

CITY OF MIDLAND, TEXAS MASTER DRAINAGE PLAN

EXECUTIVE SUMMARY

GENERAL

Parkhill, Smith & Cooper, Inc. would like to thank the City of Midland for giving us the opportunity to assist with the development of this Master Drainage Plan. PSC would also like to thank the City of Midland engineering staff for their cooperative efforts. The teamwork between the City of Midland engineering staff and Parkhill, Smith and Cooper, Inc. was very beneficial in bringing this Master Drainage Plan to fruition.

Development of this Master Drainage Plan was authorized by the City Council of Midland, Texas in November 1991 and involved the creation of a series of rainfall-runoff and hydraulic flow computer models. The first step in developing the models was to combine the soil maps for the City and its extra-territorial jurisdiction (ETJ) with existing land use and detailed Geographic Information System (GIS) data provided by the City of Midland. This information was used to develop a rainfall-runoff model based on existing conditions as of June 1993. The "Existing Condition" June 1993 model became the base line model for all comparisons with anticipated future rainfall-runoff conditions. As part of the "Existing Condition" model, rainfall runoff was routed through the large number of natural playa lakes and the existing Jal Draw and Midland Draw channels located within the City's ETJ. These computer simulations produced hydrographs that indicate the magnitude of peak runoff flow rates and the time that the peak flow rates occur. The timing of these peak flow rates from various subareas in the watershed was critical to successful master drainage planning.

The next step in development of the Master Drainage Plan was to derive a computer model based on estimated future development within the City of Midland's ETJ. The purpose of this model was to estimate the future runoff impacts in the year 2020 if no runoff mitigation efforts were provided. This "Future - No Action" model showed that runoff will substantially increase if nothing is done to alleviate the increased flow rates. As an example, the "Existing Condition" model flow rate at the confluence of the Scharbauer channel with Midland Draw is approximately 8,400 cubic feet per second. Under the "Future - No Action" scenario,

with the ETJ and vacant areas within the City of Midland fully developed, the future flow rate at the same location is predicted to be approximately 13,140 cubic feet per second, an increase of 56 percent.

Because significantly increased impacts from runoff were predicted by the "Future - No Action" model, a third computer model was developed based upon the "Future - No Action" model to determine the effectiveness of developing playa lakes as regional detention facilities. This model, called the "Playas" model, was based on estimated future development but with the only improvements being to the playa lakes. This provided a comparison with both the "Existing Condition" and "Future - No Action" models. The intent was to see if playa lake improvement alone could provide the necessary mitigation. Results of the "Playas" model showed that the playa lakes provided a valuable means to mitigate stormwater runoff. However, the playa lakes alone could not completely alleviate the stormwater runoff problems associated with future development.

The final predictive computer model developed was refined to become the Master Drainage Plan model. This computer model incorporated the playa lake improvements determined in the "Playas" model, as well as man-made regional detention basins, in-line channel detention, excavation of existing and proposed channels, and analysis of culvert bridge structures to reduce the impacts of estimated stormwater runoff in the year 2020 to at, or near, existing values. A detailed estimate of proposed improvements are outlined in the following six sections that represent the six major watershed areas studied in this master drainage plan. Table 1 provides the total opinion of cost for recommended improvements to the six watershed areas. A brief summary of the recommended improvements is provided in the following paragraphs.

CONCLUSION

The opinion of cost to fully realize the City of Midland's Master Drainage Plan is \$62,889,750 in 1996 dollars. This amount is indicative of the magnitude of planning that has been performed and the complexity of the interaction between watersheds contributing runoff to the detailed master planning area. The amount of money involved may seem daunting, but pro-rated linearly over 25 years the investment becomes \$2,515,590 per year. This is not an immaterial amount, but this view of the investment presents a more realistic annual impact on the City of Midland economy. With the implementation of the improvements in this Master Drainage Plan, the citizens of Midland will know that their concerns over flood plain issues and flood damages are being addressed. Parkhill, Smith and Cooper, Inc. encourages the City Council's adoption of this Master Drainage Plan to guide the City in runoff and related growth issues.

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