CORRIDOR LOCATION STUDY - CEDAR RAPIDS & MARION

PREPARED FOR
IOWA STATE
HIGHWAY COMMISSION
BY
HOWARD NEEDLES TAMMEN & BERGENDOFF

Iowa
a place to grow

INTRODUCTION

Within the corporate limits of the Cedar Rapids and Marion live approximately 127,000 people, with a forecast of 192,000 residents anticipated by 1990. During the past four decades, the automobile has emerged as the most flexible, convenient and private form of transportation and will likely remain as an integral part of a balanced transportation system which includes some form of transit. The cities of Cedar Rapids and Marion are faced with the need for providing good transportation facilities for the movement of people and goods to meet today's needs as well as the forecasted increased demands generated by continuing urban development.

The purpose of the study was to investigate and evaluate the engineering and social, economic and environmental elements which combine to influence the location of the transportation corridor.

STUDY AREA

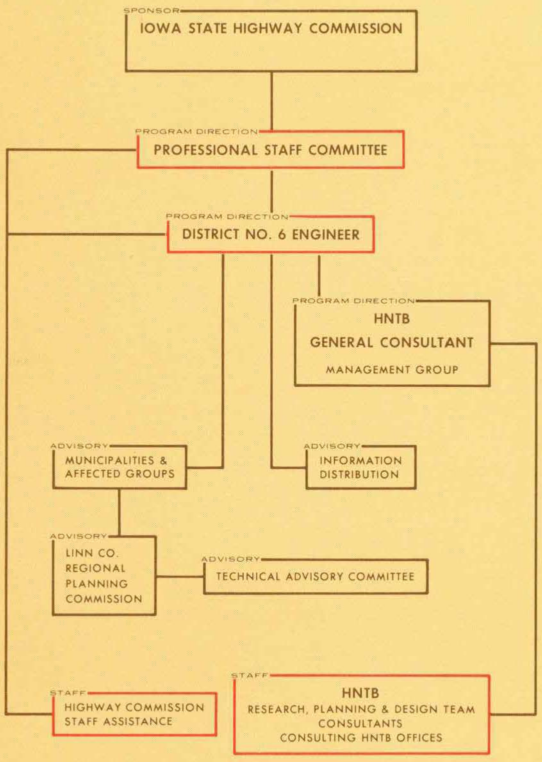
The study area consisted of a corridor band approximately four miles wide, centered on First Avenue, the transportation spine of the metropolitan area. The southwestern terminus is in the vinity of the intersection of the proposed alignment of U.S. Route 30 and West Post Road, at approximately 33rd Avenue Southwest. The eastern terminus is just east of the intersection of U.S. Route 151 and State Route 13, east of Marion.

The study area includes the major portion of the metropolitan area, with the primary growth areas of the city located in close proximity to the two terminal points of the corridor. The proposed facility will therefore serve as the primary internal transportation facility serving the heavy traffic demands from within the study area as well as the areas of future development in the metropolitan area.

BASIC PROGRAM ORGANIZATION

The basic organizational structure of the program is illustrated on the diagram below. The program was sponsored by the Iowa State Highway Commission, with major program and operational policy matters, general guidance and direction provided jointly by a Professional Staff Committee and the District No. 6 Engineer. The Management Group within the firm of Howard, Needles, Tammen & Bergendoff provided day-to-day operational and technical direction for the program.

Municipalities and groups directly, indirectly or individually affected by the program participated in an advisory capacity. Advisory activities included technical review of the completed program elements, tasks, reports and recommendations. The general public participated in an advisory capacity through a series of public meetings held in Marion and Cedar Rapids.



ORGANIZATIONAL STRUCTURE - PROGRAM

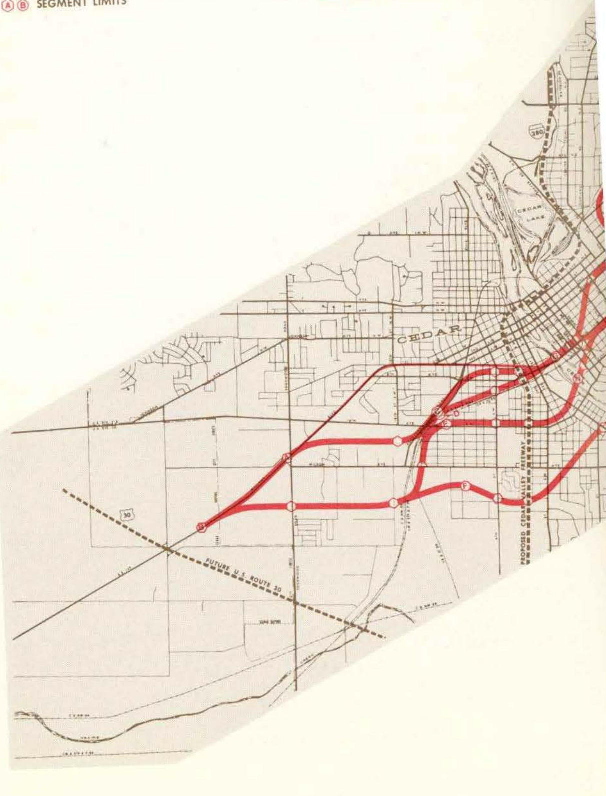
LEGEND

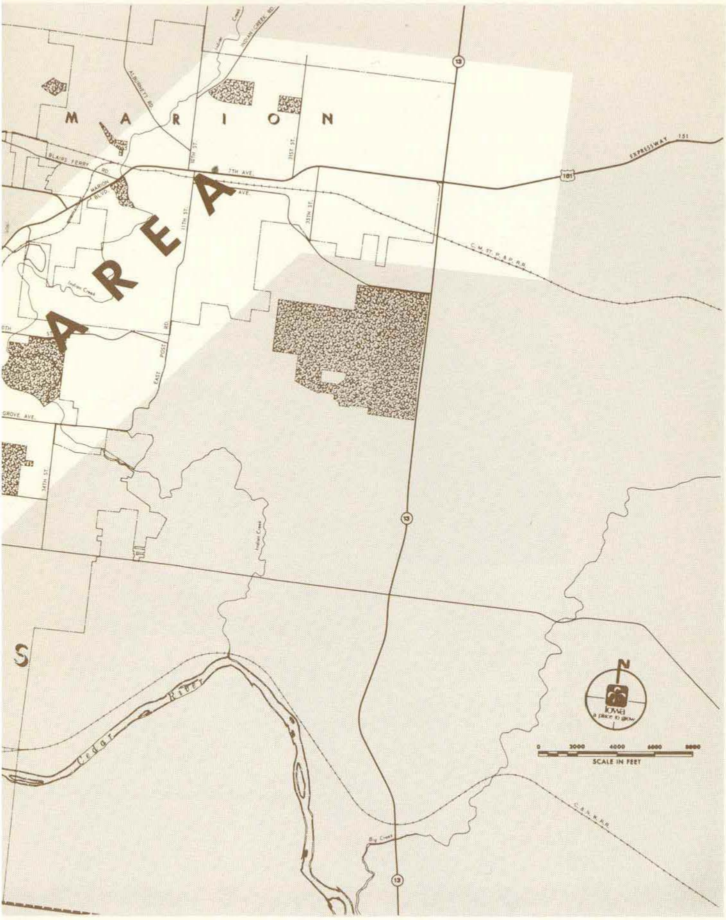
INTERCHANGE LOCATIONS

Ⓐ Ⓑ SEGMENT LIMITS

CORRIDOR

SURFACE ROUTE




MARION
AREA
BLAIRS FERRY RD.
7TH AVE.
EXPRESSWAY 151
Indian Creek
Cedar River
Big Creek
N
IOWA a place to grow
0 2000 4000 6000 8000
SCALE IN FEET


MARION
EXPRESSWAY 151

STUDY GOALS

The major goals of the study were to arrive at recommendations that:

1. Were responsive to the desires of the locality.
2. Resulted in the least social and environmental cost to the locality.
3. Were compatible with regional and local transportation requirements and traffic service.
4. Were reflective of sound engineering design concepts, resulting in high-cost benefit ratios.

MULTIDISCIPLINE TEAM

The HNTB Research, Planning and Design (RP&D) Team provides the technical staff and expertise required for the technical program. The team was comprised of the following professional disciplines: transportation engineers, traffic engineers, highway engineers, civil engineers, soils and foundation engineers, comprehensive planners, urban designers, sociologist, economist, architects, site planners and landscape architects.

BASIC STUDIES

The initial phases of the study entailed the assembly of all data deemed to have identification with the study area and the project. Included was information related to land use, public facilities and service areas, transportation and traffic, physiography and soils, economic characteristics, population and social characteristics and other pertinent data.

Subsequent to the preparation of the extensive volume of data into a usable form, the individual members of the RP&D Team performed a general analysis of the study area which included an overall physical, socio-economic, engineering, traffic and environmental evaluation to identify basic problems, issues and contraints.

TRAFFIC SERVICE

First Avenue is virtually the only facility along the SW-NE axis that qualifies and functions as a major arterial. The increasing volume of traffic through the years emphasizes the importance of First Avenue to the Northeast sector of the Cedar Rapids–Marion metropolitan area. This volume has grown from 14,000 vehicles per day in 1959 to more than 31,000 vehicles per day in 1970; a 121 percent increase in only 16 years. Moreover, future 1990 projections indicate volumes of 80,000 through certain segments of the NE corridor. The maximum volume that can be accommodated under existing conditions without serious congestion has been estimated at 25,700 vehicles per day.

While the magnitude of existing and future traffic is of primary concern, the origins and destinations of this traffic must also be recognized. In this regard, special analyses were conducted in order to measure travel demand. Basically, traffic through the SW-NE corridor can be classified in one of three ways; traffic having both origin and destination within the metropolitan area (internal–internal); and traffic having origin and destination outside the metropolitan area (external–external); and traffic having origin within the metropolitan area and destination outside the metropolitan area (internal–external). These analyses indicated that, in 1990, 91 percent of the traffic will be internal–internal, 8 percent will be internal–external and only 1 per cent will be external–external. These results indicate that a by-pass system will not begin to serve the predominant traffic demand. In fact only 1 percent of the 1990 volume – the external–external traffic would be served by a by-pass route. If the majority of traffic is to be served according to the main axis of travel demand, then future improvements must be through the SW-NE corridor.

PUBLIC TRANSIT

Public transit is an important element of the total urban transportation system. While transit in the Cedar Rapids–Marion area has experienced a decline in use and revenue there is, and will continue to be, a need for this service by those citizens who rely on transit for their primary source of transportation. According to the Regional Transit Authority's Report entitled a "Transit Improvement Plan for the Cedar Rapids–Marion, Iowa Area" published in November, 1970, the future effort will be to maintain the existing level of usage and to continue to promote ridership among those people who are not using transit service.

PRELIMINARY CORRIDOR SELECTION

Utilizing all available data the RP&D Team proposed and studied a number of different corridors. Following extensive discussion, review and consensus agreement, the most feasible corridors were selected for detailed evaluation. Each of the preliminary corridors selected offered a unique and workable solution. The preliminary corridors were then mapped and divided into three sections to facilitate evaluation.

CORRIDOR EVALUATION PROCEDURE

The procedure followed in evaluating the preliminary corridors was basically a statistical process requiring several sequential steps. This methodology provided assurance that each corridor was evaluated against exactly the same comprehensive criteria. A comprehensive list of major factors was developed to adequately cover the broad transportation planning considerations relevant to the study.

An essential part of the total corridor evaluation was the input of local values in determining the relative importance of the seven major factors. An attitude survey was administered to a sample of public officials, civic organizations and local homeowners to evaluate the relative value placed upon the various considerations utilized in the study, which in turn produced preference weights to the seven major factors.

The evaluation of the major factors was determined by scoring the applicable sub-factors under each evaluation factor. Scoring was on the basis of dollars for costable items and on the basis of a numerical scale of 0 through 10 for non-costable items.

Each alternate corridor received a weighted score for each major factor, resulting in a three-digit score. From these scores, a ranking of all alternate corridors was obtained, with the highest total indicating numerically the most desirable corridors from the standpoint of the total design concept utilized by the Multidiscipline Design Team.

EVALUATION CRITERIA

The following evaluation criteria were used as the basis for analyzing and evaluating the corridor locations for the SW-NE transportation corridor. Each of the phases listed is a data item of criteria, which were grouped into seven major categories and used to measure the effectiveness of each of the preliminary corridors.

Traffic Impact

Traffic assignment to the metropolitan network • Access to existing and proposed generators • Compatibility with existing and proposed generators • Impact on existing travel patterns.

Environmental Impact

Freeway relationship to existing areas of similarity • Freeway relationship to planned use areas • Freeway relationship or impact on the urban structure of the metropolitan areas • Freeway relationship to existing and planned community facilities and services • Impact on natural resources, historic or ecological values • Visual impacts within the scenic corridor • Adaption of freeway to physical environment • Highway alignment and design (site adaption) • Design opportunities • Level of compatibility-freeway and environs.

Economic Impact

Market and assessed property values • Impact upon existing businesses and future industrial and commercial development potential, from the highway user viewpoint • Disruption of business operations and owners'/operators' economic welfare • Disruption of the housing market and the occupants' economic welfare.

Social Impact

Individual identity • Family activities • Local interaction • General neighborhood quality • Regional interaction • Population change.

Construction Costs

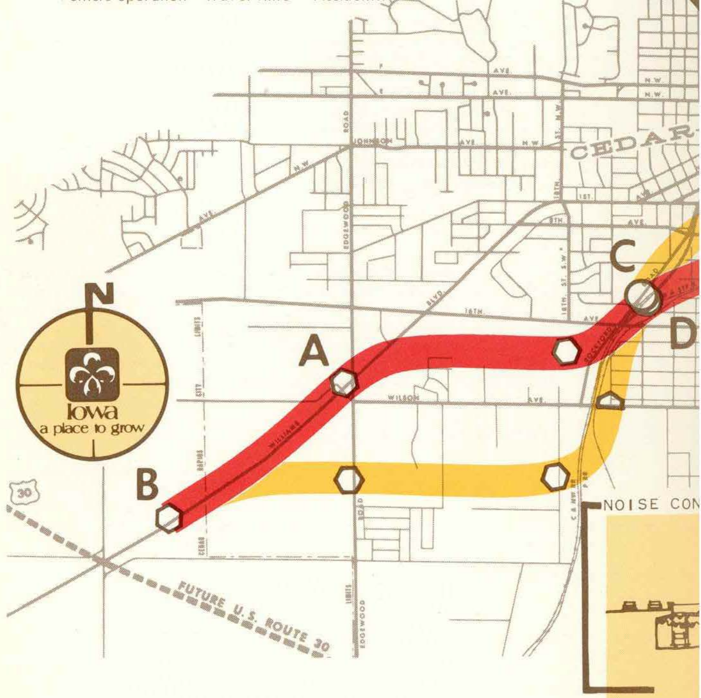
Construction • Right-Of-Way • Engineering and contingencies.

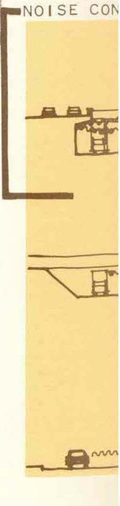
Annual Costs

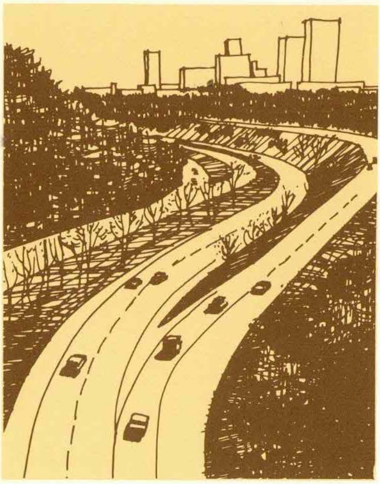
Operation and maintenance • Amoritized capital or construction.

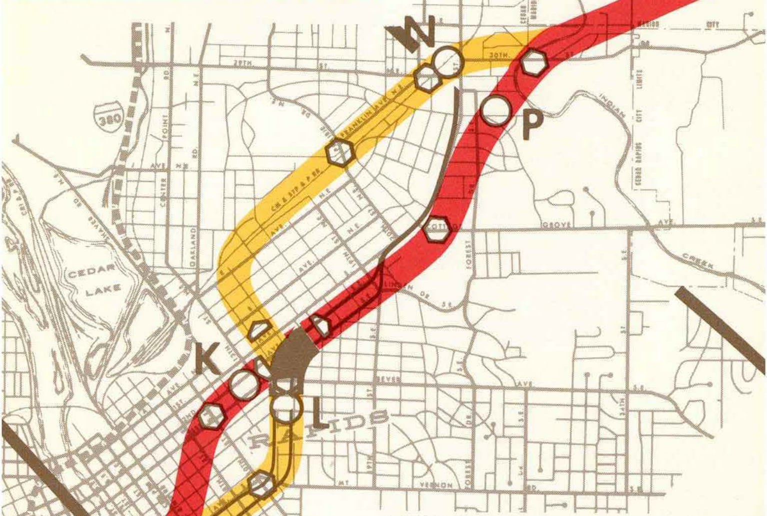
Road Use Costs

Vehicle operation • Travel Time • Accidents.

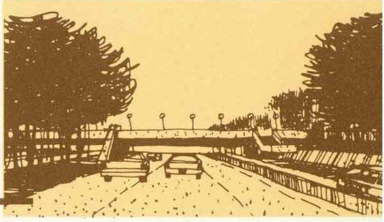


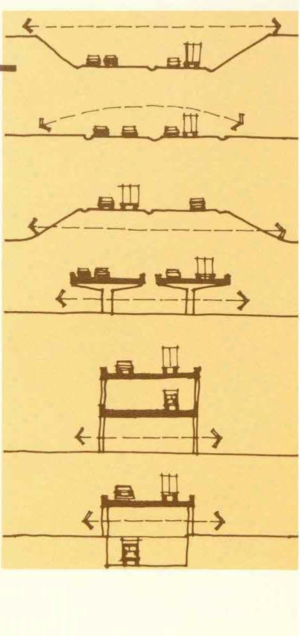




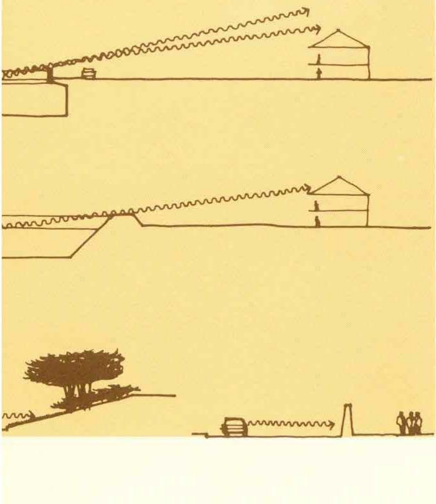


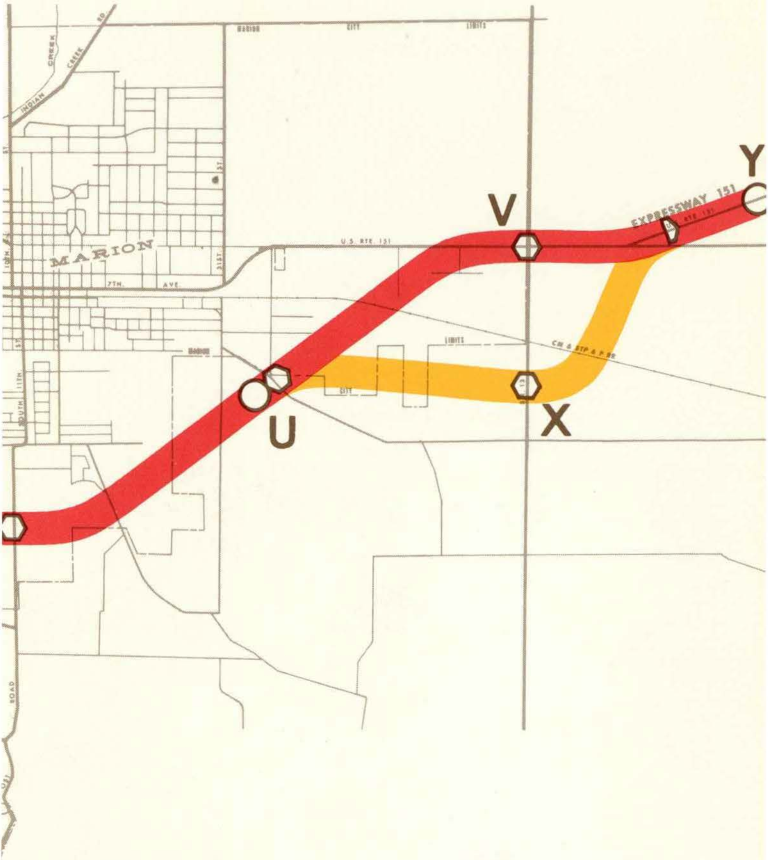
DIFFERENT DESIGN SITUATIONS CALL FOR DIFFERENT DESIGN ALTERNATIVES.





THROUGH THE USE OF A SOLID MASS BARRIER





FINDINGS

The highest rated corridors in each of the three sections of the SW-NE study area are illustrated on the map at left and tabulated as follows:

SECTION I	SECTION II	SECTION III
BADG (RED)	SURFACE (BROWN)	PUVY (RED)
BACG (RED-GOLD)	GKP (RED)	NUVY (GOLD-RED)
BDG (GOLD-RED)	GLN (GOLD)	PUXY (RED-GOLD)
	GLP (GOLD-BROWN-RED)	NUXY (GOLD-RED-GOLD)

Section I

Corridor BADG (illustrated in RED) scored well in several major factors. Road user costs and estimated annual maintenance costs were low, while high scores were recorded for social impact, environmental impact and traffic impact.

Corridor BACG (illustrated in Section I as a combined RED-GOLD LINE) scored well on economic impact and social impact as well as construction costs, annual costs and road user costs.

Corridor BDG (illustrated in GOLD-RED) rated relatively poor in construction cost due to extensive structure requirements.

Section II

The surface route in Section II (illustrated in BROWN), rated better than the remaining 16 corridors, which were proposed at a freeway standard of design. The high rating of the surface route was due to the anticipated minimum disruption and displacement of buildings, people and activities, thereby resulting in high scores for environmental impact, social impact and economic impact. It also had a relatively low overall estimate of cost.

Segment GKP (illustrated in RED) was the highest ranking freeway segment, with high scores in road user costs, economic impact, environmental impact and social impact. Another high rated freeway corridor segment was GLN, which is the GOLD line in Section II. Corridor Segment GLN scored well in social impact, environmental impact, and traffic impact.

Corridor segment GLP (illustrated as a GOLD-BROWN-RED line) received high scores for excellent traffic service and high ratings (low cost) for construction costs and road user costs.

Section III

In Section III, closely related corridor segments PUVY, NUVY and PUXY and NUXY were the highest rated segments forming practicable corridor combinations with segments in Section II. Corridors PUVY (illustrated in RED) and NUVY (illustrated in RED-GOLD) scored well in environmental impact, economic impact and social impact, with relatively lower estimated costs.

Corridor segments PUXY (illustrated as the RED-GOLD line in Section III) and NUXY (the GOLD-RED-GOLD line) were rated just slightly lower with good scores in environmental impact, economic impact, social impact and the estimated cost factors.

The highest rated corridors in Section III – RUVY and RUXY – did not combine with practicable corridor combinations in Sections II and III and, therefore, do not appear in the summary tabulation of corridor findings.