191,712			\$191,712
MASTERS RD from BOOTH BLACE RD to REED LN	\$7,510				\$8,237	\$15,746
MASTERS RD from E/O OF GATES LP to UZZELL RD			\$204,691			\$204,691
MASTERS RD from JORDAN RD to TAYLOR ST			\$111,485			\$111,485
MASTERS RD from KEMP ST to BISSELL RD		\$32,149				\$32,149
MASTERS RD from REED LN to JORDAN RD	\$11,732		\$12,110			\$23,842
MASTERS RD from TAYLOR ST to KING ST				\$42,836		\$42,836
MISSISSIPPI from MORRIS AVE to LOUISIANA ST		\$181,474				\$181,474
OAK HILL from MASTERS RD to FURNACE RD		\$144,206				\$144,206
PALMETTO ST from LARGE AVE to CANAAN ST			\$4,868			\$4,868
PINE ST from HORSE SHOE DR to CREEK DR	\$5,268					\$5,268
PINE ST from MORRIS AVE to HORSE SHOE DR					\$1,011,662	\$1,011,662
ROGERS RD from ELM ST to CEMETERY RD				\$160,076		\$160,076
ROGERS RD from LOUDEN ST to WILSON RD			\$2,909			\$2,909
ROGERS RD from MAGNOLIA ST to ELM ST				\$32,672		\$32,672
ROGERS RD from MASTERS RD to RUSSELL ST		\$27,244				\$27,244
ROGERS RD from PALMETTO RD to SPILLANE ST				\$2,635		\$2,635
ROGERS RD from SPILLANE ST to MASTERS RD	\$2,531					\$2,531

Functional Class/Street Name	Plan Year					Grand Total
	2023	2024	2025	2026	2027	
SCHOOL RD from MORRIS AVE to LARGE AVE	\$2,522					\$2,522
SHERRI CIR from JORDAN RD to JORDAN RD		\$269,653				\$269,653
STEVENS RD from 1400 FT W/O MASON RD to MASON RD		\$9,676				\$9,676
STEVENS RD from MASON RD to IOWA LN		\$62,641				\$62,641
TAYLOR ST from MASTERS RD to RUSSELL ST	\$2,540					\$2,540
TAYLOR ST from RUSSELL ST to MAGNOLIA ST				\$44,183		\$44,183
Twin Oaks DR from HANSELMAN RD to EAST END				\$256,789		\$256,789
UZZELL RD from VALUSEK RD to MASTERS RD				\$190,142		\$190,142
Grand Total	\$933,779	\$2,307,581	\$1,267,432	\$1,186,621	\$3,027,503	\$8,722,915

It should be noted that the PMS analysis performed on this project does not account for potential emergency repairs required due to unforeseen events such as flooding, utility repairs/placements, or over-loaded vehicles. Further improvements in the M&R plan may be made over time with improved performance models. A consistent data collection program will provide the necessary information to develop enhanced pavement deterioration models to reflect the local pavement performance trends in the City.

4.6 PCI Analysis for Various Budget Scenarios

The impacts of all analyzed scenarios on the network PCI scores are discussed in this section. Figure 4.7 shows the forecasted PCI values for the network. As stated earlier, the survey was conducted in February 2022 and the start date of the PMS analysis was set to January 1, 2023. For the "No Fund" scenario, the PCI decreases from 45 to 28 in 5 years and the overall network would be in the "Very Poor" condition category. For Scenario 1, a total budget of \$4.96 million is needed to maintain the PCI at 45. For Scenario 3, a total budget of \$8.72 million is needed to improve the PCI by 5 points.

Figures 4.8 and 4.9 show the PCI change under different scenarios for Arterial and Collector roads and Local roads, respectively. In these scenarios, the condition of Arterial and Collector roads is equal to or better than that of the Local roads condition.

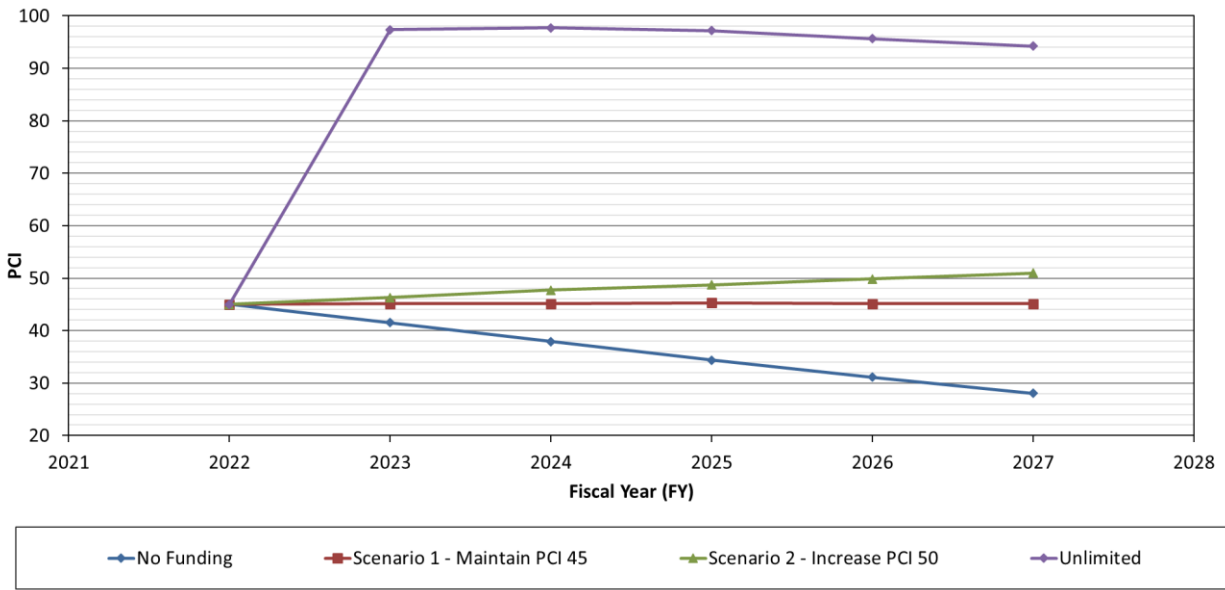


Figure 4.7: PCI Comparisons between Different Scenarios for Overall Network

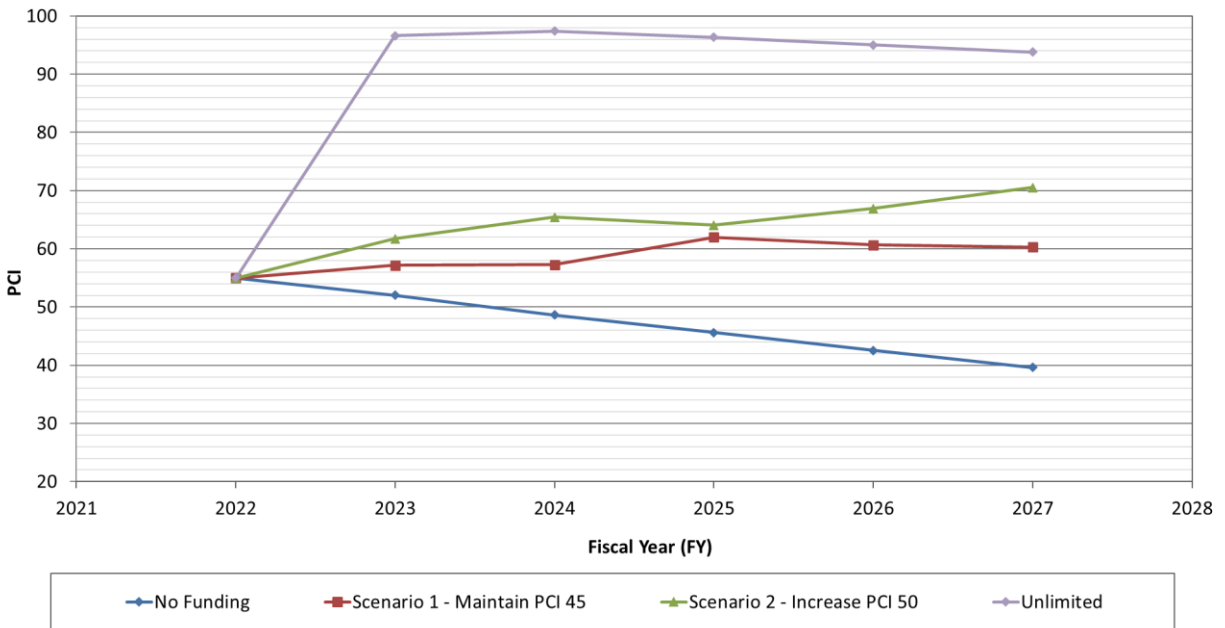


Figure 4.8: PCI Comparisons between Different Scenarios for Arterial & Collector Roads

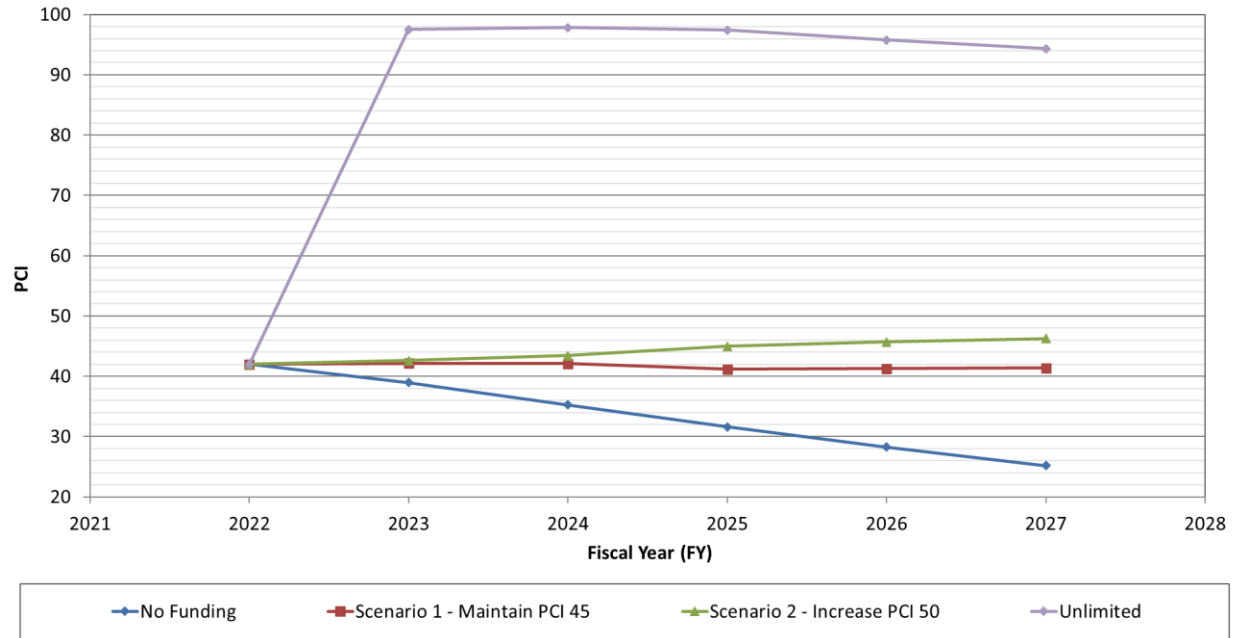


Figure 4.9: PCI Comparisons between Different Scenarios for Local Roads

4.8 Road Widening

As mentioned in Section 4.4, based on the City's interest in road widening a prioritized list of sections was developed for widening. Fugro used the following criteria: 1) if the total pavement width was less than 26 ft (i.e., width summation in both directions) and 2) if the section PCI was less than 40 and in need of treatment. The selected sections were then sorted by functional class and width as shown in Appendix G. The City's goal is to widen the roads to the 26 ft requirement at the time that major maintenance is also planned. The selected sections will be reclaimed and widened if their PCI is between 25 and 40 and will be reconstructed and widened if their PCI is less than 25.

It should be noted that the selected sections are all ACP and the cost of widening and treatment for these sections has been estimated as the sum of the treatment cost (based on the current width) and the cost of the extra construction (i.e., the difference of 26 ft and the current width multiplied by the length and unit cost of construction) since pavement structural layers should be constructed from the subgrade to the surface layer for the widened areas.

The list of candidate sections for widening is provided in Appendix G. Some of the sections in need of widening have already been selected in Scenario 2 as part of the 5-year work plan. For these sections, the cost of treatment is already calculated in the scenario, and therefore, only the cost of widening is added in Appendix G to avoid double counting. However, for other sections that are not part of the Scenario 2 work plan, both the treatment cost and widening cost were added up to derive a total widening cost estimate.

Based on the calculations for widening, it is estimated that City would need approximately \$34 million to bring all the City maintained roads to the 26 ft width standard. It should be noted that Fugro has not performed any right of way studies for this analysis. The cost of right of way acquisition in local/residential areas may increase the overall widening costs.

5. Recommendations

Several budgets and target driven scenarios have been discussed to provide 5-year M&R work plan options for the City. Fugro is making the following recommendations to the City:

- PMS analysis is an ongoing process. Fugro recommends that the City periodically reviews and updates its PMS program. Pavement maintenance and rehabilitation information need to be updated in the PMS database at least on an annual basis. Unit cost data for various M&R treatments should also be updated annually. The City's M&R Work Plan should be updated annually given its revised fiscal year and forecasted budgets.
- It is recommended that the City investigates the use of other innovative treatments such as full-depth reclamation, bonded concrete overlay, and whitetopping as potential future M&R strategies. Fugro can work with the City to develop an implementation plan (in a separate contract) if requested.
- It is recommended that the City collects a new round of pavement distress data at least every three years. Periodic collection of network distress data will greatly enhance the accuracy of network level multi-year plans and will result in significant cost savings for the City over time.
- It is recommended that the City considers adding additional pavement related data to its PMS database including structural layer thickness information (from Ground Penetrating Radar (GPR) studies) and pavement stiffness information (from Falling Weight Deflectometer (FWD) studies). This additional data can be used, in conjunction with the pavement distress data and road profiling data, to develop more comprehensive pavement condition indices such as an Overall Pavement Condition Index (OCI), which is used by several agencies throughout the State of Texas and across the US.
- Fugro recommends collecting data for ROW assets of the City including sidewalks, ramps, signals, signs, and pavement markings. Fugro recommends that the City collects ROW asset data every 3 to 5 years. Fugro can collect ROW asset data using its ARAN fleet at the same time as pavement distress data collection. Periodic collection and updates of the ROW asset inventory provides the City with the necessary information to develop and maintain an effective asset management system. With regular updates, the asset management system will help identify the current needs of the network and provide information for effective allocation of the City's budget to maintain existing assets or add new ones as necessary.

6. Conditions

The professional services that form the basis for this report have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable pavement engineers practicing in the same locality. No other warranty, expressed or implied, is made as the professional advice set forth.

The results, conclusions, and recommendations contained in this report are directed at and are intended to be utilized within the scope of work contained in the agreement executed by Fugro USA Land, Inc. and the client. This report is not intended to be used for any other purposes. Fugro USA Land, Inc. makes no claim or representation concerning any activity or condition falling outside the specified purposes to which this report is directed, said purposes being specifically limited to the scope of work as defined in said agreement. Inquiries as to said scope of work or concerning any activity or condition not specifically contained therein should be directed to Fugro USA Land, Inc. for a determination and, if necessary, further investigation.

7. References

- PAVER Asphalt Distress Manual: Pavement Distress Identification Guide for Asphalt-Surfaced Roads and Parking Lots. TR/104, U.S. Army Corps of Engineers Construction Engineering Research Laboratories, 1997.
- Shahin, M. Y. Pavement Management for Airports, Roads, and Parking Lots. Springer, Second Edition, 1994.
- ASTM D6433-20, Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys, ASTM International, West Conshohocken, PA, 2020.
- ASTM E950 / E950M-09(2018), Standard Test Method for Measuring the Longitudinal Profile of Travelled Surfaces with an Accelerometer-Established Inertial Profiling Reference, ASTM International, West Conshohocken, PA, 2018.
- ASTM E1926 – Standard Practice for Computing International Roughness Index of Roads from Longitudinal Profile Measurements, ASTM International, West Conshohocken, PA, 2015.

Appendix A. Field Comments

Road Segments Not Collected

*Fugro ID	R SECTION	Direction	Road Name	Expected Length	Collected Length	Comments
Near 138	100510	5	2ND ST	0.116	0	Uncollectable - Does not exist. Grass.
Near 153	100740	5	FREY RD	0.704	0	Uncollectable- does not exist
Near 164	100750	5	FURNACE	0.295	0	Uncollectable - does not exist
Near 101	100780	5	GILBOUGH RD	0.075	0	Uncollectable - does not exist
Near 153	100810	5	KELLY	0.163	0	Uncollectable - does not exist
Near 153	100810	5	KELLY	0.032	0	Uncollectable - does not exist
Near 153	100980	5	RYAN RD	0.054	0	Uncollectable - does not exist
Near 153	101030	5	STARDUSTER	0.109	0	Uncollectable - does not exist
Total				1.548		

**For Fugro IDs identified as "near", a unique id was not defined since nothing was collected for these sections. A reference near the area is provided for ease of identifying the location.*

Road Segments Collected Short

*Fugro ID	R SECTION	Road Name	Routed Length	Collected Length	Difference	Comments
41	100010	ALLELUIA TRL	0.651	0.591	0.06	Ended Earlier, Dead end
NA	100030	BISSELL RD	0.582	0.355	0.227	Started Late, Gravel road - Pavement type MISC.
201	100040	BISSELL RD	2.19	2.112	0.078	Started Late, Gravel road
201	100046	BISSELL RD	1.185	1.105	0.08	Ended Early, Gravel road
28	100050	BOOTH PLACE RD	0.22	0.203	0.017	Started Late, Dead End
49	100090	COOK RD	0.326	0.259	0.067	Ended Early, Closed Gate
47	100140	JORDAN RD	2.596	2.277	0.319	Ended Early, Closed Gate
63	100160	KING ST	0.935	0.922	0.013	Started Late, Dead End
42, 43, 44	100190	KIRCHNER RD	0.643	0.636	0.007	Started Late, Dead End
58	100200	KREUZER	0.258	0.246	0.012	Started Late, Dead End
NA	100230	MAGNOLIA ST	0.072	0.038	0.034	Ended Early, Gravel Road - Pavement type MISC.
NA	100270	MAYWALD ST	0.103	0.092	0.011	Started Late, Dead end - Pavement type MISC.
NA	100370	SHAW RD	0.278	0.185	0.093	Started Late, Gravel road - Pavement type MISC.

*Fugro ID	R SECTION	Road Name	Routed Length	Collected Length	Difference	Comments
NA	100390	SPRAGUE ST	0.298	0.227	0.071	Ended Early, Muddy Road - Pavement type MISC.
15	100450	UZZELL RD	1.087	0.831	0.256	Ended Early, Gate
NA	100460	VALUSEK RD	0.404	0.041	0.363	Started Late, Gravel road - Pavement type MISC.
NA	100470	WILSON DR	0.582	0.536	0.046	Ended Early, Gate - Pavement Type MISC.
NA	100560	CARPENTER RD	0.23	0.143	0.087	Started Late, Dead End Start- Pavement Type MISC.
Near 123	100580	CEMETERY RD	1.723	1.654	0.069	Ended Early, Gravel Road
Near 149	100620	CREEK DR	0.31	0.273	0.037	Started Late, Gravel road;End Earlier, Gravel Road
Near cross section of 123 & 133	100630	CREST RIDGE DR	0.7	0.534	0.166	Ended Early, Road Doesn't Exists
NA	100640	CROSSFIELD RD	0.232	0.078	0.154	Ended Early, Private Road
129	100650	DALMOLIN	0.421	0.383	0.038	Started Late, Dead End Start
159	100660	DEL BELLO BLVD	0.306	0.114	0.192	Ended Early, Closed Gate
Near 830	100720	ELM ST	0.068	0.045	0.023	Ended Early, Gravel Road
122	100730	FLORA	0.446	0.282	0.164	Started Late, Dead End Start
154	100790	HAL MCLAIN RD	0.596	0.573	0.023	Gap, Closed Gate
Near 82	100850	LOUDEN ST	0.073	0.057	0.016	Started Late, Dead End Start
101	100910	PALMETTO RD	0.136	0.108	0.028	Ended Early, Gravel Road
105	100940	PETRY LN	0.141	0.118	0.023	Ended Early, Dead End
145	100950	PINE ST	0.739	0.621	0.118	Started Late, Dead End Start
156	100960	POLLARD DR	0.515	0.387	0.128	Ended Early, Dead End
Near 84	101020	SPILLANE ST	0.071	0.056	0.015	Ended Early, Gravel Road
Total					3.035	

**For Fugro IDs identified as "near", a unique id was not defined since nothing was collected for these sections. A reference near the area is provided for ease of identifying the location.*

Appendix B. Network Condition Listings

Network Condition Listings

Fugro Unique ID	Road Name	BEG_DESC	END_DESC	Pavement Length (ft)	Pavement Area (ft ²)	Pavement Type	Functional Class	Inspection Date	PCI	IRI
205	LEWIS LN	MCCOY DR	WILSON RD	723	17,649	ACP	Arterial	2/19/2022	79	166
206	LEWIS LN	WILSON RD	CINDY DR	452	11,028	ACP	Arterial	2/19/2022	73	166
207	LEWIS LN	CINDY DR	PETRY LN	257	6,384	ACP	Arterial	2/19/2022	84	146
208	LEWIS LN	PETRY LN	PALMETTO ST	729	17,947	ACP	Arterial	2/19/2022	67	185
209	LEWIS LN	PALMETTO ST	SCHOOL RD	1,453	33,138	ACP	Arterial	2/19/2022	39	274
210	LEWIS LN	SCHOOL RD	CEMETRY RD	2,164	42,252	ACP	Arterial	2/19/2022	45	194
55	MCCOY RD	LEWIS LN	MORRIS AVE	1,793	19,823	PCC	Arterial	2/19/2022	53	186
56	MCCOY RD	CHARLOTTE DR	LEWIS LN	1,800	22,218	PCC	Arterial	2/19/2022	54	222
57	MCCOY RD	TANKERSLEY RD	CHARLOTTE DR	892	10,969	PCC	Arterial	2/19/2022	100	213
195	MCCOY RD	MORRIS AVE	LEWIS LN	1,818	20,617	PCC	Arterial	2/19/2022	55	208
196	MCCOY RD	LEWIS LN	CHARLOTTE DR	1,793	22,364	PCC	Arterial	2/19/2022	53	205
197	MCCOY RD	CHARLOTTE DR	TANKERSLEY RD	892	11,149	PCC	Arterial	2/19/2022	74	244
51	MERIDIANA PKWY	KREUZER RD	JORDAN RD	937	21,864	PCC	Arterial	2/19/2022	100	332
52	MERIDIANA PKWY	BISSELL RD	KREUZER RD	1,338	31,586	PCC	Arterial	2/19/2022	100	282
53	MERIDIANA PKWY	ROGERS RD	BISSELL RD	806	19,012	PCC	Arterial	2/19/2022	63	278
54	MERIDIANA PKWY	MORRIS AVE	ROGERS RD	526	12,727	PCC	Arterial	2/19/2022	80	215
191	MERIDIANA PKWY	JORDAN RD	KREUZER RD	952	22,110	PCC	Arterial	2/19/2022	67	293
192	MERIDIANA PKWY	KREUZER RD	BISSELL RD	1,337	30,134	PCC	Arterial	2/19/2022	62	278
193	MERIDIANA PKWY	BISSELL RD	ROGERS RD	829	18,901	PCC	Arterial	2/19/2022	95	295
194	MERIDIANA PKWY	ROGERS RD	MORRIS AVE	503	11,571	PCC	Arterial	2/19/2022	100	229
201	BISSELL RD	203 W/O MERIDIANA PKWY	SPRAGUE ST	1,295	28,403	ACP	Collector	2/19/2022	7	301
202	BISSELL RD	SPRAGUE ST	MASTERS RD	1,461	34,198	ACP	Collector	2/19/2022	6	261
203	BISSELL RD	MASTERS RD	RUSSELL ST	364	8,200	ACP	Collector	2/19/2022	82	205
204	BISSELL RD	RUSSELL ST	2952 FT W/O AMANDA LN	2,598	54,940	ACP	Collector	2/19/2022	83	193
199	CHARLOTTE	MCCOY RD	CINDY DR	1,358	24,768	ACP	Collector	2/19/2022	8	266
200	CHARLOTTE	CINDY DR	MASTERS RD	1,049	19,513	ACP	Collector	2/19/2022	13	251
59	CHARLOTTE ST	MCCOY RD	LIVINGSTON DR	996	12,352	PCC	Collector	2/19/2022	96	228
198	CHARLOTTE ST	LIVINGSTON DR	MCCOY RD	995	11,741	PCC	Collector	2/19/2022	100	243
182	CLARK RD	KIRCHNER RD	JORDAN RD	2,312	55,737	ACP	Collector	2/19/2022	41	161
211	DOGWOOD AVE	POLLARD DR	MASTERS RD	4,756	111,622	ACP	Collector	2/19/2022	20	272
183	JORDAN RD	CLARK RD	MERIDIANA PKWY (start of PCC)	2,468	57,705	ACP	Collector	2/19/2022	23	181
184	JORDAN RD	MERIDIANA PKWY (start of PCC)	MERIDIANA PKWY (end of PCC)	179	4,471	PCC	Collector	2/19/2022	97	180
185	JORDAN RD	MERIDIANA PKWY	MASTERS RD	3,012	69,340	ACP	Collector	2/19/2022	65	260
186	JORDAN RD	MASTERS RD	MAGNOLIA ST	618	14,518	ACP	Collector	2/19/2022	70	144
187	JORDAN RD	MAGNOLIA ST	SHERRI CIR	441	10,406	ACP	Collector	2/19/2022	90	158
188	JORDAN RD	SHERRI CIR WEST	SHERRI CIR EAST	778	17,905	ACP	Collector	2/19/2022	54	182
189	JORDAN RD	SHERRI CIR EAST	COOK RD	1,781	43,924	ACP	Collector	2/19/2022	83	161
190	JORDAN RD	COOK RD	1400 SE/O COOK RD	1,414	34,229	ACP	Collector	2/19/2022	79	228
140	1ST ST	LOUISIANA ST	485 FT E/O LOUISIANA ST	559	13,970	ACP	Local	2/19/2022	52	203
10	ACORN DR	HANSELMAN RD	EAST END	2,610	65,864	ACP	Local	2/19/2022	50	137
142	AIRPARK RD	WOLFE LN	HAL MCCLAIN RD	589	12,951	ACP	Local	2/19/2022	17	456
143	AIRPARK RD	HAL MCCLAIN RD	CUL DE SAC	354	7,299	ACP	Local	2/19/2022	23	373
133	ALABAMA ST	GEORGIA ST	CREST RIDGE DR	920	22,019	ACP	Local	2/19/2022	59	200
40	ALLELUIA TRL	IOWA LN	KIRCHNER RD	1,977	36,028	ACP	Local	2/19/2022	33	192
41	ALLELUIA TRL	KIRCHNER RD	1379 FT E/O KIRCHNER	1,075	21,759	ACP	Local	2/19/2022	10	207
77	AMANDA LN	798 FT S/O JANE ST	JANE ST	804	18,965	ACP	Local	2/19/2022	10	372

Network Condition Listings

Fugro Unique ID	Road Name	BEG_DESC	END_DESC	Pavement Length (ft)	Pavement Area (ft ²)	Pavement Type	Functional Class	Inspection Date	PCI	IRI
78	AMANDA LN	JANE ST	BISSELL RD	1,155	25,868	ACP	Local	2/19/2022	40	190
180	BELCHER RD	HAL McCLAIN RD	MASTERS RD	6,671	156,241	ACP	Local	2/19/2022	31	232
73	BISSELL RD	2952 FT W/O AMANDA LN	AMANDA LN	2,951	55,282	ACP	Local	2/19/2022	69	207
74	BISSELL RD	AMANDA LN	BRIARCREST ST	1,041	19,981	ACP	Local	2/19/2022	65	192
75	BISSELL RD	BRIARCREST ST	1187 FT E/O BRIARCREST ST	1,190	22,583	ACP	Local	2/19/2022	72	153
28	BOOTH PLACE RD	1136 FT W/O MASTERS RD	MASTERS RD	1,050	27,191	ACP	Local	2/19/2022	21	245
79	BRIARCREST ST	2955 FT S/O BISSELL RD	BISSELL RD	2,972	70,955	ACP	Local	2/19/2022	15	225
46	BURNETT RD	CUL DE SAC W/O KIRCHNER RD	1379 FT E/O KIRCHNER	1,240	31,154	ACP	Local	2/19/2022	52	145
109	CEDAR	MASTERS RD	420 FT E/O MASTERS RD	357	9,420	ACP	Local	2/19/2022	42	-1
118	CEMETERY RD	ROGERS RD	LEWIS LN	2,146	48,536	ACP	Local	2/19/2022	17	380
119	CEMETERY RD	LEWIS LN	GEORGIA ST	670	15,678	ACP	Local	2/19/2022	32	268
120	CEMETERY RD	GEORGIA ST	CREST RIDGE DR	1,155	27,210	ACP	Local	2/19/2022	36	288
121	CEMETERY RD	CREST RIDGE DR	SCOTT ST	1,212	26,662	ACP	Local	2/19/2022	38	256
124	CEMETERY RD	CEMETERY RD	CREST RIDGE DR	388	8,689	ACP	Local	2/19/2022	21	430
126	CEMETERY RD	SCOTT ST	CEMETERY RD	1,308	30,600	ACP	Local	2/19/2022	51	180
106	CINDY	LEWIS LN	CHARLOTTE DR	1,843	44,965	ACP	Local	2/19/2022	40	258
49	COOK RD	742 FT S/O COOK RD	COOKRD	407	8,457	ACP	Local	2/19/2022	5	260
50	COOK RD	COOK RD	937 FT N/O COOKRD	937	17,988	ACP	Local	2/19/2022	41	299
148	CREEK DR	374 FT NW/O PINE ST	PINE ST	296	6,806	ACP	Local	2/19/2022	18	-1
149	CREEK DR	PINE ST	HORSE SHOE DR	709	18,292	ACP	Local	2/19/2022	76	165
123	CREST RIDGE DR	CEMETERY RD	CEMETERY RD	3,046	70,822	ACP	Local	2/19/2022	67	177
128	DALMOLIN	SCOTT ST	SCOTT AVE	1,179	22,436	ACP	Local	2/19/2022	29	266
129	DALMOLIN	SCOTT AVE	1000 FT N/O SCOTT AVE	956	22,145	ACP	Local	2/19/2022	57	168
159	DEL BELLO BLVD	POLLARD DR	DEL BELLO BLVD	581	13,156	ACP	Local	2/19/2022	38	178
166	DEL BELLO LN	4589 ft west of Del Bello RD	Del Bello RD	2,261	40,122	ACP	Local	2/19/2022	66	161
160	DEL BELLO RD	Del Bello LN	1290 ft North of Del Bello LN	1,437	27,598	ACP	Local	2/19/2022	79	186
161	DEL BELLO RD	LIRA RD	DEL BELLO LN	592	11,487	ACP	Local	2/19/2022	70	138
162	DEL BELLO RD	DEL BELLO BLVD	LIRA ROAD	411	8,061	ACP	Local	2/19/2022	89	136
163	DEL BELLO RD	PATTERSON RD	DEL BELLO BLVD	1,261	24,708	ACP	Local	2/19/2022	58	177
164	DEL BELLO RD	DEL BELLO SPUR	PATTERSON RD	1,840	35,338	ACP	Local	2/19/2022	75	149
165	DEL BELLO RD	MASTERS RD	DEL BELLO SPUR	1,603	30,170	ACP	Local	2/19/2022	83	128
158	DEL BELLO SPUR	POLLARD DR	DEL BELLO SPUR	3,674	83,570	ACP	Local	2/19/2022	27	260
114	ELM ST	MORRIS AVE	LARGE AVE	337	8,959	ACP	Local	2/19/2022	66	-1
122	FLORA	2300 FT W/O CEMETERY RD	CEMETERY RD	1,451	34,248	ACP	Local	2/19/2022	70	194
172	FURNACE RD	OAK HILL	LUM RD	1,114	27,978	ACP	Local	2/19/2022	30	367
173	FURNACE RD	LUM RD	OLD CHOCOLATE BAYOU RD	1,706	37,623	ACP	Local	2/19/2022	27	263
0	GATES LP	MASTERS RD	MASTERS RD	2,714	47,806	ACP	Local	2/19/2022	16	260
131	GEORGIA	CEMETERY RD	ALABAMA ST	718	16,945	ACP	Local	2/19/2022	40	252
132	GEORGIA	ALABAMA ST	MISSISSIPPI ST	874	19,551	ACP	Local	2/19/2022	22	232
152	HAL McCLAIN RD	AIRPARK RD	FREY RD	372	8,751	ACP	Local	2/19/2022	47	121
153	HAL McCLAIN RD	FREY RD	KELLY ST	684	15,732	ACP	Local	2/19/2022	36	195
154	HAL McCLAIN RD	KELLY ST	1910 FT N/O KELLY ST	1,909	44,661	ACP	Local	2/19/2022	62	252
5	Hanselman RD	LIVE OAK CT	MASTERS RD	2,760	56,028	ACP	Local	2/19/2022	36	165
6	Hanselman RD	ACORN DR	LIVE OAK CT	945	20,315	ACP	Local	2/19/2022	20	238
7	Hanselman RD	OAKCREST DR	ACORN DR	514	9,959	ACP	Local	2/19/2022	44	141
8	Hanselman RD	TWIN OKAS DR	OAKCREST DR	665	12,758	ACP	Local	2/19/2022	83	117

Network Condition Listings

Fugro Unique ID	Road Name	BEG_DESC	END_DESC	Pavement Length (ft)	Pavement Area (ft ²)	Pavement Type	Functional Class	Inspection Date	PCI	IRI
146	HORSE SHOE DR	PINE ST	CROSSSHEILD RD	1,125	26,162	ACP	Local	2/19/2022	88	250
147	HORSE SHOE DR	CROSSSHEILD RD	CREEK RD	320	7,159	ACP	Local	2/19/2022	87	180
35	IOWA LN	STEVENS RD	SHAW RD	1,343	26,429	ACP	Local	2/19/2022	19	222
36	IOWA LN	SHAW RD	BISSELL RD	238	4,857	ACP	Local	2/19/2022	26	562
37	IOWA LN	BISSELL RD	MORRIS AVE	1,428	27,774	ACP	Local	2/19/2022	24	295
76	JANE ST	1106 FT W/O AMANDA LN	AMANDA LN	1,098	27,011	ACP	Local	2/19/2022	9	258
47	JORDAN RD	1400 SE/O COOK RD	SE END	1,012	21,250	ACP	Local	2/19/2022	18	329
72	KEMP ST	MASTERS RD	RUSSELL ST	354	7,996	ACP	Local	2/19/2022	20	-1
61	KING ST	683 FT W/O SPRAGUE ST	SPRAGUE ST	628	13,686	ACP	Local	2/19/2022	32	301
62	KING ST	SPRAGUE ST	MASTERS RD	1,808	43,375	ACP	Local	2/19/2022	18	373
63	KING ST	RUSSELL ST	2366 FT E/O RUSSELL ST	2,300	50,542	ACP	Local	2/19/2022	18	362
17	KINGS CIR	S/O KINGS CIR	N/O KINGS CIR	523	12,517	ACP	Local	2/19/2022	28	485
16	KINGS DR	KINGS DR	KINGS CIR	1,919	35,504	ACP	Local	2/19/2022	27	269
42	KIRCHNER RD	CLARK RD	BURNETT RD	874	19,765	ACP	Local	2/19/2022	32	219
43	KIRCHNER RD	BURNETT RD	ALLELUIA TRL	1,489	35,174	ACP	Local	2/19/2022	15	247
44	KIRCHNER RD	384 FT N/O ALLELUIA TRL	ALLELUIA TRL	382	8,330	ACP	Local	2/19/2022	19	159
58	KREUZER	1333 FT W/O MERIDIANA PKWY	MERIDIANA PKWY	1,257	30,441	ACP	Local	2/19/2022	38	292
90	LARGE AVE	MCCOY AVE	WILSON RD	729	17,778	ACP	Local	2/19/2022	100	163
91	LARGE AVE	WILSON RD	PALMETTO ST	1,437	35,345	ACP	Local	2/19/2022	100	199
92	LARGE AVE	PALMETTO ST	RUSSELL ST	1,111	27,640	ACP	Local	2/19/2022	73	318
93	LARGE AVE	RUSSELL ST	SCHOOL RD	348	8,083	ACP	Local	2/19/2022	91	217
94	LARGE AVE	SCHOOL RD	ELM ST	360	8,210	ACP	Local	2/19/2022	95	214
95	LARGE AVE	ELM ST	456 FT E/O ELM ST	455	10,048	ACP	Local	2/19/2022	63	286
168	LIRA RD	DEL BELLO RD	TAMMY DR	525	11,872	ACP	Local	2/19/2022	37	215
169	LIRA RD	TAMMY DR	1015 FT NE/O TAMMY DR	1,016	23,354	ACP	Local	2/19/2022	10	294
9	LIVE OAK CT	HANSELMAN RD	EAST END	1,661	40,113	ACP	Local	2/19/2022	18	229
137	LOUISIANA ST	MISSISSIPPI ST	1ST ST	1,782	45,981	ACP	Local	2/19/2022	75	182
138	LOUISIANA ST	1ST ST	2ND ST	717	18,499	ACP	Local	2/19/2022	49	223
139	LOUISIANA ST	2ND ST	WOLFE LN	1,807	45,985	ACP	Local	2/19/2022	70	209
30	LOVERS LN	CLARK RD	1667 FT N/O CLARK RD	1,683	39,230	ACP	Local	2/19/2022	42	159
175	LUM RD	FURNACE RD	527 FT N/E OF FURNACE RD	506	11,951	ACP	Local	2/19/2022	60	157
68	MAGNOLIA ST	JORDAN RD	TAYLOR ST	1,050	24,761	ACP	Local	2/19/2022	12	559
1	Manvel Sandy Point RD	MASTERS RD	Hanselman RD	2,662	50,584	ACP	Local	2/19/2022	53	142
32	MASON RD	1239 FT S/O STEVENS RD	STEVENS RD	1,232	27,556	ACP	Local	2/19/2022	30	180
2	MASTERS RD	Hanselman RD	W/O OF GATES LP	1,802	35,252	ACP	Local	2/19/2022	27	186
3	MASTERS RD	W/O OF GATES LP	E/O OF GATES LP	1,372	27,160	ACP	Local	2/19/2022	37	125
4	MASTERS RD	E/O OF GATES LP	UZZELL RD	2,061	42,031	ACP	Local	2/19/2022	51	212
19	MASTERS RD	UZZELL RD	BOOTH BLACE RD	1,942	41,831	ACP	Local	2/19/2022	39	189
20	MASTERS RD	BOOTH BLACE RD	REED LN	1,188	24,225	ACP	Local	2/19/2022	70	114
21	MASTERS RD	REED LN	JORDAN RD	1,762	37,845	ACP	Local	2/19/2022	66	120
22	MASTERS RD	JORDAN RD	TAYLOR ST	1,090	22,892	ACP	Local	2/19/2022	52	134
23	MASTERS RD	TAYLOR ST	KING ST	368	8,533	ACP	Local	2/19/2022	45	168
24	MASTERS RD	KING ST	KEMP ST	366	8,263	ACP	Local	2/19/2022	32	236
25	MASTERS RD	KEMP ST	BISSELL RD	361	8,736	ACP	Local	2/19/2022	58	125
26	MASTERS RD	BISSELL RD	ROGERS RD	1,079	24,360	ACP	Local	2/19/2022	32	168
27	MASTERS RD	ROGERS RD	MORRIS AVE	346	8,154	PCC	Local	2/19/2022	100	302

Network Condition Listings

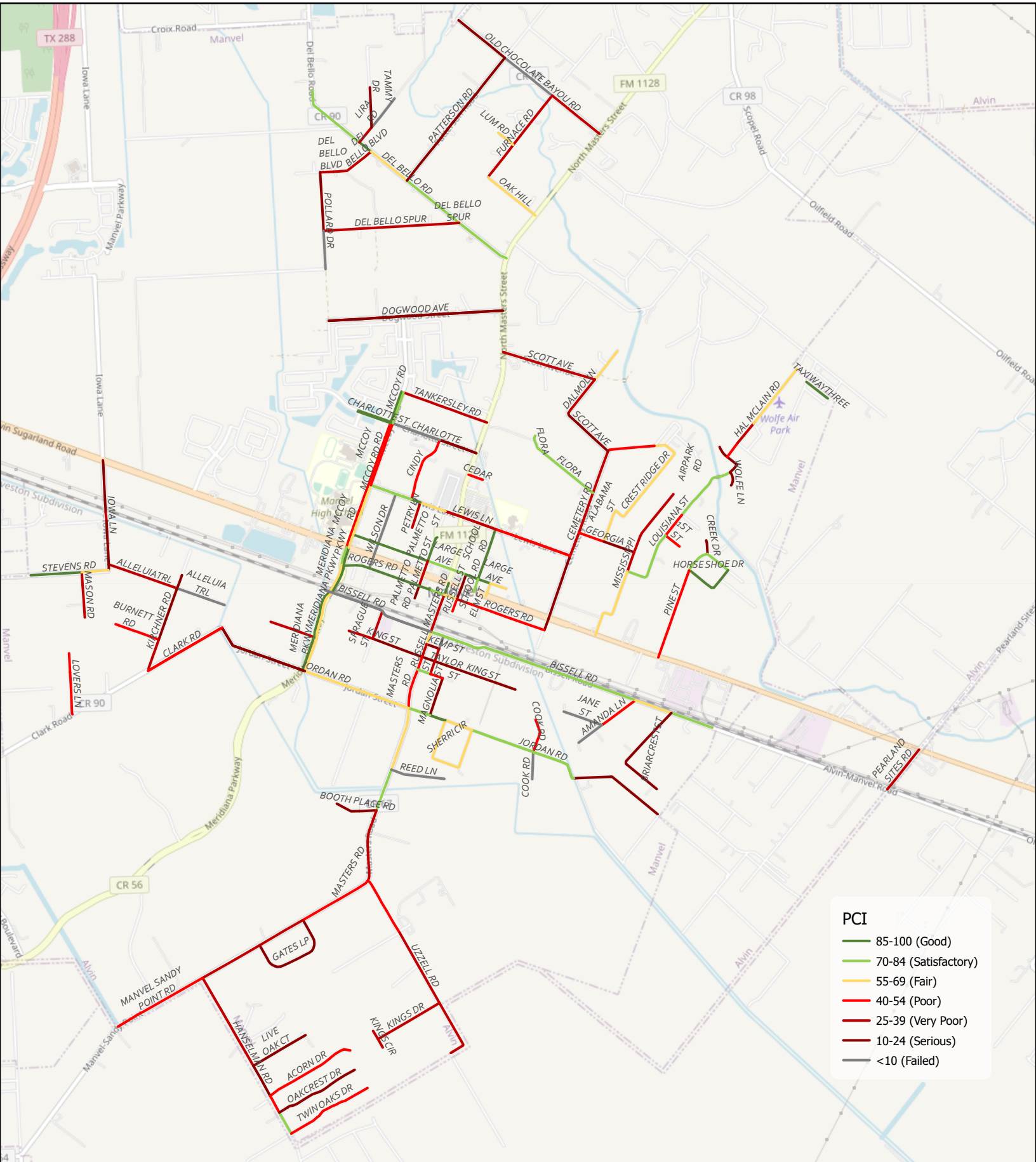
Fugro Unique ID	Road Name	BEG_DESC	END_DESC	Pavement Length (ft)	Pavement Area (ft ²)	Pavement Type	Functional Class	Inspection Date	PCI	IRI
134	MISSISSIPPI	MORRIS AVE	LOUISIANA ST	2,115	49,314	ACP	Local	2/19/2022	63	194
135	MISSISSIPPI	LOUISIANA ST	GEORGIA ST	551	10,798	ACP	Local	2/19/2022	31	154
136	MISSISSIPPI	GEORGIA ST	1937 FT N/O GEORGIA ST	1,950	40,868	ACP	Local	2/19/2022	36	170
174	OAK HILL	MASTERS RD	FURNACE RD	1,650	39,187	ACP	Local	2/19/2022	54	166
11	Oakcrest DR	HANSELMAN RD	EAST END	2,399	55,286	ACP	Local	2/19/2022	21	325
176	OLD CHOCOLATE BAYOU	PATTERSON RD	1628 FT. NW/O PATTERSON RD	1,623	33,435	ACP	Local	2/19/2022	22	215
177	OLD CHOCOLATE BAYOU	FURNACE RD	PATTERSON RD	1,655	34,766	ACP	Local	2/19/2022	10	230
178	OLD CHOCOLATE BAYOU	MASTERS RD	FURNACE RD	1,643	33,813	ACP	Local	2/19/2022	26	209
101	PALMETTO RD	S/W OF ROGERS RD	ROGERS RD	222	5,722	ACP	Local	2/19/2022	12	-1
102	PALMETTO ST	PALMETTO RD	LARGE AVE	655	14,872	ACP	Local	2/19/2022	29	383
103	PALMETTO ST	LARGE AVE	CANAAN ST	698	15,212	ACP	Local	2/19/2022	89	512
171	PATTERSON RD	DEL BELLO RD	OLD CHOCOLATE BAYOU RD	4,299	86,738	ACP	Local	2/19/2022	22	162
80	Pearland Sites RD	ALVIN MANVEL RD	HIGHWAY 6	1,373	32,677	ACP	Local	2/19/2022	38	281
105	PETRY LN	725 FT S/O LEWIS LN	LEWIS LN	623	14,080	ACP	Local	2/19/2022	30	229
144	PINE ST	MORRIS AVE	HORSE SHOE DR	2,504	58,681	ACP	Local	2/19/2022	44	142
145	PINE ST	HORSE SHOE DR	CREEK DR	702	16,993	ACP	Local	2/19/2022	80	216
156	POLLARD DR	1047 ft SOUTH OF DEL BELLO SPUR	DEL BELLO SPUR	396	8,149	ACP	Local	2/19/2022	4	372
157	POLLARD DR	DEL BELLO SPUR	DEL BELLO BLVD	1,596	35,051	ACP	Local	2/19/2022	12	211
29	REED LN	MASTERS RD	1477 FT E/O MASTERS RD	1,452	33,091	ACP	Local	2/19/2022	10	354
81	ROGERS RD	MCCOY DR	LOUDEN ST	344	8,867	ACP	Local	2/19/2022	96	253
82	ROGERS RD	LOUDEN ST	WILSON RD	355	9,091	ACP	Local	2/19/2022	89	344
83	ROGERS RD	WILSON RD	PALMETTO RD	1,452	36,585	ACP	Local	2/19/2022	100	216
84	ROGERS RD	PALMETTO RD	SPILLANE ST	363	7,986	ACP	Local	2/19/2022	93	188
85	ROGERS RD	SPILLANE ST	MASTERS RD	371	8,164	ACP	Local	2/19/2022	80	201
86	ROGERS RD	MASTERS RD	RUSSELL ST	363	7,403	ACP	Local	2/19/2022	61	254
87	ROGERS RD	RUSSELL ST	MAGNOLIA ST	364	6,703	ACP	Local	2/19/2022	28	353
88	ROGERS RD	MAGNOLIA ST	ELM ST	358	6,508	ACP	Local	2/19/2022	45	259
89	ROGERS RD	ELM ST	CEMETERY RD	1,795	31,888	ACP	Local	2/19/2022	48	297
69	RUSSELL ST	TAYLOR ST	KING ST	355	8,728	ACP	Local	2/19/2022	27	253
70	RUSSELL ST	KING ST	KEMP ST	362	8,394	ACP	Local	2/19/2022	25	538
71	RUSSELL ST	KEMP ST	BISSELL RD	362	8,531	ACP	Local	2/19/2022	5	682
110	RUSSELL ST	370 FT S/O ROGERS RD	ROGERS RD	347	8,821	ACP	Local	2/19/2022	41	-1
111	RUSSELL ST	ROGERS RD	LARGE AVE	656	15,608	ACP	Local	2/19/2022	21	223
115	SCHOOL RD	MORRIS AVE	LARGE AVE	325	8,135	ACP	Local	2/19/2022	84	-1
116	SCHOOL RD	LARGE AVE	LEWIS LN	1,456	34,509	PCC	Local	2/19/2022	97	262
127	SCOTT AVE	MASTERS RD	DALMOLIN RD	2,607	51,491	ACP	Local	2/19/2022	33	177
130	SCOTT AVE	CEMETRY RD	SCOTT AVE	1,502	28,525	ACP	Local	2/19/2022	19	200
48	SHERRI CIR	JORDAN RD	JORDAN RD	2,877	73,275	ACP	Local	2/19/2022	60	151
65	SPRAGUE ST	KING ST	BISSELL RD	777	20,034	ACP	Local	2/19/2022	24	140
33	STEVENS RD	1400 FT W/O MASON RD	MASON RD	1,402	30,237	ACP	Local	2/19/2022	88	210
34	STEVENS RD	MASON RD	IOWA LN	738	17,022	ACP	Local	2/19/2022	63	264
170	TAMMY DR	LIRA RD	1090 FT N/O LIRA RD	1,088	24,367	ACP	Local	2/19/2022	15	307
60	TANKERSLEY RD	MCCOY DR	MASTERS RD	2,396	58,418	ACP	Local	2/19/2022	29	399
155	TAXI WAY THREE	FREY RD	740 FT E/O FREY RD	709	14,472	ACP	Local	2/19/2022	100	300
66	TAYLOR ST	MASTERS RD	RUSSELL ST	366	8,194	ACP	Local	2/19/2022	81	321
67	TAYLOR ST	RUSSELL ST	MAGNOLIA ST	344	8,801	ACP	Local	2/19/2022	46	372

Network Condition Listings

Fugro Unique ID	Road Name	BEG_DESC	END_DESC	Pavement Length (ft)	Pavement Area (ft ²)	Pavement Type	Functional Class	Inspection Date	PCI	IRI
12	Twin Oaks DR	HANSELMAN RD	EAST END	2,435	51,153	ACP	Local	2/19/2022	48	227
13	UZZELL RD	VALUSEK RD	MASTERS RD	1,685	37,877	ACP	Local	2/19/2022	44	171
14	UZZELL RD	KINGS DR	VALUSEK RD	2,193	35,312	ACP	Local	2/19/2022	27	176
15	UZZELL RD	1719 FT S/O KINGS DR	KINGS DR	418	9,436	ACP	Local	2/19/2022	25	407
96	WILSON DR	852 FT S/O ROGERS RD	ROGERS RD	371	9,043	ACP	Local	2/19/2022	9	595
98	WILSON DR	ROGERS RD	LARGE AVE	710	16,623	ACP	Local	2/19/2022	7	284
99	WILSON DR	LARGE AVE	LEWIS LN	1,434	32,128	ACP	Local	2/19/2022	5	275
141	WOLFE LN	LOUISIANA ST	484 FT SE/O LOUISIANA ST	378	8,760	ACP	Local	2/19/2022	23	675

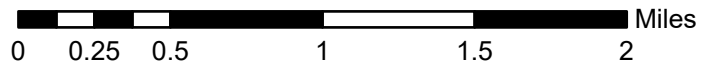
Appendix C. Network Condition Maps

City of Manvel, TX PCI Map - Feb 2022

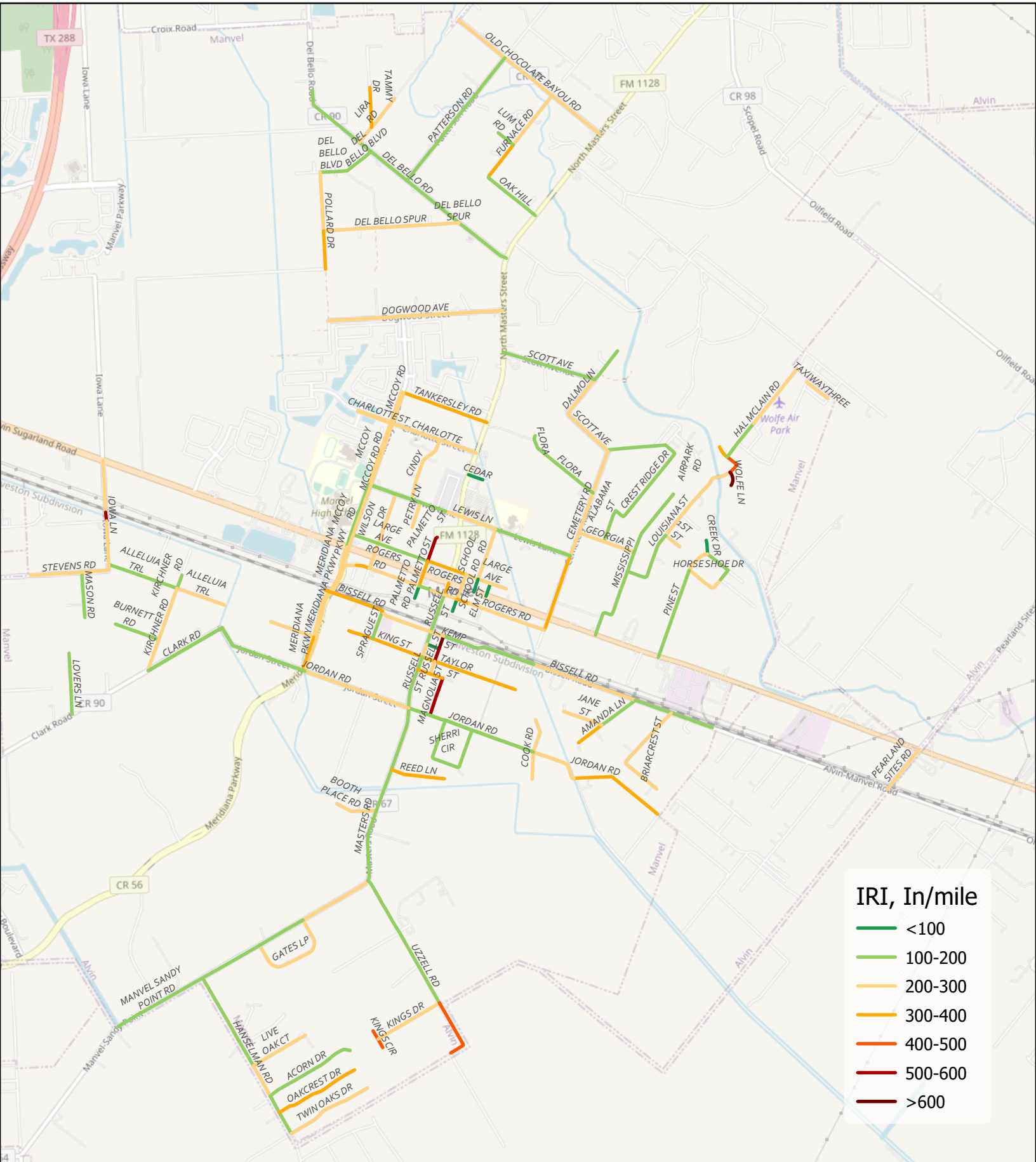


Fugro USA Land, Inc.
Date of Compilation: 05/16/2022

Scale: 1:40,000

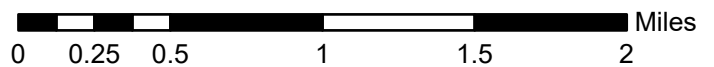


City of Manvel, TX International Roughness Index Map - Feb 2022



Fugro USA Land, Inc.
Date of Compilation: 05/16/2022

Scale: 1:40,000



Appendix D. Current Needs

Network Level Needs Assessment

Fugro Unique ID	Street Name	BEG_DESC	END_DESC	Pavement Type	Functional Class	Pavement Area (ft ²)	Plan Year	Treatment	Treatment Cost (\$)	Before PCI	Improved PCI
140	1ST ST	LOUISIANA ST	485 FT E/O LOUISIANA ST	ACP	Local	13,970	2023	AC - Mill & 2" Overlay	\$49,873	48	100
10	ACORN DR	HANSELMAN RD	EAST END	ACP	Local	65,864	2023	AC - Mill & 2" Overlay	\$235,135	47	100
143	AIRPARK RD	HAL MCCLAIN RD	CUL DE SAC	ACP	Local	7,299	2023	AC - Reconstruction	\$111,815	19	100
142	AIRPARK RD	WOLFE LN	HAL MCCLAIN RD	ACP	Local	12,951	2023	AC - Reconstruction	\$198,415	13	100
133	ALABAMA ST	GEORGIA ST	CREST RIDGE DR	ACP	Local	22,019	2023	AC - Crack/Slurry Seal	\$6,826	55	80
40	ALLELUIA TRL	IOWA LN	KIRCHNER RD	ACP	Local	36,028	2023	AC - Reclamation	\$165,369	28	100
41	ALLELUIA TRL	KIRCHNER RD	1379 FT E/O KIRCHNER	ACP	Local	21,759	2023	AC - Reconstruction	\$333,352	8	100
78	AMANDA LN	JANE ST	BISSELL RD	ACP	Local	25,868	2023	AC - Reclamation	\$118,732	36	100
77	AMANDA LN	798 FT S/O JANE ST	JANE ST	ACP	Local	18,965	2023	AC - Reconstruction	\$290,544	8	100
180	BELCHER RD	HAL MCCLAIN RD	MASTERS RD	ACP	Local	156,241	2023	AC - Reclamation	\$717,147	27	100
73	BISSELL RD	2952 FT W/O AMANDA LN	AMANDA LN	ACP	Local	55,282	2023	AC - Crack/Slurry Seal	\$17,137	66	91
74	BISSELL RD	AMANDA LN	BRIARCREST ST	ACP	Local	19,981	2023	AC - Crack/Slurry Seal	\$6,194	61	86
75	BISSELL RD	BRIARCREST ST	1187 FT E/O BRIARCREST ST	ACP	Local	22,583	2023	AC - Crack/Slurry Seal	\$7,001	68	93
201	BISSELL RD	203 W/O MERIDIANA PKWY	SPRAGUE ST	ACP	Collector	28,403	2023	AC - Reconstruction	\$435,132	6	100
204	BISSELL RD	RUSSELL ST	2952 FT W/O AMANDA LN	ACP	Collector	54,940	2023	AC - Crack/Slurry Seal	\$17,032	81	100
203	BISSELL RD	MASTERS RD	RUSSELL ST	ACP	Collector	8,200	2023	AC - Crack/Slurry Seal	\$2,542	80	100
202	BISSELL RD	SPRAGUE ST	MASTERS RD	ACP	Collector	34,198	2023	AC - Reconstruction	\$523,918	3	100
28	BOOTH PLACE RD	1136 FT W/O MASTERS RD	MASTERS RD	ACP	Local	27,191	2023	AC - Reconstruction	\$416,572	16	100
79	BRIARCREST ST	2955 FT S/O BISSELL RD	BISSELL RD	ACP	Local	70,955	2023	AC - Reconstruction	\$1,087,023	13	100
46	BURNETT RD	CUL DE SAC W/O KIRCHNER RD	1379 FT E/O KIRCHNER	ACP	Local	31,154	2023	AC - Mill & 2" Overlay	\$111,219	48	100
109	CEDAR	MASTERS RD	420 FT E/O MASTERS RD	ACP	Local	9,420	2023	AC - Reclamation	\$43,236	38	100
119	CEMETERY RD	LEWIS LN	GEORGIA ST	ACP	Local	15,678	2023	AC - Reclamation	\$71,962	27	100
126	CEMETERY RD	SCOTT ST	CEMETERY RD	ACP	Local	30,600	2023	AC - Mill & 2" Overlay	\$109,243	47	100
118	CEMETERY RD	ROGERS RD	LEWIS LN	ACP	Local	48,536	2023	AC - Reconstruction	\$743,573	14	100
121	CEMETERY RD	CREST RIDGE DR	SCOTT ST	ACP	Local	26,662	2023	AC - Reclamation	\$122,378	34	100
120	CEMETERY RD	GEORGIA ST	CREST RIDGE DR	ACP	Local	27,210	2023	AC - Reclamation	\$124,893	32	100
124	CEMETERY RD	CEMETERY RD	CREST RIDGE DR	ACP	Local	8,689	2023	AC - Reconstruction	\$133,115	17	100
200	CHARLOTTE	CINDY DR	MASTERS RD	ACP	Collector	19,513	2023	AC - Reconstruction	\$298,945	10	100
199	CHARLOTTE	MCCOY RD	CINDY DR	ACP	Collector	24,768	2023	AC - Reconstruction	\$379,447	7	100
106	CINDY	LEWIS LN	CHARLOTTE DR	ACP	Local	44,965	2023	AC - Reclamation	\$206,390	36	100
182	CLARK RD	KIRCHNER RD	JORDAN RD	ACP	Collector	55,737	2023	AC - Reclamation	\$255,835	37	100
50	COOK RD	COOK RD	937 FT N/O COOKRD	ACP	Local	17,988	2023	AC - Reclamation	\$82,567	37	100
49	COOK RD	742 FT S/O COOK RD	COOKRD	ACP	Local	8,457	2023	AC - Reconstruction	\$129,566	4	100
148	CREEK DR	374 FT NW/O PINE ST	PINE ST	ACP	Local	6,806	2023	AC - Reconstruction	\$104,263	14	100
149	CREEK DR	PINE ST	HORSE SHOE DR	ACP	Local	18,292	2023	AC - Crack/Slurry Seal	\$5,671	74	99
123	CREST RIDGE DR	CEMETERY RD	CEMETERY RD	ACP	Local	70,822	2023	AC - Crack/Slurry Seal	\$21,955	64	89
128	DALMOLIN	SCOTT ST	SCOTT AVE	ACP	Local	22,436	2023	AC - Reclamation	\$102,982	25	100
129	DALMOLIN	SCOTT AVE	1000 FT N/O SCOTT AVE	ACP	Local	22,145	2023	AC - Mill & 2" Overlay	\$79,058	53	100
159	DEL BELLO BLVD	POLLARD DR	DEL BELLO BLVD	ACP	Local	13,156	2023	AC - Reclamation	\$60,385	34	100
166	DEL BELLO LN	4589 ft west of Del Bello RD	Del Bello RD	ACP	Local	40,122	2023	AC - Crack/Slurry Seal	\$12,438	63	88
164	DEL BELLO RD	DEL BELLO SPUR	PATTERSON RD	ACP	Local	35,338	2023	AC - Crack/Slurry Seal	\$10,955	72	97
161	DEL BELLO RD	LIRA RD	DEL BELLO LN	ACP	Local	11,487	2023	AC - Crack/Slurry Seal	\$3,561	67	92
160	DEL BELLO RD	Del Bello LN	1290 ft North of Del Bello LN	ACP	Local	27,598	2023	AC - Crack/Slurry Seal	\$8,555	77	100
165	DEL BELLO RD	MASTERS RD	DEL BELLO SPUR	ACP	Local	30,170	2023	AC - Crack/Slurry Seal	\$9,353	82	100
163	DEL BELLO RD	PATTERSON RD	DEL BELLO BLVD	ACP	Local	24,708	2023	AC - Mill & 2" Overlay	\$88,207	53	100
158	DEL BELLO SPUR	POLLARD DR	DEL BELLO SPUR	ACP	Local	83,570	2023	AC - Reconstruction	\$1,280,295	24	100
211	DOGWOOD AVE	POLLARD DR	MASTERS RD	ACP	Collector	111,622	2023	AC - Reconstruction	\$1,710,055	16	100
114	ELM ST	MORRIS AVE	LARGE AVE	ACP	Local	8,959	2023	AC - Crack/Slurry Seal	\$2,777	63	88
122	FLORA	2300 FT W/O CEMETERY RD	CEMETERY RD	ACP	Local	34,248	2023	AC - Crack/Slurry Seal	\$10,617	67	92
172	FURNACE RD	OAK HILL	LUM RD	ACP	Local	27,978	2023	AC - Reclamation	\$128,417	26	100
173	FURNACE RD	LUM RD	OLD CHOCOLATE BAYOU RD	ACP	Local	37,623	2023	AC - Reconstruction	\$576,384	23	100
0	GATES LP	MASTERS RD	MASTERS RD	ACP	Local	47,806	2023	AC - Reconstruction	\$732,394	13	100

Network Level Needs Assessment

Fugro Unique ID	Street Name	BEG_DESC	END_DESC	Pavement Type	Functional Class	Pavement Area (ft ²)	Plan Year	Treatment	Treatment Cost (\$)	Before PCI	Improved PCI
131	GEORGIA	CEMETERY RD	ALABAMA ST	ACP	Local	16,945	2023	AC - Reclamation	\$77,777	36	100
132	GEORGIA	ALABAMA ST	MISSISSIPPI ST	ACP	Local	19,551	2023	AC - Reconstruction	\$299,529	17	100
152	HAL MCLAIN RD	AIRPARK RD	FREY RD	ACP	Local	8,751	2023	AC - Mill & 2" Overlay	\$31,243	43	100
153	HAL MCLAIN RD	FREY RD	KELLY ST	ACP	Local	15,732	2023	AC - Reclamation	\$72,210	32	100
154	HAL MCLAIN RD	KELLY ST	1910 FT N/O KELLY ST	ACP	Local	44,661	2023	AC - Crack/Slurry Seal	\$13,845	58	83
8	Hanselman RD	TWIN OKAS DR	OAKCREST DR	ACP	Local	12,758	2023	AC - Crack/Slurry Seal	\$3,955	81	100
6	Hanselman RD	ACORN DR	LIVE OAK CT	ACP	Local	20,315	2023	AC - Reconstruction	\$311,223	15	100
7	Hanselman RD	OAKCREST DR	ACORN DR	ACP	Local	9,959	2023	AC - Reclamation	\$45,710	40	100
5	Hanselman RD	LIVE OAK CT	MASTERS RD	ACP	Local	56,028	2023	AC - Reclamation	\$257,170	32	100
37	IOWA LN	BISSELL RD	MORRIS AVE	ACP	Local	27,774	2023	AC - Reconstruction	\$425,495	19	100
36	IOWA LN	SHAW RD	BISSEL RD	ACP	Local	4,857	2023	AC - Reconstruction	\$74,412	23	100
35	IOWA LN	STEVENS RD	SHAW RD	ACP	Local	26,429	2023	AC - Reconstruction	\$404,898	15	100
76	JANE ST	1106 FT W/O AMANDA LN	AMANDA LN	ACP	Local	27,011	2023	AC - Reconstruction	\$413,805	7	100
185	JORDAN RD	MERIDIANA PKWY	MASTERS RD	ACP	Collector	69,340	2023	AC - Crack/Slurry Seal	\$21,495	62	87
183	JORDAN RD	CLARK RD	MERIDIANA PKWY (start of PCC)	ACP	Collector	57,705	2023	AC - Reconstruction	\$66,885	19	100
186	JORDAN RD	MASTERS RD	MAGNOLIA ST	ACP	Collector	14,518	2023	AC - Crack/Slurry Seal	\$4,501	67	92
190	JORDAN RD	COOK RD	1400 SE/O COOK RD	ACP	Collector	34,229	2023	AC - Crack/Slurry Seal	\$10,611	76	100
189	JORDAN RD	SHERRI CIR EAST	COOK RD	ACP	Collector	43,924	2023	AC - Crack/Slurry Seal	\$13,616	80	100
47	JORDAN RD	1400 SE/O COOK RD	SE END	ACP	Local	21,250	2023	AC - Reconstruction	\$325,548	14	100
188	JORDAN RD	SHERRI CIR WEST	SHERRI CIR EAST	ACP	Collector	17,905	2023	AC - Mill & 2" Overlay	\$63,922	47	100
72	KEMP ST	MASTERS RD	RUSSELL ST	ACP	Local	7,996	2023	AC - Reconstruction	\$122,497	16	100
63	KING ST	RUSSELL ST	2366 FT E/O RUSSELL ST	ACP	Local	50,542	2023	AC - Reconstruction	\$774,296	14	100
61	KING ST	683 FT W/O SPRAGUE ST	SPRAGUE ST	ACP	Local	13,686	2023	AC - Reclamation	\$62,819	28	100
62	KING ST	SPRAGUE ST	MASTERS RD	ACP	Local	43,375	2023	AC - Reconstruction	\$664,502	14	100
17	KINGS CIR	S/O KINGS CIR	N/O KINGS CIR	ACP	Local	12,517	2023	AC - Reconstruction	\$191,760	25	100
16	KINGS DR	KINGS DR	KINGS CIR	ACP	Local	35,504	2023	AC - Reconstruction	\$543,917	23	100
42	KIRCHNER RD	CLARK RD	BURNETT RD	ACP	Local	19,765	2023	AC - Reclamation	\$90,720	28	100
43	KIRCHNER RD	BURNETT RD	ALLELUIA TRL	ACP	Local	35,174	2023	AC - Reconstruction	\$538,864	13	100
44	KIRCHNER RD	384 FT N/O ALLELUIA TRL	ALLELUIA TRL	ACP	Local	8,330	2023	AC - Reconstruction	\$127,613	15	100
58	KREUZER	1333 FT W/O MERIDIANA PKWY	MERIDIANA PKWY	ACP	Local	30,441	2023	AC - Reclamation	\$139,726	34	100
92	LARGE AVE	PALMETTO ST	RUSSELL ST	ACP	Local	27,640	2023	AC - Crack/Slurry Seal	\$8,568	70	95
95	LARGE AVE	ELM ST	456 FT E/O ELM ST	ACP	Local	10,048	2023	AC - Crack/Slurry Seal	\$3,115	59	84
207	LEWIS LN	CINDY DR	PETRY LN	ACP	Arterial	6,384	2023	AC - Crack/Slurry Seal	\$1,979	82	100
210	LEWIS LN	SCHOOL RD	CEMETRY RD	ACP	Arterial	42,252	2023	AC - Reclamation	\$193,936	40	100
206	LEWIS LN	WILSON RD	CINDY DR	ACP	Arterial	11,028	2023	AC - Crack/Slurry Seal	\$3,419	70	95
209	LEWIS LN	PALMETTO ST	SCHOOL RD	ACP	Arterial	33,138	2023	AC - Reclamation	\$152,105	34	100
205	LEWIS LN	MCCOY DR	WILSON RD	ACP	Arterial	17,649	2023	AC - Crack/Slurry Seal	\$5,471	77	100
208	LEWIS LN	PETRY LN	PALMETTO ST	ACP	Arterial	17,947	2023	AC - Crack/Slurry Seal	\$5,564	64	89
169	LIRA RD	TAMMY DR	1015 FT NE/O TAMMY DR	ACP	Local	23,354	2023	AC - Reconstruction	\$357,779	8	100
168	LIRA RD	DEL BELLO RD	TAMMY DR	ACP	Local	11,872	2023	AC - Reclamation	\$54,492	33	100
9	LIVE OAK CT	HANSELMAN RD	EAST END	ACP	Local	40,113	2023	AC - Reconstruction	\$614,527	14	100
138	LOUISIANA ST	1ST ST	2ND ST	ACP	Local	18,499	2023	AC - Mill & 2" Overlay	\$66,040	45	100
137	LOUISIANA ST	MISSISSIPPI ST	1ST ST	ACP	Local	45,981	2023	AC - Crack/Slurry Seal	\$14,254	73	98
139	LOUISIANA ST	2ND ST	WOLFE LN	ACP	Local	45,985	2023	AC - Crack/Slurry Seal	\$14,255	66	91
30	LOVERS LN	CLARK RD	1667 FT N/O CLARK RD	ACP	Local	39,230	2023	AC - Reclamation	\$180,066	38	100
175	LUM RD	FURNACE RD	527 FT N/E OF FURNACE RD	ACP	Local	11,951	2023	AC - Crack/Slurry Seal	\$3,705	55	80
68	MAGNOLIA ST	JORDAN RD	TAYLOR ST	ACP	Local	24,761	2023	AC - Reconstruction	\$379,335	10	100
1	Manvel Sandy Point RD	MASTERS RD	Hanselman RD	ACP	Local	50,584	2023	AC - Mill & 2" Overlay	\$180,584	49	100
32	MASON RD	1239 FT S/O STEVENS RD	STEVENS RD	ACP	Local	27,556	2023	AC - Reclamation	\$126,484	26	100
25	MASTERS RD	KEMP ST	BISSELL RD	ACP	Local	8,736	2023	AC - Mill & 2" Overlay	\$31,188	54	100
4	MASTERS RD	E/O OF GATES LP	UZZELL RD	ACP	Local	42,031	2023	AC - Mill & 2" Overlay	\$150,051	48	100
19	MASTERS RD	UZZELL RD	BOOTH BLACE RD	ACP	Local	41,831	2023	AC - Reclamation	\$192,005	35	100

Network Level Needs Assessment

Fugro Unique ID	Street Name	BEG_DESC	END_DESC	Pavement Type	Functional Class	Pavement Area (ft ²)	Plan Year	Treatment	Treatment Cost (\$)	Before PCI	Improved PCI
22	MASTERS RD	JORDAN RD	TAYLOR ST	ACP	Local	22,892	2023	AC - Mill & 2" Overlay	\$81,725	48	100
20	MASTERS RD	BOOTH BLACE RD	REED LN	ACP	Local	24,225	2023	AC - Crack/Slurry Seal	\$7,510	66	91
3	MASTERS RD	W/O OF GATES LP	E/O OF GATES LP	ACP	Local	27,160	2023	AC - Reclamation	\$124,663	33	100
24	MASTERS RD	KING ST	KEMP ST	ACP	Local	8,263	2023	AC - Reclamation	\$37,925	28	100
23	MASTERS RD	TAYLOR ST	KING ST	ACP	Local	8,533	2023	AC - Mill & 2" Overlay	\$30,463	41	100
21	MASTERS RD	REED LN	JORDAN RD	ACP	Local	37,845	2023	AC - Crack/Slurry Seal	\$11,732	63	88
26	MASTERS RD	BISSELL RD	ROGERS RD	ACP	Local	24,360	2023	AC - Reclamation	\$111,812	28	100
2	MASTERS RD	Hanselman RD	W/O OF GATES LP	ACP	Local	35,252	2023	AC - Reconstruction	\$540,061	24	100
56	MCCOY RD	CHARLOTTE DR	LEWIS LN	PCC	Arterial	22,218	2023	PCC - Panel Replacement	\$272,175	51	100
195	MCCOY RD	MORRIS AVE	LEWIS LN	PCC	Arterial	20,617	2023	PCC - Panel Replacement	\$252,553	52	100
196	MCCOY RD	LEWIS LN	CHARLOTTE DR	PCC	Arterial	22,364	2023	PCC - Panel Replacement	\$273,958	51	100
55	MCCOY RD	LEWIS LN	MORRIS AVE	PCC	Arterial	19,823	2023	PCC - Panel Replacement	\$242,834	50	100
197	MCCOY RD	CHARLOTTE DR	TANKERSLEY RD	PCC	Arterial	11,149	2023	PCC - Crack/Joint Seal	\$155	72	82
191	MERIDIANA PKWY	JORDAN RD	KREUZER RD	PCC	Arterial	22,110	2023	PCC - Partial Depth Repair	\$203,186	65	85
192	MERIDIANA PKWY	KREUZER RD	BISSELL RD	PCC	Arterial	30,134	2023	PCC - Partial Depth Repair	\$276,933	60	80
54	MERIDIANA PKWY	MORRIS AVE	ROGERS RD	PCC	Arterial	12,727	2023	PCC - Crack/Joint Seal	\$89	78	88
53	MERIDIANA PKWY	ROGERS RD	BISSELL RD	PCC	Arterial	19,012	2023	PCC - Partial Depth Repair	\$174,722	61	81
134	MISSISSIPPI	MORRIS AVE	LOUISIANA ST	ACP	Local	49,314	2023	AC - Crack/Slurry Seal	\$15,287	59	84
136	MISSISSIPPI	GEORGIA ST	1937 FT N/O GEORGIA ST	ACP	Local	40,868	2023	AC - Reclamation	\$187,586	32	100
135	MISSISSIPPI	LOUISIANA ST	GEORGIA ST	ACP	Local	10,798	2023	AC - Reclamation	\$49,561	27	100
174	OAK HILL	MASTERS RD	FURNACE RD	ACP	Local	39,187	2023	AC - Mill & 2" Overlay	\$139,896	50	100
11	Oakcrest DR	HANSELMAN RD	EAST END	ACP	Local	55,286	2023	AC - Reconstruction	\$846,980	16	100
177	OLD CHOCOLATE BAYOU RD	FURNACE RD	PATTERSON RD	ACP	Local	34,766	2023	AC - Reconstruction	\$532,620	8	100
178	OLD CHOCOLATE BAYOU RD	MASTERS RD	FURNACE RD	ACP	Local	33,813	2023	AC - Reconstruction	\$518,021	22	100
176	OLD CHOCOLATE BAYOU RD	PATTERSON RD	1628 FT. NW/O PATTERSON RD	ACP	Local	33,435	2023	AC - Reconstruction	\$512,230	18	100
101	PALMETTO RD	S/W OF ROGERS RD	ROGERS RD	ACP	Local	5,722	2023	AC - Reconstruction	\$87,667	10	100
102	PALMETTO ST	PALMETTO RD	LARGE AVE	ACP	Local	14,872	2023	AC - Reclamation	\$68,262	25	100
171	PATTERSON RD	DEL BELLO RD	OLD CHOCOLATE BAYOU RD	ACP	Local	86,738	2023	AC - Reconstruction	\$1,328,825	18	100
80	Pearland Sites RD	ALVIN MANVEL RD	HIGHWAY 6	ACP	Local	32,677	2023	AC - Reclamation	\$149,989	34	100
105	PETRY LN	725 FT S/O LEWIS LN	LEWIS LN	ACP	Local	14,080	2023	AC - Reclamation	\$64,626	26	100
145	PINE ST	HORSE SHOE DR	CREEK DR	ACP	Local	16,993	2023	AC - Crack/Slurry Seal	\$5,268	78	100
144	PINE ST	MORRIS AVE	HORSE SHOE DR	ACP	Local	58,681	2023	AC - Mill & 2" Overlay	\$209,492	40	100
157	POLLARD DR	DEL BELLO SPUR	DEL BELLO BLVD	ACP	Local	35,051	2023	AC - Reconstruction	\$536,986	10	100
156	POLLARD DR	1047 ft SOUTH OF DEL BELLO SPUR	DEL BELLO SPUR	ACP	Local	8,149	2023	AC - Reconstruction	\$124,849	3	100
29	REED LN	MASTERS RD	1477 FT E/O MASTERS RD	ACP	Local	33,091	2023	AC - Reconstruction	\$506,951	8	100
85	ROGERS RD	SPILLANE ST	MASTERS RD	ACP	Local	8,164	2023	AC - Crack/Slurry Seal	\$2,531	78	100
87	ROGERS RD	RUSSELL ST	MAGNOLIA ST	ACP	Local	6,703	2023	AC - Reconstruction	\$102,691	25	100
86	ROGERS RD	MASTERS RD	RUSSELL ST	ACP	Local	7,403	2023	AC - Crack/Slurry Seal	\$2,295	56	81
89	ROGERS RD	ELM ST	CEMETERY RD	ACP	Local	31,888	2023	AC - Mill & 2" Overlay	\$113,839	44	100
88	ROGERS RD	MAGNOLIA ST	ELM ST	ACP	Local	6,508	2023	AC - Mill & 2" Overlay	\$23,235	42	100
111	RUSSELL ST	ROGERS RD	LARGE AVE	ACP	Local	15,608	2023	AC - Reconstruction	\$239,115	17	100
71	RUSSELL ST	KEMP ST	BISSELL RD	ACP	Local	8,531	2023	AC - Reconstruction	\$130,701	3	100
69	RUSSELL ST	TAYLOR ST	KING ST	ACP	Local	8,728	2023	AC - Reconstruction	\$133,714	24	100
70	RUSSELL ST	KING ST	KEMP ST	ACP	Local	8,394	2023	AC - Reconstruction	\$128,593	21	100
110	RUSSELL ST	370 FT S/O ROGERS RD	ROGERS RD	ACP	Local	8,821	2023	AC - Reclamation	\$40,490	37	100
115	SCHOOL RD	MORRIS AVE	LARGE AVE	ACP	Local	8,135	2023	AC - Crack/Slurry Seal	\$2,522	82	100
127	SCOTT AVE	MASTERS RD	DALMOLIN RD	ACP	Local	51,491	2023	AC - Reclamation	\$236,345	29	100
130	SCOTT AVE	CEMETRY RD	SCOTT AVE	ACP	Local	28,525	2023	AC - Reconstruction	\$437,001	15	100
48	SHERRI CIR	JORDAN RD	JORDAN RD	ACP	Local	73,275	2023	AC - Crack/Slurry Seal	\$22,715	55	80
65	SPRAGUE ST	KING ST	BISSELL RD	ACP	Local	20,034	2023	AC - Reconstruction	\$306,916	20	100
34	STEVENS RD	MASON RD	IOWA LN	ACP	Local	17,022	2023	AC - Crack/Slurry Seal	\$5,277	59	84
170	TAMMY DR	LIRA RD	1090 FT N/O LIRA RD	ACP	Local	24,367	2023	AC - Reconstruction	\$373,298	13	100

Network Level Needs Assessment

Fugro Unique ID	Street Name	BEG_DESC	END_DESC	Pavement Type	Functional Class	Pavement Area (ft ²)	Plan Year	Treatment	Treatment Cost (\$)	Before PCI	Improved PCI
60	TANKERSLEY RD	MCCOY DR	MASTERS RD	ACP	Local	58,418	2023	AC - Reclamation	\$268,136	25	100
66	TAYLOR ST	MASTERS RD	RUSSELL ST	ACP	Local	8,194	2023	AC - Crack/Slurry Seal	\$2,540	79	100
67	TAYLOR ST	RUSSELL ST	MAGNOLIA ST	ACP	Local	8,801	2023	AC - Mill & 2" Overlay	\$31,421	42	100
12	Twin Oaks DR	HANSELMAN RD	EAST END	ACP	Local	51,153	2023	AC - Mill & 2" Overlay	\$182,617	44	100
15	UZZELL RD	1719 FT S/O KINGS DR	KINGS DR	ACP	Local	9,436	2023	AC - Reconstruction	\$144,552	21	100
13	UZZELL RD	VALUSEK RD	MASTERS RD	ACP	Local	37,877	2023	AC - Mill & 2" Overlay	\$135,220	41	100
14	UZZELL RD	KINGS DR	VALUSEK RD	ACP	Local	35,312	2023	AC - Reconstruction	\$540,981	24	100
98	WILSON DR	ROGERS RD	LARGE AVE	ACP	Local	16,623	2023	AC - Reconstruction	\$254,661	5	100
96	WILSON DR	852 FT S/O ROGERS RD	ROGERS RD	ACP	Local	9,043	2023	AC - Reconstruction	\$138,533	7	100
99	WILSON DR	LARGE AVE	LEWIS LN	ACP	Local	32,128	2023	AC - Reconstruction	\$492,199	3	100
141	WOLFE LN	LOUISIANA ST	484 FT SE/O LOUISIANA ST	ACP	Local	8,760	2023	AC - Reconstruction	\$134,208	19	100
133	ALABAMA ST	GEORGIA ST	CREST RIDGE DR	ACP	Local	22,019	2024	AC - Crack/Slurry Seal	\$7,046	78	100
74	BISSELL RD	AMANDA LN	BRIARCREST ST	ACP	Local	19,981	2024	AC - Crack/Slurry Seal	\$6,394	84	100
162	DEL BELLO RD	DEL BELLO BLVD	LIRA ROAD	ACP	Local	8,061	2024	AC - Crack/Slurry Seal	\$2,580	85	100
154	HAL MCLAIN RD	KELLY ST	1910 FT N/O KELLY ST	ACP	Local	44,661	2024	AC - Crack/Slurry Seal	\$14,292	81	100
147	HORSE SHOE DR	CROSSSHEILD RD	CREEK RD	ACP	Local	7,159	2024	AC - Crack/Slurry Seal	\$2,291	84	100
146	HORSE SHOE DR	PINE ST	CROSSSHEILD RD	ACP	Local	26,162	2024	AC - Crack/Slurry Seal	\$8,372	84	100
185	JORDAN RD	MERIDIANA PKWY	MASTERS RD	ACP	Collector	69,340	2024	AC - Crack/Slurry Seal	\$22,189	85	100
95	LARGE AVE	ELM ST	456 FT E/O ELM ST	ACP	Local	10,048	2024	AC - Crack/Slurry Seal	\$3,215	82	100
175	LUM RD	FURNACE RD	527 FT N/E OF FURNACE RD	ACP	Local	11,951	2024	AC - Crack/Slurry Seal	\$3,824	78	100
197	MCCOY RD	CHARLOTTE DR	TANKERSLEY RD	PCC	Arterial	11,149	2024	PCC - Crack/Joint Seal	\$164	81	91
191	MERIDIANA PKWY	JORDAN RD	KREUZER RD	PCC	Arterial	22,110	2024	PCC - Crack/Joint Seal	\$177	83	93
192	MERIDIANA PKWY	KREUZER RD	BISSELL RD	PCC	Arterial	30,134	2024	PCC - Crack/Joint Seal	\$248	77	87
53	MERIDIANA PKWY	ROGERS RD	BISSELL RD	PCC	Arterial	19,012	2024	PCC - Crack/Joint Seal	\$148	78	88
134	MISSISSIPPI	MORRIS AVE	LOUISIANA ST	ACP	Local	49,314	2024	AC - Crack/Slurry Seal	\$15,780	82	100
86	ROGERS RD	MASTERS RD	RUSSELL ST	ACP	Local	7,403	2024	AC - Crack/Slurry Seal	\$2,369	79	100
48	SHERRI CIR	JORDAN RD	JORDAN RD	ACP	Local	73,275	2024	AC - Crack/Slurry Seal	\$23,448	78	100
34	STEVENS RD	MASON RD	IOWA LN	ACP	Local	17,022	2024	AC - Crack/Slurry Seal	\$5,447	82	100
33	STEVENS RD	1400 FT W/O MASON RD	MASON RD	ACP	Local	30,237	2024	AC - Crack/Slurry Seal	\$9,676	85	100
123	CREST RIDGE DR	CEMETERY RD	CEMETERY RD	ACP	Local	70,822	2025	AC - Crack/Slurry Seal	\$22,663	85	100
166	DEL BELLO LN	4589 ft west of Del Bello RD	Del Bello RD	ACP	Local	40,122	2025	AC - Crack/Slurry Seal	\$12,839	84	100
114	ELM ST	MORRIS AVE	LARGE AVE	ACP	Local	8,959	2025	AC - Crack/Slurry Seal	\$2,867	84	100
187	JORDAN RD	MAGNOLIA ST	SHERRI CIR	ACP	Collector	10,406	2025	AC - Crack/Slurry Seal	\$3,330	84	100
93	LARGE AVE	RUSSELL ST	SCHOOL RD	ACP	Local	8,083	2025	AC - Crack/Slurry Seal	\$2,587	85	100
208	LEWIS LN	PETRY LN	PALMETTO ST	ACP	Arterial	17,947	2025	AC - Crack/Slurry Seal	\$5,743	85	100
21	MASTERS RD	REED LN	JORDAN RD	ACP	Local	37,845	2025	AC - Crack/Slurry Seal	\$12,110	84	100
54	MERIDIANA PKWY	MORRIS AVE	ROGERS RD	PCC	Arterial	12,727	2025	PCC - Crack/Joint Seal	\$94	85	95
103	PALMETTO ST	LARGE AVE	CANAAN ST	ACP	Local	15,212	2025	AC - Crack/Slurry Seal	\$4,868	83	100
82	ROGERS RD	LOUDEN ST	WILSON RD	ACP	Local	9,091	2025	AC - Crack/Slurry Seal	\$2,909	83	100
73	BISSELL RD	2952 FT W/O AMANDA LN	AMANDA LN	ACP	Local	55,282	2026	AC - Crack/Slurry Seal	\$18,243	85	100
192	MERIDIANA PKWY	KREUZER RD	BISSELL RD	PCC	Arterial	30,134	2026	PCC - Crack/Joint Seal	\$262	84	94
84	ROGERS RD	PALMETTO RD	SPILLANE ST	ACP	Local	7,986	2026	AC - Crack/Slurry Seal	\$2,635	85	100
161	DEL BELLO RD	LIRA RD	DEL BELLO LN	ACP	Local	11,487	2027	AC - Crack/Slurry Seal	\$3,905	84	100
122	FLORA	2300 FT W/O CEMETERY RD	CEMETERY RD	ACP	Local	34,248	2027	AC - Crack/Slurry Seal	\$11,644	84	100
186	JORDAN RD	MASTERS RD	MAGNOLIA ST	ACP	Collector	14,518	2027	AC - Crack/Slurry Seal	\$4,936	84	100
139	LOUISIANA ST	2ND ST	WOLFE LN	ACP	Local	45,985	2027	AC - Crack/Slurry Seal	\$15,635	83	100
20	MASTERS RD	BOOTH BLACE RD	REED LN	ACP	Local	24,225	2027	AC - Crack/Slurry Seal	\$8,237	83	100
53	MERIDIANA PKWY	ROGERS RD	BISSELL RD	PCC	Arterial	19,012	2027	PCC - Crack/Joint Seal	\$165	84	94

Needs Summary

Functional Class/Treatment Type	Plan Year					Grand Total
	2023	2024	2025	2026	2027	
Arterial	\$2,059,080	\$738	\$5,837	\$262	\$165	\$2,066,081
AC - Crack/Slurry Seal	\$16,432	\$0	\$5,743	\$0	\$0	\$22,175
AC - Reclamation	\$346,041	\$0	\$0	\$0	\$0	\$346,041
PCC - Crack/Joint Seal	\$244	\$738	\$94	\$262	\$165	\$1,502
PCC - Panel Replacement	\$1,041,521	\$0	\$0	\$0	\$0	\$1,041,521
PCC - Partial Depth Repair	\$654,842	\$0	\$0	\$0	\$0	\$654,842
Collector	\$3,803,937	\$22,189	\$3,330	\$0	\$4,936	\$3,834,392
AC - Crack/Slurry Seal	\$69,797	\$22,189	\$3,330	\$0	\$4,936	\$100,252
AC - Mill & 2" Overlay	\$63,922	\$0	\$0	\$0	\$0	\$63,922
AC - Reclamation	\$255,835	\$0	\$0	\$0	\$0	\$255,835
AC - Reconstruction	\$3,414,383	\$0	\$0	\$0	\$0	\$3,414,383
Local	\$28,724,857	\$104,734	\$60,842	\$20,879	\$39,421	\$28,950,733
AC - Crack/Slurry Seal	\$262,414	\$104,734	\$60,842	\$20,879	\$39,421	\$488,290
AC - Mill & 2" Overlay	\$2,079,746	\$0	\$0	\$0	\$0	\$2,079,746
AC - Reclamation	\$4,583,030	\$0	\$0	\$0	\$0	\$4,583,030
AC - Reconstruction	\$21,799,668	\$0	\$0	\$0	\$0	\$21,799,668
Grand Total	\$34,587,874	\$127,661	\$70,010	\$21,140	\$44,522	\$34,851,207

Appendix E. 5-Year Work Plan Listing (Scenario 2)

Network Level Work Plan - Scenario 2 (Increase PCI to 50 by 2027)

Fugro Unique ID	Street Name	BEG_DESC	END_DESC	Pavement Type	Functional Class	Pavement Area (ft ²)	Plan Year	Treatment	Treatment Cost (\$)	Before PCI	Improved PCI
205	LEWIS LN	MCCOY DR	WILSON RD	ACP	Arterial	17,649	2023	AC - Crack/Slurry Seal	\$5,471	77	100
206	LEWIS LN	WILSON RD	CINDY DR	ACP	Arterial	11,028	2023	AC - Crack/Slurry Seal	\$3,419	70	95
207	LEWIS LN	CINDY DR	PETRY LN	ACP	Arterial	6,384	2023	AC - Crack/Slurry Seal	\$1,979	82	100
208	LEWIS LN	PETRY LN	PALMETTO ST	ACP	Arterial	17,947	2023	AC - Crack/Slurry Seal	\$5,564	64	89
197	MCCOY RD	CHARLOTTE DR	TANKERSLEY RD	PCC	Arterial	11,149	2023	PCC - Crack/Joint Seal	\$155	72	82
53	MERIDIANA PKWY	ROGERS RD	BISSELL RD	PCC	Arterial	19,012	2023	PCC - Partial Depth Repair	\$174,722	61	81
54	MERIDIANA PKWY	MORRIS AVE	ROGERS RD	PCC	Arterial	12,727	2023	PCC - Crack/Joint Seal	\$89	78	88
191	MERIDIANA PKWY	JORDAN RD	KREUZER RD	PCC	Arterial	22,110	2023	PCC - Partial Depth Repair	\$203,186	65	85
192	MERIDIANA PKWY	KREUZER RD	BISSELL RD	PCC	Arterial	30,134	2023	PCC - Partial Depth Repair	\$276,933	60	80
203	BISSELL RD	MASTERS RD	RUSSELL ST	ACP	Collector	8,200	2023	AC - Crack/Slurry Seal	\$2,542	80	100
204	BISSELL RD	RUSSELL ST	2952 FT W/O AMANDA LN	ACP	Collector	54,940	2023	AC - Crack/Slurry Seal	\$17,032	81	100
185	JORDAN RD	MERIDIANA PKWY	MASTERS RD	ACP	Collector	69,340	2023	AC - Crack/Slurry Seal	\$21,495	62	87
186	JORDAN RD	MASTERS RD	MAGNOLIA ST	ACP	Collector	14,518	2023	AC - Crack/Slurry Seal	\$4,501	67	92
189	JORDAN RD	SHERRI CIR EAST	COOK RD	ACP	Collector	43,924	2023	AC - Crack/Slurry Seal	\$13,616	80	100
190	JORDAN RD	COOK RD	1400 SE/O COOK RD	ACP	Collector	34,229	2023	AC - Crack/Slurry Seal	\$10,611	76	100
73	BISSELL RD	2952 FT W/O AMANDA LN	AMANDA LN	ACP	Local	55,282	2023	AC - Crack/Slurry Seal	\$17,137	66	91
74	BISSELL RD	AMANDA LN	BRIARCREST ST	ACP	Local	19,981	2023	AC - Crack/Slurry Seal	\$6,194	61	86
75	BISSELL RD	BRIARCREST ST	1187 FT E/O BRIARCREST ST	ACP	Local	22,583	2023	AC - Crack/Slurry Seal	\$7,001	68	93
149	CREEK DR	PINE ST	HORSE SHOE DR	ACP	Local	18,292	2023	AC - Crack/Slurry Seal	\$5,671	74	99
123	CREST RIDGE DR	CEMETERY RD	CEMETERY RD	ACP	Local	70,822	2023	AC - Crack/Slurry Seal	\$21,955	64	89
166	DEL BELLO LN	4589 ft west of Del Bello RD	Del Bello RD	ACP	Local	40,122	2023	AC - Crack/Slurry Seal	\$12,438	63	88
160	DEL BELLO RD	Del Bello LN	1290 ft North of Del Bello LN	ACP	Local	27,598	2023	AC - Crack/Slurry Seal	\$8,555	77	100
161	DEL BELLO RD	LIRA RD	DEL BELLO LN	ACP	Local	11,487	2023	AC - Crack/Slurry Seal	\$3,561	67	92
164	DEL BELLO RD	DEL BELLO SPUR	PATTERSON RD	ACP	Local	35,338	2023	AC - Crack/Slurry Seal	\$10,955	72	97
165	DEL BELLO RD	MASTERS RD	DEL BELLO SPUR	ACP	Local	30,170	2023	AC - Crack/Slurry Seal	\$9,353	82	100
114	ELM ST	MORRIS AVE	LARGE AVE	ACP	Local	8,959	2023	AC - Crack/Slurry Seal	\$2,777	63	88
122	FLORA	2300 FT W/O CEMETERY RD	CEMETERY RD	ACP	Local	34,248	2023	AC - Crack/Slurry Seal	\$10,617	67	92
8	Hanselman RD	TWIN OKAS DR	OAKCREST DR	ACP	Local	12,758	2023	AC - Crack/Slurry Seal	\$3,955	81	100
92	LARGE AVE	PALMETTO ST	RUSSELL ST	ACP	Local	27,640	2023	AC - Crack/Slurry Seal	\$8,568	70	95
95	LARGE AVE	ELM ST	456 FT E/O ELM ST	ACP	Local	10,048	2023	AC - Crack/Slurry Seal	\$3,115	59	84
137	LOUISIANA ST	MISSISSIPPI ST	1ST ST	ACP	Local	45,981	2023	AC - Crack/Slurry Seal	\$14,254	73	98
139	LOUISIANA ST	2ND ST	WOLFE LN	ACP	Local	45,985	2023	AC - Crack/Slurry Seal	\$14,255	66	91
20	MASTERS RD	BOOTH BLACE RD	REED LN	ACP	Local	24,225	2023	AC - Crack/Slurry Seal	\$7,510	66	91
21	MASTERS RD	REED LN	JORDAN RD	ACP	Local	37,845	2023	AC - Crack/Slurry Seal	\$11,732	63	88
145	PINE ST	HORSE SHOE DR	CREEK DR	ACP	Local	16,993	2023	AC - Crack/Slurry Seal	\$5,268	78	100
85	ROGERS RD	SPILLANE ST	MASTERS RD	ACP	Local	8,164	2023	AC - Crack/Slurry Seal	\$2,531	78	100
115	SCHOOL RD	MORRIS AVE	LARGE AVE	ACP	Local	8,135	2023	AC - Crack/Slurry Seal	\$2,522	82	100
66	TAYLOR ST	MASTERS RD	RUSSELL ST	ACP	Local	8,194	2023	AC - Crack/Slurry Seal	\$2,540	79	100
55	MCCOY RD	LEWIS LN	MORRIS AVE	PCC	Arterial	19,823	2024	PCC - Panel Replacement	\$250,169	48	100
56	MCCOY RD	CHARLOTTE DR	LEWIS LN	PCC	Arterial	22,218	2024	PCC - Panel Replacement	\$280,396	48	100
195	MCCOY RD	MORRIS AVE	LEWIS LN	PCC	Arterial	20,617	2024	PCC - Panel Replacement	\$260,181	50	100
196	MCCOY RD	LEWIS LN	CHARLOTTE DR	PCC	Arterial	22,364	2024	PCC - Panel Replacement	\$282,232	48	100
197	MCCOY RD	CHARLOTTE DR	TANKERSLEY RD	PCC	Arterial	11,149	2024	PCC - Crack/Joint Seal	\$164	81	91
53	MERIDIANA PKWY	ROGERS RD	BISSELL RD	PCC	Arterial	19,012	2024	PCC - Crack/Joint Seal	\$148	78	88
191	MERIDIANA PKWY	JORDAN RD	KREUZER RD	PCC	Arterial	22,110	2024	PCC - Crack/Joint Seal	\$177	83	93
192	MERIDIANA PKWY	KREUZER RD	BISSELL RD	PCC	Arterial	30,134	2024	PCC - Crack/Joint Seal	\$248	77	87
185	JORDAN RD	MERIDIANA PKWY	MASTERS RD	ACP	Collector	69,340	2024	AC - Crack/Slurry Seal	\$22,189	85	100
133	ALABAMA ST	GEORGIA ST	CREST RIDGE DR	ACP	Local	22,019	2024	AC - Mill & 2" Overlay	\$81,029	50	100
74	BISSELL RD	AMANDA LN	BRIARCREST ST	ACP	Local	19,981	2024	AC - Crack/Slurry Seal	\$6,394	84	100
129	DALMOLIN	SCOTT AVE	1000 FT N/O SCOTT AVE	ACP	Local	22,145	2024	AC - Mill & 2" Overlay	\$81,494	48	100
162	DEL BELLO RD	DEL BELLO BLVD	LIRA ROAD	ACP	Local	8,061	2024	AC - Crack/Slurry Seal	\$2,580	85	100
163	DEL BELLO RD	PATTERSON RD	DEL BELLO BLVD	ACP	Local	24,708	2024	AC - Mill & 2" Overlay	\$90,925	49	100

Network Level Work Plan - Scenario 2 (Increase PCI to 50 by 2027)

Fugro Unique ID	Street Name	BEG_DESC	END_DESC	Pavement Type	Functional Class	Pavement Area (ft ²)	Plan Year	Treatment	Treatment Cost (\$)	Before PCI	Improved PCI
154	HAL MCLAIN RD	KELLY ST	1910 FT N/O KELLY ST	ACP	Local	44,661	2024	AC - Mill & 2" Overlay	\$164,353	53	100
146	HORSE SHOE DR	PINE ST	CROSSSHEILD RD	ACP	Local	26,162	2024	AC - Crack/Slurry Seal	\$8,372	84	100
147	HORSE SHOE DR	CROSSSHEILD RD	CREEK RD	ACP	Local	7,159	2024	AC - Crack/Slurry Seal	\$2,291	84	100
95	LARGE AVE	ELM ST	456 FT E/O ELM ST	ACP	Local	10,048	2024	AC - Crack/Slurry Seal	\$3,215	82	100
175	LUM RD	FURNACE RD	527 FT N/E OF FURNACE RD	ACP	Local	11,951	2024	AC - Mill & 2" Overlay	\$43,980	50	100
25	MASTERS RD	KEMP ST	BISSELL RD	ACP	Local	8,736	2024	AC - Mill & 2" Overlay	\$32,149	49	100
134	MISSISSIPPI	MORRIS AVE	LOUISIANA ST	ACP	Local	49,314	2024	AC - Mill & 2" Overlay	\$181,474	54	100
174	OAK HILL	MASTERS RD	FURNACE RD	ACP	Local	39,187	2024	AC - Mill & 2" Overlay	\$144,206	46	100
86	ROGERS RD	MASTERS RD	RUSSELL ST	ACP	Local	7,403	2024	AC - Mill & 2" Overlay	\$27,244	51	100
48	SHERRI CIR	JORDAN RD	JORDAN RD	ACP	Local	73,275	2024	AC - Mill & 2" Overlay	\$269,653	50	100
33	STEVENS RD	1400 FT W/O MASON RD	MASON RD	ACP	Local	30,237	2024	AC - Crack/Slurry Seal	\$9,676	85	100
34	STEVENS RD	MASON RD	IOWA LN	ACP	Local	17,022	2024	AC - Mill & 2" Overlay	\$62,641	54	100
208	LEWIS LN	PETRY LN	PALMETTO ST	ACP	Arterial	17,947	2025	AC - Crack/Slurry Seal	\$5,743	85	100
54	MERIDIANA PKWY	MORRIS AVE	ROGERS RD	PCC	Arterial	12,727	2025	PCC - Crack/Joint Seal	\$94	85	95
187	JORDAN RD	MAGNOLIA ST	SHERRI CIR	ACP	Collector	10,406	2025	AC - Crack/Slurry Seal	\$3,330	84	100
140	1ST ST	LOUISIANA ST	485 FT E/O LOUISIANA ST	ACP	Local	13,970	2025	AC - Reclamation	\$68,034	40	100
10	ACORN DR	HANSELMAN RD	EAST END	ACP	Local	65,864	2025	AC - Reclamation	\$320,759	38	100
46	BURNETT RD	CUL DE SAC W/O KIRCHNER RD	1379 FT E/O KIRCHNER	ACP	Local	31,154	2025	AC - Reclamation	\$151,719	39	100
126	CEMETERY RD	SCOTT ST	CEMETERY RD	ACP	Local	30,600	2025	AC - Reclamation	\$149,023	39	100
123	CREST RIDGE DR	CEMETERY RD	CEMETERY RD	ACP	Local	70,822	2025	AC - Crack/Slurry Seal	\$22,663	85	100
166	DEL BELLO LN	4589 ft west of Del Bello RD	Del Bello RD	ACP	Local	40,122	2025	AC - Crack/Slurry Seal	\$12,839	84	100
114	ELM ST	MORRIS AVE	LARGE AVE	ACP	Local	8,959	2025	AC - Crack/Slurry Seal	\$2,867	84	100
93	LARGE AVE	RUSSELL ST	SCHOOL RD	ACP	Local	8,083	2025	AC - Crack/Slurry Seal	\$2,587	85	100
1	Manvel Sandy Point RD	MASTERS RD	Hanselman RD	ACP	Local	50,584	2025	AC - Mill & 2" Overlay	\$191,712	40	100
4	MASTERS RD	E/O OF GATES LP	UZZELL RD	ACP	Local	42,031	2025	AC - Reclamation	\$204,691	39	100
21	MASTERS RD	REED LN	JORDAN RD	ACP	Local	37,845	2025	AC - Crack/Slurry Seal	\$12,110	84	100
22	MASTERS RD	JORDAN RD	TAYLOR ST	ACP	Local	22,892	2025	AC - Reclamation	\$111,485	40	100
103	PALMETTO ST	LARGE AVE	CANAAN ST	ACP	Local	15,212	2025	AC - Crack/Slurry Seal	\$4,868	83	100
82	ROGERS RD	LOUDEN ST	WILSON RD	ACP	Local	9,091	2025	AC - Crack/Slurry Seal	\$2,909	83	100
210	LEWIS LN	SCHOOL RD	CEMETRY RD	ACP	Arterial	42,252	2026	AC - Reclamation	\$212,105	27	100
192	MERIDIANA PKWY	KREUZER RD	BISSELL RD	PCC	Arterial	30,134	2026	PCC - Crack/Joint Seal	\$262	84	94
188	JORDAN RD	SHERRI CIR WEST	SHERRI CIR EAST	ACP	Collector	17,905	2026	AC - Reclamation	\$89,885	30	100
73	BISSELL RD	2952 FT W/O AMANDA LN	AMANDA LN	ACP	Local	55,282	2026	AC - Crack/Slurry Seal	\$18,243	85	100
152	HAL MCLAIN RD	AIRPARK RD	FREY RD	ACP	Local	8,751	2026	AC - Reclamation	\$43,932	29	100
138	LOUISIANA ST	1ST ST	2ND ST	ACP	Local	18,499	2026	AC - Reclamation	\$92,863	32	100
23	MASTERS RD	TAYLOR ST	KING ST	ACP	Local	8,533	2026	AC - Reclamation	\$42,836	27	100
84	ROGERS RD	PALMETTO RD	SPILLANE ST	ACP	Local	7,986	2026	AC - Crack/Slurry Seal	\$2,635	85	100
88	ROGERS RD	MAGNOLIA ST	ELM ST	ACP	Local	6,508	2026	AC - Reclamation	\$32,672	28	100
89	ROGERS RD	ELM ST	CEMETERY RD	ACP	Local	31,888	2026	AC - Reclamation	\$160,076	31	100
67	TAYLOR ST	RUSSELL ST	MAGNOLIA ST	ACP	Local	8,801	2026	AC - Reclamation	\$44,183	29	100
12	Twin Oaks DR	HANSELMAN RD	EAST END	ACP	Local	51,153	2026	AC - Reclamation	\$256,789	31	100
13	UZZELL RD	VALUSEK RD	MASTERS RD	ACP	Local	37,877	2026	AC - Reclamation	\$190,142	27	100
53	MERIDIANA PKWY	ROGERS RD	BISSELL RD	PCC	Arterial	19,012	2027	PCC - Crack/Joint Seal	\$165	84	94
182	CLARK RD	KIRCHNER RD	JORDAN RD	ACP	Collector	55,737	2027	AC - Reconstruction	\$960,913	19	100
186	JORDAN RD	MASTERS RD	MAGNOLIA ST	ACP	Collector	14,518	2027	AC - Crack/Slurry Seal	\$4,936	84	100
109	CEDAR	MASTERS RD	420 FT E/O MASTERS RD	ACP	Local	9,420	2027	AC - Reconstruction	\$162,392	20	100
161	DEL BELLO RD	LIRA RD	DEL BELLO LN	ACP	Local	11,487	2027	AC - Crack/Slurry Seal	\$3,905	84	100
122	FLORA	2300 FT W/O CEMETERY RD	CEMETERY RD	ACP	Local	34,248	2027	AC - Crack/Slurry Seal	\$11,644	84	100
7	Hanselman RD	OAKCREST DR	ACORN DR	ACP	Local	9,959	2027	AC - Reconstruction	\$171,688	22	100
139	LOUISIANA ST	2ND ST	WOLFE LN	ACP	Local	45,985	2027	AC - Crack/Slurry Seal	\$15,635	83	100
30	LOVERS LN	CLARK RD	1667 FT N/O CLARK RD	ACP	Local	39,230	2027	AC - Reconstruction	\$676,325	20	100
20	MASTERS RD	BOOTH BLACE RD	REED LN	ACP	Local	24,225	2027	AC - Crack/Slurry Seal	\$8,237	83	100

Network Level Work Plan - Scenario 2 (Increase PCI to 50 by 2027)

Fugro Unique ID	Street Name	BEG_DESC	END_DESC	Pavement Type	Functional Class	Pavement Area (ft ²)	Plan Year	Treatment	Treatment Cost (\$)	Before PCI	Improved PCI
144	PINE ST	MORRIS AVE	HORSE SHOE DR	ACP	Local	58,681	2027	AC - Reconstruction	\$1,011,662	22	100

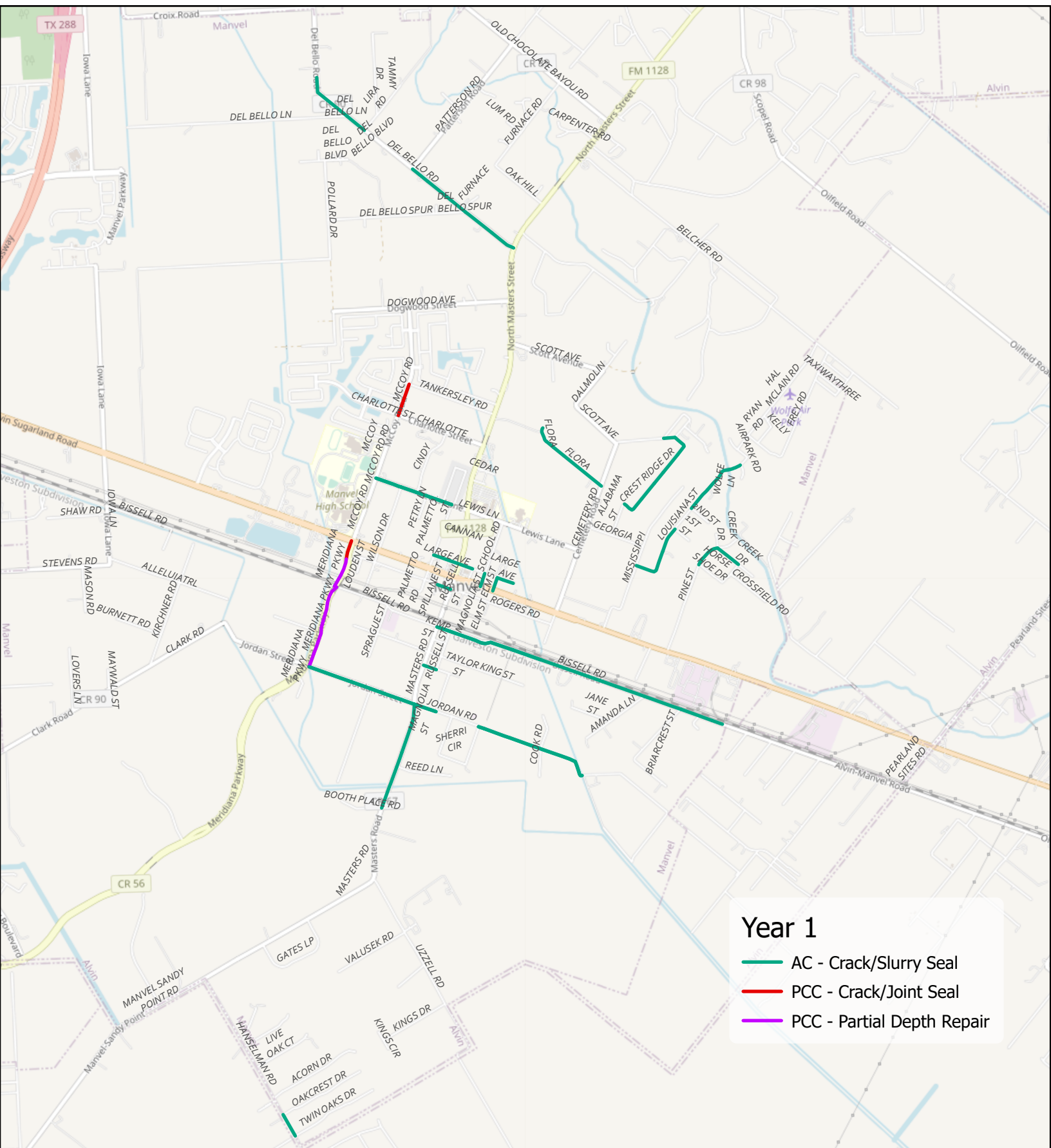
Summary Table

Functional Class/Treatment Type	Plan Year					Grand Total
	2023	2024	2025	2026	2027	
Arterial	\$671,518	\$1,073,716	\$5,837	\$212,366	\$165	\$1,963,603
AC - Crack/Slurry Seal	\$16,432	\$0	\$5,743	\$0	\$0	\$22,175
AC - Reclamation	\$0	\$0	\$0	\$212,105	\$0	\$212,105
PCC - Crack/Joint Seal	\$244	\$738	\$94	\$262	\$165	\$1,502
PCC - Panel Replacement	\$0	\$1,072,979	\$0	\$0	\$0	\$1,072,979
PCC - Partial Depth Repair	\$654,842	\$0	\$0	\$0	\$0	\$654,842
Collector	\$69,797	\$22,189	\$3,330	\$89,885	\$965,849	\$1,151,050
AC - Crack/Slurry Seal	\$69,797	\$22,189	\$3,330	\$0	\$4,936	\$100,252
AC - Reclamation	\$0	\$0	\$0	\$89,885	\$0	\$89,885
AC - Reconstruction	\$0	\$0	\$0	\$0	\$960,913	\$960,913
Local	\$192,464	\$1,211,676	\$1,258,265	\$884,369	\$2,061,489	\$5,608,263
AC - Crack/Slurry Seal	\$192,464	\$32,528	\$60,842	\$20,879	\$39,421	\$346,134
AC - Mill & 2" Overlay	\$0	\$1,179,148	\$191,712	\$0	\$0	\$1,370,860
AC - Reclamation	\$0	\$0	\$1,005,711	\$863,491	\$0	\$1,869,201
AC - Reconstruction	\$0	\$0	\$0	\$0	\$2,022,068	\$2,022,068
Grand Total	\$933,779	\$2,307,581	\$1,267,432	\$1,186,621	\$3,027,503	\$8,722,915

Appendix F. 5-Year Work Plan Maps (Scenario 2)

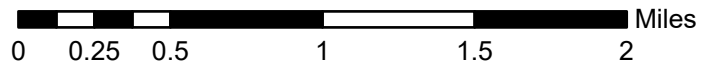
City of Manvel, TX - Year 2023 Workplan

For scenario 2: Increasing PCI by 5 points in 5 years



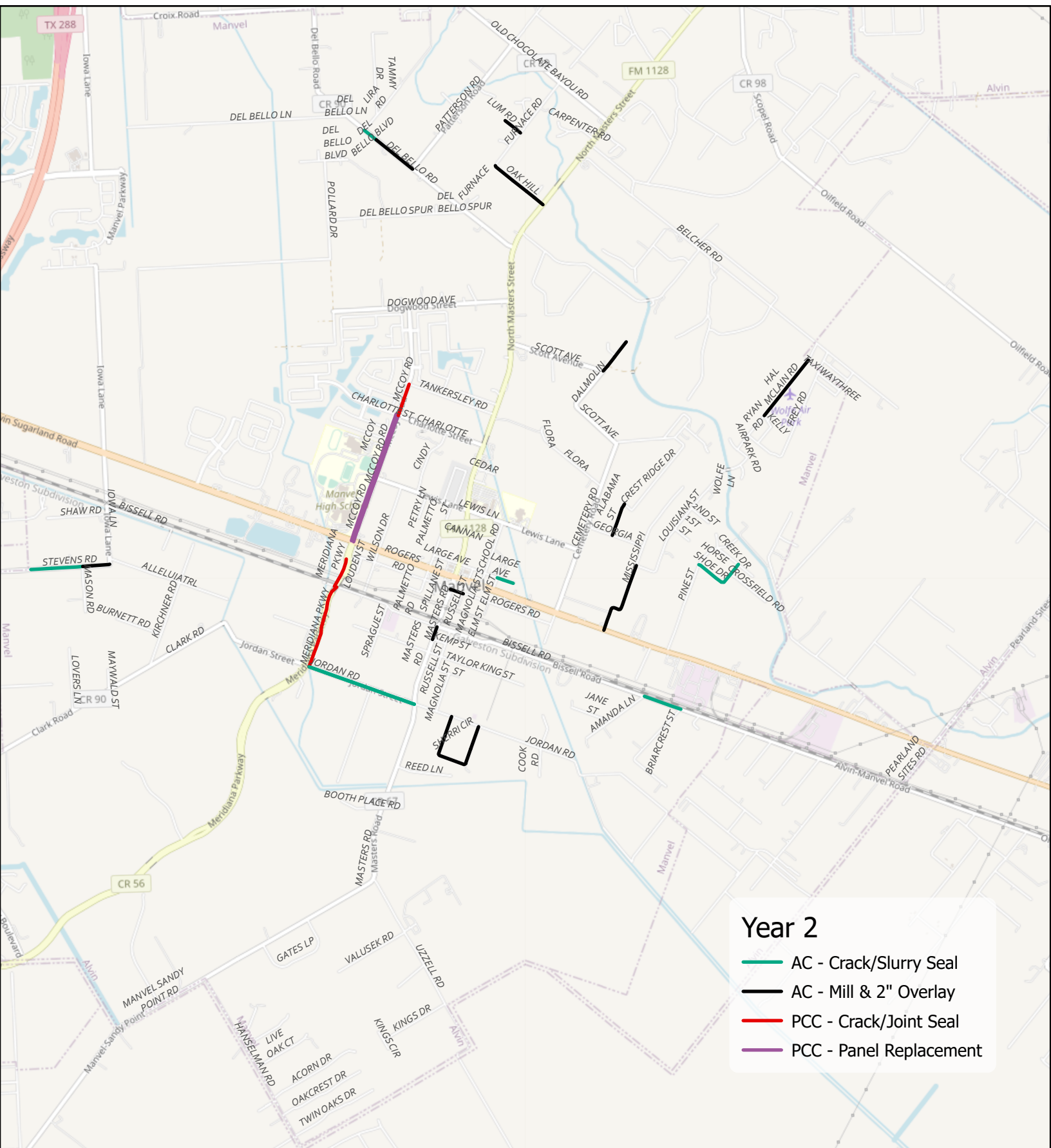
Fugro USA Land, Inc.
Date of Compilation: 05/13/2022

Scale: 1:40,000



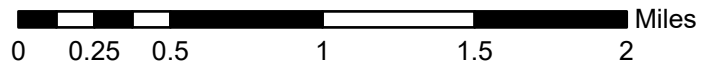
City of Manvel, TX - Year 2024 Workplan

For scenario 2: Increasing PCI by 5 points in 5 years



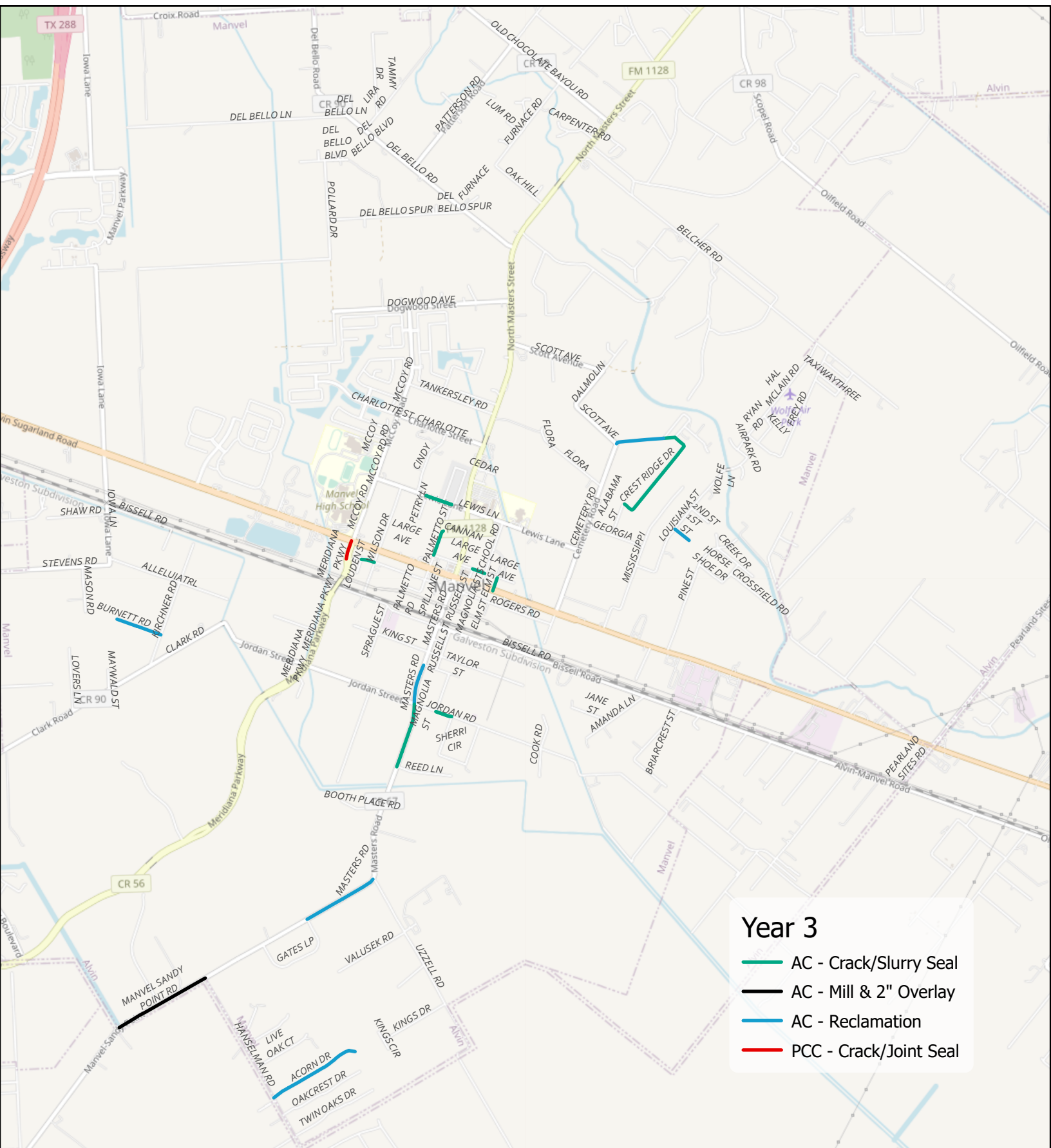
Fugro USA Land, Inc.
Date of Compilation: 05/13/2022

Scale: 1:40,000



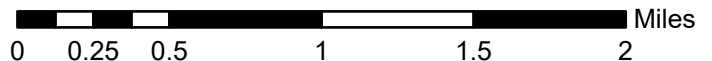
City of Manvel, TX - Year 2025 Workplan

For scenario 2: Increasing PCI by 5 points in 5 years

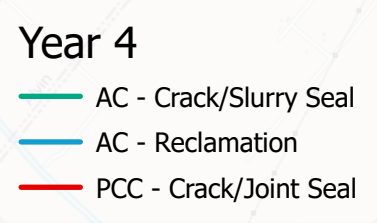


Fugro USA Land, Inc.
Date of Compilation: 05/13/2022

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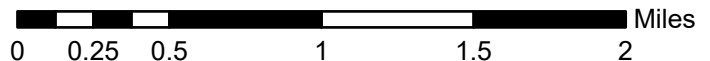


For scenario 2: Increasing PCI by 5 points in 5 years



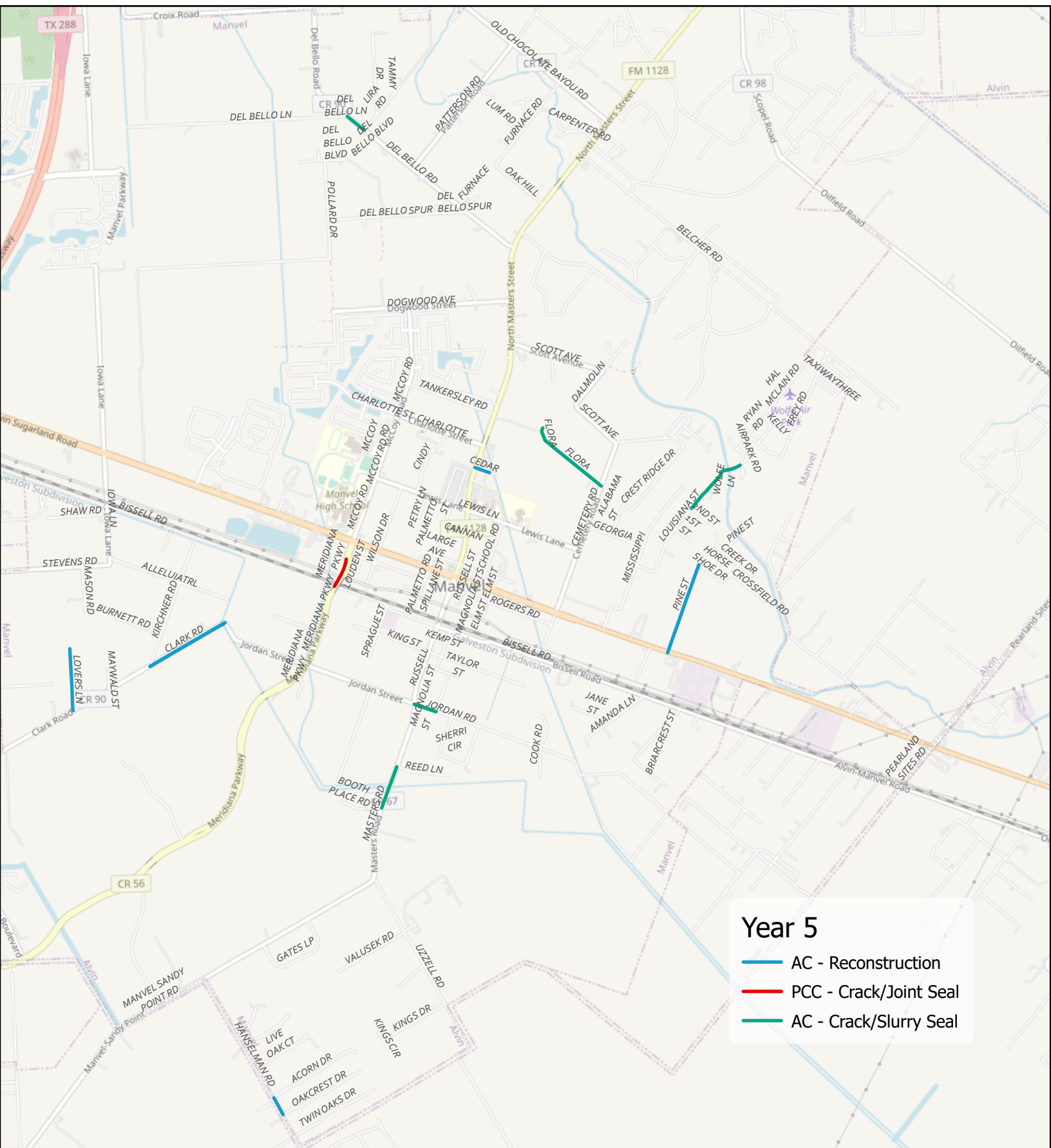
Fugro USA Land, Inc.
Date of Compilation: 05/13/2022

Scale: 1:40,000



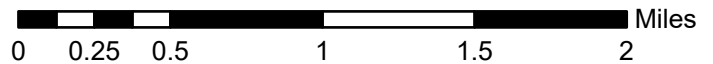
City of Manvel, TX - Year 2027 Workplan

For scenario 2: Increasing PCI by 5 points in 5 years



Fugro USA Land, Inc.
Date of Compilation: 05/13/2022

Scale: 1:40,000



Appendix G – Road Widening Listing

Road Widening Project Listing

Fugro Unique ID	Road Name	BEG_DESC	END_DESC	Total Pavement Width	Pavement Length (ft)	Pavement Area (ft ²)	Pavement Type	Functional Class	2022 PCI	in workplan for Scenario 2	Workplan Year	Treatment Cost in Workplan	Widening Year	PCI at Plan Year	Treatment Cost	Additional Widening Cost	Rehab + Widening Cost
14	UZZELL RD	KINGS DR	VALUSEK RD	16.1	2,193	35,312	ACP	Local	27	-	-	-	2023	<40	\$529,681	\$325,667	\$855,348
0	GATES LP	MASTERS RD	MASTERS RD	17.6	2,714	47,806	ACP	Local	16	-	-	-	2023	<40	\$215,129	\$341,325	\$556,454
40	ALLELUIA TRL	IOWA LN	KIRCHNER RD	18.2	1,977	36,028	ACP	Local	33	-	-	-	2023	<40	\$540,422	\$230,491	\$770,913
199	CHARLOTTE	MCCOY RD	CINDY DR	18.2	1,358	24,768	ACP	Collector	8	-	-	-	2023	<40	\$111,456	\$158,001	\$269,458
87	ROGERS RD	RUSSELL ST	MAGNOLIA ST	18.4	364	6,703	ACP	Local	28	-	-	-	2023	<40	\$100,547	\$41,530	\$142,077
16	KINGS DR	KINGS DR	KINGS CIR	18.5	1,919	35,504	ACP	Local	27	-	-	-	2023	<40	\$532,556	\$215,815	\$748,371
200	CHARLOTTE	CINDY DR	MASTERS RD	18.6	1,049	19,513	ACP	Collector	13	-	-	-	2023	<40	\$87,810	\$116,273	\$204,083
130	SCOTT AVE	CEMETERY RD	SCOTT AVE	19.0	1,502	28,525	ACP	Local	19	-	-	-	2023	<40	\$128,362	\$157,789	\$286,151
128	DALMOLIN	SCOTT ST	SCOTT AVE	19.0	1,179	22,436	ACP	Local	29	-	-	-	2023	<40	\$336,542	\$123,151	\$459,693
50	COOK RD	COOK RD	937 FT N/O COOKRD	19.2	937	17,988	ACP	Local	41	-	-	-	2023	<40	\$269,827	\$95,564	\$365,391
37	IOWA LN	BISSELL RD	MORRIS AVE	19.5	1,428	27,774	ACP	Local	24	-	-	-	2023	<40	\$124,882	\$140,235	\$265,117
2	MASTERS RD	Hanselman RD	W/O OF GATES LP	19.6	1,802	35,252	ACP	Local	27	-	-	-	2023	<40	\$528,781	\$173,921	\$702,702
35	IOWA LN	STEVENS RD	SHAW RD	19.7	1,343	26,429	ACP	Local	19	-	-	-	2023	<40	\$118,932	\$127,134	\$246,066
127	SCOTT AVE	MASTERS RD	DALMOLIN RD	19.7	2,607	51,491	ACP	Local	33	-	-	-	2023	<40	\$772,368	\$244,518	\$1,016,886
135	MISSISSIPPI	LOUISIANA ST	GEORGIA ST	19.6	551	10,798	ACP	Local	31	-	-	-	2024	<40	\$161,965	\$52,886	\$214,851
3	MASTERS RD	W/O OF GATES LP	E/O OF GATES LP	19.8	1,372	27,160	ACP	Local	37	-	-	-	2024	<40	\$407,395	\$127,568	\$534,963
171	PATTERSON RD	DEL BELLO RD	OLD CHOCOLATE BAYOU RD	20.2	4,299	86,738	ACP	Local	22	-	-	-	2024	<40	\$390,321	\$375,698	\$766,018
41	ALLELUIA TRL	KIRCHNER RD	1379 FT E/O KIRCHNER	20.2	1,075	21,759	ACP	Local	10	-	-	-	2024	<40	\$97,917	\$92,783	\$190,699
5	Hanselman RD	LIVE OAK CT	MASTERS RD	20.3	2,760	56,028	ACP	Local	36	-	-	-	2024	<40	\$840,426	\$236,052	\$1,076,478
36	IOWA LN	SHAW RD	BISSELL RD	20.4	238	4,857	ACP	Local	26	-	-	-	2024	<40	\$72,859	\$20,000	\$92,859
178	OLD CHOCOLATE BAYOU RD	MASTERS RD	FURNACE RD	20.6	1,643	33,813	ACP	Local	26	-	-	-	2024	<40	\$507,202	\$133,685	\$640,887
156	POLLARD DR	1047 ft SOUTH OF DEL BELLO SPUR	DEL BELLO SPUR	20.6	396	8,149	ACP	Local	4	-	-	-	2024	<40	\$36,672	\$32,044	\$68,716
143	AIRPARK RD	HAL MCCLAIN RD	CUL DE SAC	20.6	354	7,299	ACP	Local	23	-	-	-	2024	<40	\$32,844	\$28,698	\$61,542
176	OLD CHOCOLATE BAYOU RD	PATTERSON RD	1628 FT, NW/O PATTERSON RD	20.6	1,623	33,435	ACP	Local	22	-	-	-	2024	<40	\$150,460	\$131,243	\$281,703
49	COOK RD	742 FT S/O COOK RD	COOKRD	20.8	407	8,457	ACP	Local	5	-	-	-	2024	<40	\$38,058	\$31,715	\$69,773
136	MISSISSIPPI	GEORGIA ST	1937 FT N/O GEORGIA ST	21.0	1,950	40,868	ACP	Local	36	-	-	-	2024	<40	\$613,026	\$147,552	\$760,578
47	JORDAN RD	1400 SE/O COOK RD	SE END	21.0	1,012	21,250	ACP	Local	18	-	-	-	2024	<40	\$95,625	\$75,893	\$171,517
177	OLD CHOCOLATE BAYOU RD	FURNACE RD	PATTERSON RD	21.0	1,655	34,766	ACP	Local	10	-	-	-	2024	<40	\$156,449	\$123,760	\$280,208
6	Hanselman RD	ACORN DR	LIVE OAK CT	21.5	945	20,315	ACP	Local	20	-	-	-	2024	<40	\$91,417	\$63,945	\$155,361
19	MASTERS RD	UZZELL RD	BOOTH BLACE RD	21.5	1,942	41,831	ACP	Local	39	-	-	-	2024	<40	\$627,468	\$129,756	\$757,224
44	KIRCHNER RD	384 FT W/O ALLELUIA TRL	ALLELUIA TRL	21.8	382	8,330	ACP	Local	19	-	-	-	2024	<40	\$37,484	\$24,072	\$61,556
61	KING ST	683 FT W/O SPRAGUE ST	SPRAGUE ST	21.8	628	13,686	ACP	Local	32	-	-	-	2024	<40	\$205,291	\$39,551	\$244,842
201	BISSELL RD	203 W/O MERIDIANA PKWY	SPRAGUE ST	21.9	1,295	28,403	ACP	Collector	7	-	-	-	2024	<40	\$127,813	\$78,811	\$206,624
157	POLLARD DR	DEL BELLO SPUR	DEL BELLO BLVD	22.0	1,596	35,051	ACP	Local	12	-	-	-	2024	<40	\$157,731	\$96,632	\$254,363
4	MASTERS RD	E/O OF GATES LP	UZZELL RD	20.4	2,061	42,031	ACP	Local	51	AC - Reclamation	2025	\$204,691	2025	39	Only widening cost included for this section.		\$173,208
22	MASTERS RD	JORDAN RD	TAYLOR ST	21.0	1,090	22,892	ACP	Local	52	AC - Reclamation	2025	\$111,485	2025	40	Only widening cost included for this section.		\$81,758
63	KING ST	RUSSELL ST	2366 FT E/O RUSSELL ST	22.0	2,300	50,542	ACP	Local	18	-	-	-	2025	<40	\$227,437	\$138,799	\$366,236
142	AIRPARK RD	WOLFE LN	HAL MCCLAIN RD	22.0	589	12,951	ACP	Local	17	-	-	-	2025	<40	\$58,281	\$35,322	\$93,603
121	CEMETERY RD	CREST RIDGE DR	SCOTT ST	22.0	1,212	26,662	ACP	Local	38	-	-	-	2025	<40	\$399,927	\$72,714	\$472,641
173	FURNACE RD	LUM RD	OLD CHOCOLATE BAYOU RD	22.1	1,706	37,623	ACP	Local	27	-	-	-	2025	<40	\$564,345	\$100,995	\$665,340
32	MASON RD	1239 FT S/O STEVENS RD	STEVENS RD	22.4	1,232	27,556	ACP	Local	30	-	-	-	2025	<40	\$413,346	\$67,290	\$480,636
132	GEORGIA	ALABAMA ST	MISSISSIPPI ST	22.4	874	19,551	ACP	Local	22	-	-	-	2025	<40	\$87,982	\$47,432	\$135,413
170	TAMMY DR	LIRA RD	1090 FT N/O LIRA RD	22.4	1,088	24,367	ACP	Local	15	-	-	-	2025	<40	\$109,650	\$58,741	\$168,391
124	CEMETERY RD	CREST RIDGE DR	CREST RIDGE DR	22.4	388	8,689	ACP	Local	21	-	-	-	2025	<40	\$39,100	\$20,947	\$60,047
78	AMANDA LN	JANE ST	BISSELL RD	22.4	1,155	25,868	ACP	Local	40	-	-	-	2025	<40	\$388,013	\$62,359	\$450,372
99	WILSON DR	LARGE AVE	LEWIS LN	22.4	1,434	32,128	ACP	Local	5	-	-	-	2025	<40	\$144,576	\$77,263	\$221,839
26	MASTERS RD	BISSELL RD	ROGERS RD	22.6	1,079	24,360	ACP	Local	32	-	-	-	2025	<40	\$365,399	\$55,216	\$420,615
72	KEMP ST	MASTERS RD	RUSSELL ST	22.6	354	7,996	ACP	Local	20	-	-	-	2025	<40	\$35,981	\$18,044	\$54,025
15	UZZELL RD	1719 FT S/O KINGS DR	KINGS DR	22.6	418	9,436	ACP	Local	25	-	-	-	2025	<40	\$42,460	\$21,293	\$63,752
105	PETRY LN	725 FT S/O LEWIS LN	LEWIS LN	22.6	623	14,080	ACP	Local	30	-	-	-	2025	<40	\$211,197	\$31,773	\$242,970
24	MASTERS RD	KING ST	KEMP ST	22.6	366	8,263	ACP	Local	32	-	-	-	2025	<40	\$123,938	\$18,646	\$142,584
168	LIRA RD	DEL BELLO RD	TAMMY DR	22.6	525	11,872	ACP	Local	37	-	-	-	2025	<40	\$178,077	\$26,790	\$204,867
118	CEMETERY RD	ROGERS RD	LEWIS LN	22.6	2,146	48,536	ACP	Local	17	-	-	-	2025	<40	\$218,412	\$109,016	\$327,428
42	KIRCHNER RD	CLARK RD	BURNETT RD	22.6	874	19,765	ACP	Local	32	-	-	-	2025	<40	\$296,468	\$44,314	\$340,782
158	DEL BELLO SPUR	POLLARD DR	DEL BELLO SPUR	22.7	3,674	83,570	ACP	Local	27	-	-	-	2025	<40	\$1,253,552	\$179,269	\$1,432,821
29	REED LN	MASTERS RD	1477 FT E/O MASTERS RD	22.8	1,452	33,091	ACP	Local	10	-	-	-	2025	<40	\$148,908	\$69,763	\$218,671
126	CEMETERY RD	SCOTT ST	CEMETERY RD	23.4	1,308	30,600	ACP	Local	51	AC - Reclamation	2025	\$149,023	2025	39	Only widening cost included for this section.		\$51,000
140	1ST ST	LOUISIANA ST	485 FT E/O LOUISIANA ST	25.0	559	13,970	ACP	Local	52	AC - Reclamation	2025	\$68,034	2025	40	Only widening cost included for this section.		\$8,382
46	BURNETT RD	CUL DE SAC W/O KIRCHNER RD	1379 FT E/O KIRCHNER	25.1	1,240	31,154	ACP	Local	52	AC - Reclamation	2025	\$151,719	2025	39	Only widening cost included for this section.		\$16,175
10	ACORN DR	HANSELMAN RD	EAST END	25.2	2,610	65,864	ACP	Local	50	AC - Reclamation	2025	\$320,759	2025	38	Only widening cost included for this section.		\$30,053
89	ROGERS RD	ELM ST	CEMETERY RD	17.8	1,795	31,888	ACP	Local	48	AC - Reclamation	2026	\$160,076	2026	31	Only widening cost included for this section.		\$221,893
88	ROGERS RD	MAGNOLIA ST	ELM ST	18.2	358	6,508	ACP	Local	45	AC - Reclamation	2026	\$32,672	2026	28	Only widening cost included for this section.		\$41,839
210	LEWIS LN	SCHOOL RD	CEMETERY RD	19.5	2,164	42,252	ACP	Arterial	45	AC - Reclamation	2026	\$212,105	2026	27	Only widening cost included for this section.		\$210,162
12	Twin Oaks DR	HANSELMAN RD	EAST END	21.0	2,435	51,153	ACP	Local	48	AC - Reclamation	2026	\$256,789	2026	31	Only widening cost included for this section.		\$182,353
13	UZZELL RD	VALUSEK RD	MASTERS RD	22.5	1,685	37,877	ACP	Local	44	AC - Reclamation	2026	\$190,142	2026	27	Only widening cost included for this section.		\$88,998
159	DEL BELLO BLVD	POLLARD DR	DEL BELLO BLVD	22.7	581	13,156	ACP	Local	38	-	-	-	2026	<40	\$197,336	\$29,059	\$226,395
102	PALMETTO ST	PALMETTO RD	LARGE AVE	22.7	655	14,872	ACP	Local	29	-	-	-	2026	<40	\$223,077	\$32,529	\$255,606
209	LEWIS LN	PALMETTO ST	SCHOOL RD	22.8	1,453	33,138	ACP	Arterial	39	-	-	-	2026	<40	\$497,075	\$69,615	\$566,690
169	LIRA RD	TAMMY DR	1015 FT NE/O TAMMY DR	23.0	1,016	23,354	ACP	Local	10	-	-	-	2026	<40	\$105,092	\$46,091	\$151,182
148	CREEK DR	374 FT NW/O PINE ST	PINE ST	23.0	296	6,806	ACP	Local	18	-	-	-	2026	<40	\$30,626	\$13,316	\$43,941
153	HAL MCCLAIN RD	FREY RD	KELLY ST	23.0	684	15,732	ACP	Local	36	-	-	-	2026	<40	\$235,980	\$30,780	\$266,760
188	JORDAN RD	SHERRI CIR WEST	SHERRI CIR EAST	23.0	778	17,905	ACP	Collector	54	AC - Reclamation	2026	\$89,885	2026	30	Only widening cost included for this section.		\$34,937
11	Oakcrest DR	HANSELMAN RD	EAST END	23.1	2,399	55,286	ACP	Local	21	-	-	-	2026	<40	\$248,787	\$106,127	\$354,913

Road Widening Project Listing

Fugro Unique ID	Road Name	BEG_DESC	END_DESC	Total Pavement Width	Pavement Length (ft)	Pavement Area (ft ²)	Pavement Type	Functional Class	2022 PCI	in workplan for Scenario 2	Workplan Year	Treatment Cost in Workplan	Widening Year	PCI at Plan Year	Treatment Cost	Additional Widening Cost	Rehab + Widening Cost
141	WOLFE LN	LOUISIANA ST	484 FT SE/O LOUISIANA ST	23.2	378	8,760	ACP	Local	23	-	-	-	2026	<40	\$39,421	\$15,859	\$55,281
70	RUSSELL ST	KING ST	KEMP ST	23.2	362	8,394	ACP	Local	25	-	-	-	2026	<40	\$125,906	\$15,196	\$141,102
23	MASTERS RD	TAYLOR ST	KING ST	23.2	368	8,533	ACP	Local	45	AC - Reclamation	2026	\$42,836	2026	27	Only widening cost included for this section.	\$15,448	\$15,448
183	JORDAN RD	CLARK RD	MERIDIANA PKWY (start of PCC)	23.4	2,468	57,705	ACP	Collector	23	-	-	-	2026	<40	\$259,671	\$97,178	\$356,849
119	CEMETERY RD	LEWIS LN	GEORGIA ST	23.4	670	15,678	ACP	Local	32	-	-	-	2026	<40	\$235,171	\$26,168	\$261,339
202	BISSELL RD	SPRAGUE ST	MASTERS RD	23.4	1,461	34,198	ACP	Collector	6	-	-	-	2026	<40	\$153,892	\$56,621	\$210,513
98	WILSON DR	ROGERS RD	LARGE AVE	23.4	710	16,623	ACP	Local	7	-	-	-	2026	<40	\$74,803	\$27,519	\$102,321
180	BELCHER RD	HAL MCCLAIN RD	MASTERS RD	23.4	6,671	156,241	ACP	Local	31	-	-	-	2026	<40	\$2,343,617	\$257,878	\$2,601,495
211	DOGWOOD AVE	POLLARD DR	MASTERS RD	23.5	4,756	111,622	ACP	Collector	20	-	-	-	2026	<40	\$502,301	\$180,621	\$682,922
152	HAL MCCLAIN RD	AIRPARK RD	FREY RD	23.5	372	8,751	ACP	Local	47	AC - Reclamation	2026	\$43,932	2026	29	Only widening cost included for this section.	\$13,692	\$13,692
67	TAYLOR ST	RUSSELL ST	MAGNOLIA ST	25.6	344	8,801	ACP	Local	46	AC - Reclamation	2026	\$44,183	2026	29	Only widening cost included for this section.	\$2,063	\$2,063
138	LOUISIANA ST	1ST ST	2ND ST	25.8	717	18,499	ACP	Local	49	AC - Reclamation	2026	\$92,863	2026	32	Only widening cost included for this section.	\$2,151	\$2,151
7	Hanselman RD	OAKCREST DR	ACORN DR	19.4	514	9,959	ACP	Local	44	AC - Reconstruction	2027	\$171,688	2027	22	Only widening cost included for this section.	\$50,884	\$50,884
30	LOVERS LN	CLARK RD	1667 FT N/O CLARK RD	23.3	1,683	39,230	ACP	Local	42	AC - Reconstruction	2027	\$676,325	2027	20	Only widening cost included for this section.	\$67,958	\$67,958
144	PINE ST	MORRIS AVE	HORSE SHOE DR	23.4	2,504	58,681	ACP	Local	44	AC - Reconstruction	2027	\$1,011,662	2027	22	Only widening cost included for this section.	\$96,226	\$96,226
120	CEMETERY RD	GEORGIA ST	CREST RIDGE DR	23.6	1,155	27,210	ACP	Local	36	-	-	-	2027	<40	\$408,146	\$42,382	\$450,528
68	MAGNOLIA ST	JORDAN RD	TAYLOR ST	23.6	1,050	24,761	ACP	Local	12	-	-	-	2027	<40	\$111,424	\$37,931	\$149,355
71	RUSSELL ST	KEMP ST	BISSELL RD	23.6	362	8,531	ACP	Local	5	-	-	-	2027	<40	\$38,391	\$13,014	\$51,405
77	AMANDA LN	798 FT S/O JANE ST	JANE ST	23.6	804	18,965	ACP	Local	10	-	-	-	2027	<40	\$85,342	\$28,930	\$114,272
131	GEORGIA	CEMETERY RD	ALABAMA ST	23.6	718	16,945	ACP	Local	40	-	-	-	2027	<40	\$254,172	\$52,848	\$280,020
43	KIRCHNER RD	BURNETT RD	ALLELUIA TRL	23.6	1,489	35,174	ACP	Local	15	-	-	-	2027	<40	\$158,282	\$52,985	\$211,267
111	RUSSELL ST	ROGERS RD	LARGE AVE	23.8	656	15,608	ACP	Local	21	-	-	-	2027	<40	\$70,236	\$21,641	\$91,878
80	Pearland Sites RD	ALVIN MANVEL RD	HIGHWAY 6	23.8	1,373	32,677	ACP	Local	38	-	-	-	2027	<40	\$490,161	\$45,309	\$535,470
79	BRIARCREST ST	2955 FT S/O BISSELL RD	BISSELL RD	23.9	2,972	70,955	ACP	Local	15	-	-	-	2027	<40	\$319,295	\$94,606	\$413,902
17	KINGS CIR	S/O KINGS CIR	N/O KINGS CIR	23.9	523	12,517	ACP	Local	28	-	-	-	2027	<40	\$187,755	\$16,215	\$203,970
62	KING ST	SPRAGUE ST	MASTERS RD	24.0	1,808	43,375	ACP	Local	18	-	-	-	2027	<40	\$195,187	\$54,420	\$249,607
182	CLARK RD	KIRCHNER RD	JORDAN RD	24.1	2,312	55,737	ACP	Collector	41	AC - Reconstruction	2027	\$960,913	2027	19	Only widening cost included for this section.	\$65,717	\$65,717
9	LIVE OAK CT	HANSELMAN RD	EAST END	24.1	1,661	40,113	ACP	Local	18	-	-	-	2027	<40	\$180,507	\$46,178	\$226,685
58	KREUZER	1333 FT W/O MERIDIANA PKWY	MERIDIANA PKWY	24.2	1,257	30,441	ACP	Local	38	-	-	-	2027	<40	\$456,620	\$33,688	\$490,308
60	TANKERSLEY RD	MCCOY DR	MASTERS RD	24.4	2,396	58,418	ACP	Local	29	-	-	-	2027	<40	\$876,263	\$58,177	\$934,440
96	WILSON DR	852 FT S/O ROGERS RD	ROGERS RD	24.4	371	9,043	ACP	Local	9	-	-	-	2027	<40	\$40,692	\$8,894	\$49,586
106	CINDY	LEWIS LN	CHARLOTTE DR	24.4	1,843	44,965	ACP	Local	40	-	-	-	2027	<40	\$674,477	\$44,137	\$718,614
76	JANE ST	1106 FT W/O AMANDA LN	AMANDA LN	24.6	1,098	27,011	ACP	Local	9	-	-	-	2027	<40	\$121,549	\$23,058	\$144,607
69	RUSSELL ST	TAYLOR ST	KING ST	24.6	355	8,728	ACP	Local	27	-	-	-	2027	<40	\$130,921	\$7,451	\$138,372
172	FURNACE RD	OAK HILL	LUM RD	25.1	1,114	27,978	ACP	Local	30	-	-	-	2027	<40	\$419,663	\$14,836	\$434,499
101	PALMETTO RD	S/W OF ROGERS RD	ROGERS RD	25.8	222	5,722	ACP	Local	12	-	-	-	2027	<40	\$25,751	\$665	\$26,416
65	SPRAGUE ST	KING ST	BISSELL RD	25.8	777	20,034	ACP	Local	24	-	-	-	2027	<40	\$90,152	\$2,329	\$92,481
28	BOOTH PLACE RD	1136 FT W/O MASTERS RD	MASTERS RD	25.9	1,050	27,191	ACP	Local	21	-	-	-	2027	<40	\$122,361	\$1,746	\$124,107

Total Widening Cost

\$34,206,601

Colony West
(triangle)

ORDINANCE NO. 2022-O-27

AN ORDINANCE OF THE CITY OF MANVEL, TEXAS, PROVIDING FOR THE DISANNEXATION OF A ±5.8 ACRE TRIANGULAR AREA OF LAND LOCATED IN THE COLONY WEST SUBDIVISION IN THE CITY OF MANVEL, CONTAINING THE PORTIONS IN THE CITY LIMITS OF SECTION 1, (ABSTRACT 286 H T & B R R), LOTS 15, 16, 17, 18 AND 24A(EAST HALF), BRAZORIA COUNTY, TEXAS; DISANNEXING AND DISCONTINUING SAID PROPERTY FROM THE CORPORATE BOUNDARIES OF THE CITY; CONTAINING CERTAIN FINDINGS; AND PROVIDING OTHER MATTERS RELATED TO THE SUBJECT.

* * * * *

WHEREAS, the City of Manvel has reviewed an approximately ±5.8 acre area within its city limits within the Colony West Subdivision and determined that the city limit boundaries in that area dissect certain properties and do not show a clear, even boundary; and,

WHEREAS, the City has also determined that it is unlikely that the area can be properly served by city services and should be considered for disannexation; and

WHEREAS, the area considered for disannexation contains approximately 5.8 acres, located in the COLONY WEST SUBDIVISION, containing portions in the city limits of Section 1, (A0286 H T & B R R), Lots 15, 16, 17, 18 and 24A (east Half) Brazoria County, Texas said 5.8 acres being more particularly described and depicted by map in Exhibit A and legal descriptions shown on Exhibit B (the “Property”); and

WHEREAS, on the 3rd day of October, 2022, a public hearing was held before the City Council of the City of Manvel, Texas, regarding the proposed disannexation. All persons wishing to be heard were given an opportunity to do so; and

WHEREAS, the City of Manvel has determined that the amount of money spent by the city for the direct benefit of the area whilst in the city limits equals or exceeds the amount of money collected by the city in property taxes and fees; and

WHEREAS, consistent with Texas Local Government Code § 43.142 and article 2.04 of the City Charter, the City Council of the City of Manvel, Texas, hereby determines that the territory is not necessary or suitable for city purposes; and

WHEREAS, the City Council of the City of Manvel, Texas, hereby finds and determines that the disannexation or discontinuance of the Property from the City is necessary and appropriate and in the best interest of the citizens of the City of Manvel; now, therefore,

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MANVEL, TEXAS:

Section 1. The facts and matters set forth in the preamble of this Ordinance are hereby found to be true and correct.

Section 2. The Property, located in the COLONY WEST SUBDIVISION, containing the portions in the city limits of Section 1, (A0286 H T & B R R), Lots 15, 16, 17, 18 and 24A (east Half) Brazoria County, Texas, said 5.8 acres being more particularly described and depicted by maps in Exhibit A-1 and A-2, and legal descriptions shown on Exhibit B, is hereby disannexed and discontinued from the corporate limits of the City of Manvel, Texas.

Section 3. The Mayor is hereby authorized and directed to enter an Order into the records of the City Council stating that this Ordinance was duly adopted, and that the disannexation and discontinuance of the above-described territory is effective as of the date of such Order.

Section 4. The City Secretary is hereby authorized and directed to forthwith cause a certified copy of this Ordinance and the Mayor's Order to be delivered to the County Clerk of

Brazoria County, Texas, as required by § 41.0015, Texas Local Government Code, and to any other person or entity where required by law.

Section 5. The City Council finds and hereby determines that the amount of money spent by the city for the direct benefit of the area whilst in the city limits equals or exceeds the amount of money collected by the city in property taxes and fees from the affected landowners.

PASSED AND APPROVED on first reading this ____th day of _____, 2022.

PASSED, APPROVED, AND ADOPTED on second and final reading this _____ day of _____, 2022.

Debra Davison, Mayor

ATTEST:

Tammy Bell, City Secretary

APPROVED AS TO FORM:

Robert Gervais, City Attorney

EXHIBIT A-1, A-2

MAPS

EXHIBIT B

Legal Descriptions/Property Identification

DISANNEXATION AREA

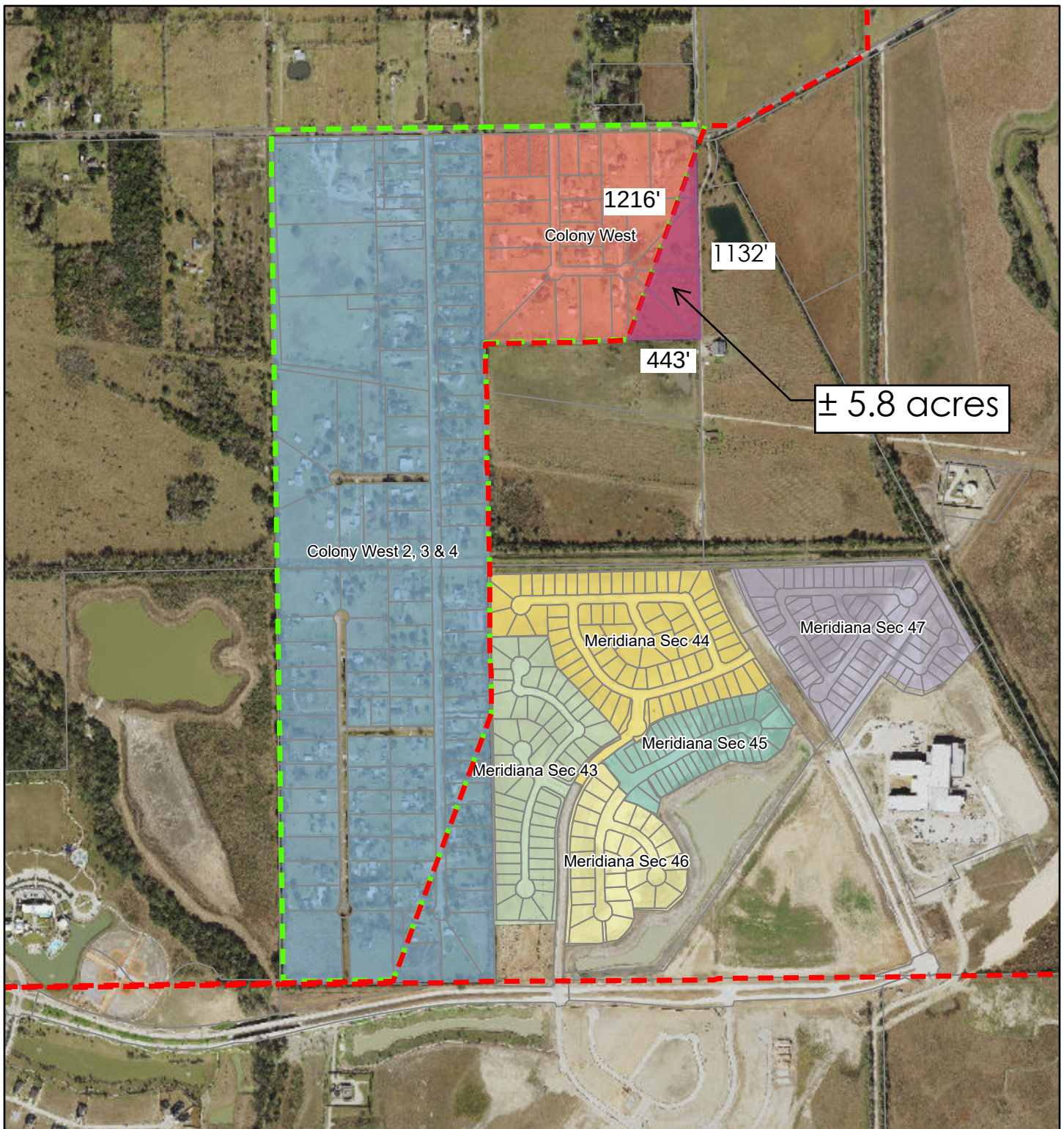
A ±5.8 ACRE TRIANGULAR AREA OF LAND BEGINNING AT THE SOUTHWEST CORNER OF THE COLONY WEST SUBDIVISION, APPROXIMATELY 1,132 FEET NORTH TOWARDS CLARK ROAD, THEN APPROXIMATELY 1,216 FEET SOUTHWEST TO THE SOUTHERN BORDER OF THE COLONY WEST SUBDIVISION AND APPROXIMATELY 443 FEET WEST BACK TO THE POINT OF BEGINNING.

Being the portions of the following tracts situated in the City limits of the City of Manvel, Texas:

- (1) Colony West, Section 1 (A0286 H T & B R R), Lot 15, Brazoria County, Texas (2.22 acres)**
- (2) Colony West, Section 1 (A0286 H T & B R R), Lot 16, Brazoria County, Texas (2.22 acres)**
- (3) Colony West, Section 1 (A0286 H T & B R R), Lot 17, Brazoria County, Texas (2.17 acres)**
- (4) Colony West, Section 1 (A0286 H T & B R R), Lot 18, Brazoria County, Texas (2.18 acres)**
- (5) Colony West, Section 1 (A0286 H T & B R R), Lot 24A (East Half), Brazoria County, Texas (2.98 acres)**

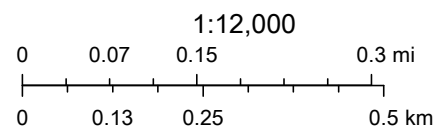
Ordinance 2022-O-27

Exhibit A



4/13/2021, 11:19:03 AM

- City Limits - CityLimits
- ETJ
- Parcels
- Subdivisions
 - Colony West
 - Colony West 2, 3 & 4
 - Meridiana Sec 43
 - Meridiana Sec 44
 - Meridiana Sec 45
 - Meridiana Sec 46
 - Meridiana Sec 47



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

ArcGIS Web AppBuilder

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community |

ORDINANCE NO. 2022-O-28

AN ORDINANCE OF THE CITY OF MANVEL, TEXAS, PROVIDING FOR THE DISANNEXATION OF A ±11.8 ACRE TRIANGULAR AREA OF LAND LOCATED IN THE COLONY WEST SUBDIVISION IN THE CITY OF MANVEL, CONTAINING THE PORTIONS IN THE CITY LIMITS OF SECTIONS 2, 3, AND 4, (ABSTRACT 286 H T & B R R), LOTS 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 39A, 40, AND 41, BRAZORIA COUNTY, TEXAS; DISANNEXING AND DISCONTINUING SAID PROPERTY FROM THE CORPORATE BOUNDARIES OF THE CITY; CONTAINING CERTAIN FINDINGS; AND PROVIDING OTHER MATTERS RELATED TO THE SUBJECT.

* * * * *

WHEREAS, the City of Manvel has reviewed an approximately ±11.8 acre area within its city limits within the Colony West Subdivision and determined that the city limit boundaries in that area dissect certain properties and do not show a clear, even boundary; and,

WHEREAS, the City has also determined that it is unlikely that the area can be properly served by city services and should be considered for disannexation; and

WHEREAS, the area considered for disannexation contains approximately 11.8 acres, located in the COLONY WEST SUBDIVISION, containing portions in the city limits of Sections 2, 3 and 4, (A0286 H T & B R R), Lots 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 39A, 40, and 41, Brazoria County, Texas said 11.8 acres being more particularly described and depicted by maps in Exhibit A and legal descriptions shown on Exhibit B (the “Property”); and

WHEREAS, on the 3rd day of October, 2022, a public hearing was held before the City Council of the City of Manvel, Texas, regarding the proposed disannexation. All persons wishing to be heard were given an opportunity to do so; and

WHEREAS, the City of Manvel has determined that the amount of money spent by the city for the direct benefit of the area whilst in the city limits equals or exceeds the amount of money collected by the city in property taxes and fees; and

WHEREAS, consistent with Texas Local Government Code § 43.142 and article 2.04 of the City Charter, the City Council of the City of Manvel, Texas, hereby determines that the territory is not necessary or suitable for city purposes; and

WHEREAS, the City Council of the City of Manvel, Texas, hereby finds and determines that the disannexation or discontinuance of the Property from the City is necessary and appropriate and in the best interest of the citizens of the City of Manvel; now, therefore,

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MANVEL, TEXAS:

Section 1. The facts and matters set forth in the preamble of this Ordinance are hereby found to be true and correct.

Section 2. The Property, located in the COLONY WEST SUBDIVISION, containing the portions in the city limits of Sections 2, 3 and 4, (A0286 H T & B R R), Lots 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 39A, 40, and 41, Brazoria County, Texas, said ±11.8 acres being more particularly described and depicted by maps in Exhibit A-1 and A-2, and legal descriptions shown on Exhibit B, is hereby disannexed and discontinued from the corporate limits of the City of Manvel, Texas.

Section 3. The Mayor is hereby authorized and directed to enter an Order into the records of the City Council stating that this Ordinance was duly adopted, and that the disannexation and discontinuance of the above-described territory is effective as of the date of such Order.

Section 4. The City Secretary is hereby authorized and directed to forthwith cause a certified copy of this Ordinance and the Mayor's Order to be delivered to the County Clerk of

Brazoria County, Texas, as required by § 41.0015, Texas Local Government Code, and to any other person or entity where required by law.

Section 5. The City Council finds and hereby determines that the amount of money spent by the city for the direct benefit of the area whilst in the city limits equals or exceeds the amount of money collected by the city in property taxes and fees from the affected landowners.

PASSED AND APPROVED on first reading this ____th day of _____, 2022.

PASSED, APPROVED, AND ADOPTED on second and final reading this ____ day of _____, 2022.

Debra Davison, Mayor

ATTEST:

Tammy Bell, City Secretary

APPROVED AS TO FORM:

Robert Gervais, City Attorney

EXHIBITS A-1, A-2

MAPS

EXHIBIT B

Legal Descriptions/Property Identification

DISANNEXATION AREA

A ± 11.8-acre triangular area, beginning at the southeast corner of the Colony West 2, 3, & 4 Subdivision approximately 1640 feet north, then approximately 1750 feet southwest to the southern border of the Colony West 2, 3, & 4 Subdivision and approximately 628 feet east back to the point of beginning.

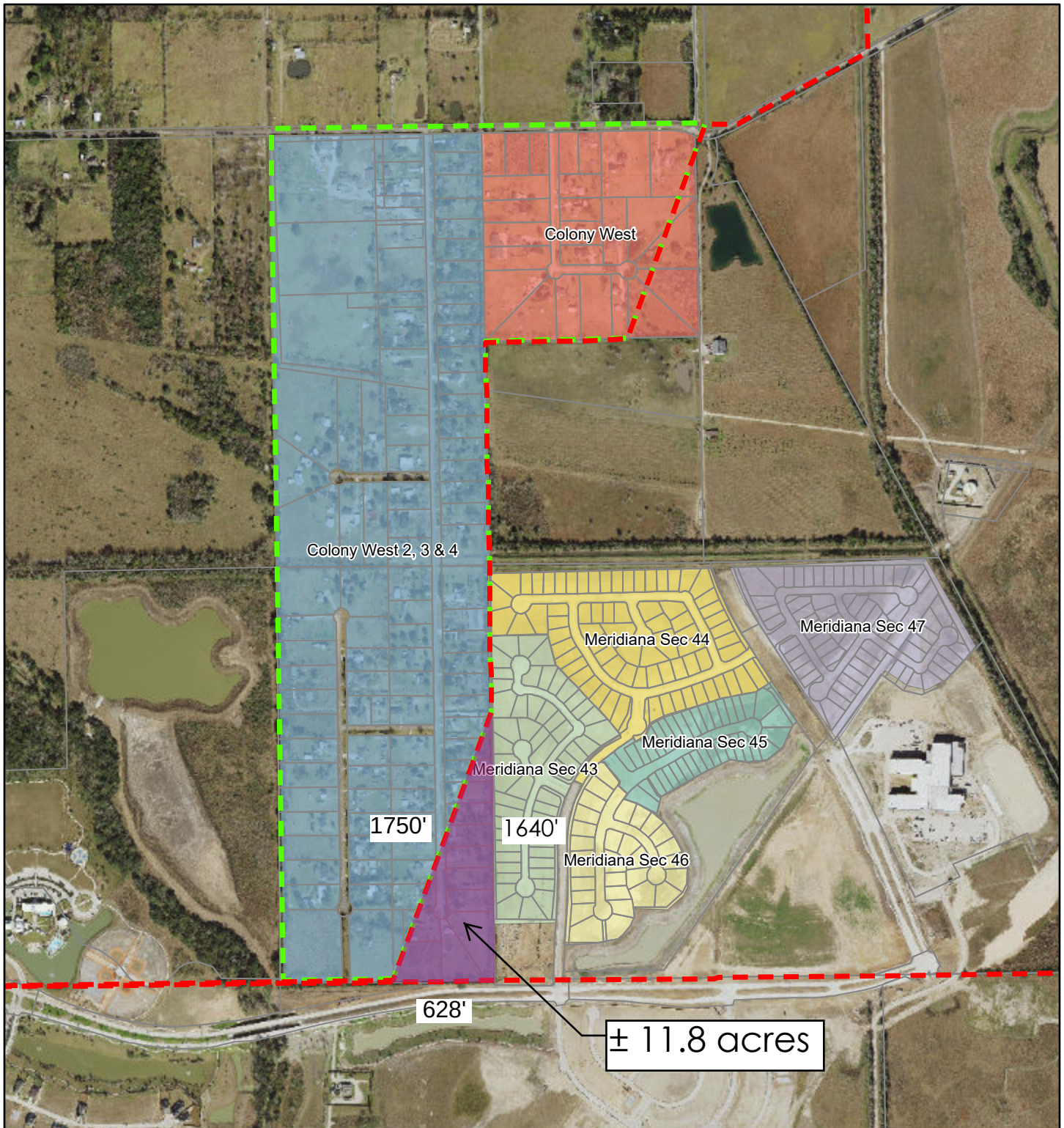
Being the portions of the following tracts that are situated within the city limits of the City of Manvel, Texas:

- (1) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 27, Brazoria County, Texas (1.0 acres)**
- (2) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 28, Brazoria County, Texas (1.0 acres)**
- (3) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 29, Brazoria County, Texas (1.0 acres)**
- (4) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 30, Brazoria County, Texas (1.0 acres)**
- (5) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 31, Brazoria County, Texas (1.0 acres)**
- (6) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 32, Brazoria County, Texas (1.0 acres)**
- (7) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 33, Brazoria County, Texas (1.0 acres)**
- (8) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 34, Brazoria County, Texas (1.0 acres)**
- (9) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 35, Brazoria County, Texas (1.0 acres)**
- (10) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 36 MH, Brazoria County, Texas (1.0 acres)**

- (11) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 37, Brazoria County, Texas (1.8 acres)**
- (12) Colony West, Section 1-2-3-4 (A0286 H T & B R R), Lot 38 MH, Brazoria County, Texas (1.8 acres)**
- (13) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 39, Brazoria County, Texas (3.3 acres)**
- (14) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 39A, Brazoria County, Texas (1.0 acres)**
- (15) Colony West, Section 2-3-4 (A0286 H T & B R R), Lot 40, Brazoria County, Texas (1.11 acres)**
- (16) Colony West, Section 1-2-3-4 (A0286 H T & B R R), Lot 41 MH, Brazoria County, Texas (1.0 acres)**

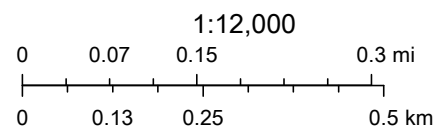
Ordinance 2022-O-28

Exhibit A



4/13/2021, 11:19:03 AM

- City Limits - CityLimits
- ETJ
- Parcels
- Subdivisions
 - Colony West
 - Colony West 2, 3 & 4
 - Meridiana Sec 43
 - Meridiana Sec 44
 - Meridiana Sec 45
 - Meridiana Sec 46
 - Meridiana Sec 47



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

ArcGIS Web AppBuilder

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community |



MANVEL CITY COUNCIL DATA SHEET

MEETING DATE: October 17, 2022

TOPIC: Subdivision variance request seeking to vary Chapter 62, Section 62-111, *Additional Street Requirements* and Section 62-113, *Sidewalks* for an approximate 4.9997-acre tract of land located at 3927 Shamrock Lane. The subject site abuts the southern most property along the eastern side of Shamrock Lane.

BACKGROUND: The subject site is located within the City of Manvel's Extraterritorial Jurisdiction (ETJ), along the eastern side of Shamrock Lane (vicinity map attached). The subject site is undeveloped and is accessed from Shamrock Lane which is a Brazoria County right-of-way (ROW). Shamrock Lane ROW is unimproved and includes a gravel road. The subject site was illegally subdivided into 6 lots by the previous owner due to which the property needs to be platted prior to development.

Current owners Kimberley N. & Roberto Garcia (the applicant) intend to plat and develop the subject site for single-family residential use. In combination, Section 62-111 and Section 62-113 of the subdivision ordinance requires construction on one-half of all perimeter (abutting) roads as concrete curb and gutter with sidewalk in accordance with the City's Design Criteria Manual and Major Thoroughfare Plan. Therefore, the applicant is requesting this variance to allow platting and developing the property without the right-of-way improvement as required by the referenced sections of the subdivision ordinance.

With respect to the criteria provided in Section 62-5, *Variance*, Staff finds the following:

- There are special circumstances affecting the subject site based on its location. The subject site is located within the ETJ along a Brazoria County unimproved street ROW that already provides access to several developed residential lots.
- Generally, the strict enforcement of the requirement will not deprive the applicant of a substantial property right. However, considering that adjoining properties (north of subject site) were developed in the recent past without the required ROW improvements, the strict enforcement of the requirement will not appear equitable. The enforcement of the requirement will expand the scale of the project due to the required right-of-way improvements. Also, conforming to the street and sidewalk construction requirement for the subject site, will not offer any significant improvement to the Shamrock ROW condition, especially considering that existing lots are mostly developed.
- Granting of the variance will not be materially detrimental to the public welfare or injurious to other property or property rights in the vicinity. Granting of the variance will not cause any undesirable/unsafe change to the existing right-of way condition/usage; instead, only allows the use of the existing gravel road as access to the subject site.

The requested variance does not create any public health or safety related concerns and does not undermine the intent of the regulation. Staff reached out to Brazoria County Engineering and Manvel Volunteer Fire Department for their input on the requested variance. Both entities have confirmed that they have no concerns or objection regarding the proposed variance request.

RECOMMENDATION: The staff recommends approval of this variance request to Chapter 62, Section 62-111 and 62-113 with two conditions as specified in the development agreement: 1) the subdivision variance will expire upon change of use from (1) single-family residential detached structure; and 2) the property may not be subdivided.

ATTACHMENTS: Application, Survey, Development Agreement, Letter from Brazoria County Engineering, Letter from Manvel Volunteer Fire Department, and Vicinity Aerial Map.

FUNDING ISSUES

- ☒ Not applicable
☐ Not budgeted
☐ Full amount already budgeted
☐ Funds to be transferred from Acct.#

SUBMITTING STAFF MEMBER
Jose Abraham, City Planner

FINANCE DIRECTOR APPROVAL _____

CITY MANAGER APPROVAL _____



CITY OF MANVEL

<http://www.cityofmanvel.com>

PO Box 187
Manvel, Texas 77578

Phone: (281) 489-0630
Fax: (281) 489-0634

Subdivision Variance Application

Applicant Information

Applicant (if not owner): _____

Phone: _____ e-mail: _____

Owner: Kimberley N & Roberto Garcia

Owner Address: 3026 Richfield Ct City Pearland State TX Zip 77584

Phone: 281-795-0296 e-mail: kimberley_garcia@hotmail.com

Property Information

Site Address: 3927 Shamrock Ln

Legal description (from deed): N 1/2 Lot 100 of the Allison Richey Gulf Coast Home Company Suburban Gardens Sub, Section 92, A.C.H. & D. Survey, Abstract 541
(Property must be legally subdivided or be lot of record)

Brazoria County Identification Number: 177018

Description of Subdivision Variance Request

Request a variance from Section 62.111 and forego improvement to the existing road or installing sidewalks

Detailed Explanation of Subdivision Variance Request

Please answer, on a separate sheet of paper if necessary, the following questions:

- o What are the special circumstances or conditions affecting the land involved such that the strict application of the provisions of the subdivision code would require a variance to the city's subdivision ordinance?

(see attachment)

o How is the variance necessary for the preservation and enjoyment of a substantial property right of the applicant?

(see attachment)

o Describe how the granting of the variance will not be detrimental to the public health, safety or welfare, or injurious to other property in the area.

(see attachment)

o Describe how the granting of the variance will not have the effect of preventing the orderly subdivision of other land in the area in accordance with the provisions of the subdivision ordinance.

(see attachment)

Applicant Authorization

I authorize the City of Manvel to conduct any site visits necessary to evaluate this subdivision variance application.

I hereby state that I have prepared this application and that, to the best of my knowledge, the information contained herein is complete, accurate, and a true representation of the subdivision variance request. I further attest that I have the authority to submit this application and agree to comply with any and all conditions of subdivision variance approval. I agree to provide any additional information requested by the City of Manvel as they deem necessary for the processing of this application.



Applicant Signature

9/16/22

Date

Submit variance request material to the Permit Department, City of Manvel, 20025 Highway 6 Manvel, Texas 77578 with the plat application. Failure to pay the required application fees or provide the information, drawings, or attachments in the form as requested by the City shall automatically mark the application as 'incomplete' and such application shall not be placed on the agenda for consideration until all information, fees, drawings, or attachments are deemed to be complete and in proper form by city staff.

Variance Request
3927 Shamrock Ln, Manvel, TX 77578
Manvel ETJ

What are the special circumstances or conditions affecting the land involved such that the strict application of the provisions of the subdivision code would require a variance to the city's subdivision ordinance?

Shamrock Lane is a private road running north-south, located south of Bailey Rd and west of County Rd 89. It is a dirt/gravel road the entire length of the road from Bailey past our lot at 3927 (Photos pasted below). As all other homes on the road are accessible with the current road surface, including a home south of our property, we are requesting a variance to not be required to change the road surface only for the width of our property. In addition, there are no sidewalks on the entire road, and we request that sidewalks not be required only for 3927 Shamrock.

We plan to build one single-family home on this 5-acre property and would like approval to move forward doing so without the requirement of time and cost associated with changing the road surface or installing sidewalks only for our lot.



← View of Shamrock Lane south from NW corner of 3927 Shamrock Ln



View of Shamrock Lane north from NW corner of 3927 Shamrock Ln →

How is the variance necessary for the preservation and enjoyment of a substantial property right of the applicant?

In order to exercise our right of control over the land we own, and to build a single-family home there, we believe this variance is necessary to allow us to move forward with the building permitting process and not incur excess costs unnecessarily. We are also concerned that being required to pave this portion of the road would hinder access by the property owners south of us to their own property. We would ask to be allowed to maintain the same road surface as all other property/home owners on Shamrock Lane. In addition, as there are no other sidewalks along Shamrock Lane to connect with a sidewalk on our lot, we request to not have a sidewalk requirement only for 3927 Shamrock.

Describe how granting of the variance will not be detrimental to the public health, safety or welfare, or injurious to other property in the area.

This variance would allow the road surface in front of 3927 Shamrock Ln to be the same as the surface of the remainder of Shamrock Ln, which already has several lots with built structures. Assuming the existing road surface is sufficient for those homes and not detrimental to public health, safety or welfare and is not injurious to other properties or property owners, we believe the same should be true for the road in front of our property. In addition, there is no sidewalk installed on any other property on Shamrock Lane, so we would propose that a sidewalk on our property is not required for any of these reasons (public health, safety, etc).

Describe how the granting of the variance will not have the effect of preventing the orderly subdivision of other land in the area in accordance with the provisions of the subdivision ordinance.

Maintaining the road surface of Shamrock Lane as-is in front of 3927 Shamrock Ln should have no effect on the ability of other landowners along Shamrock to subdivide their own property. In fact, the granting of this variance would maintain consistency along this private road and ensure there is no access impediment to the property owners further south from our property.

LEGEND * ITEMS THAT MAY APPEAR IN *
DRAWING BELOW

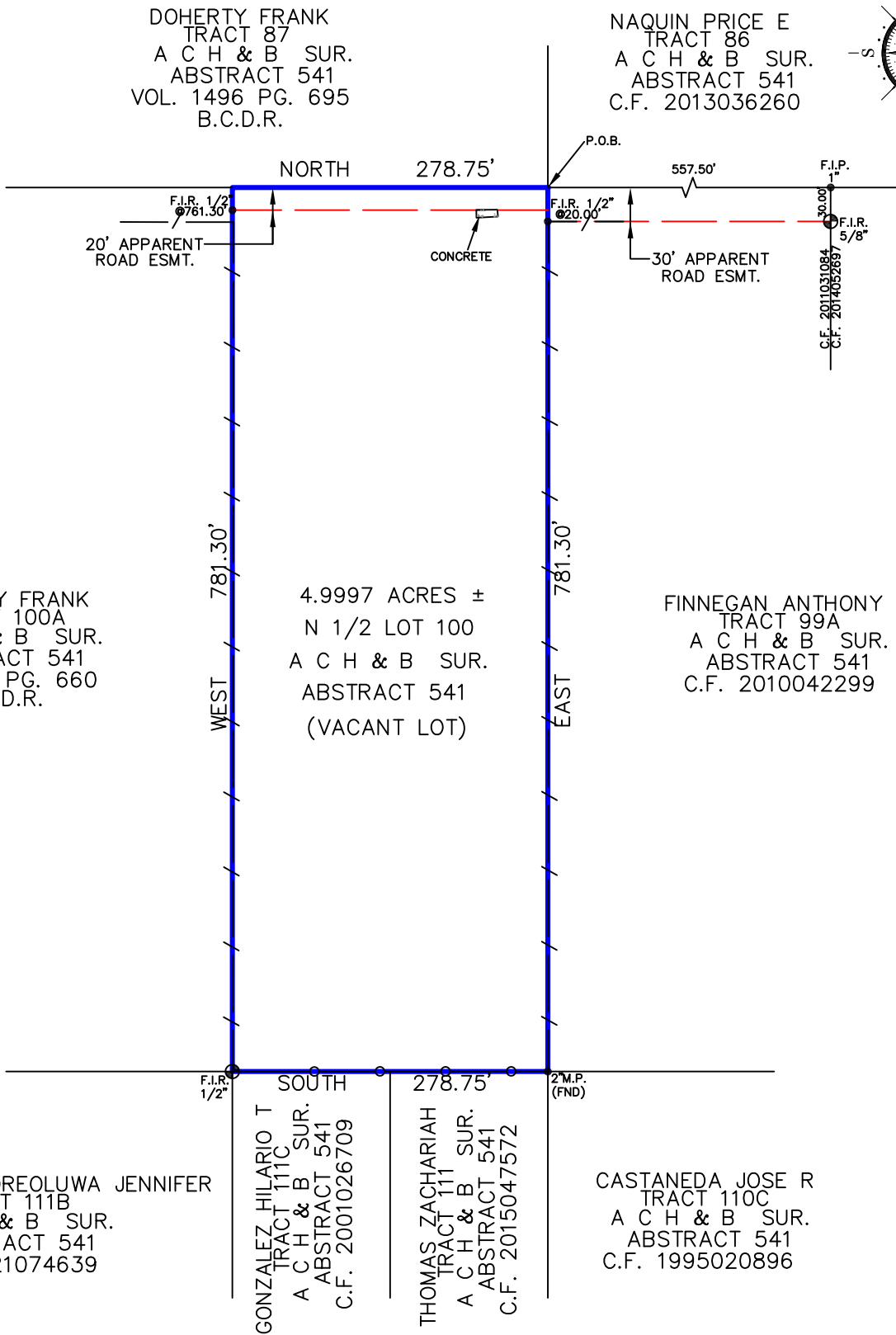
M.U.E. = MUNICIPAL UTILITY EASEMENT
U.E. = UTILITY EASEMENT
A.E. = AERIAL EASEMENT
D.E. = DRAINAGE EASEMENT
S.S.E. = SANITARY SEWER EASEMENT
STM.S.E. = STORM SEWER EASEMENT
W.L.E. = WATER LINE EASEMENT
= NOT TO SCALE

F.I.R. = FOUND IRON ROD
F.I.P. = FOUND IRON PIPE
S.I.R. = SET IRON ROD
W.P. = WOODEN POST
M.P. = METAL POST
C.F.# = CLERK'S FILE NUMBER
P.O.C. = POINT OF COMMENCING
P.O.B. = POINT OF BEGINNING
B.L. = BUILDING LINE
FND. = FOUND
BRS = BEARS

P.A.E. = PERMANENT ACCESS EASEMENT
P.U.E. = PUBLIC UTILITY EASEMENT
W.S.E. = WATER & SEWER EASEMENT
E.E. = ELECTRIC EASEMENT
P.C. = POINT OF CURVATURE
P.T. = POINT OF TANGENCY
P.R.C. = POINT OF REVERSE CURVATURE
P.P. = POWER POLE
U.T.S. = UNABLE TO SET
S.F.N.F. = SEARCHED FOR, NOT FOUND

⊕ = CONTROL MONUMENT
● = PROPERTY CORNER
— = PROPERTY LINE
— = EASEMENT LINE
— = BUILDING SETBACK LINE
— = BUILDING WALL

— = WOODEN FENCE
— = CHAIN LINK FENCE
⊙ = METAL FENCE
— = WIRE FENCE
— = VINYL FENCE



Reviewed & Accepted by: _____ Date _____ / _____ Date _____

NOTES:

— BEARING BASIS: C.F. 2022019963
— SUBJECT TO ANY AND ALL RECORDED AND UNRECORDED EASEMENTS
— SURVEYOR HAS NOT INDEPENDENTLY ABSTRACTED PROPERTY
— UNDERGROUND UTILITY INSTALLATIONS, UNDERGROUND IMPROVEMENTS, FOUNDATIONS AND/OR OTHER UNDERGROUND STRUCTURES WERE NOT LOCATED BY THIS SURVEY
— THIS SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY, IT IS NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS OR SUBSEQUENT OWNERS
— SUBJECT TO ZONING AND BUILDING ORDINANCES ENFORCED BY LOCAL MUNICIPALITIES
— THIS SURVEY WAS COMPLETED WITHOUT THE BENEFIT OF A TITLE REPORT/COMMITMENT, ADDITIONAL BUILDING SETBACK LINES, EASEMENTS OR RIGHTS-OF-WAY MAY APPLY
— PAGE 1 OF 2

LEGAL DESCRIPTION

A 4.9997 ACRE TRACT OF LAND, MORE OR LESS, BEING THE NORTH ONE-HALF OF LOT 100 OF THE ALLISON RICHEY GULF COAST HOME COMPANY SUBURBAN GARDENS SUBDIVISION OF DIVISION "L", SECTION 92, A. C. H. & B. SURVEY, ABSTRACT 541, BRAZORIA COUNTY, TEXAS, ACCORDING TO THE MAP OR PLAT THEREOF RECORDED IN VOLUME 2, PAGE 99, OF THE PLAT RECORDS OF BRAZORIA COUNTY, TEXAS, AND BEING MORE PARTICULARLY DESCRIBED AS ATTACHED.

KIMBERLEY N GARCIA
ROBERTO GARCIA

ADDRESS

3927 SHAMROCK LANE



I DO HEREBY CERTIFY THAT THIS SURVEY WAS THIS DAY MADE ON THE GROUND OF THE PROPERTY LEGALLY DESCRIBED HEREON (OR ON ATTACHED SHEET), AND THERE ARE NO ENCROACHMENTS EXCEPT AS SHOWN, AND WAS DONE BY ME OR UNDER MY SUPERVISION.

JOB # 2206088

DATE 7-1-2022 REV 7-7-2022

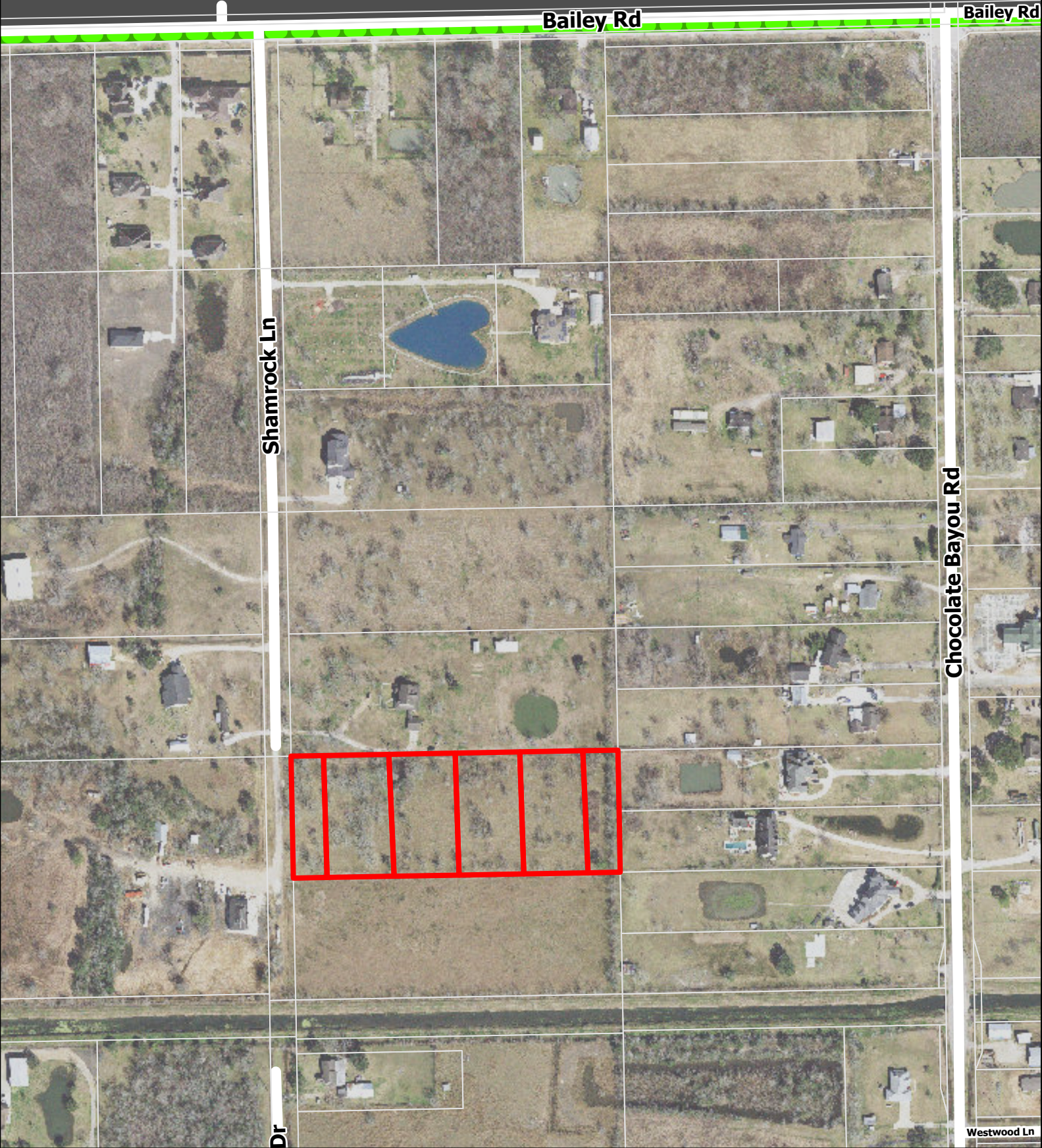
GF# N/A

PRO-SURV

P.O. BOX 1366, FRIENDSWOOD, TX 77549
PHONE: 281-996-1113 FAX: 281-996-0112
EMAIL: orders@prosurv.net
T.B.P.E.L.S. FIRM #10119300

ONLY SURVEY MAPS WITH THE SURVEYOR'S ORIGINAL SIGNATURE ARE GENUINE TRUE AND CORRECT COPIES OF THE SURVEYOR'S ORIGINAL WORK AND OPINION

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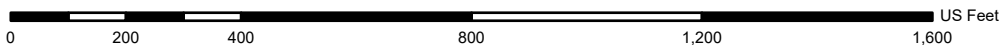


3927 SHAMROCK LN PID: 177018



 City of Manvel City Limits  City of Manvel ETJ  3927 SHAMROCK LN

This map is made available for reference purposes only and should not be substituted for a survey product. The City of Manvel will not accept liability of any kind in conjunction with its use.



Date: September 2022
Reference: 2022088
Data Source: City of Manvel,
Brazoria County Open Data

Matt Hanks, P.E., CFM
COUNTY ENGINEER



Karen McKinnon, P.E.
ASST. COUNTY ENGINEER

Wael Tabara, P.E., CFM
ASST. COUNTY ENGINEER

(979) 864-1265
ANGLETON

(979) 388-1265
CLUTE

(281) 756-1265
HOUSTON

(979) 864-1270
FAX

BRAZORIA COUNTY ENGINEERING

451 N VELASCO, SUITE 230
ANGLETON, TEXAS 77515

September 29, 2022

Jose Abraham
City Planner
City of Manvel Texas
20025 Highway 6
Manvel, Texas 77578

RE: 3927 Shamrock Lane – Letter of No Objection – Brazoria County, Texas.

Dear Jose:

Shamrock Lane is an unmaintained County Road ROW and the County has no plans on improvement on said road. The County has No Objection to the requested variance on the exiting street condition.

Best Regards,

A handwritten signature in blue ink, appearing to read "Jorge Reyna".

Jorge Reyna
Development Coordinator



Manvel Volunteer Fire Department

Physical Address: 6212 Masters Rd.

Mailing Address: P.O. Box 374

Manvel, TX 77578

Telephone: (281) 692-0279

To: Joe Murray

Date: 10/10/2022

Subject: 3927 Shamrock

The road that currently leads to the address 3927 Shamrock is adequate, and will not hinder fire response.

Manvel Volunteer Fire Department

Signed by:

A handwritten signature in black ink, appearing to read "Ricky Burleson", written over a horizontal line.

Ricky Burleson

Fire Chief MVFD

Chief@manvelvfd.org

DEVELOPMENT AGREEMENT (FOR VARIANCE)

STATE OF TEXAS §
 §
COUNTY OF BRAZORIA §

This Development Agreement executed as of the ____ day of _____, 2022, is by and between the City of Manvel, Texas, (“City”) and Kimberley N. & Roberto Garcia, property owner of certain hereinafter described property located within the city, (together known as “Developer”), all collectively referred to as the “Parties.” This Agreement is in regard to the platting of an approximate 4.9997-acre tract of land located at 3927 Shamrock Lane.

WHEREAS, Developer wishes to construct a new single-family structure on the approximate 5.00-acre tract of land located within the city limits of the City of Manvel, more fully described and depicted on Exhibit “A”, attached hereto; and,

WHEREAS, construction of a single-family structure will require approval of a plat and compliance with the city’s subdivision ordinance; and

WHEREAS, Section 62-111 of the city code requires construction of all streets in accordance with the city’s design criteria; construction of all roadways within the development in accordance with the city’s minor street standards; and construction of perimeter streets in conjunction with plat approval; and

WHEREAS, Section 62-113 of the city code requires construction of sidewalks in accordance with the city’s design criteria and major thoroughfare plan; and

WHEREAS, pursuant to Section 62-5 of the city code, the Developer has applied for a variance to construct this perimeter road requirement;

NOW THEREFORE, for and in consideration of the premises and mutual obligations, covenants, and benefits hereinafter set forth, if said variance is granted by the city council, the Parties agree to the conditions, as follows:

1. PROJECT

- 1.01 **Location.** The property that is the subject of this agreement is located at 3927 Shamrock Lane and is all the property legally described as: being an approximate 4.9997-acre tract including north one-half of Lot 100 of the Allison Richey Gulf Coast Home Company Suburban Gardens Subdivision of Division “L,” Section 92, A.C.H.&B Survey, Abstract 541, Brazoria County, Texas, according to the Map or Plat thereof recorded in Volume 2, Page 99, of the Plat Records of Brazoria County, Texas. The Property is more fully described and depicted in survey attached as Exhibit “A”, attached hereto.

1.02 Project Description. This Agreement is in regard to the construction of a proposed single-family structure on the Property, owned by Developer.

1.03 The Property has never been platted. To construct a single-family structure on the Property will require approval of a plat and compliance with the city's subdivision ordinance. Section 62-111 of the city's subdivision requires construction of all streets in accordance with the city's design criteria; construction of all roadways within the development in accordance with the city's minor street standards; and construction of perimeter streets in conjunction with plat approval. Section 62-113 of the city code requires construction of sidewalks in accordance with the city's design criteria and major thoroughfare plan. The Developer has applied to vary these requirements for his property.

2. CITY APPROVAL

2.01 Pursuant to its authority under Section 62-5 of the city code, the city agrees to allow the Developer to vary the requirements of Section 62-111 and Section 62-113 of the city's subdivision ordinance, with conditions.

2.02 Conditions: The required conditions are as follows:

- (i) This Agreement will expire upon change of use from one (1) single-family detached structure; or
- (ii) The Property may not be subdivided.

2.03 City shall record this agreement with the Brazoria County Clerk and evidence the agreement on a "plat note" on the plat of said Property. Developer shall be responsible for the cost of recordation.

3. DEVELOPER COVENANTS

3.01 The Developer agrees to following:

(i) Other than permits for the construction of one single-family structure and accessory residential structures, the city shall not issue any other construction permit or approve any further plat/re-plat of the Property;

(ii) Developer agrees to begin construction of the single-family structure, and diligently pursue to completion, within two-years of city council approval;

(iii) Developer agrees to pay the cost of recordation of this agreement within thirty (30) days of invoice by the city.

3.02 Developer acknowledges that the city's covenants are contingent upon the Developer constructing the proposed single-family structure. Failure of the Developer to begin to construct the single-family structure, and diligently pursue completion, within two-years of city council approval shall constitute failure of this condition and the agreement shall automatically be null and void.

4. MISCELLANEOUS

- 4.01. Assignment. This Agreement evidencing said variance, with conditions, shall run with the land and shall bind and benefit the respective Parties and their legal successors in interest.
- 4.02. Amendment or Modification. Except as otherwise provided in this Agreement, this Agreement shall be subject to change, amendment or modification only in writing, and by the signatures and mutual consent of the Parties.
- 4.03. Parties in Interest. This Agreement shall be for the sole and exclusive benefit of the Parties hereto and shall not be construed to confer any rights upon any third party. Developer shall not be a third-party beneficiary to any contract the city has with any other party for the engineering, design, or construction of said improvements.
- 4.04. Remedies Not Exclusive. The rights and remedies contained in this Agreement shall not be exclusive, but shall be cumulative of all rights and remedies now or hereinafter existing, by law or in equity.
- 4.05. Waiver. The failure of any party to insist in any one or more instances on the performance of any of the terms, covenants or conditions of this Agreement, or to exercise any of its rights, shall not be construed as a waiver or relinquishment of such term, covenant, or condition, or right with respect to further performance.
- 4.06. Entire Agreement. This Agreement constitutes the entire agreement between the Parties related to the subject matter of this Agreement and supersedes any and all prior agreements, whether oral or written, dealing with the subject matter of this Agreement.
- 4.07. Venue. This Agreement shall be performable and enforceable in Brazoria County, Texas, and shall be construed in accordance with the laws of the State of Texas.
- 4.08. Severability. If any term or provision of this Agreement is held to be invalid, void or unenforceable by a court of competent jurisdiction, the remainder of the terms and provisions of this Agreement shall remain in full force and effect and shall not in any way be invalidated, impaired or affected.
- 4.09. Notices. Any notice provided or permitted to be given under this Agreement must be in writing and may be served by (i) depositing the same in the United States mail, addressed to the party to be notified, postage prepaid, registered or certified mail, return receipt requested; or (ii) by delivering the same in person to such party; or (iii) by overnight or messenger delivery service that retains regular records of delivery and receipt; or (iv) by facsimile; provided a copy of such notice is sent within one (1) day thereafter by another method provided above.

The initial addresses of the parties for the purpose of notice under this Agreement shall be as follows:

If to City: City of Manvel
20031 Morris Avenue
Manvel, Texas 77578
ATTN:City Manager

If to Developer: Kimberly N & Roberto Garcia
3026 Richfield Ct
Pearland, Texas 77584

This Agreement may be executed in multiple counterparts, each of which shall be deemed an original, but all of which when taken together shall constitute one and the same instrument.

CITY OF MANVEL:

Debra Davison, Mayor

ATTEST:

Tammy Bell, City Secretary

THE STATE OF TEXAS §

COUNTY OF BRAZORIA §

This instrument was acknowledged before me on the ____ day of _____, 20__, by DEBRA DAVISON, as Mayor of the City of Manvel, Texas, on behalf of said City of Manvel.

Notary, State of Texas

(NOTARY SEAL)

Kimberly N:

By: _____
Name: Kimberly N.

THE STATE OF TEXAS §

COUNTY OF BRAZORIA §

 This instrument was acknowledged before me on the ____ day of _____,
20__, by _____, as property owner.

(NOTARY SEAL)

Notary, State of Texas

Roberto Garcia:

By: _____

Name: Roberto Garcia

THE STATE OF TEXAS §

COUNTY OF BRAZORIA §

 This instrument was acknowledged before me on the ____ day of _____,
20__, by _____, as property owner.

Notary, State of Texas

(NOTARY SEAL)

Exhibit A

being an approximate 4.9997-acre tract including north one-half of Lot 100 of the Allison Richey Gulf Coast Home Company Suburban Gardens Subdivision of Division "L," Section 92, A.C.H.&B Survey, Abstract 541, Brazoria County, Texas, according to the Map or Plat thereof recorded in Volume 2, Page 99, of the Plat Records of Brazoria County, Texas. (the "Property").

LEGEND

- CONTR. MOUNTAIN
- PROPERTY LINE
- EXISTING LINE
- BUILDING SETBACK LINE
- SEALING WALL
- SECTION PRICE
- SHAW LINE FENCE
- METAL PINS
- WIRE FENCE
- SEMI FENCE

DOHERTY, FRANK
TRACT 87
A C H & B SUR.
ABSTRACT 541
VOL. 1496 PG. 695
B.C.D.R.

NAQUIN, PRICE E
TRACT 85
A C H & B SUR.
ABSTRACT 541
C.F. 2013036260

SONOLA MOYOSOREOLUWA, JENNIFER
TRACT 111B
A C H & B SUR.
ABSTRACT 541
VOL. 1737 PG. 660
B.C.D.R.

GONZALEZ, HILARIO T
TRACT 111C
A C H & B SUR.
ABSTRACT 541
C.F. 2001026709

THOMAS, ZACHARIAH
TRACT 111D
A C H & B SUR.
ABSTRACT 541
C.F. 2015047572

FINNEGAN, ANTHONY N
TRACT 99A
A C H & B SUR.
ABSTRACT 541
C.F. 2010042299

CASTANEDA, JOSE R
TRACT 110C
A C H & B SUR.
ABSTRACT 541
C.F. 1995020896

LEGAL DESCRIPTION

A 4.9997 ACRE TRACT OF LAND, MORE OR LESS, BEING THE NORTH ONE-HALF OF LOT 100 OF THE ALLISON RISKNEY GULF COAST HOME COMPANY SUBURBAN GARDENS SUBDIVISION OF SECTION 22, A.C.H. & B. SURVEY, ABSTRACT 541, BRAZORIA COUNTY, TEXAS, ACCORDING TO THE MAP OR PLAT THEREOF RECORDED IN VOLUME 2, PAGE 90, OF THE PLAT RECORDS OF BRAZORIA COUNTY, TEXAS, AND BEING MORE PARTICULARLY DESCRIBED AS ATTACHED.

KIMBERLEY N. GARCIA
ROBERTO GARCIA

ADDRESS
3927 SHAMROCK LANE

JOB # 2206088
DATE 7-1-2022 REV 7-7-2022
GF# N/A

PRO-SURV
P.O. BOX 1366, FINCHESWOOD, TX 77549
PHONE: 281-996-1113 FAX: 281-996-0112
EMAIL: orders@prosurv.net
T.B.P.E.L.S. #19118300
ONLY SURVEY MAPS WITH THE SURVEYOR'S ORIGINAL SIGNATURE ARE LEGAL TRUE AND CORRECT COPIES OF THE SURVEYOR'S ORIGINAL WORK AND OTHER

STATE OF TEXAS
REGISTERED PROFESSIONAL SURVEYOR
No. 2206088

I DO HEREBY CERTIFY THAT THIS SURVEY WAS THIS DAY MADE ON THE GROUNDS OF THE PROPERTY LEGALLY RECORDED HEREIN (OR ON ATTACHED MAPS), AND THERE ARE NO ENCUMBRANCES EXCEPT AS SHOWN, AND WAS DONE BY ME OR UNDER MY SUPERVISION.

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AGENDA ITEM

City of Manvel

TO: City Council

Council Meeting: 10/17/2022

FROM: Dan Johnson

SUBJECT: Design Criteria Manual

Legal Review

☐ BUSINESS ITEM	☐ BONDS	☐ PUBLIC HEARING	☐ ORDINANCE	(☐)
☐ CONSENT AGENDA	☐ APPOINTMENTS	☐ BID AWARD	x RESOLUTION	(☐)
☐ WORKSHOP	x REPORT	☐ OTHER	☐ CONTRACT	(☐)
			☐ BONDS	(☐)

EXECUTIVE SUMMARY: *(Attach additional pages if necessary)*

1. **PAGE 7 & PAGE 64:** Added new verbiage regarding Water and Sewer Availability.

For all projects located within a MUD, a Water and Sewer Utility Availability Summary Table shall be provided with/within every plan and plat submittal. The Table will include a summary of currently platted lots and corresponding connections, along with reserved connections and planned future connections. It will also include the current capacity of the water and wastewater facilities (plant(s), lift stations, etc.) within the MUD.

2. **PAGE 15:** Updated minimum slopes for larger wastewater lines.
21" from 0.09% to 0.10%

27" from 0.06% to 0.07%

3. **PAGE 19:** Provided more detail regarding Lift Station site development.
37. Refer to Section 6 Controlled Access Gate Requirements.

4. **PAGE 28:** Provided more detail regarding Water Plant site development.

3. Provide minimum 8' board fence (either masonry, cedar or heart redwood) with steel posts in concrete, and a treated 2"x6" (or wider) rot board along the bottom.
4. Entrance drive to be at least fourteen (14) feet wide concrete pavement. Provide enough room to park inside site. Provide rolling gate with minimum 10' wide gate.
5. Indicate method of drainage on site plan. Internal drainage, sheet flow and valley gutter driveways are acceptable. Drain to street or storm sewer, never onto adjacent private property.

5. PAGE 32:
 6. Refer to Section 6 Controlled Access Gate Requirements.
Provided more detail regarding backflow prevention.
 4. Refer to Section 71-7 of the City Code.
6. PAGE 39 & PAGE 65: Clarified sidewalk requirements.
 4. Sidewalks are required along all ~~curb and gutter~~ streets.
7. PAGE 44: Updated Rainfall Intensity coefficients to be consistent with Brazoria County's Drainage Criteria (Atlas 14 Rainfall Intensity).

SUGGESTED MOTION/RECOMMENDATION/ACTION: Request Motion to approve

RESOLUTION NO. 2022-R-16

A RESOLUTION OF THE CITY OF MANVEL, TEXAS ADOPTING A REVISED DESIGN CRITERIA MANUAL CONTAINING SUBDIVISION IMPROVEMENT STANDARDS FOR ALL DEVELOPMENT WITHIN THE CITY OR ITS EXTRATERRITORIAL JURISDICTION, PURSUANT TO AUTHORITY CONTAINED IN CHAPTER 62, SUBDIVISION ORDINANCE, OF THE CODE OF ORDINANCES OF THE CITY OF MANVEL, TEXAS, CHAPTER 212 OF THE TEXAS LOCAL GOVERNMENT CODE, AND OTHER PROVISIONS OF THE CODE OF ORDINANCES OF THE CITY OF MANVEL, AS AMENDED OR TO BE AMENDED; AND CONTAINING OTHER MATTERS ON THE SUBJECT.

* * * * *

WHEREAS, the city has determined that there is a need for comprehensive and concise guidelines covering improvements constructed during the subdividing and development of property within the City of Manvel and its extraterritorial jurisdiction, and such is authorized by provisions of the Code of Ordinances of the City of Manvel and Texas Local Government Code Chapter 212; and

WHEREAS, the City of Manvel has determined that all related improvement standards and requirements should be incorporated into one document, entitled Design Criteria Manual, that is separate from the Subdivision Ordinance itself, to allow for more timely modification if necessary; and

WHEREAS, attached hereto is a revised Design Criteria Manual containing the minimum subdivision improvement standards and minimum standards for development within the City of Manvel and its extraterritorial jurisdiction. These are only minimum requirements, and additional requirements may be imposed as determined by the city;

BE IT RESOLVED BY THE CITY OF COUNCIL OF THE CITY OF MANVEL, TEXAS:

Section 1. Pursuant to the City of Manvel Subdivision Ordinance, Chapter 62 of the City Code of Ordinances, Chapter 212 of the Texas Local Government Code, and other provisions of the Code of Ordinances of the City of Manvel, as amended or to be amended, the City Council hereby adopts the revised “Design Criteria Manual,” attached hereto as Exhibit “A” dated October 17, 2022 and incorporated herein by this reference, and directs that the standards and related documents contained and referred to therein shall control and determine the minimum standards for improvements constructed during the subdividing and development of property within the City of Manvel, Texas.

Section 2. The City Secretary or her designee is hereby directed to maintain copies of the Design Criteria Manual and related documents and make them available upon request, for a reasonable fee, to any individual who requests one.

PASSED, APPROVED, AND RESOLVED by the City Council of the City of Manvel, Texas this _____ day of October 2022.

Debra Davison, Mayor

ATTEST:

Tammy Bell, City Secretary

CITY OF MANVEL DESIGN CRITERIA MANUAL

October 17, 2022



Approved by:

**Manvel City Council
Subdivision Ordinance**

Originally adopted as
Resolution 2008-R-04 on April 28, 2008
and Revised:

1. December 15, 2008
2. August 23, 2010
3. September 26, 2011
4. December 10, 2012
5. December 9, 2013
6. January 12, 2015
7. January 25, 2016
8. April 11, 2016
9. April 24, 2017
10. January 29, 2018
11. April 2, 2018
12. August 5, 2019
13. June 7, 2021

CITY OF MANVEL DESIGN CRITERIA MANUAL

Table of Contents

Section	Title
1	Graphic Requirements
2	Wastewater
3	Water
4	Paving
5	Drainage
6	Site Development
7	Modifications

SECTION 1 GRAPHIC REQUIREMENTS

1.0 GENERAL

1.01 CHAPTER INCLUDES:

Graphic requirements for all construction drawings including City of Manvel (public) projects, non-City of Manvel (private) projects, and all utility projects without a current Franchise Agreement.

1.02 REFERENCES – Refer to the City of Manvel Website for additional information.

1.03 DEFINITIONS

CADD (Computer Aided Drafting Design) - the preparation of documents utilizing computer facilities for the production of drawings, plans, prints and other related documents.

1.04 DESIGN REQUIREMENTS

- A. Provide a cover sheet for all projects involving three or more design drawings (excluding standard detail sheets). Plan sheet numbers shall be shown on the cover sheet or area key map. Include a vicinity map to identify project locations. Also provide approval block for the City of Manvel with a note stating that approval is valid for 2 years from date of signatures.
- B. Drawings shall be prepared on nominal 24-inch x 36-inch overall drawings.
- C. Show service area on cover sheet or area map.
- D. The engineer shall also submit, at the time of plan approval, an electronic version (*in .pdf, and .dwg, format*) of the CADD drawings on CD of the development showing all lot lines and associated lot information, rights-of-way, easements, contours, utilities, and all drainage and paving improvements.
- E. Details of special structures (not covered by approved standard drawings, such as stream or gully crossings, special manholes, or junction boxes, etc.) shall be drawn with vertical and horizontal scales equal to each other.
- F. Each set of construction drawings shall contain paving and utility key drawings indexing specific plan and profile sheets. Standard City drawings, where applicable, shall be included. All sheets shall have standard title blocks. Where applicable, show Brazoria County key drawings and numbers.
- G. Draw key overall layouts to a minimum scale of 1 inch = 100 feet.
- H. Plan stationing must run from left to right, except for short streets or lines originating from a major intersection, where the full length can be shown on one sheet.

- I. A north arrow is required on all sheets and should be oriented either toward the top or to the right. This requirement is waived under the following conditions:
 - 1. A storm or wastewater sewer whose flow is from west to east or from south to north.
 - 2. A primary outfall ditch drainage facility whose flow is from west to east or from south to north.
 - 3. Stationing is intended to start from the cardinal points of the compass and proceed in the direction of construction.
- J. Standard scales permitted for plans and profiles of paving and utility construction drawings are as follows:
 - 1. Major thoroughfares, streets with esplanades over 400 feet in length, or special intersections:
1 inch = 20 feet horizontal, 1 inch = 2 feet vertical
 - 2. Minor or residential single-family streets:
1 inch = 20 feet horizontal, 1 inch = 2 feet vertical
1 inch = 40 feet horizontal, 1 inch = 4 feet vertical
1 inch = 50 feet horizontal, 1 inch = 5 feet vertical
 - 3. Scales above are minimum; larger scales may be used to show details of construction.
- K. Each sheet shall have a benchmark elevation and description defined, and a current flood zone determination statement.
- L. The seal, date, and original signature of the Registered Professional Engineer responsible for the drawings shall be required on each sheet developed by the engineer. The engineer may use a stamped or embossed imprint for his/her seal; however, the embossed imprint must be shaded such that it will reproduce on prints.
- M. A copy of the final plat for new developments shall be included with the final drawings when submitted for final approval.
- N. If a roadway exists where drawings are being prepared to improve or construct new pavement or a utility, label the existing roadway width, surface type, and thickness, if available without destruction of pavement. Pavement thickness can be ascertained by coring with the core hole grout filled to protect pavement prior to construction.
- O. Show all streets and road alignment on drawings.
- P. Develop drawings to accurate scale showing proposed pavement, typical cross sections, details, lines and grade, and all existing topography within street right-of-way, and any easement contiguous with the right-of-way. At the intersection, the cross-street details shall be shown at sufficient distance (20-foot minimum distance outside the primary roadway right-of-way) in each direction along cross street for designing adequate street crossings.

- Q. Match lines between plan and profile sheets shall not be placed or shown within cross street intersections including cross street right-of-way.
- R. Natural ground profiles shall be shown as follows:
1. For non-City of Manvel (privately-funded) projects, center line profiles are satisfactory except where a difference of 0.50 feet or more exists from one right-of-way or easement line to the other, in which case, dual profiles are required.
 2. For City of Manvel (publicly funded) projects, provide natural ground profiles for each right-of-way line. Easement profiles shall conform to S below.
- S. Basic plan and profile sheets shall contain the following information:
1. Identify all lot lines, property lines, easements, right-of-way, and drainage outfalls.
 2. Label each plan sheet as to street/easement widths, pavement widths, pavement thickness where applicable, type of roadway materials, curbs, intersection radii, curve data, stationing, existing utilities (type and location), and any other pertinent feature affecting design.
 3. Show all utility lines 4 inches in diameter or larger within the right-of-way or construction easement in profile view. Show all utility lines, regardless of size, in the plan view including fiber optic cables.
 4. Graphically, show flow line elevations and direction of flow for all existing ditches.
 5. Label proposed top of curb grades except at railroad crossings. Center line grades are acceptable only for paving without curb and gutters.
 6. Curb return elevations for turnouts shall show in profiles.
 7. The center line elevation at the property line of all existing driveways shall be shown in profile.
 8. Station all esplanade noses or the center line of all esplanade openings with esplanade width shown - both existing and proposed.
 9. The design of both roadways is required on all paving sections with an esplanade.
 10. Station all PCs, PTs, radius returns, and grade change PIs in plan view. Station all radius returns and grade change PIs in profile with their respective elevations.
 11. Show Hydraulic Grade Line (HGL) and identify Ponding Depth on profile drawings.
- T. Provide a pollution prevention plan with legend. See Site Development (Section 6) under Design Requirements.
- U. Submit 3 printed sets of construction plans on 24" x 36" paper for review:
(1) Engineering, (2) Public Works, and (3) Fire Marshal.

- V. Approved plans will be valid for a period of 2 years and a note shall be included on the cover sheet indicating same. No extension will be granted. If work has not commenced by the 2-year expiration date, the plans will need to be resubmitted and reviewed and new plan review fees paid. The “commencement of work” shall be defined by the following milestones:
1. Preconstruction Meeting has occurred with the selected contractor
 2. Civil Site Improvement Permits have been acquired by the selected contractor
 3. Construction Equipment has been mobilized to the Site.
- W. Identify sidewalks, water meters, sewer taps, manholes, fire hydrants, and water valves on Site Plans for residential and commercial projects.
- X. For all projects located within a MUD, a Water and Sewer Utility Availability Summary Table shall be provided with/within every plan and plat submittal. The Table will include a summary of currently platted lots and corresponding connections, along with reserved connections and planned future connections. It will also include the current capacity of the water and wastewater facilities (plant(s), lift stations, etc.) within the MUD.

SECTION 2 WASTEWATER

1.0 GENERAL

1.01 CHAPTER INCLUDES:

Criteria for the design of wastewater collection systems.

1.02 REFERENCES

Texas Commission on Environmental Quality (TCEQ) - "Design Criteria for Domestic Wastewater Systems" - Texas Administration Code - Chapter 217 and "Design Criteria for Sewerage Systems" Chapter 317 (current revision).

1.03 DEFINITIONS

This Chapter addresses the design of the wastewater collection systems within the public right-of-way or a dedicated public easement. Sanitary sewers located on private property that are not in a dedicated easement, are under the jurisdiction of the Plumbing Code, and will be addressed/reviewed by the Building Official. Where used in these regulations, the following terms shall be construed to carry the meanings given below:

- A. Public Sewer - A closed conduit that conveys wastewater flow and which is located within the public right-of-way or dedicated public easement. A public sewer (or public sewer system) is intended to serve more than one (1) "owner" or occupant.
- B. Private Sewer - A closed conduit that conveys wastewater flow and is constructed and maintained by a private entity(s) (i.e., homeowner's association). Private sewers may be located in areas such as a private street or common area. Private sewers are subject to the design and construction requirements of the Plumbing Code and must discharge to a public sewer.
- C. Sewer Main - A sewer that receives the flow from one or more lateral sewers.
- D. Lateral Sewer - A sewer running laterally down a street, alley, or easement, which receives only the flow from the abutting property.
- E. Service Lead - A sewer that branches off a public sewer and extends to the limits of the public right-of-way. It shall be construed as having reference to a public sewer branching off from a main or lateral sewer to serve one or more houses, single-family lots, or other types of small land tracts situated in the same block with the said main or lateral sewer, but not directly adjacent thereto. Such a line shall never exceed 150 feet in length. If the sewer is designed to serve more than two houses, or the equivalent of two single-family residences along a street, a lateral sewer as defined above shall be constructed.
- F. Service Connection - A private sewer from a single source to the main or lateral sewer in the street, alley, or easement adjacent thereto. Service connections are covered by the Building Code. It will be owned and maintained by the owner of the property being served by said sewer.
- G. Project Area - The area within the immediate vicinity of the public sewer to be constructed.

- H. Stack - A riser pipe constructed on main or lateral sewers which are deeper than 8 feet to facilitate construction of service leads or service connections.
- I. Force Main - A pressure-rated conduit (i.e., ductile iron pipe, pressure-rated PVC, etc.) that conveys wastewater from a pump station to a discharge point.

1.04 DESIGN REQUIREMENTS

A. Easements for wastewater lines.

1. Wastewater lines shall be located within street right-of-way, permanent access easements with overlapping public utility easements, easements adjacent to street rights-of way or recorded wastewater easements.
2. When outside of a public street right-of-way or permanent access easement with an overlapping public utility easement, easements must be dedicated and restricted for wastewater lines only.
3. When possible, easements should be adjacent to public rights-of-way.
4. Easements containing wastewater lines must be at least 20-feet wide and the wastewater line must be centered in the easement.
5. Wastewater lines along State rights-of-way shall be installed outside of the right-of-way in a separate 20-foot minimum adjacent easement.
6. No back-lot easements will be allowed for the installation of wastewater lines.

B. Drawings

1. Before any main or lateral sewer is constructed and before a permit will be issued for the construction of same, plans and profiles of the proposed sewer shall be prepared and submitted to the City for approval.
2. The plan view will show the exact location of the proposed line in the street, alley or easement with respect to the edge of the particular right-of-way, the transit base line, and any nearby utilities, major landscaping, and other structures affecting construction.

C. Main and Lateral Sewers

1. Sewers in curved easements, easements defined by property lines and combined easements containing other public utilities must be shown both in detailed plan and profile views.
2. The profile should show other underground and surface utilities and facilities, both in parallel and at crossings; the size, grade of the proposed line, the elevation of same to hundreds of a foot at all manholes, changes of grade and dead-ends; and the proposed finished grade over the sewer. It should show the actual ground line as it exists prior to construction of the sewer. Where proposed fill or cut is contemplated, the proposed new ground line should be shown as a separate line from the actual ground line. Type of pipe and bedding shall comply with City of Manvel Standard Specifications and Standard Details.

3. Where sewers are to be placed between existing pavement and the street right-of-way (or interior easement line) or under existing pavement or topping, show the existing ground line at both sides (or the closest side or sewers near the edge) of the right-of-way or adjacent sewer easement.
- D. Sewer mains - plan and profile required
1. Sanitary sewer layouts for residential subdivisions should use a minimum horizontal scale of 1 inch = 40 feet with a vertical scale of 1 inch = 4 feet, or as allowed per Section 1, 1.04, J. A scale of 200 feet per inch may be used provided the following information is shown on the layout:
 - a. All easements containing or buffering sanitary sewers are shown at points of size change; all manhole locations are shown.
 - b. The sewer alignment shall accurately reflect the relative location of the sewer as shown on the detailed plan view.
 - c. All service leads that cross-street pavement or serve adjacent property are to be shown on the layout. The detail plans and profiles shall show the flow lines of all service leads at the street or easement right-of-way.
 - d. The number and size of the lots depicted on both the overall sewer layout sheet and the individual plan and profile sheets shall match the number and size of the lots depicted on the final plat after recordation.
 - e. On the overall sanitary sewer layout sheet, the size and direction of flow for all existing and proposed sewers shall be shown.
 - f. The location of the proposed sewer within the public right-of-way, a dedicated easement adjacent to the public right-of-way, or side lot easement (if allowed by the City).
 - g. The overall sanitary sewer layout sheet shall show the area, in acres, which the proposed sewer(s) is (are) designed to serve. Include a location map that references the average to nearby major thoroughfare and boulevard streets. The scale of the location map shall be 1 inch = 2,000 feet or less.
 2. Commercial subdivision sanitary sewer layouts for large areas and with a scale of 400 feet or more per inch must have an additional set of layouts at not more than 200 feet per inch, with match lines and a small index map showing which portion of the overall layout that each sheet's layout represents.
 3. Acceptable horizontal scales for the detailed plan and profile views are 10 feet, 20 feet, 40 feet and not more than 50 feet maximum per inch. Horizontal scale for major thoroughfares and boulevards shall be 1 inch = 20 feet or less.
 4. Acceptable vertical scales for detailed profile views are 2 feet, 4 feet, and not more than 5 feet maximum per inch unless otherwise approved. Vertical scale for major thoroughfares and boulevards shall be 1 inch = 2 feet or less.

5. The plan view shall show, at a minimum, the following information for the project area:
 - a. All topographical features;
 - b. Stationing for the proposed sewers;
 - c. All existing utilities (i.e., telephone, gas, power, etc.);
 - d. Any significant landscaping and/or other structures which might impact construction and/or construction related activities;
 - e. The width and type of all existing and proposed easements;
 - f. All proposed service leads;
 - g. The limits of bore and/or tunnel;
 - h. Locations where pressure pipe is to be installed for water line crossings;
 - i. Drawings for residential subdivisions shall show the proposed location, by stations, of all service leads, service connections, and stacks. The distance from the sewer or transit base line station to the nearest existing manhole shall be shown in the plan view or on an additional sewer layout sheet with a scale no more than 1 inch = 100 feet.

6. The profile view shall show, at a minimum, the following information for the project area:
 - a. Underground and/or surface utilities/facilities which are either parallel to the proposed sewer or cross the proposed sewers;
 - b. The proposed sewer's diameter and grade for each manhole section;
 - c. The flow line elevation for all sanitary sewers at each manhole;
 - d. The rim elevation of all existing and proposed manholes;
 - e. The flow line elevation at each sheet "break" (i.e., from one sheet to another);
 - f. Type of pipe bedding/backfill shall be noted on each plan/profile sheet;
 - g. The finished grade for proposed and existing pavement where "fill" and/or "cut" is proposed, the proposed new ground line should be shown as a separate line from the existing ground line;
 - h. The existing ground line for the "near side" of the public right-of-way where a sewer is to be placed between the edge of existing pavement and the edge of the public right-of-way;
 - i. The existing ground line at the centerline of the proposed sanitary sewer where a sanitary sewer is to be placed within an existing easement. Show any proposed and/or existing pavement.
 - j. The flow line elevation of all service leads where it crosses the edge of the public right-of-way or the dedicated easement adjacent to the public right-of-way;
 - k. The limits of bore and/or tunnel;
 - l. Locations where pressure pipe is to be installed for water line crossings;
 - m. The location of special backfill and/or proposed stacks shall be identified by "stations" indicated on the design plans.
 - n. The location of stacks shall be labeled with stations.

E. Service leads

1. Service leads shall be at the property line between two (2) adjoining lots, or as directed by the City. A single 6-inch service lead located at the property line between two (2) adjoining lots would serve two (2) single-family residences with a wye placed at the end of the service lead. Do not extend the wye clean-outs beyond the edge of either the public right-of-way or dedicated easement.
2. Any service lead extension of more than 50 feet parallel to the street right-of-way shall be treated as a lateral sewer.
3. Service leads from developments with more than 17,500 gallons-per-day flows shall discharge into a proposed or existing manhole. Where the flow line of the service is 24 inches or greater above the flow line of the manhole, provide a standard external drop to manhole.
 - a. Service leads shall be provided to serve each lot within proposed development inside the City limits.
 - b. Service leads shall be 6 inches in diameter (minimum). If the length of a service lead exceeds 100 feet or the width of the public right-of-way by more than 20 feet, the minimum diameter shall be 8 inches and a manhole shall be utilized for connection to the public sewer.
 - c. Service leads with a diameter of 6 inches shall utilize "full body" fitting (extruded or factory-fabricated) for connection to the proposed public sewer or an approved saddle-type connector for connection to an existing public sewer.
 - d. Saddle-type connectors shall be installed with the "stub" oriented between the "spring line" (3 o'clock and 9 o'clock positions) and 45 degrees from the "spring line" ("1:30" and "10:30" positions). Tees (aka, "full body fittings") shall be oriented in the same manner.
 - e. The service lead shall be designated to minimize the use of bends, as site conditions will permit.
 - f. Service leads exceeding the limits defined in 1.04.E.2. shall have a manhole at each end; as well as, a plan/profile drawing for each right-of-way crossing. All, or part, of these service leads which are located in a public right-of-way, alley or dedicated sanitary sewer or public utility easement may be treated as a public sewer; depending upon the location of the terminal manhole and any intermediate manholes.
 - g. For all existing lots (which are not served in accordance with these guidelines) that need a service lead, if the distance to the nearest existing sewer is less than 50 feet, the service lead is under the jurisdiction of the Plumbing Code.
4. Service leads shall not be connected to a force main. (Grinder pumps are not allowed.)

F. General Requirements

1. Sanitary sewers within the City of Manvel's jurisdiction shall allow for orderly expansion of the system and shall conform to the Master Wastewater Plan for the City of Manvel.
2. Sewers shall be sized based on the minimum requirements set out in this standard and the standard wastewater flow rates as established by the City of Manvel and shall be no less than 315 gallons per connection per day.

3. All sewers shall conform to the minimum requirements of the Texas Department of Health, "Design Criteria for Sewerage Systems".
4. Sewers shall be separated from water lines by a minimum of nine (9) feet. Sewers crossing utilities other than water, a minimum of six (6) inches of clearance must be maintained.
5. The public sanitary sewer, as maintained by the City of Manvel, shall be defined as all sewers, including stacks and service leads, that serve more than one sewer connection, that are located in public easements or street rights-of-way, and that are installed in accordance with these Standards.
6. Sanitary lines greater than 6 inches require stacks with 5 feet minimum cover. (Stacks are to be shown on plans with stations). Place stacks and wyes or tees as shown. Where no stacks are shown, it is the responsibility of the licensed plumber to place a City approved saddle for connection to the line and the responsibility of the City Inspector to determine that such saddle is water tight and properly installed.
7. Materials and construction to conform to latest City of Manvel specifications with all amendments thereto, including standard leak test.
8. Unless noted otherwise, all public sewers and service leads shall be embedded in cement stabilized sand; to 6 inches below the pipe, 12 inches above the pipe and to 6 inches on each side. All such bedding shall be compacted to 95% standard proctor density. The cross-section so described herein shall be termed the "embedment zone."
9. Backfill all excavation areas/trenches under or within 1-foot of existing or proposed pavement with cement-stabilized sand from the top of the pipe "embedment zone" to the bottom of the subgrade. Cement-stabilized sand must develop 100-psi compression at 48 hours. Backfill shall be compacted to 95% standard proctor density.
10. The location of all proposed stacks shall be shown by stations in the drawings.
11. Construction notes shall designate the kind and class of pipe with exceptions to the construction notes to be shown on the plan and profile sheets.
12. Non-sanitary sewer easements or fee strips such as pipeline, power company, drainage district, railroad, etc., are in and of themselves insufficient and unacceptable to permit laying to sanitary sewers and/or force mains across or along the underlying private property or restricted non-sanitary use type of public property.
13. All public sanitary sewers shall be located within a public right-of-way (ROW) or easement.
14. Where an easement for a public sewer ends at a public right-of-way, the last manhole shall be extended into the public right-of-way at a minimum of 2 feet beyond the property line; or as close to the public right-of-way as possible due to acceptable clearances required for other utilities (i.e., water line and storm sewers).

15. The drawings for the sewer shall show the location of any existing known pipe or duct that might interfere with the construction of the sewer and call to the attention of the City any known obstacles that might be encountered in constructing the sewer in any location under consideration. The Professional Engineer shall determine the existence of pipes, ducts and/or obstacles from a visual survey on the ground plus research of all public records and private records when available.
16. All sanitary sewer mains shall be constructed utilizing pressure rate pipe SDR 26.
17. Sanitary sewer lines shall be centered in sanitary sewer line easements.
18. In subdivisions platted or created after January 1, 1988, for single-family dwellings where each lot maintains an individual water well supply and an on-site sewage facility (OSSF) the sewage disposal plan shall show the approved water well location and sanitary control easement around the well within a 100 feet radius in which no subsurface sewage system may be constructed.
19. No back-lot easements will be allowed for the installation of sanitary sewer lines.
20. All new wastewater lines to be installed with tracer wire for future line locates, unless lines are deeper than 10 feet.

G. Line Size

1. The minimum pipe diameter for a public sanitary sewer shall be 8 inches.
2. Four-inch service leads shall be confined to the limits of the lot, which they serve and shall serve only the equivalent of one single-family lot. No 4- inch sewer shall be laid in any street, alley, or right-of-way.
3. Six-inch service leads shall not serve more than the equivalent of two single-family lots or other types of small land tracts.
4. Four-inch and six-inch service leads for single-family residential lots shall have a minimum grade of 0.70 percent.
5. For commercial service leads such as street bores, submit a copy of the approved plumbing drawings to establish the required size of the line. The minimum size lead shall be 6 inches.
6. All main and lateral sewers will end in manholes, except for special and/or unusual situations and subject to specific approval by the City.
7. All sewer lines shall be laid at a size and depth to conform to designs permitting an orderly expansion of the sewer system of the City and so as to avoid a duplication of lines in the future.
8. The City shall be the final judge as to sizes and depths required and exceptions to "lateral service leads" as previously defined.

H. Line Depth

1. The sewer should be laid with the top of the pipe a minimum of 3 feet below finished grade or top of curb, whichever is lower.
2. Sewer laid in street rights-of-way with curb and gutter paved streets shall have a minimum cover of 4 feet from the top of the pipe to the top of the curb to anticipate future sewer extension.
3. Sewers laid in street right-of-way with crowned roads and side ditches shall have a minimum cover of 5 feet from the average ground line at the adjacent street right-of-way to the top of pipe.
4. Where the minimum cover as specified in paragraphs H, 1, 2, and 3 above is not possible, the sewer shall be laid in Class 150 (150 psi) pressure pipe or rigid factory-made pipe with cement stabilized sand as shown in standard detail. Ductile iron pipe shall be lined with either a polyethylene or polyurethane coating as approved by the pipe manufacturer and applied by either the pipe manufacturer or an approved application. The minimum liner thickness shall be 40 mil.
5. Maximum depth for sanitary sewer lines shall be 20 feet from average ground surface to pipe invert.

I. Line Grades

The following table lists the minimum grades for 6–27-inch public sewers. The minimum grade is based on a minimum full pipe velocity of 2.0 feet per second (fps). The maximum grade is based on a maximum full pipe velocity of 10.0 feet per second (fps). In both cases, the Manning Formula has been used with an "n" of 0.013. The use of different pipe materials will not alter the use of 0.013 for the purpose of the Design Manual.

Inside Dimension (I.D.) of Pipe in Inches	Minimum Slope (in Percent) to Develop V=2.3 ft./sec.
6	0.70
8	0.33
10	0.25
12	0.20
15	0.15
18	0.11
21	0.09 0.10
24	0.08
27	0.06 0.07
<u>30</u>	<u>0.06</u>

For sewers larger than ~~27~~ 30 inches in diameter, the Professional Engineer of record shall determine the appropriate grade utilizing the Manning Formula, $n = 0.013$ and a full pipe velocity of ~~32~~ 32.0 fps.

J. Manholes

1. All manholes shall be precast concrete, unless the Professional Engineer submits a "cast in place" manhole design for review and approval by the City Engineer. All precast manholes to incorporate a "boot" type connector for sewer diameters up to 24". For sewer diameters greater than 24 inches, utilize either the "boot" type connector (if available) or an integral gasket. All precast manholes shall conform to the latest ASTM requirements.
2. For all public sewers, manholes shall be placed at all changes in alignment, changes in grade, junction points, and either at street, alley, or easement intersections as designs may require.
 - a. Sewers laid in easements shall have a manhole in each street crossed by the sewer.
 - b. The maximum distance between manholes shall be 350 feet.
 - c. Sewers with the same, or approximate flow line elevation shall intersect each other at a 90-degree angle. However, where a true perpendicular intersection cannot be obtained, and where the "entering" sewer intersects the receiving sewer at, or about, the same flow line, one or more manholes shall be utilized to maintain a minimum angle of 80 degrees at the point of intersection. When the "entering" sewer is on the upstream side of the manhole, the minimum angle between the sewers may be reduced to a 45-degree angle; provided:
 - (1) A distinct flow channel can be maintained within the manhole when the flowline elevations of the sewers are at, or within, one (1) pipe diameter of the smaller pipe; or
 - (2) When the flow line elevation of the "entering" pipe is above the crown of the "primary" sewer and clearance can be provided between the sewers.
 - d. Manholes shall be placed at all dead-end mains and laterals.
 - e. Criteria for connections to, and utilization of, manholes.
 - (1) Where manholes are utilized to facilitate connections between public sewers, when possible, the sewers shall match the manhole's flow line, match the elevation of each other's crown or utilize an "outside" manhole drop.
 - (2) Connections between public sewers at the manhole shall adhere to the following criteria when possible:
 - (a) The elevation of the crown of the discharging sewer shall either match the elevation of the crown of the receiving sewer or be approved as special cases by the City.
 - (b) A standard drop connection is required when the difference in elevation between discharging sewer flowline and receiving flowline is greater than 24 inches.
 - (3) The routing of service connection directly to manholes will be allowed only where the flowline elevation of the existing sanitary sewer is more than 10 feet below grade and there is no available stack and either
 - (a) The lot to be so connected is a single-family, owner-occupied, single lot residence connection to an existing manhole; or
 - (b) The lot to be so connected is a single-family, owner- occupied, single lot residence connecting to a proposed manhole at the end of a cul-de-sac.
 - (4) When routing an approved service connection to a manhole (see Item "3"), the wall penetration shall not be greater than 10 inches in diameter and shall be cored and sealed using grout as approved by the Standard Wastewater Products Committee.

- (5) When routing an approved service connection to a manhole (see Item "3"), the connections shall utilize an external drop and shall adhere to the following criteria:
 - (a) The manhole wall penetration shall be a minimum of 10 feet below the manhole rim elevation and shall not be greater than 10 inches in diameter;
 - (b) The drop shall be 6 inches in diameter and shall be constructed of SDR 26 PVC pipe (ATSM D 3034-94);
 - (c) The drop shall be located 45 degrees from the upstream side of the main sewer;
 - (d) The wall penetration (core) shall be sealed using a "grout" as approved by the City Engineer.
- (6) All public sewers shall terminate in a manhole. Clean-outs will not be utilized except at the end of each service lead.
 - (a) The manhole cover shall have a minimum diameter of 32 inches.
 - (b) All sanitary sewer manholes shall have stainless steel inflow protectors.
- f. Manholes to be coated with Raven 405.
- g. Manholes shall not be located within a driveway, street, or sidewalk.

K. Lift Stations and Wastewater Treatment Plants

- 1. Lift station design shall comply with the City of Manvel specifications, with a storage volume in the wet well equal to 1.5 times the peak design flow to the lift station. Add 10% to account for volume displaced by pumps.
- 2. Minimum site size shall be 40 feet by 40 feet. Smaller sites that are adjacent to public rights-of-way are contiguous to green space or similar land use areas, may be approved when adequate odor control provisions are provided.
- 3. Pumps shall be sized to operate at optimum efficiency. Minimum acceptable efficiency at the operating point will be sixty percent (60%).
- 4. Operation and maintenance should be considered in the design of the station and the location of the station.
- 5. Wet well working volume should be sized to allow for the ~~recommended~~ minimum pump cycle of six (6) minutes for each pump.
- 6. Prior to installation controls and equipment shall be approved by Public Works.
- 7. Emergency operations shall be considered. Provide fittings and a blind flange that will be readily accessible for emergency bypass pumping.
- 8. The inlet structure shall be designed to minimize turbulence.
- 9. The velocity in the Force Main and riser pipes shall be between 3 and 8 fps.
- 10. The wet well shall be sized to provide adequate clearance between the pumps (refer to manufacturers recommended clearances).

11. A peak factor of four (4) shall be used for Lift Station design.
12. A minimum of two (2) feet of clearance shall be provided between pumps and between pump and wall.
13. Low water levels shall be at least six (6) inches above impeller.
14. Complete immersion of submersible pump motor at low water level is preferred.
15. Tie steel in Lift Station bottom to wall (includes caisson construction situation) to provide watertight wet well.
16. Nuts, bolts, chains and all other metal components within wet well shall be stainless steel.
17. Vent pipe shall be six (6) inches minimum diameter equipped with odor control system.
18. The following Hazen-Williams Coefficient shall be used for various pipe types:

PVC	New	C = 160
	10-year	C = 140
DIP	New	C = 140
	10-year	C = 100
19. Provide minimum 8' board fence (either masonry, cedar or heart redwood) with steel posts in concrete, and a treated 2"x6" (or wider) rot board along the bottom.
20. Entrance drive to be at least fourteen (14) feet wide concrete pavement. Provide enough room to park inside ~~lift station~~ site. Provide rolling gate with minimum 10' wide gate.
21. Indicate method of drainage on site plan. Internal drainage, sheet flow and valley gutter driveways are acceptable. Drain to street or storm sewer, never onto adjacent private property.
22. Locate control panel and wet well hatch above 100-year flood plain. Call out the 100-year flood plain elevation on the plans.
23. Dual stainless steel guide rails (or other pump removal method that avoids entering wet well) are required for submersible pumps.
24. A tee, plug valve (or gate valve), and blind flange assembly is required on the force main on the downstream side of the discharge valves and header. This is required so truck-mounted pumps can bypass the lift station pumps and piping while work is being done.
25. Bedding for PVC force main is bank sand a minimum of 6 inches from all sides of pipe.
26. PVC force mains must be C-900.
27. DIP force mains are to be bedded in bank sand and polyethylene wrapped.
28. When calculating headloss in force main and piping, use of K factors on fittings, with the Hazen-Williams formula, is preferred.
29. Backfill structural excavations (wet well, etc.) with cement stabilized sand.

30. Lift station site plans shall be submitted in scales of 1-inch = 5-feet or 1-inch = 10-feet.
31. Provide a protective coating or concrete additive to interior walls of wet well. The Public Works Department shall approve coating or additive used.
32. Lift station shall be equipped with a telemetry system, approved by City and compatible with existing system. A bubbler system shall be installed and connected to telemetry system to monitor status of lift station.
33. Permanent power supply to lift stations and wastewater treatment plants shall be 3-phase (and 480 volts where possible) and installed prior to City Council acceptance.
34. A system of floats shall be provided to control pumps.
35. A pressure gauge suitable for application shall be installed on each discharge pipe.
36. Emergency backup generator (natural gas or diesel) to be installed on site and hard-wired to the electrical panel, with an automatic transfer switch (permanent installation; not a portable or trailer-mount style). Additionally, a quick-connect style plug to be installed on the panel, as a backup precaution, upon preapproval from Public Works. Generators must be new when installed (not refurbished or previously used).

37. Refer to Section 6 Controlled Access Gate Requirements.

1.05 APPURTENANCES - Reserved

1.06 SUBMITTALS

- A. Preliminary design - submit the following for review and comment:
 1. Copies of any documents which grant approval of exceptions to the City design criteria.
 2. Design calculations for line sizes and grades
 3. Contour map for overall area.
 4. Plan and profile sheets showing proposed improvements (City projects only).
 5. Geotechnical soils report for the project (City projects only).
- B. Final design - submit the following for approval:
 1. Final documents of the above plus plan and profile sheets and Geotechnical soils reports.
 2. Review prints.
 3. Original drawings.

1.07 QUALITY ASSURANCE

- A. Prepare calculations and construction drawings under the supervision of a Professional Engineer trained and Licensed under the disciplines required by the drawings. The final construction drawings must be sealed, signed, and dated by the Professional Engineer responsible for the development of the drawings.
- B. Prior to release of the maintenance bond (and in conjunction with the final walk-thru), the developer shall have all sanitary sewer lines (within the project boundary) inspected with television equipment. Any pipe settlement which causes excess ponding of water in pipeline, any misaligned joints, or other defects shall be cause for rejection. The developer shall provide the City with one copy of the TV videotape and one copy of the TV inspection report. For each segment, the video tape and corresponding written report shall clearly identify:
 - 1. Each line segment being inspected.
 - 2. The size and type of pipe being inspected.
 - 3. Accurate footage of the line segment inspected.
 - 4. Deficiencies in materials, alignment, pipe grade, or any other apparent deficiencies; and
 - 5. Locations of all service connections.

2.0 EXECUTION

2.01 RESEARCH REQUIREMENTS

- A. Research existing utility and right-of-way information.
- B. Verify that no restrictions exist that will deny approval of the project concept.

2.02 DESIGN ANALYSIS

Calculations of design flow for overall development project. All wastewater components in the City of Manvel and its ETJ shall be designed for a minimum of 315 gallons per equivalent single-family connection.

2.03 DRAWINGS

Drawings shall include layout sheets with contours, plan and profile sheets, and detail sheets for special items and treatment plants.

SECTION 3 WATER

1.0 GENERAL

1.01 CHAPTER INCLUDES:

Criteria for the design of water distribution systems.

1.02 REFERENCES

- A. Texas Commission on Environmental Quality (TCEQ), Water Utilities Division "Rules and Regulations for Public Water Systems," latest revision.
- B. American Water Works Association (AWWA).
- C. National Sanitation Foundation (NSF).
- D. Texas Department of Health.
- E. Texas State Board of Insurance.

1.03 DEFINITIONS

Water Line - Closed conduits designed to distribute potable water for human consumption to various areas and provide fire protection. Line size and fire protection accessory locations are dependent on distance from primary source and quantity of demand.

1.04 DESIGN REQUIREMENTS

- A. Easements for water lines
 - 1. Lines shall be located within street right-of-way, permanent access easements with overlapping public utility easements, easements adjacent to street rights-of way or recorded water line easements.
 - 2. When outside of a public street right-of-way or permanent access easement with an overlapping public utility easement, easements must be dedicated and restricted for water lines only.
 - 3. When possible, easements should be adjacent to public rights-of-way.
 - 4. When possible, water line easements shall be contiguous to a paved access.
 - 5. For water lines 12 inches or smaller located outside of street rights-of-way, the minimum width of easement shall be 10 feet.
 - 6. For water lines larger than 12 inches located outside of street rights-of-way, the minimum width of easement shall be 20 feet.

7. For water mains located within 5 feet from the right-of-way line, the outside edge of a water line easement shall be located 10 feet from the right-of-way line.
 8. Water lines along State rights-of-way shall be installed outside of the right-of-way in a separate 20-foot minimum contiguous easement.
 9. No back-lot easements will be allowed for the installation of water lines.
 10. Commercial Developments inside the City requiring on-site fire hydrants must provide a minimum 20-foot water line easement for the water line and fire hydrant.
 11. Water lines shall be centered in water line easements.
 12. When using side lot easements, such easements shall be a minimum of 20 feet in width, located on one lot or centered between lots. If centered between lots, the water line maybe centered within the five feet of one lot, or centered in the easement.
 13. Location of a water main in an easement not adjoining a public right-of-way shall be prohibited. When approved, these water mains will be centered in a 20-foot wide exclusive easement restricted to water only.
- B. Location of water lines
1. Locate water lines within a street right-of-way whenever possible.
 2. In the event that a proposed water line cannot be located within the street right-of-way, locate water lines in the center of a dedicated water line easement.
 3. When a water line is placed parallel to another utility line, other than a sanitary sewer, the water line shall have a minimum of 4 feet horizontal clearance from outside wall of the water line to the outside wall of the existing utility.
 4. All new water lines to be installed with tracer wire for future line locates.
- C. Water line size
1. 6-inch lines may be used within cul-de-sacs or if the line is less than 1,000 feet in length and interconnected between two lines which are 8 inches in size or larger. The maximum number of fire hydrants or flushing valves on any length of 6-inch line is one.
 2. 8-inch lines may be used for lines over 1,000 feet long or when 2 or more fire hydrants or flushing valves are required.
 3. 12 inch and larger lines - lines to be determined by the Professional Engineer (P.E.) and City of Manvel.
- D. Dead-end lines shall be avoided.

E. Depth of cover

1. 14 inch and smaller mains and fire lines shall have a minimum cover of 4 feet from top of curb. For open ditch roadway sections, 12 inch and smaller shall be installed at least 3 feet below the ultimate flowline of the ditch or 6 feet below natural ground at the right-of-way line, whichever is deeper.
2. 16 inch and larger mains shall have minimum cover of 5 feet from top of curb. For open ditch roadway sections, 16 inch and larger mains shall be installed at least 3 feet below the flow line of the ditch or 7 feet below natural ground at the right-of-way line, whichever is deeper.
3. Changes in grade to clear other utilities or underground features may be made by deflecting pipe joints. The maximum designed deflection shall be one-half ($\frac{1}{2}$) of the manufacturer's allowable deflection. If a depth greater than 8 feet to the top of the pipes is required, a welded steel section will be used. The standard depth of cover maintained on the water main and the grade change shall be made using the welded steel section. The installation of fittings for vertical deflections or changes in grade shall not be allowed except with specific approval of the City of Manvel.

F. Water line crossings

1. Where a water line crosses another utility (public or private) other than a sanitary sewer, a minimum of 6 inches of clearance must be maintained between the outside wall of the water line and the outside wall of the utility.
2. Elevated Stream and Ditch Crossings ~~Crossings~~
 - a. All water lines shall be steel or restrained joint metallic pipe and shall extend a minimum of 15 feet beyond the last bend or to the right-of-way line, whichever is greater.
 - b. Elevated crossings are preferred to underground crossings.
 - c. Support water lines on existing or proposed bridges. The following criteria may be used when approved in advance by the City Engineer:
 - (1) Have adequate structural capacity.
 - (2) Have sufficient clearance above the bent cap elevation for installation under the bridge.
 - (3) Design elevated crossings with the elevation of the bottom of the water line above the low chord of the nearest adjacent bridge or a minimum of 1 $\frac{1}{2}$ feet above the 100-year flood plain elevation, whichever is higher.
 - (4) Extend pipe from right-of-way to right-of-way for crossings.
 - (5) Provide sufficient span length to accommodate the cross section of future widening of the stream or ditch, if available.
 - (6) Support the line on columns spaced to accommodate the structural capacity of the pipe considering deflection and loading.
 - (7) Base column support design on soil capacity, spacing, loading, and structural requirements.

G. Underground crossings

1. Provide a minimum 3-foot clearance above the top of the pipe to the ultimate flow line of the ditch.
2. Provide sufficient length to exceed the ultimate development of the stream or ditch.
3. All water lines shall be steel or restrained joint pipe and shall extend a minimum of 15 feet beyond the last bend or to the right-of-way, whichever is greater and have valves located on both sides of the crossing.

H. State highway and County Road crossings

1. Extend carrier pipe from right-of-way to right-of-way.
2. Use welded steel pipe or restrained joint pipe in steel casing under existing and future roadways from a point 15 feet outside of the service road or outside of pavement toward the right-of-way, to a similar point on the other side of the highway across the right-of-way. For highway or roadway crossings with open ditch sections, extend the casing from right-of-way to right-of-way.
3. State highway crossings shall be constructed in conformance with the requirements of the Texas Department of Transportation.
4. When additional right-of-way has been acquired or will be required for future widening, the casing, should be carried to within 10 feet of each future right-of-way line.

I. Street crossings

1. All street crossings shall be perpendicular to the right-of-way.
2. All water mains, services and sprinkler line crossings under major thoroughfare boulevards shall be encased using a minimum of PVC pipe, SDR, as shown on the construction detail for "Water Main Encasement." Welded steel pipe may be substituted on street crossings, when specifically approved by the City Engineer.
3. Crossings under existing concrete streets, other than major thoroughfares, shall be constructed by boring and jacking. PVC pipe shall be jacked into place with equipment designed for that purpose. Water may be used to facilitate boring and jacking operations. Jetting the pipe main into place will not be permitted. When conditions exist that warrant an open cut across an existing street, the City may specifically approve the crossing.
4. All open cut installations under existing or proposed streets shall be backfilled as shown in the construction details.
5. All street crossings shall be constructed in accordance with construction plans approved by the City. The City shall inspect all street crossings. All street crossings shall meet the requirements of these standards.
6. All street, road, and creek crossings shall be cased with a larger diameter pipe.

J. Oil and gas pipeline crossings

Do not use metallic pipe when crossing oil or gas transmission lines unless a cathodic system is implemented with City approval. Other pipe may be used, regardless of depth, subject to approval by the City. Maintain minimum 2-foot separation between pipeline and water line.

K. On-site fire loops within commercial and multi-family developments

For developments requiring on-site fire hydrants, comply with the following requirements to allow maintenance and future repair operations:

1. Do not allow placement of structures or equipment pads over easement.
2. Provide 10-foot wide longitudinal pavement joint along easement lines where the water line is located under driveway, parking or street pavement.
3. Locate public fire line within 20' easement, or provide fire line meter at the property line.

L. Additional requirements

1. The carrier pipeline shall extend a minimum of 1 foot beyond the end of the casing to allow flanged joints to be constructed.
2. For welded steel bends, extend steel pipe a minimum of 5 feet beyond the bend.
3. PVC sleeves to be installed under all concrete driveways and streets for future expansion.
4. PVC sleeves to be installed in medians for irrigation lines.
5. Coordinate sleeve size with Public Works and Engineering Departments.

M. Auger (bore) construction

Use the following general criteria for establishing auger or bore sections:

1. Auger or bore sections shall be clearly shown on drawings.
2. Improved streets - use auger construction to cross the street regardless of surface. Auger length shall be computed as roadway width at proposed bore location plus 5 feet to either side of the roadway, where applicable.
3. Sidewalks - when the water line crosses under a sidewalk in good condition, the sidewalk shall either be bored and jacked or the sidewalk shall be removed and replaced to the City of Manvel criteria, whichever is cost effective. Bore and jack length shall be at least the width of the sidewalk. The proposed type of construction shall be noted on the plans.
4. Bore Pits - Bore pits shall be at least 3 feet from back of curb and 5 feet from the back of curb on a major thoroughfare. All bore pits shall be shored in accordance with OSHA requirements. Bore pits and/or receiving pits to be located in street or driveway paving, shall be shown on plans.

N. Water quality

The layout of the overall water distribution system shall provide maximum circulation of water to prevent future problems of odor, taste, or color due to stagnant water.

1. Provide a source of fresh water at each end or at multiple points of a subdivision. Provide ways to create circulation and place valves and fire hydrants to allow simple flushing of all lines.
2. Avoid dead-ends. When necessary, isolate dead-ends with a line valve, fire hydrant at the line's end, along with an Eclipse 9800i-Genesis Auto Flusher.
3. Where stubs are provided for future extensions, isolate the stubs with a valve and do not allow service connections to stubs until extended. Place one full pipe joint between the valve and stub.
4. Water mains shall be looped unless physically impossible.
5. All materials, which come in contact with public drinking water in any stage, must conform with ANSI/NSF Standard 60.
6. Layout and size of all water mains shall be consistent with the overall layout and phasing plan of the City's water system. The overall water system shall be designed to maintain required TCEQ minimum pressure throughout the system.
7. In an unavoidable dead-end situation, reduce the sizes of pipe successively. Carry an 8-inch pipe to the next to last fire hydrant; use a 6-inch PVC to the end of the line. Provide a fire hydrant at the end of the main.

O. Clearance of water line from other utilities.

1. New water lines parallel to sanitary sewers and force mains
 - a. Locate water lines a minimum of 9 feet horizontally, outside wall to outside wall, when parallel to sanitary sewers or force mains. Use the following procedure when 9 feet of separation cannot be achieved:

When a new water line is to parallel an existing sanitary force main or gravity sanitary sewer and the 9-foot minimum separation distance cannot be maintained, the existing sanitary sewer shall be replaced with lined ductile iron or PVC pipe meeting ASTM specifications, having a minimum working pressure rating of 150 psi or greater and equipped with pressure type joints. The water lines and sanitary sewer shall be separated by a minimum vertical distance of 2 feet, and a minimum horizontal distance of 4 feet, measured between the nearest outside walls of the pipe, and in all cases, the water line shall be located above the sewer. When a water main crosses a utility other than sanitary sewer, a minimum of 6 inches of clearance must be maintained, and the water main shall have one joint of pipe, a minimum 18 feet long, centered on the other utility.

- b. Where a sanitary sewer crosses the water main, and that portion of the sewer within 9 feet of the water is constructed as described in Section 290.44(e) of the TCEQ Rules and Regulations, the water line may be placed no closer than 6 inches from the sewer. The separation distance must be measured between the nearest outside pipe diameters. The water line shall be located at a higher elevation than the sewer, wherever possible and one joint, a minimum of 18 feet long, of the new pipe must be centered on the existing line.
- 2. When water lines are installed in areas, which have existing sanitary sewers, every effort should be made to maintain 9 feet of separation between the outside pipe diameters of the two lines. Where this separation cannot be achieved because of local conditions, which must be fully documented in any planning material submitted, the following spaces shall be observed:
 - a. Where a new water line is to cross, or be installed in parallel with an existing sanitary sewer, and the sewer is constructed as described in Section 290.44(e) of the TCEQ Rules and Regulations, the separation distances specified in those rules shall apply as though the sewer were new.
 - b. Where a new water line is to be installed in parallel to existing clay, truss, or concrete gravity sewer showing no evidence of leakage vertically and 4 feet horizontally, the sanitary sewer need not be disturbed. Should excavation for the water line produce evidence that the sewer is leaking, and then the sewer must be repaired.
 - c. Where a new water main is to cross an existing clay, truss, or concrete gravity sewer showing no evidence of leakage, the sewer need not be disturbed if the water line is to be installed at least 24 inches above the existing sewer. A full joint of the water line, at least 18 feet long, should be centered over the sewer crossing, in this case, so as to provide maximum protection against contamination.
 - d. Existing clay, truss or concrete sewer pipe which shows no evidence of leakage and because of physical limitations must remain at a higher elevation than the proposed intersecting water line or closer than 2 feet may remain undisturbed if the water line is inserted in a joint of pressure type encasement pipe at least 18 foot long and 2 nominal sizes larger than the water line. The encasement pipe should be centered on the sewer crossing and both ends sealed with cement grout. In lieu of this procedure, that portion of the sewer within 9 feet of the water line may be replaced with cast iron or ductile iron pipe with watertight joints as described in Section 290.44(e) of the TCEQ Rules and Regulations, above.
- 3. Sanitary manholes - provide a minimum 9-foot horizontal clearance from outside wall of existing or proposed manholes unless manholes and connecting sewers can be made water tight and tested for no leakage. If a 9-foot clearance cannot be obtained, the water line may be located closer to the manhole when prior approval has been obtained from the City of Manvel by using one of the procedures below; however, in no case shall the clearance be less than 4 feet.
 - a. Water line may be encased in a carrier pipe. Encasement shall be a steel water line in a steel carrier pipe. Open cut and backfilled with cement stabilized sand compacted backfill.
 - b. The water line may be augured past the manhole with one 20-foot section of C-900 PVC pipe 150 psi, installed centered about the existing sanitary manhole with pressure grout using a bentonite/clay mixture.

4. Fire hydrants. Do not install fire hydrants within 9 feet vertically or horizontally of sanitary sewer mains, service leads, and force mains regardless of construction.

P. Water Plants

1. All new storage tanks to be elevated; not ground level. Developer to provide proposed timeline, plan, and funding mechanism for Elevated Storage Tank subject to review and approval by the City.
2. Emergency backup generator (natural gas or diesel) to be installed on site and hard-wired to the electrical panel, with an automatic transfer switch (permanent installation; not a portable or trailer-mount style). Additionally, a quick-connect style plug to be installed on the panel, as a backup precaution, upon preapproval by Public Works. Permanent power supply to water plants shall be installed prior to City Council acceptance. Generators must be new when installed (not refurbished or previously used).
3. Provide minimum 8' board fence (either masonry, cedar or heart redwood) with steel posts in concrete, and a treated 2"x6" (or wider) rot board along the bottom.
4. Entrance drive to be at least fourteen (14) feet wide concrete pavement. Provide enough room to park inside site. Provide rolling gate with minimum 10' wide gate.
5. Indicate method of drainage on site plan. Internal drainage, sheet flow and valley gutter driveways are acceptable. Drain to street or storm sewer, never onto adjacent private property.
6. Refer to Section 6 Controlled Access Gate Requirements.

1.05 APPURTENANCES

A. Valves - Set at maximum distances along line as follows:

1. Six inch (6") through fourteen inch (14") - 1000 feet.
2. Sixteen inch (16") through twenty inch (20") - 2000 feet.
3. The total number of valves at any intersection shall equal the total number of lines leading out from the intersection point minus one, three (3) valves for a cross, and two (2) valves for a tee, unless otherwise specified.

B. Valve Types - All valves shall open counterclockwise and have mechanical joints:

1. Six inch (6") through fourteen inch (14") shall be gate valves.
2. Sixteen inch (16") through twenty inch (20") shall be butterfly valves.

C. Valve Locations

1. All mains shall be valved within the street right-of-way or within a dedicated water line easement. Valves shall not be placed under or within 2 feet of ultimate pavement.

2. Valves are normally located on the projection of intersecting street right-of-way lines or at the curb return adjoining a paved street across the main. Tapping sleeves and valves are excluded from this requirement.
 3. Isolate fire hydrants and flushing valves from the service line with a valve located in the fire hydrant or flushing valve branch. This valve shall not be located in the slope or flowline of ditches on roadside ditch roadways.
 4. Intermediate valves, not located on the projection line of the right-of-way line, shall be located on lot lines or 5 feet from fire hydrants but not set in driveways.
 5. Locate valves a minimum of 9 feet horizontally from sanitary sewer crossings.
 6. Valves shall not be located within a driveway, sidewalk, or street.
- D. Fire hydrants and flushing valves.
1. Spacing
 - a. Single Family Residential Development:
300 foot maximum spacing and at all street intersections
 - b. Non-Residential, Commercial Developments and/or Multi-Family Developments:
300 foot maximum spacing and at all street intersections. Fire hydrants shall be placed to locate a hydrant within 300 feet of all points of each building.
 2. Location in or along street rights-of-way
 - a. Fire hydrants shall be primarily located at street intersections where possible.
 - b. Locate fire hydrants at P.C.s of the intersection curb radius, 3 feet behind the curb or projected future curb.
 - c. On all State highways and roadside ditch roadways, set the fire hydrants within 3 feet of right-of-way lines. Fire hydrants lead valves shall not be located in the slopes or flowlines of ditches.
 - d. Set intermediate fire hydrants on lot lines, as extended to pavement, when located between right of way intersections. These locations may be adjusted 5 feet either way to miss driveways or other obstructions. In either case, do not locate fire hydrants closer than 3 feet from curbed driveways or 5 feet from non- curbed driveways.
 - e. Fire hydrants and flushing valves shall not be installed within 9 feet of a sanitary sewer system under any condition.
 3. Location of fire hydrants or flushing valves outside the street right-of-way
 - a. The City Fire Marshal will establish and approve the location of fire hydrants and flushing valves in apartment complexes and platted private street developments within the City.
 - b. Locate fire hydrants and flushing valves in protected, easily accessible areas behind curb lines.
 - c. For fire hydrants or flushing valves which are located adjacent to water lines constructed in 10-foot-wide water line easements, the fire hydrant or flushing valve shall be centered in a minimum 10'x10' separate easement.
 - d. For commercial and multi-family developments inside the City, provide isolation valves at each end of fire loops requiring on-site fire hydrants.

4. Fire Flow
Fire hydrants must be able to meet current NFPA and adopted Fire Code regulations.
 5. Fire hydrants shall be audited and painted per City specifications
 - a. The barrel (base) and caps shall be baked-on paint Safety Red.
 - b. The bonnet (top) shall be baked-on paint according to the size of the line:

Red	4-inch water line
Yellow	6-inch water line
White	8-inch water line
Green	10-20 inch water line
Orange	24-inch water line and above
 6. 5" built-in Storz connections and dust covers are required on all hydrants.
 7. Fire Department Connections (FDC's) when required shall be remotely located from buildings and have Storz connections. The fire department connection (FDC) shall be located at a point no further than twenty (20) feet from a fire apparatus access road, remotely located at a horizontal distance that is greater than the height of the building on the main street side, and easily accessible to the Fire Department. The location of the FDC shall be such so as to provide hose connections that shall not block access to the building or obstruct other fire apparatus from accessing the building. There shall be an approved sign as specified by the Fire Marshal designating the address served by the FDC. A fire hydrant shall be located within fifty (50) feet of the FDC measured along a fire apparatus road. If there is a conflict between this section and another section of this code, the most restrictive requirement shall apply.
 8. All new fire hydrants to be Mueller A423 Super Centurion with Storz Outlet.
 9. There shall be a minimum clearance of 3 feet around each fire hydrant.
 10. Fire Department Connections (FDC's) shall be located within 50 feet of a fire hydrant.
 11. Buildings equipped with a standpipe system shall have a fire hydrant within 50 feet of the fire department connection.
 12. All fire hydrants located in the City and its ETJ shall be identified with a blue reflector affixed to the pavement so that a hydrant is readily visible to arriving fire companies. On unpaved streets, a blue reflector shall be affixed to a post as close as practicable to the edge of the roadway so as to be visible.
- E. Fittings
1. All fittings shall be identified and described on the construction plans.
 2. Fittings are not permitted in fire hydrant leads.
 3. Normally, all water main fittings shall be ductile iron mechanical joints only.
 4. All plugs shall be provided with retention clamps.

5. Polyethylene tube encasement shall conform with the minimum requirements of "Polyethylene Encasement for Gray and Ductile Cast-Iron Piping for Water and Other Liquids", ANSI/AWWA C105, current revision. Soils within the project shall be tested in accordance with Appendix A of ANSI/AWWA C105 to adequately determine the requirements for encasement.
6. Thrust blocking shall be required on all bends, tees, plugs and combinations thereof.
7. All fittings and fire hydrants to be tied together with 3/4-inch stainless steel all- threads and I-bolts or approved equal (i.e., Mega Lugs).

F. Water main service

1. Water main service for lines in or along street rights-of-way.
 - a. Meters 2 inch and smaller - located in rights-of-way, water line easements, or in a minimum 5'x5' separate water meter easement. Meters shall be located in areas with easy access and protection from traffic and adjacent to right-of-way whenever possible.
 - b. Meters 3 inches and larger - located at the property line or in a minimum 10' x 20' separate water meter easement if necessary.
 - (1) Meters shall be located in areas with easy access and protection from traffic and adjacent to rights-of-ways whenever possible.
 - (2) Meters shall not be located in areas enclosed by fences.
 - c. Separate tap and service leads shall be designed for each meter.
 - d. Long service connections to be minimum 1-inch leads within 2-inch PVC casing.
 - e. No water line service shall exceed 150 feet in length.
2. For proposed apartments or town homes in private street developments, provide one master meter sized for the entire development. Exceptions may be granted by the City of Manvel for unusual circumstances. If an exception is approved, do not interconnect multiple meters.
3. All sprinkler and irrigation lines must be equipped with a backflow prevention device according to its application as required by TCEQ. Every new and existing non-single-family residential user is required to install a backflow prevention assembly at any meter servicing such a user's property. The backflow assembly shall be located after the meter for an irrigation system and in a vault near the building for a sprinkler system. A certified tester shall test the backflow prevention assembly annually and submit the results to the City.

1.06 SUBMITTALS

- A. General - Conform to the following submittal requirements in addition to those of general procedure of the City of Manvel.
- B. Water Line Sizes - Submit justification, calculations, and locations for proposed 6-inch lines and for lines 12-inch and larger, for approval by the City of Manvel, unless sizes are provided by the City.
- C. Valves - Submit information for approval by the City of Manvel with justification and locations for use of 16-inch and 20-inch gate valves proposed as substitutes for butterfly valves.

D. Water Meter Service

1. For construction inside city limits, submit an application for meter services and metered sprinkler connections, to the Building Inspections Division, prior to construction.
2. Submit requests for more than one service meter in proposed private street or multi-family developments to the City.
3. All new and replacement water meters to be 3/4-inch Neptune E-Coder R900i unless approved by the City of Manvel Water and Sewer Department.

E. Elevated stream or ditch crossings - Submit design calculations for support columns and column spacing.**F. Master Development Plan - For multiple phase developments, submit a master development plan.****G. Backflow Prevention**

1. All irrigation lines must be equipped with backflow prevention devices per TCEQ.
2. A double check backflow prevention assembly is required for 3" and larger lines.
- ~~3.~~ Every new and existing non-single-family residential user is required to install a backflow prevention assembly at any meter servicing such a user's property.

~~3.4.~~ [Refer to Section 71-7 of the City Code.](#)

1.07 QUALITY ASSURANCE

Prepare calculations and construction drawings under the supervision of a Professional Engineer trained and licensed under the disciplines required by the drawings. The final construction drawings must be sealed, signed, and dated by the Professional Engineer responsible for the development of the drawings.

2.0 EXECUTION**2.01 RESEARCH REQUIREMENTS**

- A. Research existing utility and right-of-way information.
- B. Verify that no restrictions exist that will deny approval of the project concept.

2.02 DESIGN ANALYSIS

- A. Water line sizes - Prepare narrative justification and calculations for proposed 6-inch lines and for lines 12-inch and larger, unless sizing is provided by the City of Manvel in advance.
- B. Elevated stream or Ditch Crossings - Prepare design calculations for support columns and column spacing.
- C. Developments of 100 acres or more to provide Regionalization Plan, including interconnection(s) with adjacent properties subject to review and approval by the City.

- D. All water components in the City of Manvel and its ETJ shall be designed for a minimum of 360 gallons per day per equivalent single-family connection.

2.03 DRAWINGS

- A. General: Conform to the following drawing requirements in addition to those of "Graphic Requirements" and the City's standard water line details and standard specifications.
- B. Appurtenances - Identify, describe and enclose in rectangular box on drawings.
 - 1. Valves
 - a. Designate 6-inch through 12-inch gate valves with box as GV&B.
 - b. Provide complete description and size for other valves.
 - 2. Water meters, service leads, and metered sprinkler connections.
 - a. Show the location of service line tees, tapping sleeve and valves, valve boxes, and temporary plugs to be installed to serve future 3-inch or larger meters.
 - b. Develop plan and profile sheets for 4-inch and larger leads and all service connections that cross state rights-of-way (FM1128, SH6, etc.).
- C. Construction features
 - 1. Show all special construction features required to complete the project in a safe, convenient and economical manner.
 - 2. Auger Construction
 - a. If the construction is predominately open cut, all portions of the street that must be augured shall be clearly shown on drawings by location and length. Include designation for sections at trees with 6 inches or larger diameters located within 10 feet of water Line.
 - b. Curbs - Include a requirement on drawings for construction of wheel chair ramps at street intersections where curbs are to be removed or are damaged by water line construction. Conform to the City's standards for ramps.

SECTION 4 PAVING

1.0 GENERAL

1.01 CHAPTER INCLUDES:

Design guidelines for streets, criteria for street paving, and standard paving notes for drawing call outs.

1.02 REFERENCES

- A. AASHTO - American Association of State Highway and Transportation Officials.
- B. ASTM - American Society for Testing Materials.
- C. ACI - American Concrete Institute.
- D. MUTCD - Texas Manual on Uniform Traffic Control Devices.
- E. City of Manvel Transportation Corridor Plan

1.03 DEFINITIONS

- A. Geotechnical Engineer - An engineer certified by the American Association for Laboratory Accreditation (A2LA).
- B. HMAC - Hot Mix Asphaltic Concrete.
- C. Curb and Gutter Sections - Full width concrete pavement with doweled on 4-inch by 12-inch curbs. Curb and gutter sections require inlets and underground storm sewers.
- D. Roadway ditch sections - Ditch sections adjacent to either full width reinforced concrete pavement or asphaltic pavement. Roadside ditch sections do not require underground storm sewers; however, the ditch sections must be designed to accommodate the storm runoff.

1.04 DESIGN REQUIREMENTS

The following design requirements are applicable to all pavement within the City of Manvel, and its ETJ.

- A. General
 - 1. All paving shall be approved by the City of Manvel for all streets within the City.
 - 2. Street design should conform to all applicable planning tools, such as the Texas Manual on Uniform Traffic Control Devices, major thoroughfare plans, master plans, etc. Other considerations for design should include street function, street capacity, service levels, traffic safety, pedestrian safety, and utility locations. These additional considerations may affect the minimum requirements set forth herein. Refer to the City of Manvel Major Thoroughfare Plan and Transportation Corridor Plan.
 - 3. Design shall conform to the City of Manvel Standard Details.

B. Minimum Width Requirements and Paving

1. The minimum ROW width for all streets in the City of Manvel and its ETJ is 60 feet. The minimum pavement width for all developments is:
 - a. Curb and Gutter sections: 28 feet back-to-back of curb (B/B).
 - b. Open-ditch sections: 26 feet edge to edge of pavement.
2. Per the City of Manvel Thoroughfare Plan, a minimum 80 feet ROW is required for the following:
 - a. Charlotte
 - b. Chocolate Bayou
 - c. Dogwood Avenue
 - d. Iowa Lane
 - e. Jordan Road
 - f. Rodeo Drive
 - g. Uzzell Road
3. Per the City of Manvel Thoroughfare Plan, a minimum 100 feet ROW is required for the following:
 - a. Bahler Avenue (CR 100)
 - b. Bissell Road
 - c. Booth Road
 - d. Cemetery Road (Harkey Road)
 - e. Clark Road
 - f. Lewis Lane
 - g. Oil Field Road (County Road 98)
 - h. Scopel Road
4. Per the City of Manvel Thoroughfare Plan, a minimum 120 feet ROW is required for the following:
 - a. Airline Road (County Road 48)
 - b. Bailey Avenue (County Road 101)
 - c. Croix Road (Country Road 58)
 - d. Del Bello Boulevard (Rodeo Palms Parkway / Belcher / County Road 397)
 - e. Kirby Drive
 - f. Manvel Parkway (County Road 94)
 - g. Markham Road
 - h. Masters Road (FM1128 / County Road 67)
 - i. McCoy Road (Meridiana / Peters / Patterson / County Road 89 / Old Chocolate Bayou)
 - j. Pearland Sites Road (County Road 99 / County Road 143)
 - k. Pollard Boulevard (County Road 90)
 - l. Southfork Drive (County Road 59)

C. Minimum Thickness and Reinforcement Requirements for Concrete Pavement

The following requirements are the minimum allowable. Pavement thickness and reinforcement shall be designed by the Professional Engineer responsible for the project based on a current soil analysis and recommendations by a qualified geotechnical engineer.

1. For pavement widths less than or equal to 28 feet B/B of curb:
 - a. Minimum concrete slab thickness shall be 6 inches with $f_c = 4,000$ psi and reinforcement shall be Grade 60, $f_y = 60,000$ psi, #4 deformed reinforcing bars spaced at 18 inches center to center both ways and minimum lap lengths of 18 inches. Expansion joints shall be placed at the end of each curb return and at a maximum spacing of 60 feet.
 - b. Minimum stabilized subgrade thickness shall be 6 inches.
2. For pavement widths greater than 28 feet B/B and for major arterial thoroughfares:
 - a. Minimum concrete slab thickness shall be 7 inches with $f_c = 4,000$ psi and reinforcement shall be Grade 60, $f_y = 60,000$ psi, #4 deformed reinforcing bars spaced at 18 inches center to center both ways and minimum lap lengths of 18 inches. Expansion joints shall be placed at the end of each curb return and at a maximum spacing of 60 feet on residential and collector streets, and a maximum spacing of 60 feet on boulevards and major thoroughfares.
 - b. Minimum stabilized subgrade thickness shall be 8 inches.

D. Subgrade Treatment

Geotechnical Engineer shall base depth of subgrade stabilization on structural number (SN) in conjunction with pavement thickness design. Following is a general guidance for subgrade treatment:

1. For subgrade soil conditions with a clay content of 10.0% or higher and plasticity index (PI) of 10 or more, the subgrade shall be stabilized with lime. Subgrade shall be stabilized with a minimum 6% lime by weight, at required thickness and compacted to 95% standard proctor density. Alternative subgrade stabilization may be substituted when specific recommendations are made by the geotechnical engineer for the project, and when specifically approved by the City Engineer.
2. For subgrade soil conditions containing clean sand with no clay content, the subgrade shall be stabilized with cement.

E. Requirements for Intersections, Turnouts, Transitions, and Thoroughfares

1. At a "T" intersection with a street that has not been improved to its ultimate width, concrete pavement should be stopped either at the right-of-way line or the end of the curb return, whichever would require less concrete removal at a future date.
2. For roadway turnouts placed at an existing street intersection, the turnout should be designed to fit the ultimate pavement width of the intersecting cross street and then transitioned to the existing roadway.
3. The usual transition length for meeting an open-ditch street is 50 feet for street widths less than or equal to 28 feet B/B; 75 feet for 37 feet B/B width; and 100 feet for 41 feet B/B width.
 - a. Streets other than concrete shall have transitions with a minimum thickness of 8 inches of lime stabilized subgrade, 6 inches of hot-mix asphaltic concrete base, or approved equal, with 2 inches of hot-mix asphaltic surfacing.
 - b. Concrete streets shall have transitions with a minimum thickness of 6 inches of stabilized subgrade and 6 inches of concrete pavement.

4. When paving only one roadway of a proposed two-roadway thoroughfare (boulevard section) all left-turn lanes and esplanade crossovers shall be paved to the centerline of the street right-of-way.
- F. Requirements for Roadway Pavement with Open-Ditch Sections
1. No new open-ditch drainage systems are permitted.
 2. Minimum grade on ditches shall be 0.20 percent.
 3. Ditch capacity shall be designed to handle runoff as determined by the City Drainage Design Requirements.
 4. The maximum side slope shall not exceed 3:1.
 5. Culverts for roadside ditch only, shall be designed to carry ditch discharge, but not less than 18-inch diameter pipe constructed of reinforced concrete.
 6. The radius for cul-de-sac pavement shall be 50 feet in a 60' radius ROW.
- G. Requirements for Roadway Pavement with Curb and Gutter Sections
1. Inlet spacing:
 - a. Curb inlets shall be spaced and sized to intercept the calculated runoff for the design storm. The water surface elevation at the inlet shall be less than or equal to the top of curb for the design storm flow.
 - b. Maximum travel distance of water in the street to a curb inlet shall be 300 feet on a major thoroughfare and in a commercial area. The maximum travel distance of water in the street permitted in a single-family residential area shall be 500 feet.
 - c. Curb inlets should be located on the intersecting side street at an intersection with a major thoroughfare. Locations on the major thoroughfare at intersections shall be specifically approved by the City Engineer.
 - d. Curb inlets shall have grate inlets lids.
 - e. Backfill around inlets with 1.5 sacks per cubic yard of cement stabilized and to top of first stage inlets.
 2. Minimum gutter gradient shall be 0.30 percent.
 3. Maximum cut from finished grade at property line to top of curb shall be 1.75 feet.
 4. The desired slope for driveways is 2% to 8%. A maximum slope of 10% may be allowed with specific approval of the City.
 5. Minimum grade shall be 1 percent fall around intersection turnout for a maximum radius of 25 feet. Grades for larger radius shall be determined on an individual basis.
 6. Vertical curves shall be installed when algebraic differences in grades exceed 1 percent. Elevations shall be shown at 10-foot intervals through vertical curves. Maintain a minimum of 0.03-foot elevation change at 10-foot intervals by altering the calculated elevations.

7. The radius for cul-de-sac pavement shall be 50 feet in a 60 feet radius ROW.
8. When a curb and gutter section intersects a drainage ditch, the grade of gutter shall be above the designed water surface of the ditch.
9. Minimum gutter grade for cul-de-sac shall be 0.60 percent.
10. Major thoroughfares shall be in accordance with AASHTO.
11. The amount of cross slope over the pavement section should be shown on the drawings. The usual cross slope is 3/8 inch per foot from curb line to quarter, and 1/4-inch per foot from quarter point to the center line, and 7/8-inch per foot for left-turn lanes.
12. A minimum gradient of 0.40 percent around the longest radius is required on an L-Type street intersection.
13. When meeting an existing curbed street, top of curb grades shall be designed to meet an elevation 6 inches above the existing gutter. At existing inlets, top of curb grades shall be designed to match existing top of curb elevations.
14. Fill lines shall be shown on the drawings. If fill is required and the pavement is adjacent to a nonparticipating property owner, fill easements from this property owner shall be obtained, filed, and a copy of the easements shall accompany the final drawings. Construction of this nature will require back-slope drainage design to prevent trapping storm runoff.
15. Grades should be labeled for all tops of curb. Centerline grades are acceptable for open-ditch sections only.

H. Requirements for Inlets with Curb and Gutter Sections:

1. Type "BB" with grate tops or type "H-2" inlets shall be used on all curb and gutter sections within the City depending on runoff requirements.
2. Inlets should be placed away from the major thoroughfare and on the side streets at street intersections.
3. Attempt to keep the proposed inlets away from esplanade openings and out of major thoroughfare intersections.
4. Inlets shall be placed at the end of pavement in order to eliminate drainage from the pavement gutter into an open-ditch.
5. On open-ditch streets, place stubs with ring grates from inlets to ditches.

I. Requirements for Curbs and Sidewalks:

1. Standard height is 4-inches and 12-inches wide for curb located along outside edges of residential streets. Curb height for streets other than residential shall be 6 inches. The curb height for all esplanades shall be 6-inches.

2. Sidewalk wheelchair ramps are required at all intersections and driveways. The design and installation of such ramps shall comply with Texas Accessibility Standards Architectural Barriers requirements.
 3. All sidewalks are to be constructed in accordance with the City of Manvel Standard Details. The design and installation of such sidewalks shall comply with Texas Accessibility Standards Architectural Barriers requirements.
 4. Sidewalks are required along all ~~curb and gutter~~ streets. The developer, prior to the City's final acceptance of the infrastructure, must install sidewalks along reserves and ROW. Sidewalks shall have a width of not less than 5 feet.
 5. The location of all proposed and existing sidewalks shall be shown on the construction drawings and plan and profile drawings.
- J. Requirements for Miscellaneous Items:
1. The type and amount of subgrade treatment shall be shown on the drawings.
 2. Paving headers shall be placed at the end of all concrete pavements.
 3. All concrete to be removed shall be saw cut before removal.
 4. Sight distance requirements based on the design speed the roadway shall be used for determining lengths of crest vertical curves for all pavements except boulevard sections which shall be designed for 45 mph.
 5. Standard City of Manvel barricades shall be placed at the end of all dead-end streets not terminating in a cul-de-sac.
 6. Submit to the appropriate drainage agency before City approval.
 7. A letter of agreement approving the construction plan crossing is required when paving is placed over a transmission pipeline.
 8. When meeting existing concrete pavement, horizontal dowels shall be used if no exposed reinforcing steel for interconnection with new pavement exists. Horizontal dowels shall be Grade 60, #6 rebar, 24-inches long, drilled and embedded 12-inches into the center of the existing slab and epoxied. Dowels shall be 18 inches center to center, unless otherwise specified.
 9. When concrete is removed for interconnections, the pavement shall be saw-cut, and existing concrete removed, to expose a minimum of 15-inches of reinforcing steel. If no reinforcing steel exists, use horizontal dowels as previously described.
 10. Dead-end streets or ends of concrete slabs designed to be extended in the future shall have paving headers and 15-inches of reinforcing steel exposed beyond the pavement, coated with asphalt and wrapped with burlap or paving headers and dowel type expansion joint for future pavement tie.

11. Pavement extensions shall connect to the existing pavement with a pavement undercut and a minimum steel overlap of 18-inches.
 12. Concrete pavement thickness design is required for all pavement within industrial areas and on major thoroughfares. Concrete pavement thickness design shall be based on AASHTO design procedures for rigid pavements.
 13. The pavement structure for each roadway shall be designed based on soil data from the site and based on the anticipated traffic volume, loading and service life of the proposed pavement structure. The design engineer is responsible for ensuring that the pavement structure is designed to withstand the anticipated loads that are expected on the roadway.
 14. Adjust manhole frames and covers within the limits of the pavement to meet the proposed final top of slab.
 15. Adjust manhole frames and covers outside the limits of the pavement to conform to the final grading plan.
 16. No more than one (1) shrinkage crack shall be allowed in each header section. A shrinkage crack is defined as extending one half or more of the full depth of the concrete (i.e., 3" or more on 6" thick concrete) appearing within ~~1-year~~ 2 years of the final concrete placement. If two (2) or more shrinkage cracks appear in a header, the entire section shall be removed and replaced at contractor's expense.
 17. If shrinkage cracks are less than one half of the depth of the concrete (i.e., less than 3" on 6" thickness) then a recommendation letter and data sheets are required from the testing laboratory as to the type of sealant which will be used to seal the shrinkage cracks. This recommendation shall be approved by the City Engineer before application of sealant.
 18. Core samples for the sections will be taken no sooner than the twenty-eight (28) day break of the original concrete pour sample.
 19. All medians must be sleeved for future irrigation lines.
 20. Refer to MUTCD for pavement and curb markings near stopping points, crosswalks, etc.
 21. All under-pavement utility crossings to be sleeved.
 22. Manholes, fire hydrants and water valves shall not be located within a driveway, sidewalk, or street.
- K. Original Manvel Townsite
1. The Original Manvel Townsite (OMT) area is bounded by Cemetery Road on the east, Large Drive on the north, McCoy Road on the west, and the railroad tracks (sitting just north of Bissell Road), on the south.
 2. The special regulations in this section shall apply to lots in the OMT zoned Light Commercial or Planned Unit Development (PUD) allowing for commercial land use, where the lot is five (5) acres or less.

3. Roads in the OMT may be constructed with a minimum 26-foot wide asphalt (instead of concrete), with a minimum thickness of 8 inches of lime stabilized subgrade, 6 inches of hot-mix asphaltic concrete base, and 2 inches of hot-mix asphaltic surfacing.
4. Roadside ditches (open ditches) are permitted in the OMT.

1.05 APPURTENANCES – Reserved

1.06 SUBMITTALS – Reserved

1.07 QUALITY ASSURANCE.

- A. All construction drawings and specifications shall be prepared by or under the supervision of a currently Registered Professional Engineer of the State of Texas, and all documents shall be sealed, dated, and signed by the engineer responsible for their preparation.
- B. All geotechnical work shall be performed by or under the supervision of a currently Registered Professional Engineer of the State of Texas disciplined in the science of soil analysis. All reports and documents shall be sealed, dated, and signed by the engineer responsible for their preparation.
- C. The designated laboratory technician must be on the jobsite at all times during the placement of concrete.

2.0 EXECUTION

2.01 RESEARCH REQUIREMENTS – Reserved

2.02 DESIGN ANALYSIS

- A. All pavement design shall be supported by calculations to establish the required thickness and reinforcement.
- B. The current soils report shall be the basis for design considering the use, loading, and life span of the proposed pavement.
- C. Storm sewer inlets shall be established in such numbers and in such locations as to effectively drain storm water from paved sections. A graphical plot and calculations of the hydraulic gradient shall be furnished by the design engineer.
- D. Open-ditch drainage shall be designed to accommodate the anticipated storm runoff, and all culverts shall be designed to accommodate the expected ditch capacity. Construction drawings shall indicate the direction of flow in the ditches, and profiles of the ditches shall reflect this slope. Anticipated volumes of storm drainage shall be identified in each ditch to enable future culverts to be sized to accommodate anticipated runoff.

SECTION 5 DRAINAGE

1.0 GENERAL

1.01 CHAPTER INCLUDES:

Criteria for the design of storm drainage improvements.

- A. Design requirements - The drainage criteria administered by the City of Manvel and complemented by Brazoria County for newly designed areas provides protection from structural flooding from a 100-year storm event. This is accomplished with the application of various drainage enhancements such as storm sewers, roadside ditches, open channels, detention and overland (sheet) runoff. The combined system is intended to prevent structural flooding from extreme events up to a 100-year storm.
- B. Street Drainage - Street ponding of short duration is anticipated and designed to contribute to the overall drainage capability of the system. Storm sewers and roadside ditch conduits are designed as a balance of capacity and economics. These conduits are designed to convey less intense, more frequent rainfalls with the intent of allowing for traffic movement during these events. When rainfall events exceed the capacity of storm sewer system, the additional run-off is intended to be stored or conveyed overland in a manner that reduces the threat of flooding to structures.
- C. Flood Control - The City of Manvel is a participant in the National Flood Insurance Program. The intent of the flood insurance program is to make insurance available at low cost by providing for measures that reduce the likelihood of structural flooding.
- D. Relationship to the Platting Process - Approval of storm drainage is a part of the review process for planning and platting of new development.

1.02 REFERENCES

- A. City of Manvel Flood Damage Prevention Ordinance subsequent revisions.
- B. Brazoria County Design Criteria Manuals ~~(including CR3, BDD4, and BDD5)~~
- ~~C. TX DOT Bridge Division Hydraulic Manual, Third Edition, 1985.~~
- ~~D. National Weather Service Documents - TP-40 Rainfall Frequency Atlas of the United States.~~
- ~~E. TXDOT Hydraulic Design Manual 2009-1, March 1, 2009.~~

1.03 DEFINITIONS

Conduit - any open or closed device for conveying flowing water.

Drainage Area Map - Area map of watershed, which is subdivided to show each area served by each subsystem.

FEMA - Federal Emergency Management Agency

Hydraulic Grade Line - A line representing the pressure head available at any given point within the drainage system.

In-Fill Development - Development of open tracts of land in areas where the storm drainage infrastructure is already in place and takes advantage of the existing infrastructure as a drainage outlet.

Public storm sewers - Defined as sewers and appurtenances that provide drainage for a public right-of-way, or more than one private tract, and are located in public right-of-way or easement. Private storm sewers provide internal drainage for a reserve or other tract. Private storm sewer connections to public storm sewers shall occur at a manhole or at the back of an inlet. All private storm sewers shall be constructed in conformance with these standards.

Rainfall frequency- Probability of a rainfall event of defined characteristics occurring in any given year. The National Weather Service publishes information on rainfall frequency. For the purpose of storm drainage design, the following frequencies are applicable:

1. 5-year frequency – a rainfall intensity having a 20 percent probability of occurrence in any given year, or nominally likely to occur once every 5 years.
2. 10-year frequency – a rainfall intensity having a 10 percent probability of occurrence in any given year, or nominally likely to occur once every 10 years.
3. 25-year frequency – a rainfall intensity having a 4 percent probability of occurrence in any given year, or nominally likely to occur every 25 years.
4. 100-year frequency - a rainfall intensity having a 1 percent probability of occurrence in any given year, or nominally likely to occur every 100 years.

Redevelopment - A change in land use that alters the impervious cover from one type of development of either the same type or another type, and takes advantage of the existing infrastructure in place as a drainage outlet.

Sheet Flow - Overland storm run-off that is not conveyed in a defined conduit, and is typically in excess of the capacity of the conduit.

1.04 DESIGN REQUIREMENTS

All designs of drainage facilities should meet the requirements of the City of Manvel Standard Specifications and Standard Drawings.

A. Determination of Run-off

1. Design Storm Events - All drainage improvements shall be designed for the following storm frequencies:

Road Side Ditch	5 years
Storm Sewers	5 years
Channels/Storm Sewers/Culverts draining 100 acres or less	25 years
Bridges	100 years
Creeks/Channels/Culverts draining 100 acres or more	100 years

2. The Rational Method shall be used for determining the peak flow rate in the sizing of all drainage improvements.

- a. Time of Concentration (minutes) is the time required for peak runoff from the entire upstream contributing area to reach the point of interest. Time of concentration can be calculated based upon an analysis of the actual travel time from the most remote point in the drainage area. The travel path should be clearly denoted and a sketch included in the design calculations.

$$t_c = D/60V + 10 \text{ (minutes)}$$

D = flow distance (ft)

V = flow velocity (ft/sec)

For purposes of calculating t_c , use the following velocities:

V = 0.5 ft/sec for overland flow (undeveloped)

V = 1.0 ft/sec for overland flow (developed)

V = 1.5 ft/sec or flow across paved surfaces or along gutter flowlines.

V = 2 ft/sec for flow in ditch or channel

V = 3 ft/sec for flow in storm sewer

- b. Rainfall Intensity (inches/hour) shall be calculated using the following formula:

$$I = \frac{b}{(d + t_c)^e}$$

Values to be used in Manvel are listed below:

Rainfall Frequency	b	d	e
5-year	<u>71.6058.019</u>	<u>11.089.236</u>	<u>0.7704712</u>
10-year	<u>82.2357.515</u>	<u>11.547.777</u>	<u>0.7644676</u>
25-year	<u>99.1252.780</u>	<u>12.865.022</u>	<u>0.7642618</u>
100-year	<u>128.6046.316</u>	<u>14.671.555</u>	<u>0.7562533</u>

b, d, and e values are derived from a single frequency rainfall intensity graph.

b = the y-intercept of the straight line

d = a constant used to adjust the relationship to plot as a straight line

e = the slope of the straight line

Source: ~~2016 TXDOT Hydraulic Design Manual Notice: effective July 2016~~
Brazoria County Drainage Criteria Manual May 2022

~~http://onlinemanuals.txdot.gov/txdotmanuals/hyd/manual_notice.htm~~

- c. The Rational Method is a method for calculating the peak run-off for a storm drain system. The formula for determining the peak flow rate is:

$$Q = C_f CIA$$

Q = Flow rate (cubic feet per second (cfs))

C_f = Frequency factor, if the product of C_f and C exceeds 1.0, use 1.0

C = Runoff Coefficient

I = Rainfall intensity (inches/hour) for a given storm frequency

A = Area (acres)

For the purposes of calculating C_f use the following values:

C_f = 1.00, for storm frequencies of 10 years or less

C_f = 1.10, for storm frequencies of 25 years

C_f = 1.25, for storm frequencies of 100 years

For the purposes of calculating C use the following values:

<u>Land Use Type</u>	<u>Run-off Coefficient</u>
Raw Undeveloped Acres	0.20
Improved Undeveloped Acres (i.e., mowed, filled, re-graded, etc.)	0.30
Park Land	0.40
Residential:	
Single Family Estates (≥ 2 acres)	0.45
Single Family Estates (≥ 1 acre)	0.50
Single Family (< 1 acre)	0.55
Garden Homes	0.65
Multi Family Low	0.75
Multi Family Medium	0.80
Multi Family High	0.85
Mobile Homes	0.85
Commercial	0.90
Industrial	0.95
Pond (detention and amenity)	1.00

Alternatively, the run-off coefficient "C" in the rational method formula can be calculated from the equation:

$$C = 0.6Ia + 0.2$$

C = watershed coefficient

Ia = impervious area/total area

If the alternate form is to be submitted, the calculation of C shall be provided as part of the drainage calculations.

B. Design of storm sewers

1. Design Frequency

a. Newly Developed Areas

The design storm event for sizing storm sewers in newly developing areas will be a 5-year rainfall. In the case where new development will interfere with the natural sheet flow of the land, the storm system must accommodate the runoff. Runoff should not be allowed to run over newly developed lots or streets. Stub out streets next to underdeveloped areas are to stub out storm lines to the limits of the streets.

b. Redevelopment or In-fill Development

The existing storm drain will be evaluated using a 5-year storm, assuming no development takes place. The storm drain will be evaluated with the development in place.

- (1) If the proposed redevelopment has a lower or equal impervious cover, no modifications to the existing storm drain are required.
- (2) If the hydraulic gradient of the existing storm drain is below the top of the curb, no improvements to the existing storm drain are required.

c. Private Drainage Systems

Storm sewers for private drainage systems should conform to the City of Manvel Standards for public drainage systems.

- (1) An approved development permit must be filed with the City of Manvel before any work shall be done on a private drainage system. Part of the development permit include a plan and profile sheets detailing the scope of the work including elevations.
- (2) Open ditch areas may be converted into storm sewer lines with the approval of a development permit. Guidelines for the process are available at the City of Manvel.

2. Velocity Considerations

- a. All storm drains shall be designed by the application of Manning's Equation and the Continuity Equation:

$$\text{Manning's Equation: } V = (1.486/n) R^{2/3} S^{1/2}$$

V = velocity (ft/sec)

R = hydraulic radius (area in square feet/wetted perimeter in feet)

S = slope of energy line in feet

n = coefficient of roughness

n = 0.013 for concrete pipes,

n = 0.024 for CMP

n = 0.011 for PVC

n = 0.012 for HDPE

Note: All public storm sewers must be constructed of RCP. Manning's roughness coefficients for CMP, PVC, and HDPE are to be used for private storm sewers only. All storm sewer pipes entering City of Manvel ROW shall be RCP.

$$\text{Continuity Equation: } Q = VA$$

Q = discharge (cfs)

V = velocity (ft/sec)

A = cross sectional area of conduit (ft²)

- b. Design velocities shall be 3 feet per second with the pipe flowing full.
- c. Maximum velocities shall not exceed 7 feet per second.
- d. Minimum Storm Sewer Pipe Slopes:

<u>Pipe Diameter</u>	<u>% Slope</u>
18	0.26
24	0.18
30	0.14
36	0.11
42	0.08
48	0.07
54	0.06
60	0.05

For pipe sizes not listed above, the minimum slope should be determined utilizing a design velocity of 3 fps.

3. Pipe Sizes and Placement

- a. Use the storm sewer and inlet leads with at least 24-inch inside diameter or equivalent cross section. Box culverts shall be at least 2 feet x 2 feet. Closed conduits: circular, elliptical, or box, shall be selected based on hydraulic principals and economy of size and shape.
- b. Larger pipes upstream should not flow into smaller pipes downstream unless construction constraints prohibit the use of a larger pipe downstream, or the improvements are outfalling into an existing system, or the upstream system is intended for use in detention.
- c. Match crowns of pipe at any size change unless severe depth constraints prohibit.
- d. Locate storm sewers in public street rights-of-way or in parallel and adjoining easements or in approved easements. Easements must be at least 20-feet wide and the storm sewer must be centered in the easement. Side and back lot easements are discouraged.
- e. Follow the alignment of the right-of-way or easement when designing cast in place concrete storm sewers.
- f. A straight line shall be used for inlet leads and storm sewers.
- g. Center culverts in side lot storm sewer easements.
- h. Storm boxes may substitute for pipes when workable space is an issue.

4. Starting Water Surface and Hydraulic Gradient

- a. The hydraulic gradient shall be calculated assuming the top of the outfall pipe as the starting water surface.
- b. At drops in pipe flowline, should the upstream pipe be higher than the hydraulic grade line, then the hydraulic grade line shall be recalculated assuming the starting water surface to be at the top of pipe at that point.
- c. For the design storm, the hydraulic gradient shall at all times be below the gutter line for all newly developed areas.
- d. Hydraulic grade lines shall be shown on all profile drawings.

5. Manhole Locations

Use manholes for precast conduits at the following locations:

- a. Size or cross section changes.
- b. Inlet lead and conduit intersections.
- c. Changes in pipe grade.
- d. Street intersections.
- e. A maximum spacing of 500 feet measured along the conduit run.
- f. Manholes shall be placed so as not to be located in the driveway area.

6. Inlets

- a. Locate inlets at all low points in gutter.
- b. Valley gutters across intersections are not permitted.
- c. Inlet spacing is generally a function of gutter slope. For minimum gutter slopes, the maximum spacing of inlets shall result from a gutter run of 500 feet from high point in pavement or the adjacent inlet on a continuously graded street section, with a maximum of 1000 feet of pavement draining towards any one inlet location.
- d. Use only Standard Inlets:

Inlet	Application	Capacity
Type A	Parking Lots/Small Areas	2.5 cfs
Type B-B	Residential	5.0 cfs
Type D	Parking Lots	2.0 cfs
Type E	Roadside ditches	20.0 cfs
Type H-2	Residential / Commercial	5.0 cfs
- e. Do not use "Beehive" grate inlets or other "specialty" inlets.
- f. Do not use grate top inlets in unlined roadside ditch.
- g. Place inlets at the end of the proposed pavement, if drainage will enter or leave pavement.
- h. Do not locate inlets adjacent to esplanade openings.
- i. Place inlets on side streets intersecting major streets, unless special conditions warrant otherwise.
- j. On-grade inlets shall be allowed.

C. Consideration of Overland Flow

1. Design Frequency. The design frequency for consideration of overland sheet flow shall consider extreme storm events, which exceed the capacity of the underground storm sewer system resulting in ponding and overland sheet flow through the development to the primary outlet.
2. Relationship of Structure to Street. All structures shall be constructed according to the Flood Damage Prevention Ordinance and should be higher than the highest level of ponding anticipated from the extreme event analysis.

3. Calculation of Flow
 - a. Streets will be designed so that consecutive high points in the street will provide for a gravity flow of drainage to the ultimate outlet.
 - b. The maximum depth of ponding at high points will be the top of curb or the centerline of roads without curb.
 - c. The maximum depth of ponding at low points will be 12-inches above the gutter on curb and gutter roads, or 6 inches above the centerline of roads without curb.
 - d. Sheet flow between lots can be provided only through a defined drainage easement.
 - e. A map shall be provided to delineate extreme event flow direction through a proposed development and how this flow is discharged to the primary drainage outlet.
 - f. In areas where ponding occurs and no sheet flow path exists, then a calculation showing that run-off from the 100-year event can be conveyed and remain in compliance with the other terms of this section must be provided.
 4. Overland Flow shall enter outfall drainage facilities (channels or detention pond) through a storm sewer sized to convey the 100-year event. Calculations shall be submitted for sizing the structure and determining that adequate inlet capacity exists.
- D. Design of Open Channels
1. Design Frequency
 - a. Open channels shall be designed according to methods described in the corresponding Drainage District's Design Criteria Manual.
 - b. Design standards for channel construction should follow the requirements specified in the corresponding Drainage District's Design Criteria Manual.
 - c. Design standards for the outfalls into channels should conform to those in the corresponding Drainage District's Design Criteria Manual.
 2. Determination of Water Surface Elevation.
 - a. Water surface elevations shall be calculated using Manning's Equation and the Continuity equation.
 - b. For the design storm event, the water surface should be calculated to remain within banks and below freeboard.
 3. Design of Culverts
 - a. Head losses in culverts shall conform to TxDOT ~~requirements. Bridge Division Hydraulics Manual, Chapter 4—Culverts.~~
 - b. Generally, only RCP will be approved for culverts in City right-of-way.

E. Design of Roadside Ditches

1. Design Frequency
 - a. Roadside ditch design is permissible only for single-family residential lots having widths larger than, or equal to, 120 feet.
 - b. The design storm event for the roadside ditch shall be to 0.5 feet below the edge of pavement or the natural ground at the right-of-way line, whichever is lower.
 - c. Design capacity for a roadside ditch shall be to 0.5 feet below the edge of pavement or the natural ground at the right-of-way line, whichever is lower.
 - d. The design must include an extreme event analysis to indicate that structures will not be flooded.
2. Velocity Considerations
 - a. For grass-lined sections, the design velocity shall be 2.0 feet per second during the design event. The maximum velocity shall be 5 fps.
 - b. A grass-lined or unimproved roadside ditch shall have side slopes no steeper than three horizontal to one vertical.
 - c. Minimum grades for roadside ditches shall be 0.2-foot per 100-foot.
 - d. Calculation of velocity will use a Manning's roughness coefficient of 0.040 for earthen sections and 0.025 for ditches with paved inverts.
 - e. Use erosion control methods acceptable to the City when design velocities are expected to be greater than 3 feet per second.
3. Culverts
 - a. Culverts will be placed at all driveway and roadway crossings, and other locations where appropriate.
 - b. Culverts will be designed assuming inlet control.
 - c. Roadside culverts are to be sized based on drainage area. Calculations are to be provided for each block based on design criteria presented in this manual.
 - d. Cross open channels with roadside culverts no smaller than 18 inches in diameter or equivalent. The size of culvert used shall not create a head loss of more than 0.20 feet greater than the normal water surface profile without the culvert.
 - e. Use erosion control methods acceptable to the City when design velocities are expected to be greater than 3 feet per second.
 - f. Sloped end treatments (S.E.T.) must be placed at all driveways. If S.E.T.'s cannot be used due to space constraints, the culvert must be extended 12" on each side of the driveway. A head wall may be used to replace the extension of the culverts.
 - g. HDPE may be used between driveway culverts, but not under driveways or street crossings. All driveway and street culverts to be RCP or RCB.
4. Depth and Size Limitations
 - a. Residential streets - maximum depth not to exceed 3 feet from edge of pavement.
 - b. Roadside ditch bottoms should be at least 2 feet wide.
 - c. Ditches in adjoining and parallel easements shall have the top of bank not less than 2 feet from the outside easement line.
 - d. Roadside ditch side slopes shall not exceed 3 horizontal to 1 vertical.
5. No new roadside open-ditch drainage systems will be permitted.
6. Existing roadside open-ditch drainage systems adjacent to new developments to be converted to underground storm sewer system by said developer.

F. Design of Outfalls

1. Shall conform to the corresponding Drainage District's Design Criteria Manual.
2. Detention pond and storm sewer outfalls shall be placed one foot above the flowline of the receiving channel.
3. Outfalls shall be placed 6 inches above the flowline of the receiving roadside ditch.
4. Wet detention ponds may be connected by a submerged pipe.
5. Outfalls must have a means to control erosion and washouts (i.e., concrete paving, interlocking blocks). Riprap is not acceptable.

G. Storm Water Detention

The purpose of storm water detention is to mitigate the effect of new development on an existing drainage system. If 20% or less of the entire property (single SFR lot, not subdivision) will be affected by new impervious cover, then a new or revised drainage plan will not be required.

1. Application of Detention.
 - a. As a normal consideration, storm water detention is required. The use of on-site detention is required in order to mitigate potential damage to existing structures unless the current infrastructure is improved, or the City has developed a plan for a detention facility to serve the overall area.
 - b. Design calculations for sizing the detention basin and related structures must be performed by the applicable method described in the following sections.
 - c. All calculations shall be sealed and signed by a Registered Professional Engineer.
 - d. A concrete parking lot may be used as part of the detention system, provided that the maximum depth of water over the inlet does not exceed nine (9") inches and the maximum depth in the parking stall does not exceed six (6") inches.
 - e. The Rational Method can be used for determining the peak release rate and the peak inflow rate for a detention pond.
2. Calculation of Detention Volume
 - a. The Modified Rational Method may be used to determine the detention storage volume for developments that are 5 acres or smaller.
 - b. A simplified method may be used for determining the amount of detention volume required based upon a rate of 0.65 acre-feet per gross acre. This method may only be used for developments less than 100 acres.
(i.e., 5-acre site $\times$ 0.65 = 3.25 acre-feet)
 - c. The Triangular Hydrograph method may be used for determining the amount of detention volume required for development of 100 acres or less.
 - d. The Unit Hydrograph Method (Small Watershed Method), which calculates the required detention storage volume by determining the difference in volumes between the inflow and outflow hydrographs, may be used for developments less than 100 acres.
 - e. For developments with more than 100 acres, a detailed hydrologic analysis utilizing the HEC-HMS, HEC-RAS Flood Hydrograph method will be required.

3. Calculation of Outlet Size

Outfalls, which utilize a pipe restrictor to control outflow, shall use the orifice equation.

a. Reducer or Restrictor Pipes shall be sized as follows:

(1) Use the following equations to calculate the required outflow orifice:

$$\text{Area of pipe} = \pi d^2 / 4$$

$$Q = CA (2 gh)^{1/2}$$

$$D = Q^{1/2} / 2.25 h^{-1/4}$$

Q = outflow discharge in cfs.

C = 0.8

h = water surface differential (ft)

D = orifice diameter (ft)

A = area of pipe (ft²)

g = gravity (32.2 ft/s²)

- (2) For head differential in systems outfalling into a roadside ditch or storm sewer use actual head loss or 1-foot whichever is greater. For all other discharge conditions use 2 feet or difference of 100-year water surface elevation and elevation of 25-year storm in receiving channel, whichever is greater.
- (3) For detention systems outfalling into a public storm sewer, the restrictor shall be sized based upon the peak 5-year developed flow.
- (4) For detention systems outfalling into a public roadside ditch, the restrictor shall be sized based upon the peak 5-year undeveloped flow.
- (5) For detention systems outfalling into creeks, channels or storm sewers sized to carry the 25-year or 100-year storm, the restrictor shall be metered to release the 5-year, 25-year and 100-year undeveloped flows.
- (6) Restrictor shall be either the required diameter or the equivalent cross-sectional area. The orifice diameter "D" shall be a minimum of 6 inches.
- (7) Detention ponds less than one (1) acre in size shall have a minimum of 4 inches of freeboard. All ponds one (1) acre or larger in size shall have at least one (1') foot of freeboard. When a parking lot is used for detention per 1d. above, freeboard is not required within the parking lot. Freeboard shall be measured from the maximum 100-year water surface elevation and shall not be used in the calculation of storage or mitigation.

4. Detention Pond Structural Requirements

- a. Side slopes shall not exceed a slope of 4 horizontally to 1 vertically.
- b. Dry ponds with lengths over 50 feet shall have a concrete pilot channel.
- c. Concrete pilot channels shall have a minimum width of 4 feet and a minimum thickness of 4 inches with #3 rebar spaced at 12 inches on center each way. The concrete channels shall be constructed of 5-sack cement concrete with a compressive strength of 2500 psi at 28 days. Provide a 1-inch depression per every 1-foot of transverse slope with redwood headers spaced every 40 feet.
- d. Appropriate covering (grass, slope paving, etc.) shall be established on side slopes and pond bottom to prevent erosion during periods of maximum water velocity.
- e. A concrete gravity spillway, set at the maximum ponding elevation, shall be provided at the detention pond outfall structure.
- f. Wet detention ponds and ponds with vertical walls shall provide access for safety and maintenance purposes. Wet detention systems shall have a method in-place to minimize stagnation, such as an aeration system.
- g. Dry detention ponds shall not be designed with less than two feet of depth.

5. Ownership and Easements
 - a. Pumped detention or floodplain mitigation facilities are not allowed.
 - b. Maintenance responsibility of the detention facility must be indicated on the plat.
 - c. All properties being served shall have drainage access to the pond.
 - d. A maintenance agreement must be provided when multiple tracts are being served.
 - e. A maintenance berm must be provided around all sides of detention and floodplain mitigation facilities.
 - (1) The minimum maintenance berm width for dry ponds is 20 feet.
 - (2) The minimum maintenance berm width for wet ponds is 30 feet.
6. Off-Site Detention

Off-site detention, such as regional or sub-regional detention, may be used provided:

 - a. The detention facility is in the same watershed or sub-watershed as the developer's site.
 - b. The drainage area is less than 100 acres.
 - c. Excess detention capacity may not be used for mitigation of fill in the flood plain.
 - d. The Developer provides conveyance to the detention facility without having a detrimental effect on any adjacent properties.
 - e. If conveyance is directed through properties not directly owned by the developer, an executed contract or recorded deed between the parties agreeing to the said conveyance must be presented.
 - f. This procedure is approved by both the City and the corresponding drainage entity during preliminary plan review.
 - g. It is the desire of the City of Manvel that regional detention be utilized when available. If new development is within the service area of a publicly owned or operated regional storm water detention facility, connection to such regional facility shall be as required by the drainage master plan applicable to such facility.
7. Redevelopment and Additions
 - a. Additional impervious cover may be added to an existing single-family residential lot (1-time allowance), provided that the cumulative increase does not exceed 20% of the original impervious cover for that lot.
 - b. A drainage plan and detention calculations will be required for any proposed improvements, additions, or redevelopment in excess of the 20% impervious cover allotment.
 - c. All commercial and non-residential new developments, additions, or redevelopment will require a new or revised drainage plan for additional impervious cover.

1.05 RESERVED

1.06 SUBMITTALS

A. Preliminary Design - Submit for Review and Comment

One-line drawings are required as part of the platting process and include:

1. Approximate definition of lots and street patterns.
2. The approximate drainage areas for each system.
3. A definition of the proposed drainage system by single line.
4. The proposed pipe diameters.
5. Any proposed drainage easements.
6. Floodplain boundary, if any.

B. Final Design - Submit the Following for Approval

1. Copies of any documents which show approval of exceptions to the City design criteria.
2. Design calculations for storm line sizes and grades, and for detention facilities, if any.
3. Design calculations for the hydraulic grade line of each line or ditch, and for detention facilities, if any.
4. Contour map and drainage area map of the project.
5. Plan and profile sheets showing storm water design (public facilities only).
6. Projects located within a Flood Plain boundary or within a Flood Plain Management area shall show the Flood Plain boundary or Flood Plain area, as appropriate, on the one-line drawing or drainage area map.
7. Soil boring logs.
8. All drainage plans shall have a current FEMA flood zone determination statement.

C. Signature - Submit the Following for Approval

1. Review prints.
2. Original drawings.
3. Storm water detention maintenance agreement letters.

1.07 QUALITY ASSURANCE

- A. Prepare calculations and construction drawings under the supervision of a Professional Engineer trained and licensed under the disciplines required by the drawings. The final construction drawings and all design calculations must be sealed, signed, and dated by the Professional Engineer responsible for the development of the drawings.
- B. Prior to release of the maintenance bond (and in conjunction with the final walk-thru), the developer shall have all storm sewer lines (within the project boundary) inspected with television equipment. Any pipe settlement which causes excess ponding of water in pipeline, any misaligned joints, or other defects shall be cause for rejection. The developer shall provide the City with one copy of the TV videotape and one copy of the TV inspection report. For each segment, the video tape and corresponding written report shall clearly identify:
1. Each line segment being inspected.
 2. The size and type of pipe being inspected.
 3. Accurate footage of the line segment inspected.
 4. Deficiencies in materials, alignment, pipe grade, or any other apparent deficiencies.

2.0 EXECUTION**2.01 RESEARCH REQUIREMENTS – Reserved****2.02 DESIGN ANALYSIS**

- A. All projects shall be tied to National Geodetic Survey (NGS) Datum adjustment, which matches the Federal Emergency Management Agency (FEMA) rate maps or the most current NGVD, which matches the FEMA rate maps. In the event GPS surveying is used to establish benchmarks, at least two references to benchmarks relating to the FEMA rate maps must be identified. Equations may be used to translate other datum adjustments to the required adjustment.
- B. Plan sets will include a drainage area map, which shall contain all storm sewer drainage calculations as determined by the Rational Method.
- C. All drainage systems for curb and gutter pavements shall be underground closed conduits; individual residential lot drainage is exempt. Drainage systems for pavements without curb and gutter shall be roadside open-ditch sections.
- D. Soil boring with logs shall be made along the alignment of all storm sewers having a cross section equal to or greater than 72 inches in diameter or equivalent cross section area. Boring should be taken at intervals not to exceed 500 linear feet and to a depth not less than 3 feet below the flow line of the sewer. The required bedding will be determined from the soil boring.
- E. Plan sets shall include the 5-year Hydraulic Grade Line for storm sewers and roadside ditches on the plan and profile sheets. They shall also include the 100-year ponding depth on the plan and profile sheets.

SECTION 6 SITE DEVELOPMENT

1.0 GENERAL

1.01 CHAPTER INCLUDES: Site Development

1.02 REFERENCES

- A. City of Manvel Zoning Ordinance.
- B. City of Manvel Subdivision Ordinance.

1.03 DEFINITIONS

Commission – Planning, Development and Zoning Commission

1.04 DESIGN REQUIREMENTS

A. Site Development Requirements

1. General Requirements

- a. Site development plans for all site developments within the City of Manvel and its ETJ shall be approved by the City prior to construction.
- b. Site developments, not including single family residential, shall include any project that affects public water, wastewater, storm drainage, or paving facilities.
- c. All site developments shall conform to the requirements of these Standards and applicable rules and regulations of the City of Manvel.
- d. All wastewater, drainage and paving site development improvements shall be privately owned, operated and maintained up to and including the connection to the public system.
- e. All water site development improvements shall be privately owned, operated and maintained up to, but not including, the meter and meter vault.
- f. Restore the City of Manvel ROW to existing or better condition.
- g. Private utilities and service lines shall be placed in an easement or on the property being served.
- h. Hours of Construction are 7:00 AM to 9:00 PM, Monday through Saturday.
- i. As-Built Construction Plans (Record Drawings) and a Two-Year Maintenance Bond (in the amount of 100% of the cost of the infrastructure improvements, valid two years from the date the infrastructure is accepted by City Council) shall be required for all public improvements being dedicated to the City.

2. Design Review Requirements for Site Development Plans.
 - a. All site development plans for proposed developments shall be submitted to the City for approval prior to construction. Site development plans shall show all proposed water, wastewater, paving, parking, drainage, street signage, streetlight locations, flood protection facilities, and sidewalks with approved ADA ramps locations.
 - b. A traffic impact study shall be required for any development proposal expected to generate traffic volumes that will significantly impact the capacity and/or safety of the street system. All proposed developments generating volumes of 5,000 trips per day or greater shall meet this criterion. The trip estimate shall be based on the latest version of the Institute of Transportation Engineers, Trip Generation Manual.
 - c. The developer should first schedule a Pre-Development Meeting (PDM) with the City of Manvel. At this meeting, the developer should be able to discuss infrastructure issues and the feasibility of developing the site.
 - d. The next step is to prepare a site plan submittal to be reviewed by staff. The developer shall consult with staff until all significant issues surrounding the proposed site plan and development are resolved, prior to proceeding to the Commission.
 - e. The final site plan is prepared after all comments on staff review have been addressed. Any applicant may submit a site plan for consideration by the Commission at any time after the staff review is completed. The Commission reviews the final document for completeness and public awareness. The submittal for the final site plan requires that 10 copies of:
 1. Site Plan
 2. Landscaping Plan
 3. Elevation PlanAnd 3 copies of:
 1. Drainage Plan
 2. Utility Plan
 3. Grading Plan
 4. Storm Water Pollution Prevention PlanTo be provided to department staff at least 14 days prior to the next regularly scheduled PD&Z meeting.
 - f. Submittal to the appropriate drainage agency is required prior to Council approval. Once the site plan is approved, the developer may begin the building permitting process.
 - g. Three (3) copies of the site development plans shall be submitted to the Building Official for review. The City will typically respond within 2 to 4 weeks of the initial submittal.
 - h. When plan changes are requested, 2 copies of the revised site development plans shall be resubmitted to the City for final review and should result in the issuance of the building permit.
3. Building Slab Elevations - Minimum building slab elevations shall conform to the requirements of the City of Manvel Flood Damage Prevention Ordinance.
4. Water Service - Water service lines and meters shall be sized in accordance with requirements set out in Section 3 of the Design Criteria Manual.

5. Sanitary Sewer Service - Sanitary sewer service leads are normally installed during construction of the public sanitary sewer. When a sanitary sewer service lead is to be installed for a site development, refer to the Wastewater Collection System Design Requirements. All lots, tracts, or reserves shall be connected directly to a public sanitary sewer by a single lead. The City shall be contacted for all sanitary sewer connections for commercial projects within the City.
6. Site Drainage Requirements - All commercial, industrial, office, recreational, and multi-family tracts shall have an internal drainage system. The internal drainage system shall connect all site runoff into a storm sewer system that shall connect to the public drainage facilities in the area, except with specific approval.
 - a. The internal site storm sewer shall be connected to a public storm sewer and a manhole or at an inlet adjoining the site. The site drainage outfall shall be connected to the nearest existing drainage system with adequate capacity to serve the drainage area. Where extension of the existing drainage system is required, all costs for extension shall be the responsibility of the development.
 - b. All internal facilities shall be designed by a Registered Professional Engineer and shall be sized to drain the site in accordance with these standards.
 - c. Drainage calculations shall be submitted with all site development plans. Other supporting data may be required by the City.
 - d. When the site drains directly into a Brazoria County facility and/or into a highway right-of-way, the appropriate governmental entity (entities) shall approve the site development connection to public facilities.
7. Driveways
 - a. It is desirable to minimize the number of driveways on all streets in order to reduce the number of conflict points and facilitate traffic flow. It is recognized, however, that certain existing tracts may not be able to fully comply with the following standards due to limited frontage or other constraints.
 - b. When compliance with these criteria is precluded due to the location of driveways on adjoining properties, attempts should be made to obtain alternative access where feasible, including joint access driveways, access easements to adjoining properties or access to intersecting streets.
 - c. If it can be demonstrated to the City that sufficient attempts to secure alternative access have been made and that such access is still not possible, the City may accept a Traffic Impact Analysis performed by a Registered Professional Engineer to permit a deviation to the driveway spacing requirements indicated herein.
 - d. Residential driveways shall be a minimum of 12 feet wide (and a maximum of 24 feet) at the right-of-way line and should be placed away from the property line.
 - e. Residential lots must have a minimum of 120 feet of frontage in order to be eligible for two driveways on the same lot and they shall have 50 feet of separation between them.
 - f. Residential lots should not front on collector streets, thoroughfares, or arterials. For residential lots that do front on collector streets, they must have an internal turnaround or circle drive to minimize conflict points.
 - g. Non-residential driveways shall be 25 feet to 35 feet wide of pavement.
 - h. Driveways shall be spaced with a minimum of 50-foot separation.
 - i. Islands may be allowed within non-residential driveways, but must have a minimum of 12.5' travel lanes, and be pre-approved by the Fire Marshal.

- j. Driveways on major thoroughfares/boulevard streets shall be placed no closer than 125 feet from the ultimate curb line of an intersecting major thoroughfare or boulevard street.
 - k. Driveways on collector/ minor streets are to be placed no closer than 75 feet from the ultimate curb line of an intersecting major thoroughfare/boulevard street.
 - l. Driveways on major thoroughfares/boulevard streets are to be placed no closer than 75 feet from the ultimate curb line of an intersecting collector commercial/minor street.
 - m. For purposes of determining the separation distance, the back of curb or edge of street shall be used in conjunction with the edge of driveway which is closest and parallel to the street.
 - n. Non-residential tracts with less than 150 feet of frontage on a public street shall have no more than 1 driveway. Non-residential tracts with between 150 and 320 feet of frontage on a public street shall have no more than 2 driveways. Non-residential tracts with between 321 feet and 600 feet of frontage on a public street shall have no more than 3 driveways. Non-residential tracts with over 600 feet of frontage on a public street shall have driveways specially designed and specifically approved by the City.
 - o. Non-residential driveway connections to the public street shall be approved and inspected by the City of Manvel.
 - p. Driveway radii shall not extend beyond the projection of a property corner to the back of the curb.
 - q. Driveways shall be concrete installed according to the City of Manvel Construction Details.
 - r. Driveways shall be evaluated with respect to signage, landscaping and structures for adequate sight distance.
 - s. A note stating, "Access to adjacent property and common driveways may be required," shall be placed on the site plan.
 - t. Curb returns for driveways shall be, at a minimum:
 - (1) For residential driveways:
 - (a) 5 feet on local streets
 - (b) 10 feet on collector streets, major thoroughfares and boulevards
 - (2) For non-residential driveways:
 - (a) 25 feet on local streets
 - (b) 35 feet on collector streets, major thoroughfares, boulevards and local streets less than 28 feet in width.
 - u. Per Section 59-53 of the Manvel City Code, manholes, fire hydrants, and water valves shall not be located within a driveway, sidewalk, or street.
8. Controlled Access Gate Requirements
- a. Plans for access control systems shall be submitted to the Fire Marshal's Office and approved prior to construction.
 - b. All access control gates shall have emergency means of operation in the event of power loss.
 - c. Access control gates shall provide a clear, passable width of at least twenty feet.
 - d. A Knox® key switch and Click2Enter-I.V4 scanner radio receiver shall be provided for all controlled access gates. The key switch shall operate all gates.
 - e. A Knox® pad lock and Click2Enter-I.V4 scanner radio receiver shall be provided for all non-motorized gates.
 - f. The location of the key switch shall be approved by the Fire Marshal's Office.

- g. The owner shall maintain all parts of the access system and keep them in good working order.
- h. The Fire Marshal's Office and Police Dispatch shall be notified immediately of any damage to the access system that hinders access including, but not limited to, damage to the key box, lock, or gates.

9. Pollution Prevention

A pollution prevention plan shall be provided for all site development projects.

- a. Filter fabric fence shall be installed at the perimeter of the site before construction is to begin.
- b. Once construction is completed, either filter fabric fence, 5 feet of hydro mulch or sod shall be installed at the back of all curbs, or other Best Management Practices shall be implemented.
- c. Refer to the storm water ordinance for additional requirements.

10. Parking Lot Guidelines

A parking lot layout is required to ensure that adequate off-street parking is provided with the construction, alteration, remodeling or change of use of any building or change in use of land.

- a. Off-street parking spaces shall be located on the same lot, tract, parcel, or premises as the use being served or on other property of the same or less restrictive zoning classification that the owner of the premises being served has a continuing right to use for parking. When the off-street parking spaces are not located on the same lot, tract, parcel, or premises being served, the distance from the center of the parking lot to an entrance to the building or use shall not exceed 300 feet in distance, measured along the shortest available pedestrian route with public access.
- b. Any existing building or use that is enlarged, structurally altered, or remodeled to the extent of increasing or changing the use by more ~~that~~than 50 percent as it existed shall be accompanied by off-street parking for the entire building or use. When the enlargement, structural alteration, or remodeling is to the extent that the use is not increased or changed by more than 50 percent, additional off-street parking shall only be required for the increased or changed floor area or use.
- c. Existing parking spaces may not be used to satisfy additional off-street parking requirements unless the existing spaces exceed the number recommended for the building or use for which the existing spaces are associated. Commercial areas may be phased. Parking from earlier phases may count for future uses.

- d. The Parking Group Table can be found in the Zoning Ordinance, Section 77-45.
- e. The design and dimensions of off-street parking areas shall be in accordance with the following table of minimum dimensions. The minimum size of a parking spaces shall be 10 (ten) feet wide and twenty (20) feet long. All dimensions below are in feet:

	<i>Angle</i>			
	<i>0°</i>	<i>45°</i>	<i>60°</i>	<i>90°</i>
Stall, parallel to aisle	25.0	10.0	10.0	10.0
Stall, perpendicular to aisle	10.0	20.0	20.0	20.0
Aisle width, one-way	25.0	25.0	25.0	25.0
Aisle width, two-way	25.0	25.0	25.0	25.0
Cross aisle, one-way	25.0	25.0	25.0	25.0
Cross aisle, two-way	25.0	25.0	25.0	25.0

- f. Off-street parking spaces shall be clearly marked. Parking spaces abutting an adjoining property line or street right-of-way shall be provided with wheel guards or bumper guards so located that no part of a normally parked vehicle will extend beyond the property line. When wheel guards are used, they shall be centered 2.5 feet from the property line for 90-degree parking, 2.3 feet for 60-degree parking, and 2.0 feet for 45-degree and 30-degree parking
 - g. Approval of the parking area layout and design of all off-street parking areas shall be by the City. The City shall determine that spaces provided are usable, and that the circulation pattern of the area is adequate.
 - h. Mixed/Combination of Land Uses - Where a mixed or combination of land uses are proposed, parking shall be calculated based on the respective requirements of each land use. Shared parking is encouraged, if appropriate.
 - i. All new parking shall be constructed with concrete, with a minimum slab thickness of 6 inches with $f_c = 3,500$ psi and reinforcement shall be Grade 60, $f_y = 60,000$ psi, #4 deformed reinforcing bars spaced at 18 inches center to center both ways and minimum lap lengths of 18 inches.
11. Fences in any single-family residential district may not exceed six feet in height. Fences in districts other than single-family residential, may not exceed eight feet in height. Barbed wire fences are only allowed on property at least two acres in size and the barbed wire portion of the fence shall be no higher than 52 inches as measured from the natural ground.
- a. Perimeter fencing adjacent to Major Thoroughfares shall be masonry.
 - b. Perimeter fencing adjacent to Detention Ponds and Amenity Lakes shall be ornamental (wrought) iron.
 - c. Perimeter fencing to be installed prior to the release of the Maintenance Bond.

12. Driveway Culverts

a. *New Culverts*

- (1) Driveway culverts will be set by Road and Bridge Department personnel on city-maintained roads.
- (2) The Department will not set culverts in rights-of-way for State roads or on private roads.
- (3) Citizens wishing new culverts to be set are required to furnish reinforced concrete pipe (RCP) of a suitable size as determined by Department personnel. Reasonable notice from citizen is required.
- (4) New culverts will be backfilled with soil or other material available on the site at the time culvert is set. Any material other than in-place soil must be purchased by the citizen from a vendor of their choosing. Clean out openings or grates must be supplied by the citizen if the culvert is longer than 48 feet.

b. *Existing Culverts*

- (1) When drainage projects are undertaken by the Department, culverts may be enlarged if necessary, and replaced with RCP at Department's expense. Installation will be completed as follows:
 - (a) Culverts covered with base material will be re-covered with base material.
 - (b) Asphalt or concrete removed will be replaced with like material (asphalt for asphalt and concrete for concrete).
 - (c) When the Department undertakes projects to re-surface roads with asphalt, asphalt will be tapered outside edge of pavement at existing driveways to avoid abrupt drop off.

c. *Culvert Installation*

- (1) Stake and mark the ditch where you would like to have the culvert set. Call City of Manvel, Permits Department and have a work order prepared. We will send out our Public Works Personnel they measure the ditch; and will call you with the correct size of reinforced concrete pipe you need to purchase.
- (2) Once the size is determined, order the reinforced concrete culvert pipe and have them delivered to the site. The only dirt we typically use to cover pipe is fill dirt (what we usually dig out of the ditch when we set the culverts). After your culverts are delivered to the site, give City Hall a call and we will put in another work order to install the culverts.

d. *Driveway Surface*

- (1) The citizen's contractor may add asphalt or concrete surfacing over a driveway culvert at the citizen's expense. Contractor shall insure that alignment of culvert pipe is not altered during such operation.
- (2) If concrete surfacing is added by citizen's contractor: An expansion joint shall be provided two feet beyond outer edge of pipe on each side of culvert pipe, to facilitate removal of concrete as may be necessary to enlarge pipe during drainage improvement projects.
- (3) No concrete shall be placed within 11 feet of roadway centerline.

13. Streetlights
 - a. All new streetlights within a subdivision to be installed by the developer.
 - b. All monthly electrical charges and any maintenance and operation costs for streetlights within a subdivision to be paid for by the homeowners' association or MUD, as applicable.
 - c. All new streetlights to be LED Modules/Fixtures.
 - d. Refer to City Code 62-114.
 - e. Streetlights to be installed at all intersections, dead-ends, cul-de-sacs, and at a minimum spacing of 250 feet; or consistent with a photometric layout, as approved by the City.
 - f. Streetlights on Streets ($\leq 80'$ ROW) shall have minimum 60-watt LED. Streetlights on Thoroughfares ($> 80'$ ROW) shall have minimum 180-watt LED.
14. Fire Apparatus Access Roads and Fire Lanes
 - a. Fire apparatus access roads and Fire Lanes shall have a radius of 25 feet and unobstructed width of not less than 25 feet exclusive of shoulders, except for approved security gates in accordance with Section 503.6 of the Fire Code, and an unobstructed vertical clearance of not less than 14 feet (4267 mm).
 - b. Fire apparatus access roads shall be designed and maintained to support imposed loads of 80,000 lbs. for fire apparatus and shall be surfaced so as to provide all-weather driving capabilities.
 - c. Fire Lane Marking Striping, signs, or other markings, when approved by the fire code official, shall be provided for fire apparatus access roads to identify such roads or prohibit the obstruction thereof. Striping, signs and other markings shall be maintained in a clean and legible condition at all times and be replaced or repaired when necessary to provide adequate visibility.
 - (1) Striping – Fire apparatus access roads shall be continuously marked by painted lines of red traffic paint six inches (6") in width to show the boundaries of the lane. The words "NO PARKING FIRE LANE TOW-A-WAY ZONE" or "FIRE LANE NO PARKING TOW-A-WAY ZONE" shall appear in four inch (4") white letters at 25 feet intervals on the red border markings along both sides of the fire lanes. Where a curb is available, the striping shall be on the vertical face of the curb.
 - (2) Signs – Signs shall read "NO PARKING FIRE LANE TOW-A-WAY ZONE" or "FIRE LANE NO PARKING TOW-A-WAY ZONE" and shall be 12" wide and 18" high. Signs shall be painted on a white background with letters and borders in red, using not less than 2" lettering. Signs shall be permanently affixed to a stationary post and the bottom of the sign shall be six feet, six inches (6'6") above finished grade. Signs shall be spaced not more than fifty feet (50') apart along both sides of the fire lane. Signs may be installed on permanent buildings or walls or as approved by the Fire Marshal.
 - d. Where a portion of the facility or building hereafter is constructed or moved into or within the jurisdiction is more than 300 feet from a hydrant on a fire apparatus road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the Fire Marshal.

15. Address Identification. New and existing buildings shall be provided with address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be not less than 6 inches (152.4 mm) high with a minimum stroke width of 1/2 inch (12.7 mm). Where required by the fire code official, address numbers shall be provided in additional approved locations to facilitate emergency response. Where access is by means of a private road, buildings do not immediately front a street, and/or the building cannot be viewed from the public way, a monument, or other approved sign with approved 6 inch (152.4 mm) height building numerals or addresses and 4 inch (101.6 mm) height suite/apartment numerals of a color contrasting with the background of the building or other approved means shall be used to identify the structure. Numerals or addresses shall be posted on a minimum 20 inch (508 mm) by 30 inch (762 mm) background on border. Address identification shall be maintained.

Exception: R-3 Single Family occupancies shall have approved numerals of a minimum 4 inches (88.9 mm) in height and a color contrasting with the background clearly visible and legible from the street fronting the property and rear alleyway where such alleyway exists.

16. 2" PVC Conduit shall be installed along Major Thoroughfares for future City of Manvel fiber optic network.
17. A Photometric Plan is required for all Non-Residential Site Plans. The Photometric Plan shall show lighting calculations in foot-candles along all property lines. The maximum allowable light level is 0.5 foot-candles along all property lines.

18. For all projects located within a MUD, a Water and Sewer Utility Availability Summary Table shall be provided with/within every plan and plat submittal. The Table will include a summary of currently platted lots and corresponding connections, along with reserved connections and planned future connections. It will also include the current capacity of the water and wastewater facilities (plant(s), lift stations, etc.) within the MUD.

2.0 EXECUTION

2.01 RESEARCH REQUIREMENTS

- A. Discuss project concepts outlining proposed features and usage with the City.
- B. Research existing utility and right-of-way information.
- C. Verify that no restrictions exist that will deny approval of the project concept.

2.02 DESIGN ANALYSIS – Reserved

2.03 DRAWINGS

- A. The plans shall include an overall drainage layout showing:
 - 1. Total area (in acres) of site to be drained.
 - 2. Area (in acres) drained to each inlet.
 - 3. Contours or an adequate number of spot elevations to indicate area drained to each inlet.
 - 4. Top elevation and flowline elevation at each inlet.
 - 5. Gradient and size on each private storm sewer.
 - 6. Computations to support pipe sizes and grades shown
 - 7. Design velocity for storm sewers shall be 3 feet per second.
 - 8. TX DOT permit shall be required for drainage affecting a state owned/maintained facility. Submit permit with site plan.
 - 9. The drawings shall be prepared and sealed by a Registered Professional Engineer.
 - 10. The size and location of the detention facility shall be indicated on the plans, along with the size and location of the outfall structure.
- B. All drainage plans shall be approved by the appropriate drainage entity prior to City approval.
- C. The site plan shall show all water and sewer service lines, sizes, grades and alignments with appropriate ties into existing public trunk lines.
- D. The site plan shall show all parking areas.
- E. The site plan shall indicate the types and location of all existing and proposed landscaping. Landscaping shall meet the minimum requirements of the Zoning Ordinance. A tree survey is required for first 20 feet of depth adjacent to all proposed streets. If no trees exist, a note to that affect shall be placed on the site plan.
- F. The site plan shall show all proposed and existing building setbacks, locations, heights and square footage of all proposed buildings.
- G. The land use for all adjacent property shall be shown on the site plan.
- H. All parking lot pavement for site plans shall be engineered to provide for regular use of vehicles expected to utilize the parking area and based upon the soil conditions underlying the parking area. A Registered Professional Engineer shall certify the design submitted for approval.
- I. Concrete sidewalks (a minimum of 5 feet wide and 4 inches thick with steel reinforcement) shall be required along all ~~curb and gutter~~ street frontages. The design and installation of such sidewalks shall comply with Texas Accessibility Standards Architectural Barriers requirements. The location of all proposed and existing sidewalks shall be shown on the construction drawings.
- J. Show location of signs, screening walls or fences (indicate height, minimum 8 feet) and dumpsters (with appropriate screening).
- K. No improvements to the right-of-way shall be made without prior City approval. This includes planting trees in the right-of-way of residential and non-residential areas.
- L. In the event that there is a discrepancy in the drainage criteria requirements between the City and the applicable Drainage District, the City Engineer may determine which criteria will apply.

**CITY OF MANVEL
DESIGN CRITERIA MANUAL
SECTION 7 - MODIFICATION FORM**

Variations to technical standards identified in the Design Criteria Manual may be permitted by the City of Manvel City Engineer. The modification proposal must be submitted by a registered Professional Engineer following generally accepted engineering standards and such proposal contains the following information and substantiates the findings in paragraph four (4) below. If an appeal to the City of Manvel City Engineer decision is requested, the Planning Development & Zoning (PD&Z) will review that appeal and make a recommendation to City Council. City Council will have final authority on the approval or denial of the Appeal.

PROJECT NAME: _____
PROJECT ENGINEER: _____

**SUBMITTAL
DATE:**

**This entire form must be completed in its entirety. If form is submitted
incomplete, it will be administratively rejected.**

SUBDIVISION NAME: _____

MODIFICATION LOCATION:

1. Set forth the proposed deviation to the technical standard.

2. Set forth the impact such deviation has on speed differential and street capacity, the likelihood of accidents, the long-term maintenance and operation effect, the degree of functionality and efficiency, the technological advancements involved, and other relevant matters.

3. Show a comparison of the technical standard to the proposed deviation with respect to overall safety and quality, speed differential, street capacity, existing and projected accidents, long-term maintenance and operation, degree of functionality, degree of efficiency, technological advancements, and other relevant matters.

4. Describe all mitigating improvements that reduce the negative impact of the proposed deviation on overall safety and quality, speed differential, street capacity, accident occurrences, long-term maintenance and operation, degree of functionality, degree of efficiency and demonstrating the degree to which the proposed deviation detrimentally affects the foregoing. Other relevant factors, including technological advances, should be explained by describing how they will affect the proposed development. Mitigating improvements can include but are not limited to, traffic control devices, pavement improvements, added acceleration or deceleration lanes or reservoirs, and other on-site improvements.

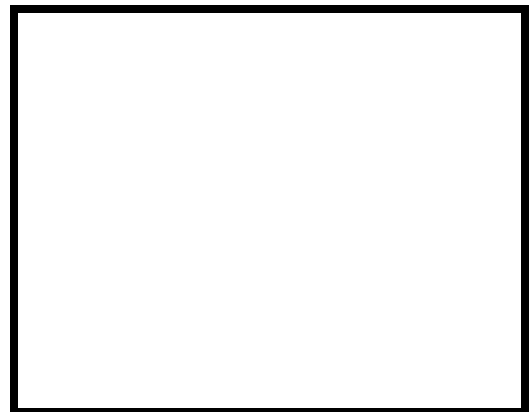
SUMMARY & CONCLUSION/RECOMMENDATION FOR MODIFICATION:

List of Supporting Documentation Attached?

Yes____

No____

Seal of Professional Engineer:



City of Manvel Use ONLY

1. Modification Request:

Approved

Denied

City Engineer

Date

2. Planning Development & Zoning:

Recommended

Not Recommended

Chair

Date

3. City Council:

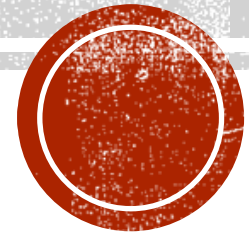
Approved

Denied

Mayor

Date

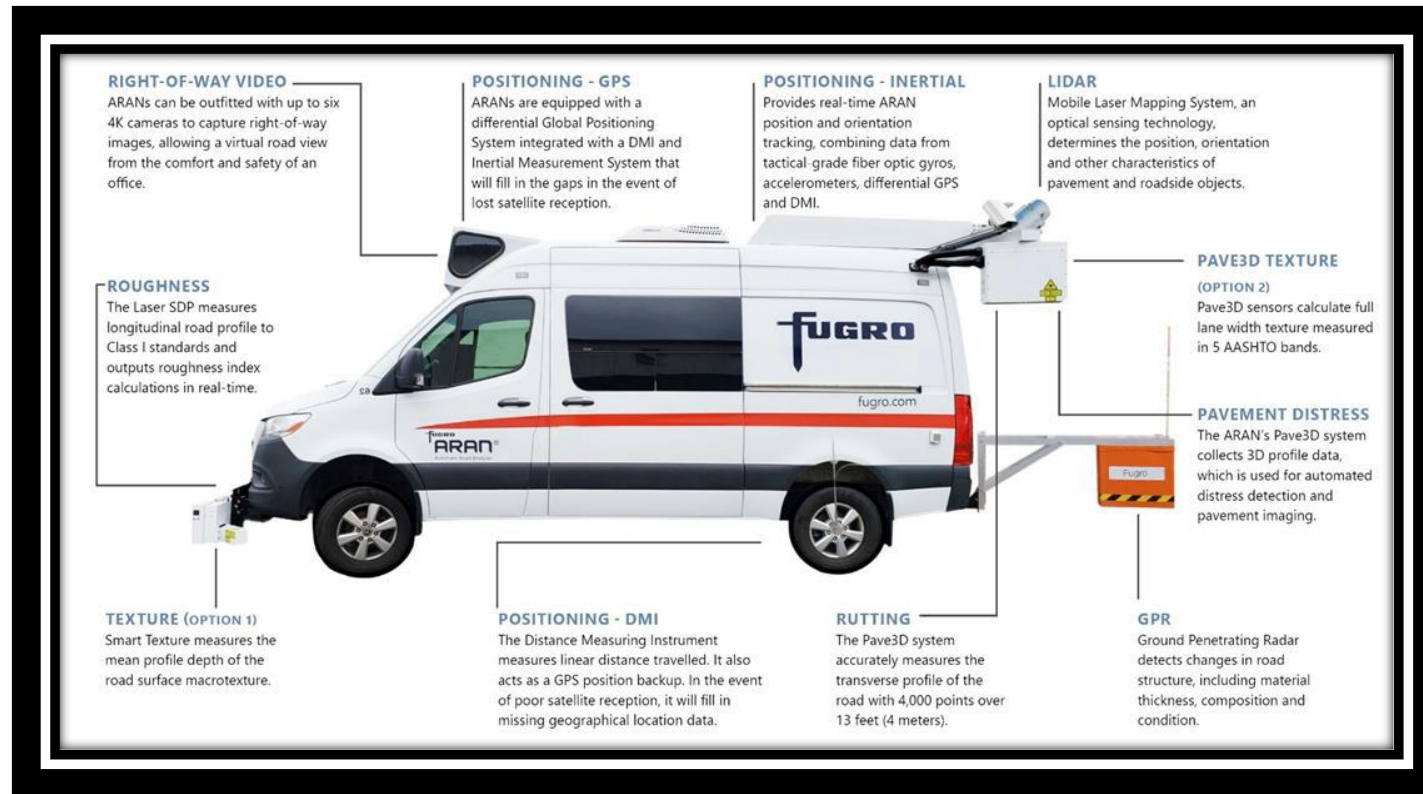
STREET MAINTENANCE AND PAVEMENT PRESERVATION



Community and Development Services

10/17/2022

SELECTION



Fugro selected 11/16/2021



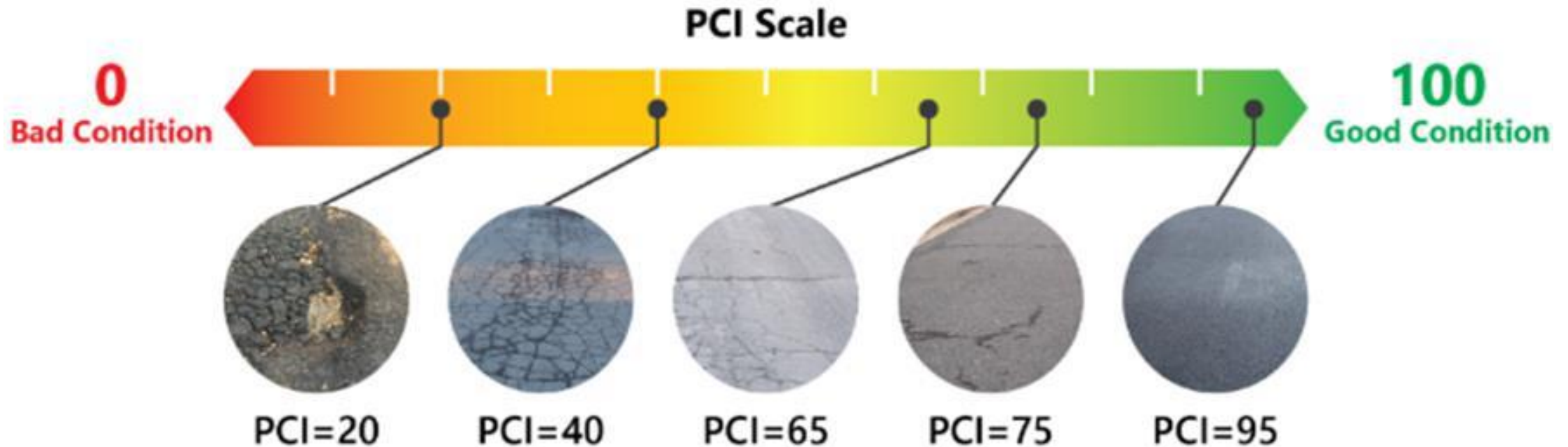
OBJECTIVES AND AREAS OF INTEREST

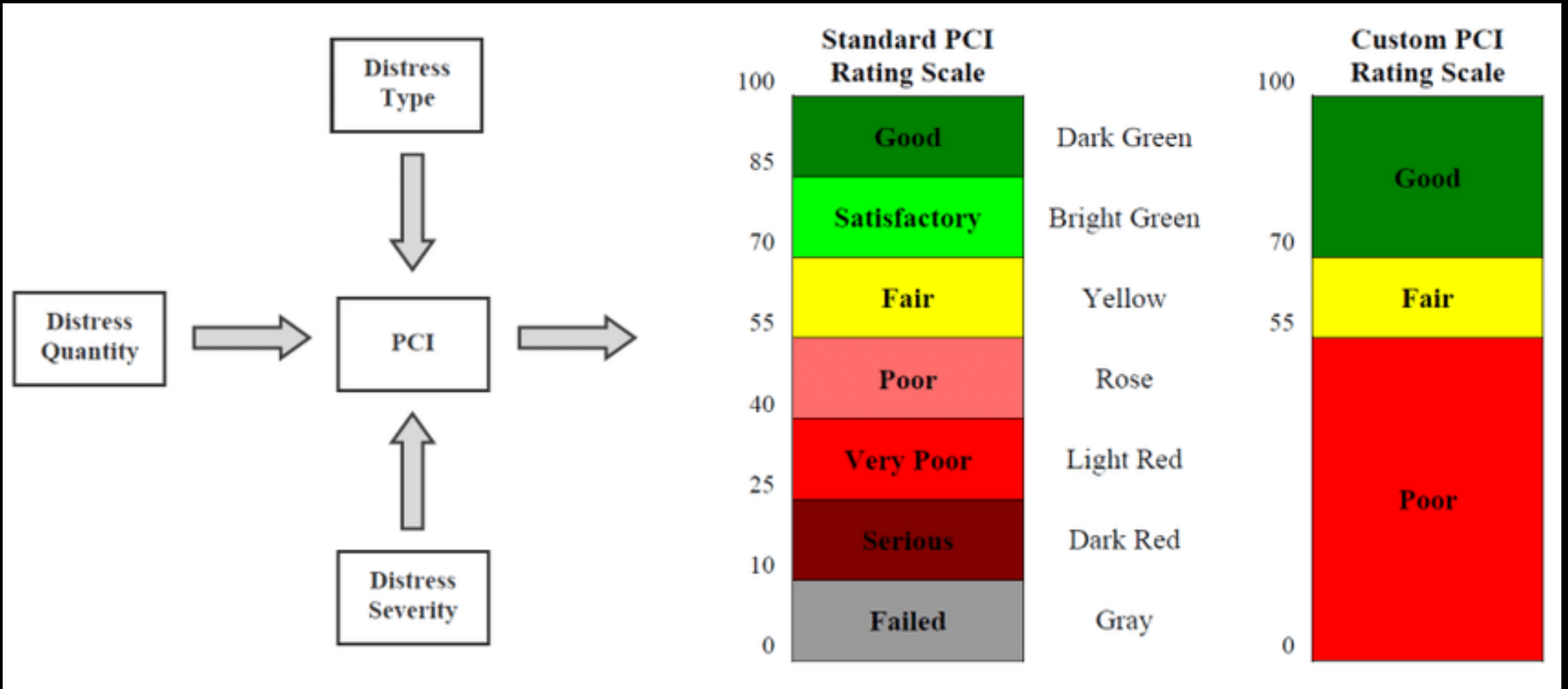
- Highlight narrow roadways
- Automatic measurement of pavement condition
- Integration with City's Geographic Information System (GIS)
- Pavement management data analysis



PAVEMENT CONDITION INDEX (PCI)

- The collected pavement distresses were used to calculate PCI values for the City's road network.
- PCI is based on the type, severity, and extent of surface distresses.
- The City's average PCI for asphalt is 42 (45 overall).

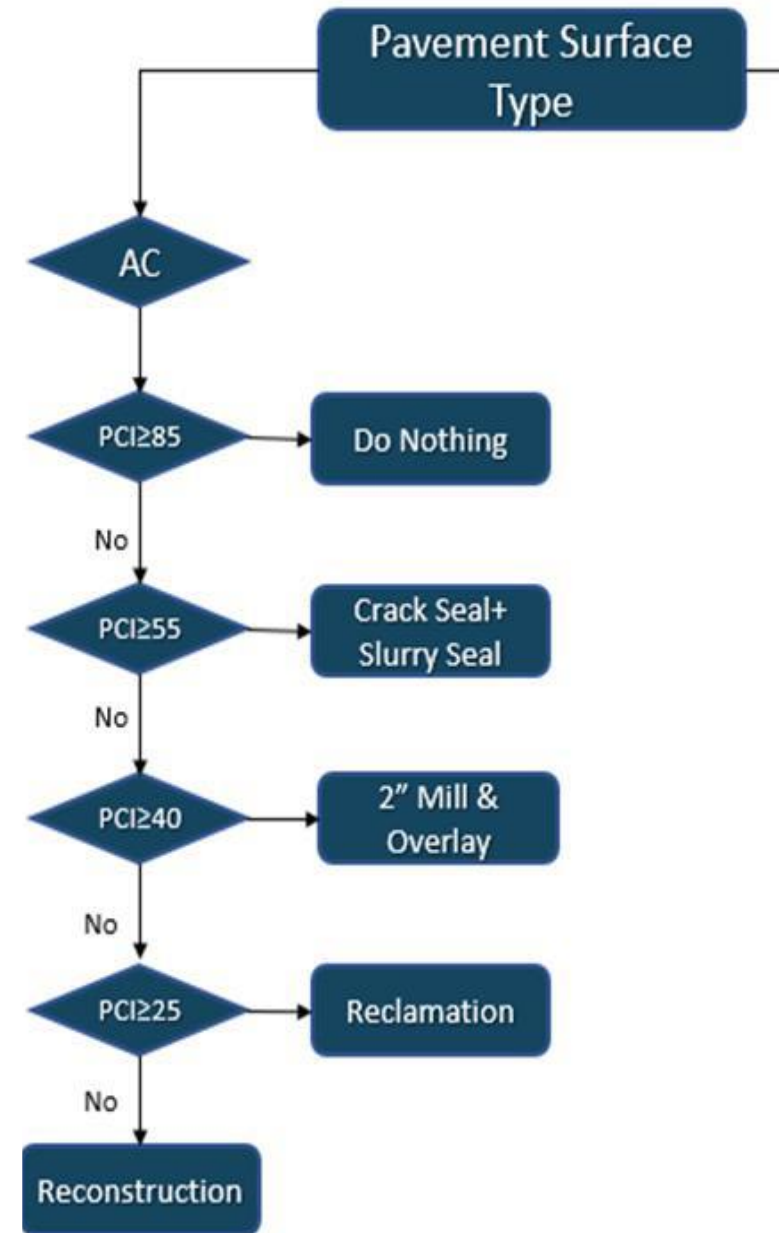




REHAB PLAN

Four approaches depending on pavement age, traffic, and condition.

1. **Preventive maintenance** - *applied at the early stage of pavement life to maintain the functional condition of pavements without increasing the structural capacity.*
2. **Minor rehabilitation** - *introduced to address the top-down surface cracking, aging of pavements, and functional deficiencies without increasing the structural capacity.*
3. **Major rehabilitation** - *Major rehabilitation activities increase the structural capacity of the existing pavements and extend the pavement life.*
4. **Reconstruction** – *For the lowest PCI roadways.*



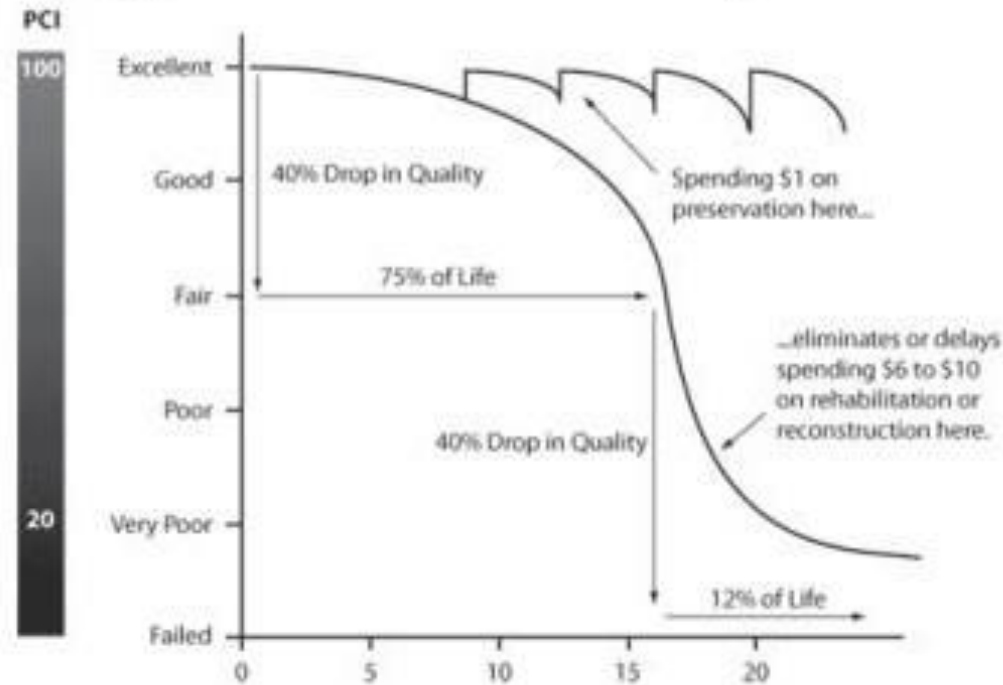
MAINTENANCE TECHNIQUES AND COST ESTIMATES

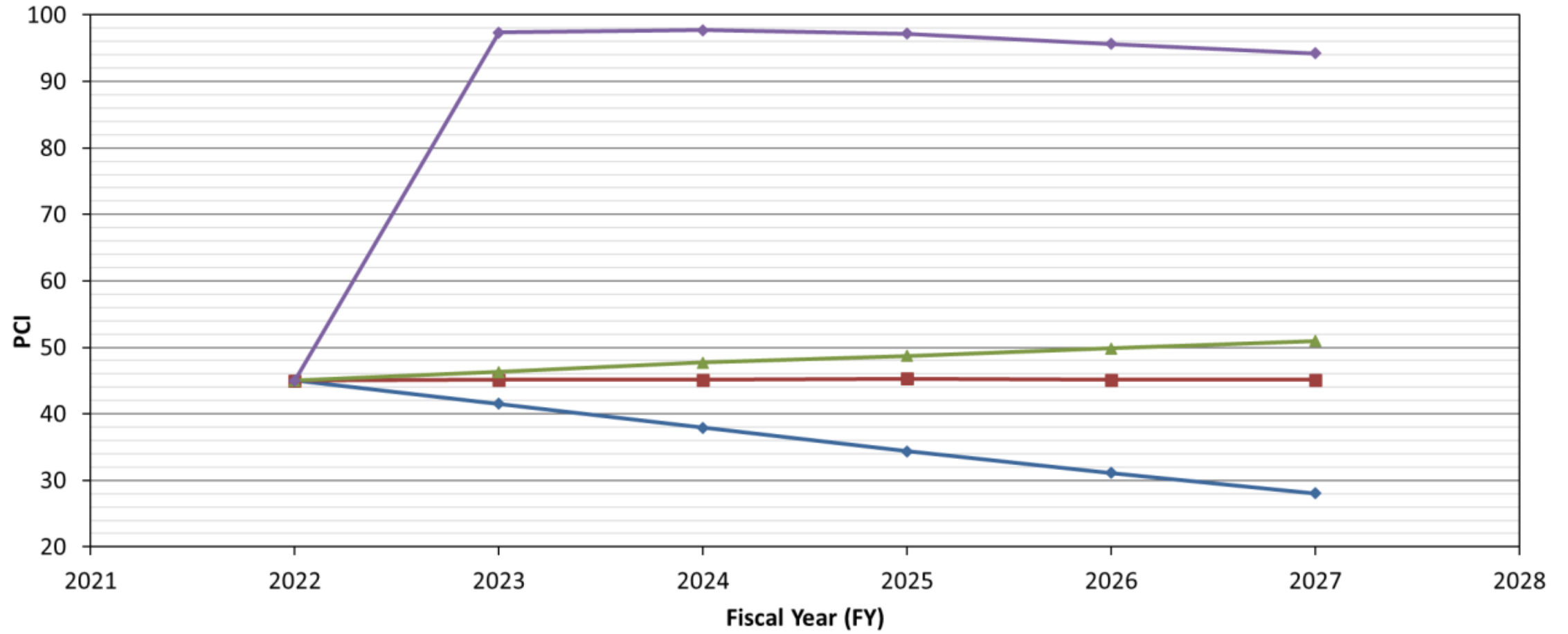
Type	Treatment	PCI Impact	Unit Cost (Per ft ²)	12ft Cross Section	Cost per Lane Mile
Asphalt	Crack Seal + Slurry Seal (Preventive Maintenance)	Increase by 25 points	\$0.30	\$ 3.60	\$ 19,008
	Mill & 2" Overlay (Minor Rehabilitation)	Reset to 100	\$3.50	\$ 42.00	\$ 221,760
	Reclamation (Major Rehabilitation)	Reset to 100	\$4.50	\$ 54.00	\$ 285,120
	Reconstruction	Reset to 100	\$15.00	\$ 180.00	\$ 950,400
Concrete	Crack Seal & Joint Seal (Preventive Maintenance)	Increase by 10 points	\$0.17	\$ 2.04	\$ 10,771
	Partial Depth Repair (Minor Rehabilitation)	Increase by 20 points	\$9.00	\$ 108.00	\$ 570,240
	Panel Replacement (Major Rehabilitation)	Reset to 100	\$12.00	\$ 144.00	\$ 760,320
	Reconstruction	Reset to 100	\$25.00	\$ 300.00	\$ 1,584,000



Every \$1 spent to keep a road in good condition avoids \$6-14 needed later to rebuild the same road once it has deteriorated significantly. *American Association of State Highway and Transportation Officials*

Pavement option curve (example). (PCI = Pavement Condition Index.) Pavement Preservation Compendium II





◆ No Funding

■ Scenario 1 - Maintain PCI 45

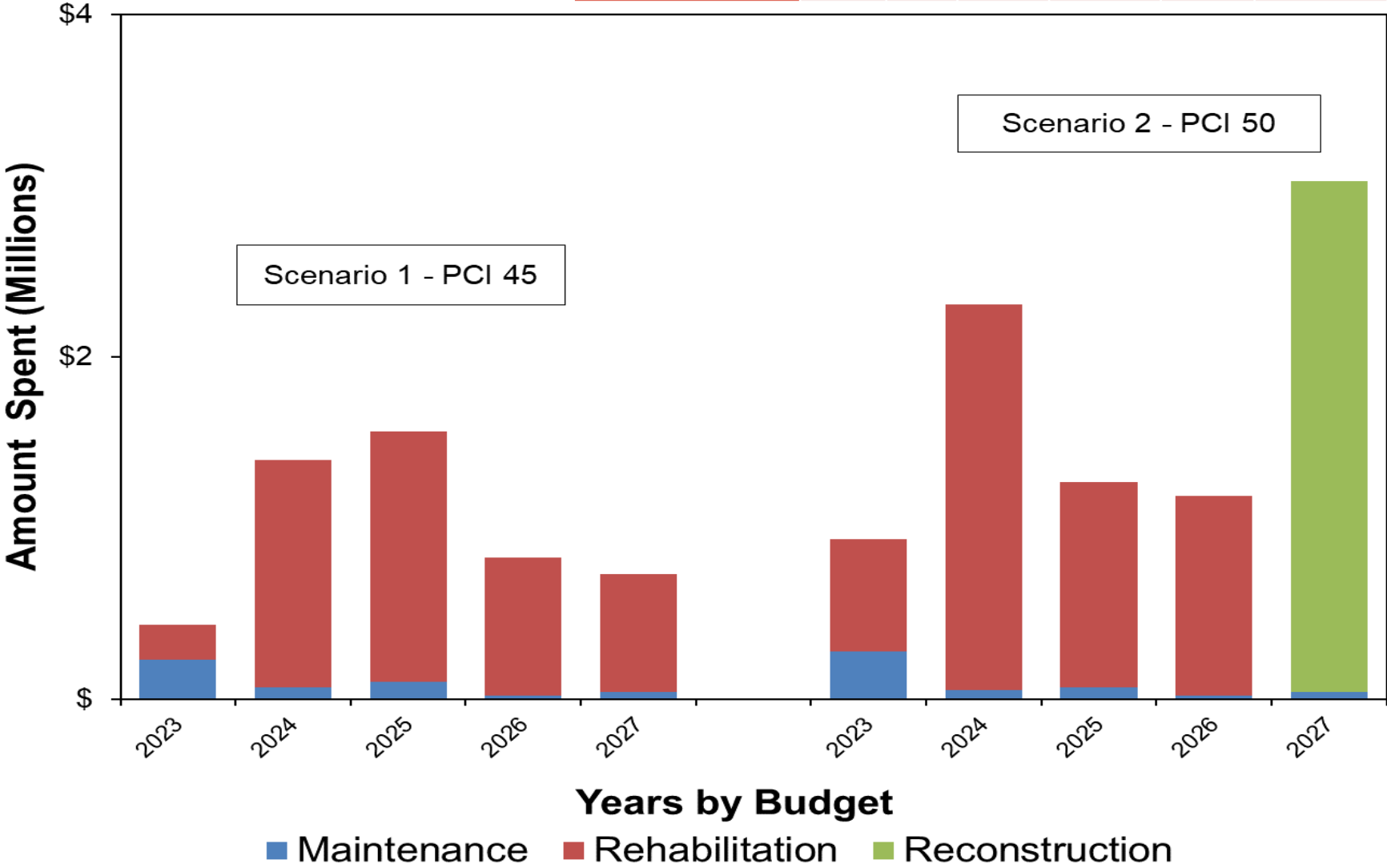
▲ Scenario 2 - Increase PCI 50

◆ Unlimited



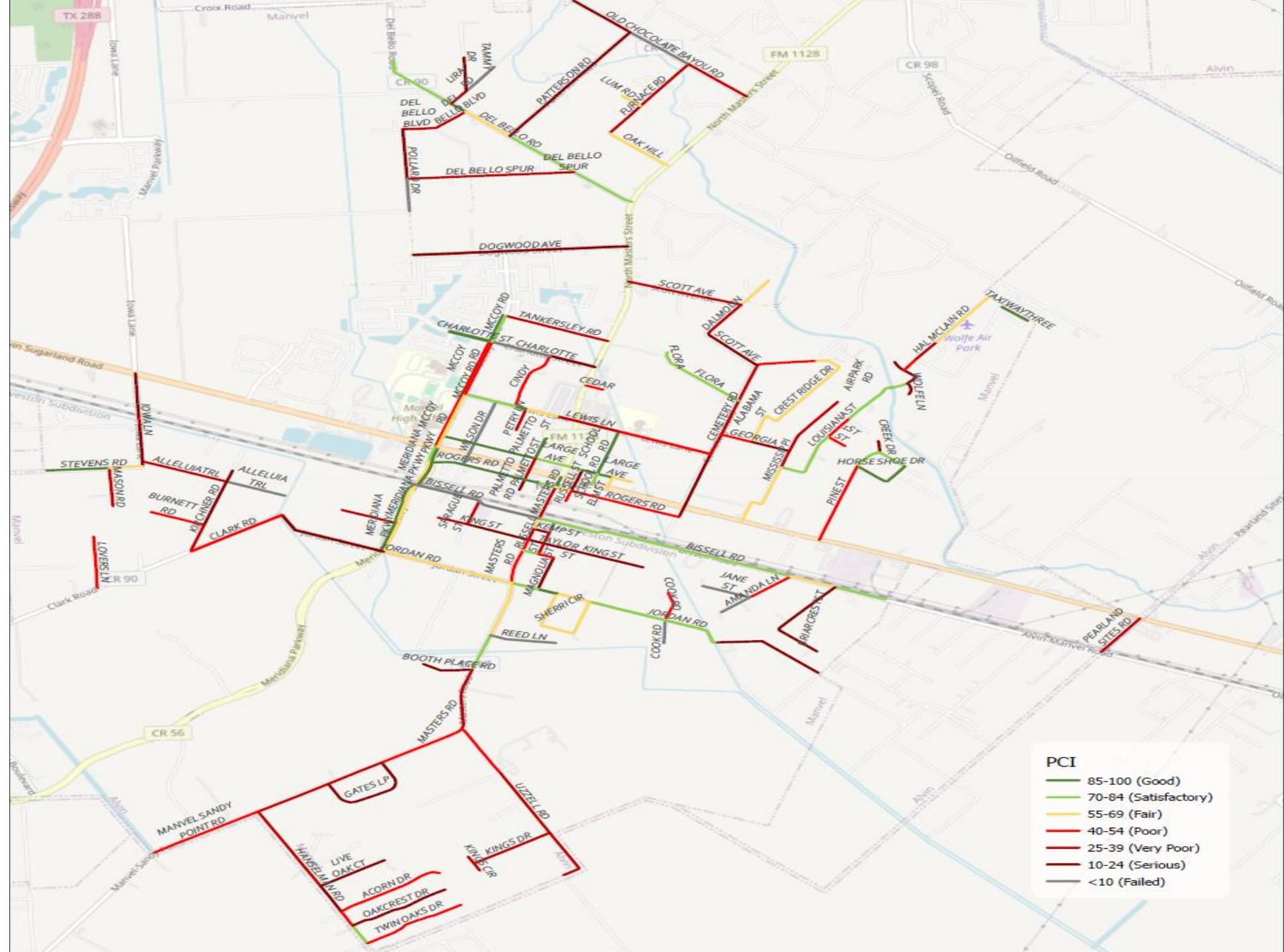
SCENARIOS

Scenario	2023	2024	2025	2026	2027	Total
Scenario 1 Maintain (PCI 45)	0.44	1.4	1.56	0.83	0.73	4.96
Scenario 2 Increase by 5 (PCI 50)	0.93	2.31	1.27	1.19	3.03	8.72



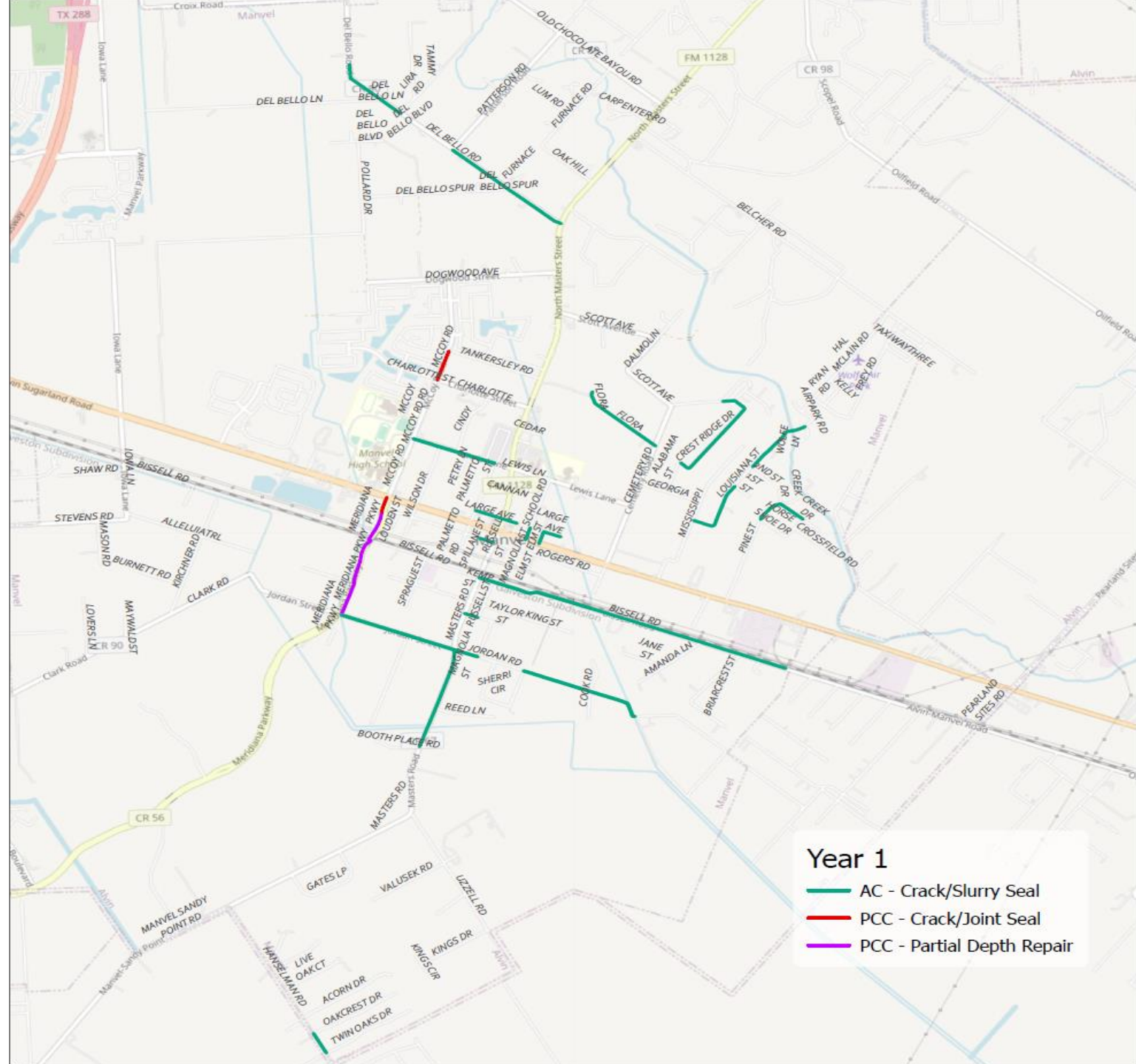
NETWORK ASSESSMENT

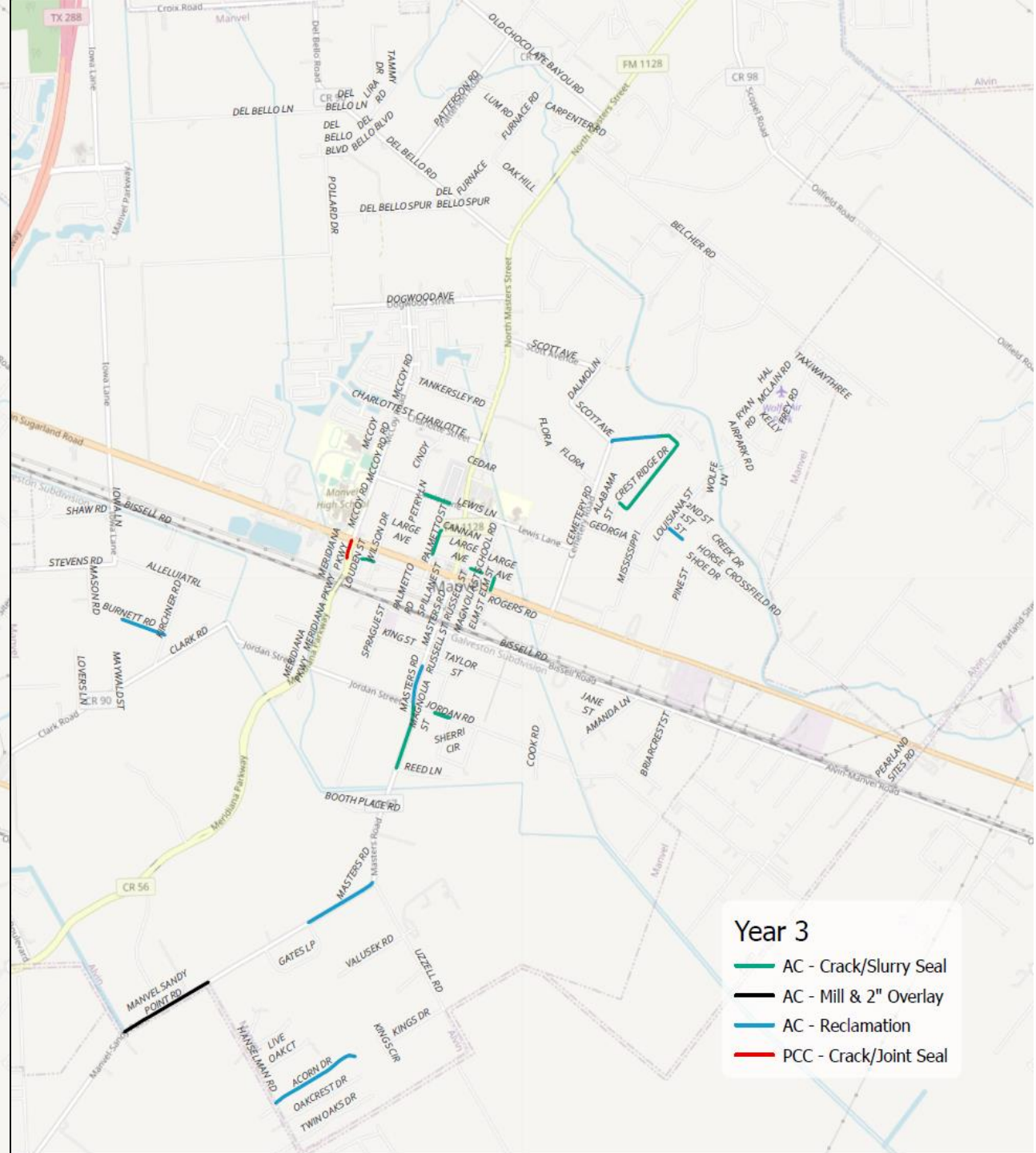
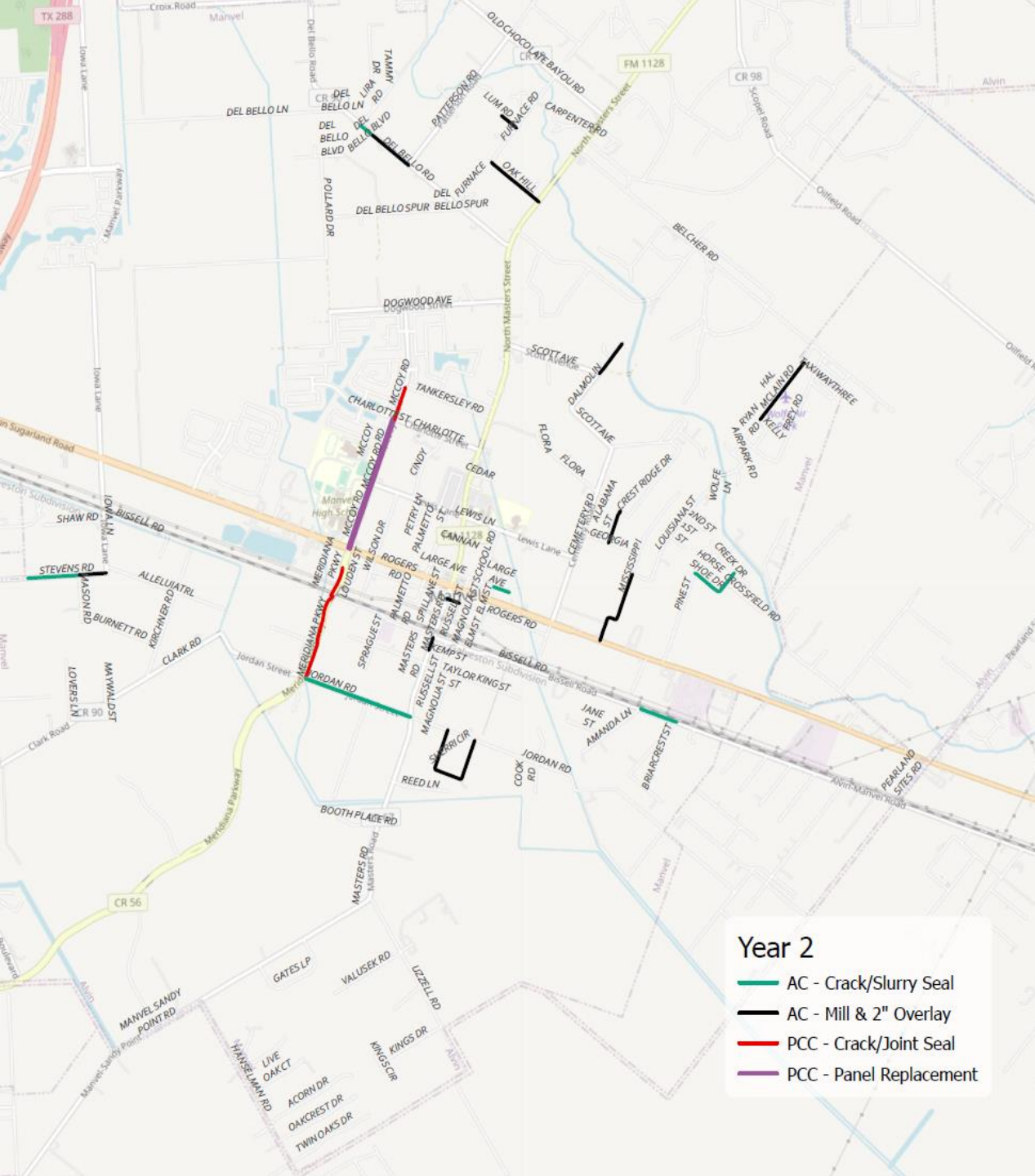
A large portion of our
roadways are below
Satisfactory condition.

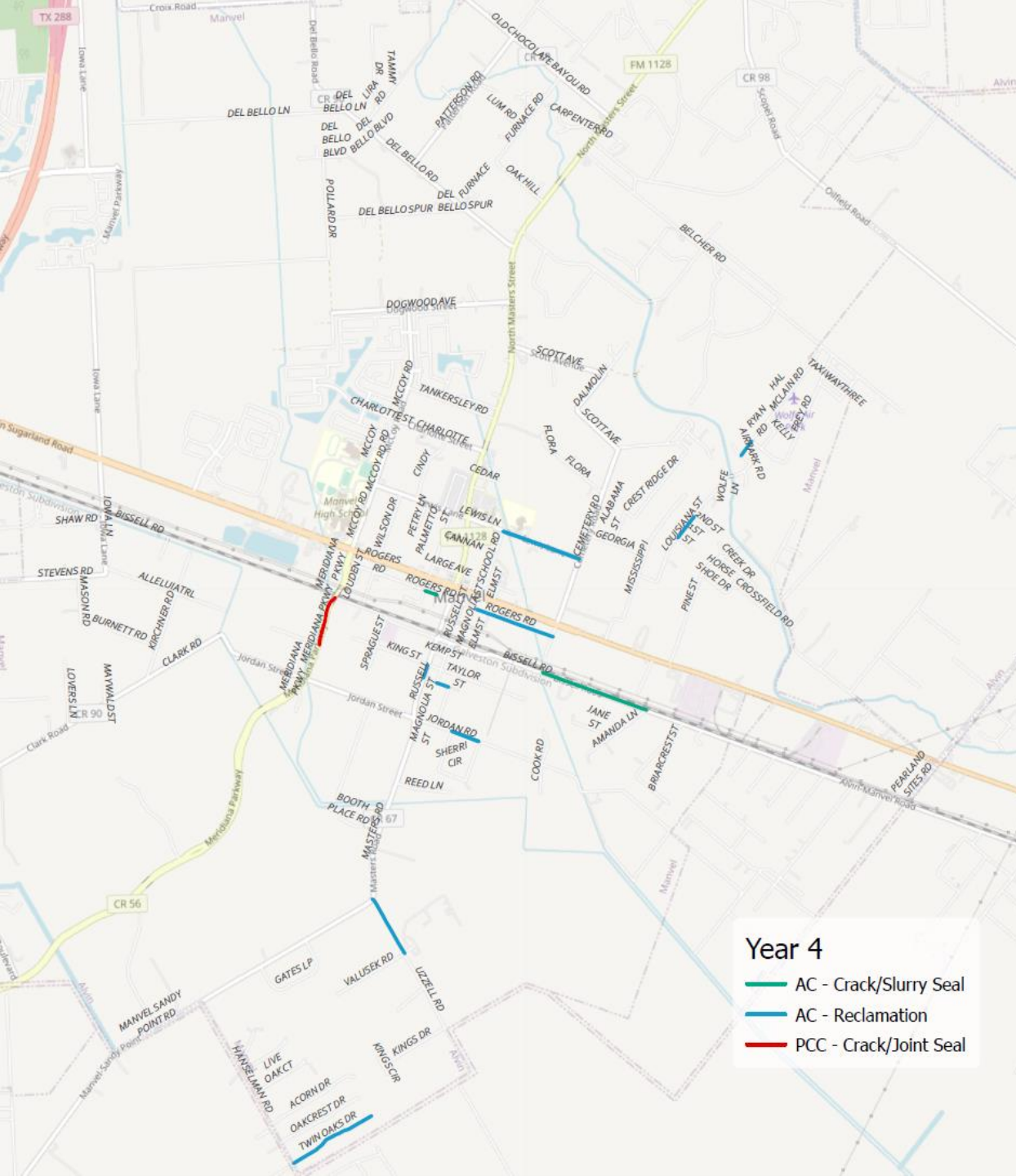


PRESERVATION

- 5 Year plan to improve overall PCI 5 points.
- Primary focus is to rehab
- Secondary is to focus on Arterial
- Work plan will be adjusted to consider the throughfare plan.
- Reclaim as option for only the sever damaged and moderate traffic.







GILBERT SALAS

FY 2022-23 DEPARTMENT GOALS

- Rehabilitate at least 2 miles of asphalt streets using data collected from street assessment.
- \$300k for rehabilitation per year.



Brazoria County Interlocal

	STREET	LIMITS FROM / TO	LENGTH (FT)	WIDTH (FT)
1	Alabama	FROM: Crestridge Dr TO: Georgia	900	26
2	Cemetery Road	FROM: Georgia TO: End	5,000	26
		FROM: SH6 TO: Georgia Street	2,400	26
3	Crestridge Drive	FROM: Cemetery Rd TO: Alabama	3,000	26
4	Georgia	FROM: Cemetery Rd TO: Mississippi	1,600	26
5	Wilson	FROM: SH6 TO: Lewis Lane	1,800	26



STREET MAINTENANCE AND PAVEMENT PRESERVATION

Community and Development Services

10/17/2022



Chapter 33 FOOD AND FOOD HANDLERS

ARTICLE I. IN GENERAL

Sec. 33-1. State regulations adopted.

- (a) The city adopts by reference the most current version of the *Texas Food Establishment Rules* promulgated by the Texas Department of State Health Services as set forth in 25 Tex. Admin. Code, Ch. 228, subchapters A—J, or successor statute. The *Texas Food Establishment Rules* shall be considered incorporated herein by reference for all purposes.
- (b) From and after enactment of this chapter, the *Texas Food Establishment Rules* shall govern the regulation of food and food establishments in the city in addition to any other requirements set forth in this chapter and other applicable laws and regulations. For purposes of this chapter, the words, terms and phrases set forth in the *Texas Food Establishment Rules* as definitions shall have the meanings and interpretations set forth therein.
- (c) Any subsequent revisions or changes to the *Texas Food Establishment Rules* shall automatically become a part of this chapter, unless council action is required by law.
- (d) Except as where may be specifically stated herein, this chapter shall be enforced by the city code enforcement officer/health officer, or such other personnel designated by the city manager.
- (e) A copy of the *Texas Food Establishment Rules* shall be on file in the office of the city secretary.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-2. Local amendments and definitions.

The *Texas Food Establishment Rules* adopted in section 33-1 are hereby amended as follows:

- (1) The following provisions are added:
 - a. 228.2(153) Code enforcement/health officer - A city "code enforcement officer" or "health officer" shall mean any person in the city marshal's office/code enforcement office, or other person designated by the city manager, assigned to inspect food establishments, educate food establishment employees and food employees on local and state statutory requirements for health and safety in food service, and enforce all local and state health and safety laws as permitted by law.
 - b. 228.2(154) Reconstituted - Food created or prepared by recombining dehydrated food products with water or other liquids.
 - c. 228.2(155) Sanitation - Effective bactericidal treatment process that provides enough accumulative heat or concentration of chemicals for enough time to reduce the bacterial count, including pathogens, to a safe level on tableware, utensils, and equipment.
 - d. 228.186(o)(2)(F) - Service Animals - In areas that are not used for food preparation or storage, a food establishment may, at the owner or manager's discretion, or where required by law, allow patrons to bring service animals on the premises. Notices stating where a patron is allowed to

bring service animals on the premises shall be posted in all areas where the service animals are to be allowed by the food establishment.

(2) The following provisions are adopted in place of the identically numbered provisions in the *Texas Food Establishment Rules*, Tex. Admin. Code, Title 25, Part 1, Chapter 228:

- a. 228.2(57) Food establishment - Food establishment means an operation that stores, prepares, packages, serves, vends, or otherwise provides food for human consumption as follows:
 1. A restaurant, retail food store, market, self-service food market, conveyance used to transport people, or institution, including any establishment where prepackaged food and food products are offered for sale to the ultimate consumer and intended for off premise consumption;
 2. An establishment that relinquishes possession of food to a consumer directly, or indirectly through a delivery service such as home delivery of grocery orders or restaurant takeout orders, or delivery service that is provided by common carriers; and
 3. Includes an element of the operation such as a transportation vehicle or a central preparation facility that supplies a vending location or satellite feeding location, unless the vending or feeding location is permitted by the regulatory authority and an operation that is conducted in a mobile, stationary, temporary, or permanent facility or location; where consumption is on or off the premises.
 4. Food establishment does not include a produce stand that only offers whole, uncut fresh fruits and vegetables, a food processing plant, a cottage food industry, an area where cottage food is prepared, sold, or offered for human consumption, a bed and breakfast limited facility as defined in this chapter, a food bank, or a private home that receives catered or home-delivered food.
- b. 228.2(85) Mobile Food Unit (MFU) - A vehicle mounted, self or otherwise propelled, self-contained food service operation, designed to be readily movable (including, but not limited to, trailers and push carts) and used to store, prepare, display, serve, or sell food. Mobile units must completely retain their mobility at all times. A Mobile Food Unit does not mean a stand or a booth. A Mobile Food Unit operating in the City must have on site at least one food employee who possesses a food manager certification.
- c. 228.2(143) Temporary food establishment - A food establishment that operates a stand or booth for a period of no more than ten (10) consecutive days in conjunction with a single event or celebration.

(3) Additional definitions. Additionally, the following words, terms and phrases shall have the meanings set forth below except where the context clearly indicates a different meaning:

Authorized agent. Means an authorized employee(s) of the City of Manvel.

Employee. The term "employee" shall mean any person who handles food or drink during preparation or serving, or who comes in contact with any eating or cooking utensils, or who is employed in a room in which food or drink is prepared or served.

Filthy. The term "filthy" shall be deemed to apply to food not securely protected from flies, dust, dirt, and as far as be necessary by all reasonable means, from all foreign or injurious contaminations.

Food. The term "food" means (1) articles used for food or drink for human consumption; and (2) components of any such article.

Food establishment. The term "food establishment" shall mean an operation that stores, prepares, packages, serves, vends, or otherwise provides food for human consumption, as defined in section 33-2 (2)a.

Health officer. The term "health officer" shall mean any person in the city fire marshal office/code enforcement office/health inspections office, or other person designated by the city manager, assigned to inspect food establishments, educate food establishment employees and food employees on local and state statutory requirements for health and safety in food service, and enforce all local and state health and safety laws as permitted by law.

Itinerant food establishment. The term "itinerant food establishment" shall mean a restaurant opening for a temporary period in connection with a fair, carnival, public exhibition, or other similar gathering.

Misbranded-food. A food shall be deemed misbranded if:

- (i) Its labeling is false or misleading in any particular.
- (ii) It is offered for sale under the name of another food.
- (iii) It is an imitation of another food, unless its label bears the word "imitation" in type of uniform size and prominence and immediately thereafter the name of the food imitated; and except in cases of mixture and compounds which may be now or from time to time hereafter known as articles of food, under their own distinctive names, and not an imitation of or offered for sale under the distinctive name of another article if the name is accompanied on the same label or brand with a statement of the place where said article has been manufactured or produced. No one administering this chapter may constitute oleomargarine as an imitation of butter.
- (iv) The container is so made, formed, or filled as to be misleading.
- (v) It is in package form without a label containing: (a) the name and place of business of the manufacturer, packer, or distributor; and (b) an accurate statement of the quantity of the content in terms of weight, measure, or numerical count; provided, that under clause (b) of this paragraph reasonable variations shall be permitted, and exemptions as to small packages shall be established, by regulations prescribed by the state commissioner of health.
- (vi) If any word, statement, or other information required by or under authority of this chapter of state law to appear on the label or labeling is not prominently placed thereon with such conspicuousness (as compared with other words, statements, designs, or devices, in the labeling) and in such terms to render it likely to be read and understood by the ordinary individual under customary conditions of purchase and use.
- (vii) If it purports to be or is represented as food for which a definition and standard of identity has been prescribed by state regulations, unless, (a) it conforms to such definition and standard, and (b) its label bears the name of the food specified in the definition and standard, and, insofar as may be required by such regulations, the common names of optional ingredients (other than spices, flavoring, and coloring) present in such foods.
- (viii) If it purports to be or is represented as: (a) A food for which a standard of quality has been prescribed by state regulations, and its quality falls below such standard unless its label bears, in such manner and form as such regulations specify, a statement that it falls below such standard; or (b) A food for which standard or standards of fill of container have been prescribed by state regulations, and it falls below the standard of fill container applicable thereto, unless it labels bears, in such manner and form as such regulations specify, a statement that it falls below such standard.
- (ix) If it is not subject to the provisions above, unless it bears labeling clearly giving: (a) the common or usual name in the food, if any there be; and (b) in case it is fabricated from two or more ingredients, the common or usual name of each such ingredient; except that spices, flavorings, and colorings, other than those sold as such may be designated as spices flavorings, and colorings, without naming each; provided that, to the extent that compliance with the

requirements of clause (b) of this subsection is impractical or results in deception or unfair competition, exemptions shall be established by regulations promulgated by the state commissioner of health; provided further that the requirements above shall not apply to any bottled carbonated drinks or soft drinks and, provided further, that clause (b) of this subsection shall not apply to any bottled carbonated drinks or soft drinks or the dispensing of carbonated soft drinks in single service cups. Nothing in this chapter shall be construed as requiring proprietors or manufacturers of proprietary foods which contain no unwholesome added ingredients to disclose their trade formulas except insofar as the provisions of the law require to secure freedom of adulteration or misbranding.

- (x) If it purports to be or is represented for special dietary uses, unless its label bears such information concerning its vitamin, mineral and other dietary properties as the state commissioner of health determines to be, and by regulations prescribed, as necessary in order to inform purchasers as to its value for such uses.
- (xii) If it bears or contains any artificial flavorings, artificial coloring, or chemical preservative, unless it bears labeling stating that fact; provided that, to the extent that compliance with the requirements of this subsection is impracticable, exemptions shall be established by regulations promulgated by the state commissioner of health. The provisions of this subsection and subsections (vii) and (ix) with respect to artificial coloring are not to apply in the case of butter, cheese, and ice cream.

Nonprofit organization. Means an incorporated organization which exists for educational or charitable reasons, and from which its shareholders or trustees do not benefit financially. Nonprofit status must be verified by submission of supporting documentation, such as an IRS form 501c.

Regulatory authority. Means the City of Manvel, Texas.

Temporary food establishment. Means a food establishment that operates for a period of no more than ten consecutive days in conjunction with a single event or celebration. This may include a stand or a booth.

Restaurant. The term "restaurant" shall include restaurant, coffee shop, cafeteria, short-order café, luncheonette, tavern, sandwich shop, sandwich stand, soda fountain, hospitals, institutions, private, public and parochial school lunchrooms, private and semi-private clubs, and all other eating or drinking establishments as well as other kitchens or other places in which food or drink is prepared for serving or for sale elsewhere.

State law definitions. Any term used in this chapter and not specifically defined herein shall have the meaning ascribed to it in the *Texas Food, Drug and Cosmetic Act*, V.T.C.A., Health and Safety Code, Ch. 431.

Utensils. The term "utensil" shall mean and include any kitchenware, tableware, glassware, cutlery, vessels, containers, or other equipment with which food or drink comes in contact during storage, preparation, serving, eating, or drinking.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-3. Application of chapter.

- (a) This chapter shall apply to all areas within the corporate limits of the city.
- (b) Persons or organizations whose food services are regulated and regularly inspected by another federal or state governmental entity are required to comply with this chapter.
- (c) If there is a conflict between a provision of this chapter and another provision of the City Code or state law, the more stringent provision shall apply.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-4. Enforcement.

Except as where may be specifically stated herein, this chapter shall be enforced by the city code enforcement officer/health officer, or such other personnel designated by the city manager.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-5. Penalty.

- (a) All provisions of this chapter shall be applicable to all food establishments, unless otherwise required by law.
- (b) No food establishment shall be operated within the city unless it conforms with the provisions of this chapter.
- (c) Any person who intentionally, knowingly, willfully, or with criminal negligence violates any provision of this chapter shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not exceeding \$2,000.00. Each day of violation of this chapter shall constitute a separate offense. Prosecution in municipal court shall be in addition to other remedies provided in this chapter, by law, or in equity.
- (d) A license holder shall ensure that the food establishment is in full compliance with this chapter at all times.
- (e) The person in charge shall ensure that the food establishment is operated in full compliance with this chapter and that all food is stored, prepared, displayed and served in accordance with the provisions of this chapter.
- (f) All mobile food vendors must comply with the requirements of the City Code, chapter 35, article IX, as amended from time to time.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-6. Injunction.

- (a) If it appears that a person has violated, is violating, or threatens to violate this chapter, the city may institute a civil suit in a district court for injunctive relief to restrain the person from continuing the violation or threat of violation.
- (b) The city may petition a district court for a temporary restraining order to immediately halt a violation or other action creating an emergency condition if it appears that:
 - (1) A person is violating or threatening to violate this chapter; and
 - (2) The violation or threatened violation creates an immediate threat to the health and safety of the public.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Secs. 33-7—33-9. Reserved.

ARTICLE II. PERMIT

Sec. 33-10. Required.

- (a) Permit. No person shall operate a food establishment without possessing a valid permit issued by the city through the permits department. Such permit be known as a "food service permit", a "temporary food service permit", or a "mobile food vendor permit", hereinafter referred to collectively as "permit", "permits", or "food permit". Only a person who complies with the requirements of this chapter shall be entitled to receive or retain such a permit.
- (b) Permits are not transferable from one person or place to another person or place. A valid permit shall be posted in view of the public in every food establishment and every temporary food establishment.
- (c) Each and every food establishment, whether under one roof or not, shall be considered a separate establishment, and a permit must be obtained for each establishment. Each such establishment is subject to the requirements in this chapter.
- (d) Application.
 - (1) Any person desiring to obtain a food service permit shall make written application for such permit on forms provided at the city's permits department or on the city's website. Such application shall include the applicant's full name and mailing address; the location of proposed food establishment; and the signature of the applicant or applicants.
 - (2) Any person desiring to obtain a temporary food service permit shall make written application for such permit on forms provided at the city's permits department or on the city's website. In addition to the information listed in subsection (1) above, such application shall include the inclusive dates of the proposed operations; the name, address and telephone number of the owner or owners of the property where the temporary food service establishment is to be located; and a statement signed by the owner(s) of the property or his/her authorized agent, stating that arrangements have been made for the proper disposal of all rubbish, trash, garbage, and for maintaining the property free from litter and nuisances during the total period of operation up to and including any cleanup time required to remove all rubbish, trash, garbage, and litter resulting from the food service. A description of such arrangements must be included. A permit for temporary food establishment may be issued for a period of time not to exceed 14 consecutive days.
 - (3) Any person desiring to obtain a mobile food vendor permit shall make written application for such permit on forms provided at the city's permits department or on the city's website. All mobile food vendors must comply with the requirements of the City Code, chapter 35, article IX.
- (e) The permit department shall issue the appropriate permit to the applicant if inspection reveals that the proposed food establishment complies with the requirements of this chapter.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-11. Duration.

Permits shall be issued annually and shall extend from the date of issuance or renewal, as applicable. Annual renewal applications must be submitted at least 30 days prior to the expiration date of the permit. A permit shall be issued only if the establishment is in complete compliance with this chapter.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-12. Fees.

- (a) Before any permit shall be issued under this chapter, the applicant shall pay the applicable fees set forth in the latest fee schedule resolution adopted by the city.
- (b) The re-inspection fee set forth in the latest fee schedule resolution adopted by the city shall apply in cases where re-inspection is deemed necessary by the city's health official/code enforcement officer.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-13. Refunds/proration.

Permit fees are not refundable and shall not be prorated.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-14. Suspension.

- (a) The city's code enforcement/ health officer may suspend any permit to operate a food establishment, temporary food establishment, and/or mobile food unit, if the permit holder does not comply with the requirements of this chapter and the violation creates an immediate threat to the health and safety of the public. Suspension is effective upon written notice, and service operations shall immediately cease.
- (b) Whenever a permit is suspended, the city shall notify the permit holder or the person in charge of the food establishment in writing of the reason(s) for which the permit is suspended and inform them of the opportunity for a hearing before the city municipal court. If the permit holder requests a hearing, they shall file their written request for a hearing with the city secretary within ten days following service of such notice of suspension. If a request for hearing is filed, a hearing shall be scheduled within ten days of the city's receipt of such request. If no request for hearing is filed within the ten-day period, the suspension of the permit is sustained. The city's code enforcement/ health officer may end the suspension at any time if reasons for suspension no longer exist.
- (c) Whenever a food service license is suspended, it may be physically removed from the premises by the code enforcement/health officer and retained at the office of the Code enforcement/health officer until the suspension has been lifted or modified.
- (d) Whenever a mobile food unit license is suspended, it shall be physically removed from the mobile food unit in violation by the code enforcement/health officer.
- (e) All hearings shall be held in the municipal court and presided over by a municipal court judge. All hearings shall be, as much as practicable, conducted pursuant to the Texas Rules of Civil Procedure.
- (f) If the permit holder fails to appear at the hearing at the time, place, and date specified, the city shall present sufficient evidence to establish a prima facie case showing violation of this chapter or conditions constituting a hazard to public health which formed the basis of the suspension of the license.
- (g) If the municipal court finds that the food establishment was, in fact, in violation of this chapter or that it constituted a hazard to public health, the court shall make written findings of fact and shall order the permit suspended until all violations of this chapter are corrected and any conditions constituting a hazard to public health are eliminated. A copy of the findings and order of the court shall be either given to the responsible party upon conclusion of the hearing, or sent by certified mail, return receipt requested, to the permit holder. If the municipal court finds that the public interest will be adequately protected by a warning or other penalty authorized under this chapter, it may reinstate the permit.

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- (h) Whenever the reasons for a suspension no longer exist, the permit holder or the person in charge shall notify the permit department that the conditions under which the permit was suspended have been corrected and that an inspection is requested. Upon receipt of request and payment of any required re-inspection fee, such inspection shall be conducted as soon as possible and in no event, no later than three regular working days after the receipt of the request for inspection.
 - (i) Revocation/suspension of mobile food vendor permits shall be in accordance with section 35-317 of the City Code.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-15. Revocation.

The city may revoke a permit for serious or repeated violation(s) of any of the requirements of this chapter or for interference with the health official/code enforcement officer in the performance of his/her duties. Prior to revocation, the city shall notify the permit holder or the person in charge of the food establishment in writing of the reason(s) for which the permit is subject to revocation and inform them of the opportunity for a hearing. If the permit holder requests a hearing, they shall file their written request for a hearing with the city secretary within ten days following service of such notice of revocation. If a request for hearing is filed, a hearing shall be scheduled within 30 days of the city's receipt of such request. If no request for hearing is filed within the ten-day period, the revocation of the permit becomes final.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-16. Service of notice.

A notice provided for in this article is properly served when it is delivered to the permit holder or the person in charge of the establishment or when it is sent by registered or certified mail, return receipt requested, to the last known address of the permit holder or when it is delivered by the city in person to the last known address of the permit holder.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-17. Hearings.

The hearings provided for in this article shall be held in the municipal court and presided over by a municipal court judge. Based upon the recorded evidence of such hearing, the municipal court judge shall make a final finding and shall sustain, modify or rescind any notice or order considered in the hearing. A written report of the hearing decision shall be furnished to the permit holder, and a copy shall be filed with the city secretary.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-18. Application for a new permit after revocation.

The permit holder that has been revoked must wait 180 days after the final date of the revocation decision before making written application for a new permit.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Secs. 33-19—33-30. Reserved.

ARTICLE III. INSPECTIONS

Sec. 33-31. Access.

Agents of the city, after proper identification, shall be permitted to enter any food service establishment at any reasonable time for the purpose of making inspections to determine compliance with this article. The agents shall be permitted to examine the records of the establishments to obtain information pertaining to food and supplies purchased, received or used, or to persons employed.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-32. Frequency.

- (a) An inspection of a food service establishment should be performed on each food establishment within the city at least every six months, and additional inspections shall be performed as often as necessary for the enforcement of this chapter. Any establishment scoring 75 or below on an inspection will automatically receive a follow-up inspection within ten days. A re-inspection fee must be paid prior to follow up inspection. Failure to pay re-inspection fee or a second score of 75 or below on an inspection shall result in an order to immediately cease all food service operations. Any person, firm, or food establishment proven to have failed to immediately cease all food service operations upon an order from the city shall be deemed guilty of a misdemeanor and shall, upon conviction by a court of competent jurisdiction, be assessed fines or other punishment as provided by this Code.
- (b) If a food establishment is being inspected for the first time by a city code enforcement/health officer, the following additional requirements apply:
 - (1) For a food establishment located at permanent premises, a code enforcement/health officer will only conduct an inspection to obtain a food service permit after the food establishment has passed final inspections by the building official and the fire marshal, or their respective designees.
 - (2) A food establishment located at permanent premises may not store any food defined as time/temperature control for safety food (TCS) at the premises until after the code enforcement/health officer has completed his/her inspection and the food establishment has passed said inspection. If a food establishment is found to have TCS food on the premises at the time of an initial health inspection, the code enforcement/health officer may order the TCS food to be disposed of properly if it is found to have been kept in unsafe conditions.
- (c) Whenever an inspection of a food establishment is conducted, the findings shall be recorded in an inspection report, and a copy of each inspection report with number score and corresponding letter grade shall be provided to the food service manager or other person in charge of the establishment. The rating score of the establishment shall be the total of the weighted point values for all violations, subtracted from 100. It is the responsibility of the food service manager to post the letter grade corresponding to the food establishment's inspection report upon an inside wall or window near the main public entrance of the establishment in a location readily visible to consumers, and such letter grade shall not be defaced or removed by any person except the code enforcement/health officer. Any person, firm, or corporation who fails to properly post the inspection report or the corresponding letter grade as required shall be deemed guilty of a misdemeanor and shall, upon conviction by a court of competent jurisdiction, be assessed fines or other punishment as provided by this Code.

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- (d) In the case of temporary food service establishments, all violations shall be corrected immediately. If violations are not corrected, the code enforcement/health officer shall immediately suspend the license. Any person, firm, or establishment who is found to have failed to immediately cease operations upon suspension of temporary food service license shall be deemed guilty of a misdemeanor and shall, upon conviction by a court of competent jurisdiction, be assessed fines or other punishment as provided by this Code.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-33. Correction of violations.

The inspection form shall specify a reasonable period of time to correct the violations and such violations must be corrected within the specified period; provided, however, that:

- (1) If an imminent health hazard exists the establishment, including a mobile food unit, shall immediately cease food service operations and operations shall not be resumed until authorized by the city; and
- (2) All violations at temporary food establishments shall result in cessation of temporary food service operations.
- (3) The establishment or mobile food unit shall not resume operations until such time as a re-inspection determines that the condition(s) responsible for the requirement to cease operations no longer exists. The city shall offer to re-inspect the establishment within a reasonable time.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Secs. 33-34—33-50. Reserved.

ARTICLE IV. CONSTRUCTION, REMODELING AND CONVERSION

Sec. 33-51. Plans.

- (a) Two sets of properly prepared plans and specifications for each construction, remodeling or alteration of a food establishment shall be submitted to the permit department prior to any on-site construction. The plans must be drawn to scale no smaller than one-eighth inch and shall consist of a plot plan, floor plan, foundation plan, structural plan, plumbing plan, elevation plan, wall section, engineer's scale and survey (if required by applicable law), mechanical and electrical details, and health equipment detail with elevations, any of the City of Manvel standard details that apply, and the city's signature block on the first page.
- (b) All food establishments shall have a minimum of a 500-gallon grease trap.
- (c) Under sink grease traps for all food establishment shall be strictly prohibited. The only exception is for MFU's.
- (d) All food prep areas shall have smooth wall board. Such as FRP (fiberglass reinforced panels.). No rough or porous wall board will be allowed.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-52. Other code requirements.

A building permit shall be required for construction, alteration, remodeling or conversion of a food establishment in accordance with the International Building and Fire Codes and any and all codes adopted by the

city. Any construction, alteration, remodeling, or conversion of a food establishment shall comply with all applicable federal and state laws and codes and regulations of the city. To the extent of a conflict between or among the provisions of this chapter and other codes or ordinances of the city, the more restrictive provision shall control.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Sec. 33-53. Ownership of food establishment.

- (a) When an existing food establishment is purchased and the purchase does not include the property or the structure, but includes the rental or lease of space and equipment, the city requires that the person who operates the food establishment obtain a valid food establishment's permit. The person who applies for the food establishment's permit is considered, legally, to be the owner.
- (b) The person who is registered on the food establishment's permit is the responsible party for the property, premises, structure and complete operating services. The operator of the food establishment is the ultimate responsible party, and the conditions under which the food establishment was leased or rented does not release the operator from the requirements of this article.
- (c) A new owner may continue to operate a food establishment without interruption from the city when the establishment is in complete compliance with this chapter. Total compliance is the basis for issuing the food establishment's permit, which must be obtained prior to opening the establishment for business. An inspection of the premises and operations can demonstrate the extent to which the food establishment is in compliance. Upon normal conditions, depending on the condition of the food establishment, many violations can be corrected within such a short period of time that an interruption of food services is unnecessary and not required.
- (d) Depending on the wear and tear (depreciation) on the establishment, the building and equipment may already be close to compliance, and it is the responsibility of the new owner to schedule an inspection from the city to determine what is required to meet current codes.

(Ord. No. 2020-O-25, § 2, 9-8-2020)

Appendix A Food Establishments Grade Card

GRADE/SCORE CARDS

Each food establishment inspection begins with 100 points. As a Code enforcement/health officer conducts an inspection, the appropriate sub-categories in the Food Establishment Inspection Report of the Texas Department of State Health Services (Texas Food Establishment Rules), will be marked. The sub-categories are assigned a specific point value based on the associated public health risk of the violation. Point value is deducted from the 100 points if violations are observed by the officer conducting the inspection. (Refer to the Texas Food Establishment Rules for a more detailed explanation of these sections.)

Beginning of the Inspection	100 points
Total points deducted	- _____
Remaining points	Grade or Score

A grade card will be issued to each food establishment with a score of seventy-six to one hundred (76 to 100) at the end of all routine inspections. The card issued will be based upon the score received on the Retail Food Establishment Inspection Report. The grading is calculated as follows:

- PART II CODE OF ORDINANCES
Chapter 33 - FOOD AND FOOD HANDLERS
Appendix A Food Establishments Grade Card

Points:

92— 100	A	Generally superior in food handling practices and overall food facility maintenance.
91— 84	B	Generally good in food handling practices and overall food facility maintenance.
83— 76	C	Generally acceptable in food handling practices and overall general food facility maintenance.
0—75	Score	Poor in food handling practices and overall general food facility maintenance.

A facility receiving a score of seventy-five (75) or below will be issued a score card and not a grade card. The score card will indicate the actual score received.

The grade or score card must remain posted until the next routine inspection, at which time the Code enforcement/health officer will issue a new grade or score card to replace the previous document issued. This replacement card must be posted as described above.

All food establishments presenting a substantial hazard to public health may be subject to closure regardless of the score received on the inspection report.

(Ord. No. 2020-O-25, § 3, 9-8-2020)

ARTICLE X. MOBILE FOOD VENDORS

Sec. 35-310. Definitions.

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Food hand cart means a food or drink vending station operating from a non-mechanical, movable cart that is pushed or pulled from one location to the next by hand (e.g. hot dog cart).

Food truck (stationary) means a food or drink vending station operating from a mechanical vehicle or pulled trailer at a fixed location (e.g. taco truck).

Food truck (mobile) means a food or drink vending station operating from a mechanical vehicle or pulled trailer that drives continuously, intermittently stopping for sales (e.g. ice cream truck).

Mobile food vendor means any person or entity engaged in selling or serving food or drink from a vehicle, booth or cart, including, but not limited to, operating any of the following:

- (1) Sidewalk stand; or
- (2) Food hand cart; or
- (3) Food truck (stationary); or
- (4) Food truck (mobile)

Sidewalk stand means a food or drink vending station operating from a non-mechanical booth or stand on or near the sidewalk or in the city right-of-way (e.g. lemonade stand).

(Ord. No. 2018-O-52, § 2, 1-22-2019)

Sec. 35-311. General prohibition.

Except where specifically authorized by this article, mobile food vendors of any type are expressly prohibited.

(Ord. No. 2018-O-52, § 2, 1-22-2019)

Sec. 35-312. Sidewalk stand.

Sidewalk stands are prohibited. There shall be an exception for temporary lemonade/soft drink sidewalk stands operated by juveniles, or a non-profit corporation, which may be operated without a permit for a single period of up to eight hours, limited to one period within one calendar month.

(Ord. No. 2018-O-52, § 2, 1-22-2019)

Sec. 35-313. Food hand cart.

Food hand carts are prohibited. There shall be an exception for temporary operation for the following:

- (1) City events;

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- (2) City approved or sponsored events; and
 - (3) Private events (where admission is not open to the general public) on private property.
- (Ord. No. 2018-O-52, § 2, 1-22-2019)

Sec. 35-314. Food truck (stationary).

Food trucks (stationary) are prohibited. There shall be an exception for temporary operation for the following:

- (1) City events;
 - (2) City approved or sponsored events; and
 - (3) Private events (where admission is not open to the general public) on private property.
- (Ord. No. 2018-O-52, § 2, 1-22-2019)

Sec. 35-315. Food truck (mobile).

Food trucks (mobile) are prohibited.

- (1) There shall be an exception for temporary operation for the following:
 - a. pre-packaged food vendors
 - b. ice cream trucks
 - (2) Food trucks (mobile) shall not stand for more than 15 minutes at any one location and may not prepare or cook food or drink items on the vehicle (pre-packaged only).
 - (3) Food trucks with music or a public address system shall not exceed 65 decibels.
 - (4) Food trucks may only operate from dawn until dusk, except for events with extended hours as may be expressly authorized by the city manager or designee.
 - (5) Food trucks may not vend from the second lane of traffic, and may not double park or impede traffic.
- (Ord. No. 2018-O-52, § 2, 1-22-2019)

Sec. 35-316. Basic requirements.

The following requirements shall apply to the mobile food vendors that are specifically permitted under this article:

- (1) Permitted mobile food vendors shall operate only on a temporary basis. Temporary shall mean for eight hours or as long as the city event or city-approved event is ongoing.
- (2) There shall be no water, wastewater or electric hookups to the adjacent property.
- (3) There shall be no overnight parking or operation.
- (4) Vehicles must be marked with the vendor's name.
- (5) No detachable signage shall be permitted, except for one removable sandwich-board sign displaying product and/or pricing information.

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- (6) All stationary food truck vendors must set out a trash can for patrons while present and must remove all trash from the premises upon departure. Vendor must not allow trash to spill over and must change out trash bags when trash can is full.
 - (7) Vendors may not set up within 300 yards of a restaurant, except with express written consent of the restaurant owner.
 - (8) The city manager is authorized to sponsor and approve events on behalf of the city. In considering approval or sponsorship for the event, the city manager shall consider the following:
 - a. The nature of the event, which must be open to the general public;
 - b. Whether the organizers are in compliance with all city, county and state laws and regulations;
 - c. Whether the organizers have the means, personnel, volunteers, and resources to have a successful event;
 - d. Past history of events by the requesting organization, or similar events by other organizations, and whether there were any health, safety, or sanitation issues; and
 - e. Such other characteristics of the event, including time of year, that may place a burden on city or local law enforcement or first responders.

(Ord. No. 2018-O-52, § 2, 1-22-2019)

Sec. 35-317. Permits and health requirements.

The following requirements shall apply to the mobile food vendors that are specifically allowed under this article:

- (1) *Permits.*
 - a. All food truck vendors, mobile and stationary, must obtain a permit from the fire marshal's office. Each permit will be issued unit-by-unit only after an inspection reveals satisfactory compliance with state law and this article, as applicable. Such permits shall remain the property of the city. Permit fees shall be as prescribed by the city council.
 - b. No person shall operate or cause to be operated any food truck (mobile or stationary) which does not possess a valid permit issued by the fire marshal's office. Any person, firm, or establishment who is found to have operated or caused to be operated a food truck (mobile or stationary) without a valid mobile food truck permit shall be deemed guilty of a misdemeanor and shall, upon conviction by a court of competent jurisdiction, be assessed fines or other punishment as provided by this Code.
 - c. Such permit shall be affixed by the fire marshal or designee on the food truck in a conspicuous place where it can be viewed by patrons. A permit shall set forth the business name, license plate number, mobile food unit license number, and expiration date for said license.
 - d. Every food truck must be readily identifiable by its business name and phone number that are printed, permanently affixed, and prominently displayed on the back of the unit and on the side of the unit from which food is served, in letters not less than three inches in height.
 - e. Sidewalk stands, where allowed by this article, are exempt from permit requirements.
 - f. Food hand cart vendors, where allowed by this article, are exempt from permit requirements.
- (2) *Health regulations.* All vendors must obey and be in compliance with all state, county and city health laws and regulations. Compliance with these laws shall be a part of the city permit process.

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- (3) *Food handling regulations.* All vendors must obey and be in compliance with all state, county and city food handling regulations.
 - (4) *Vehicle inspections.* All mobile vendors must pass a vehicle inspection from the fire marshal's office as part of the city permit process. All vendors must obey and be in compliance with the fire code and all other city codes.
 - (5) *Administrative rules.* The city manager or designee shall promulgate rules and regulations to administer the provisions of this article. Such rules and regulations shall not conflict with any applicable provisions of this Code. All rules and regulations so promulgated shall be kept on file for public inspection at the office of the city secretary. A copy of the rules and regulations shall be provided to any person upon payment of the fees prescribed by law.
 - (6) *Violation.* Anyone who intentionally, willfully, recklessly, or with criminal negligence violates this article shall, upon conviction, be guilty of a misdemeanor and shall be assessed fines or other punishment as provided by this Code.
 - (7) *Revocation of permit.* In addition to the imposition of a criminal penalty, the failure to comply with any of the provisions of this article, or any of the promulgated rules or regulations established thereunder, shall be grounds for the revocation or suspension of the permit, or the refusal to issue or renew any permit required under this Code. If requested by the permittee in writing within seven business days of notice of revocation, the city manager or designee shall hear the cause for revocation/suspension/non-renewal and determine whether the grounds for such action are justified. The city manager's (or designee's) decision shall be final. The revocation or suspension of any permit shall not prohibit the imposition of a criminal penalty, and the imposition of a criminal penalty shall not prevent the revocation or suspension of a license under this article.

(Ord. No. 2018-O-52, § 2, 1-22-2019)

Secs. 35-318-35-329. Reserved.