ENVIRONMENTAL SCIENCES DIVISION
Board of Health Building
(406) 449-3946

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A.C. Knight, M.D.
Director

Jan. 25, 1978

Honorable Thomas Judge, Governor, State of Montana, Helena, MT 59601
Honorable Ted Schwinden, Lieutenant Governor, State of Montana, Helena, MT 59601
Montana State Library, Helena, MT 59601 (5 copies)
Environmental Quality Council, Helena, MT 59601
Department of Community Affairs, Aeronautics Division, Box 1698, Helena, MT 59601
Department of Fish & Game, Attn: Jim Posewitz, Administrator, Ecological Services Division, Helena, MT 59601
Department of Fish & Game, Administrator, Recreation and Parks, Helena, MT 59601
Department of State Lands, Office of the Commissioner, Helena, MT 59601
Department of Natural Resources and Conservation, Office of the Director, Helena, MT 59601
Department of Natural Resources and Conservation, Administrator, Conservation District Division, Helena, MT 59601
Montana Historical Society, State Historic Preservation Officer, Helena, MT 59601
U.S. Department of Transportation, United States Coast Guard Commander (OAN), Thirteenth Coast Guard District, 915 Second Avenue, Seattle, WA 98174
U.S. Department of Transportation, Federal Aviation Administration, FAA Building, Room 2, Helena, MT 59601
U.S. Department of the Interior, U.S. Geological Survey; MS-104, Chief, Environmental Impact Assessment Program, Reston, VA 22092
U.S. Department of the Interior, Bureau of Mines, Chief, Western Field Operation Center, East 315 Montgomery, Spokane, WA 99207
U.S. Department of the Interior, District Chief, Water Resources Division, U.S. Geological Survey, Box 1696, Helena, MT 59601
U.S. Department of the Interior, Fish & Wildlife Service, Regional Director, Region 6, Box 25486, Denver Federal Center, Denver, CO 80226
U.S. Department of the Interior, Bureau of Reclamation, Regional Director, Region UM, Box 2553, Federal Office Building, Billings, MT 59103
U.S. Department of the Interior, Bureau of Outdoor Recreation, Regional Director, Mid-Continent Region, Box 25387, Building 41, Denver Federal Center, Denver, CO 80225
U.S. Department of the Interior, National Park Service, Regional Director, Rocky Mountain Region, Box 25287, 655 Parfet Avenue, Denver, CO 80215
U.S. Department of the Interior, Missouri River Basin, Special Assistant to the Secretary, Room 688, Building 67, Denver Federal Center, Denver, CO 80225
Environmental Protection Agency, Deputy Regional Administrator, Region VIII, Suite 900, 1860 Lincoln Street, Denver, CO 80203
Federal Housing Administration, Housing and Urban Development, Office of the Director, 616 Helena Avenue, Helena, MT 59601
Bureau of Land Management, Montana State Office, Box 30157, Billings, MT 59107
Department of the Army, Omaha District Corps of Engineers, 7410 U.S. Post Office and Courthouse, Omaha, NE 68102
U.S. Department of Transportation, Federal Highway Administration, 501 North Fee Street, Helena, MT 59601

Honorable Edmund P. Sedivy, Mayor of Bozeman, Box 640, Bozeman, MT 59715
S.C. Gesko, Jr., City Manager of Bozeman, Box 640, Bozeman, MT 59715
Don Barrick, City of Bozeman, Box 640, Bozeman, MT 59715
Paul Bolton, City of Bozeman, Box 640, Bozeman, MT 59715
Bozeman City-County Planning Board, Attn: President, Bozeman City Hall, Box 640, Bozeman, MT 59715
Ben Berg, City Attorney, Box 550, Bozeman, MT 59715
Transportation Planning Section, Attn: Dick Howell, Supervisor, Box 640, Bozeman, MT 59715
Board of County Commissioners, Gallatin County Courthouse, Bozeman, MT 59715
Dick Holmes, Supervisor, Division Construction Section, Department of Highways, Box 1110, Bozeman, MT 59715
Harry Daum, Box 9, Hampa, ID 83651 and Route 38, Livingston, MT 59047
Hal Bolinger, Box 1047, Bozeman, MT 59715
Robert Copple, Box 1583, Boise, ID 83701
Harry Newlon, President, First National Bank, Box 730, Bozeman, MT 59715
Ron Marcoux, Regional Fishery Manager, Department of Fish & Game, Route 3 Box 274, Bozeman, MT 59715
Burlington Northern, Inc., Rocky Mountain District, Attn: Donald Nettleton, Director, Timber and Land Management, 700 South Avenue, Missoula, MT 59801
Montana Automobile Association, Box 4129, Helena, MT 59601
Montana Stockgrowers Association, Box 1679, First National Bank Bldg., Helena, MT 59601
Center for Public Interest, Box 931, Bozeman, MT 59715
University of Montana, Attn: Dee Taylor, Department of Anthropology, Missoula, MT 59801
Montana State University, Attn: Dr. A.P. Samson, Department of Anthropology, Bozeman, MT 59715
Montana State University, Institute of Applied Research, Bozeman, MT MT 59715
Rick Graetz, Box 894, Helena, MT 59601
Friends of the Earth, Attn: Ed Dobson, Box 882, Billings, MT 59103
Sierra Club, Upper Missouri Group, Attn: Jack Schmidt, Box 515, Helena, MT 59601
The Wilderness Society, 4260 East Evans Avenue, Denver, CO 80222
Bozeman Chamber of Commerce, 129 West Main, Bozeman, MT 59715
The Montana Power Co., 40 East Broadway, Butte, MT 59701
Mountain Bell Telephone Co., Inc., Attn: F.R. Ketron, Plant Staff Supervisor, Box 1716, Helena, MT 59601
Ralph W. Zimmer, 1307 Cherry Dr., Bozeman, MT 59715
Bozeman Public Library, 35 N. Bozeman, Bozeman, MT 59715

Reviewer:

The enclosed draft environmental impact statement has been prepared for the proposed Main Mall shopping center in Gallatin County. This impact statement is submitted for your consideration. Comments and questions will be accepted for 30 days after the date of this publication. If no communication occurs during the time period it will be assumed the person or agency does not have any comments. An extension, not to exceed 15 days, may be requested. All comments should be sent to: Tom Ellerhoff, Environmental Sciences Division, Department of Health & Environmental Sciences, Board of Health Building, Helena, MT, 59601.

Sincerely,

Homer G. Wheeler

Homer G. Wheeler, P.E.
Ass't Admin.-Eng. Div.
Department of Highways

D.G. Willems

D.G. Willems, P.E., Chief
Water Quality Bureau
Department of Health and Environmental Sciences

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Contributors

MONTANA DEPARTMENT OF HIGHWAYS
AND
MONTANA DEPARTMENT OF HEALTH
AND
ENVIRONMENTAL SCIENCES

DRAFT ENVIRONMENTAL IMPACT STATEMENT

MAIN MALL SHOPPING CENTER

Pursuant to the Montana Environmental Policy Act, Section 69-6504 (b) (3), Administrative Rules of Montana 16-2.2 (2) - P2000 et. seq. and 18-2.2 (2) - P210 et. seq., the following draft environmental impact statement (EIS) was prepared by the Montana Department of Health and Environmental Sciences (DHES) and Department of Highways (DOH) concerning a traffic approach permit pursuant to Department of Highways - Powers and Duties, Title 32, Chapter 24, RCM, 1947, and administrative approval of the MAIN MALL SHOPPING CENTER, a proposed development west of Bozeman, Montana, pursuant to the Public Water Supply Act, Title 69, Chapter 49, RCM, 1947.

I. DESCRIPTION

Harry and Kathleen Daum propose to build the Main Mall Shopping Center just west of the city limits, north of U.S. Highway 191 (Southern ½, Southwestern ¼, Section 11, Township 2 South, Range 5 East - See attached Map #1). The 39.69 acres will include the main complex of stores, a store not attached to the mall and parking (See attached Map #2).

II. CURRENT ENVIRONMENTAL CONDITIONS

The land is in a high groundwater area and has a perennial stream flowing north through the property. Presently the tract is being used for growing hay and pasture.

The proposed change in land use is indicative of the trend for the area.

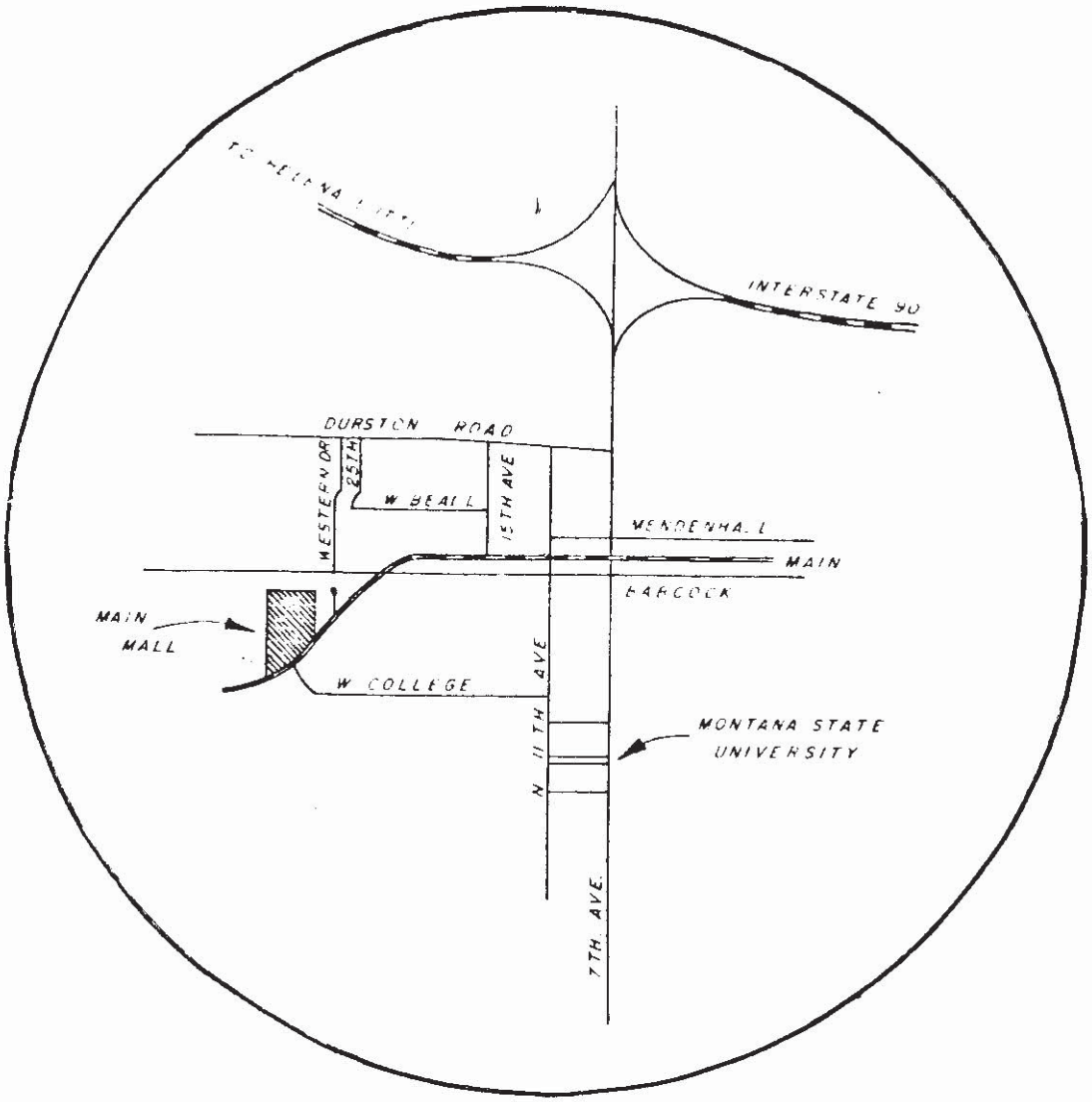
III. PHYSICAL ENVIRONMENT

Terrestrial and Aquatic Life and Habitats:

Although the northwest corner of the land bounds the Department of Fish & Game's Bozeman Ponds fishing site, the stream meandering through the property is not a water source for the ponds. The waterway is a perennial stream containing a few aquatic invertebrates.

The Fish & Game Department made an electrofishing run to determine if there were any fish in the portion of the stream passing through the proposed development. No fish were found.

Map #1


TO HELENA (I-15)
INTERSTATE 90
DURSTON ROAD
WESTERN DR
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MAIN
BABCOCK
MAIN MALL
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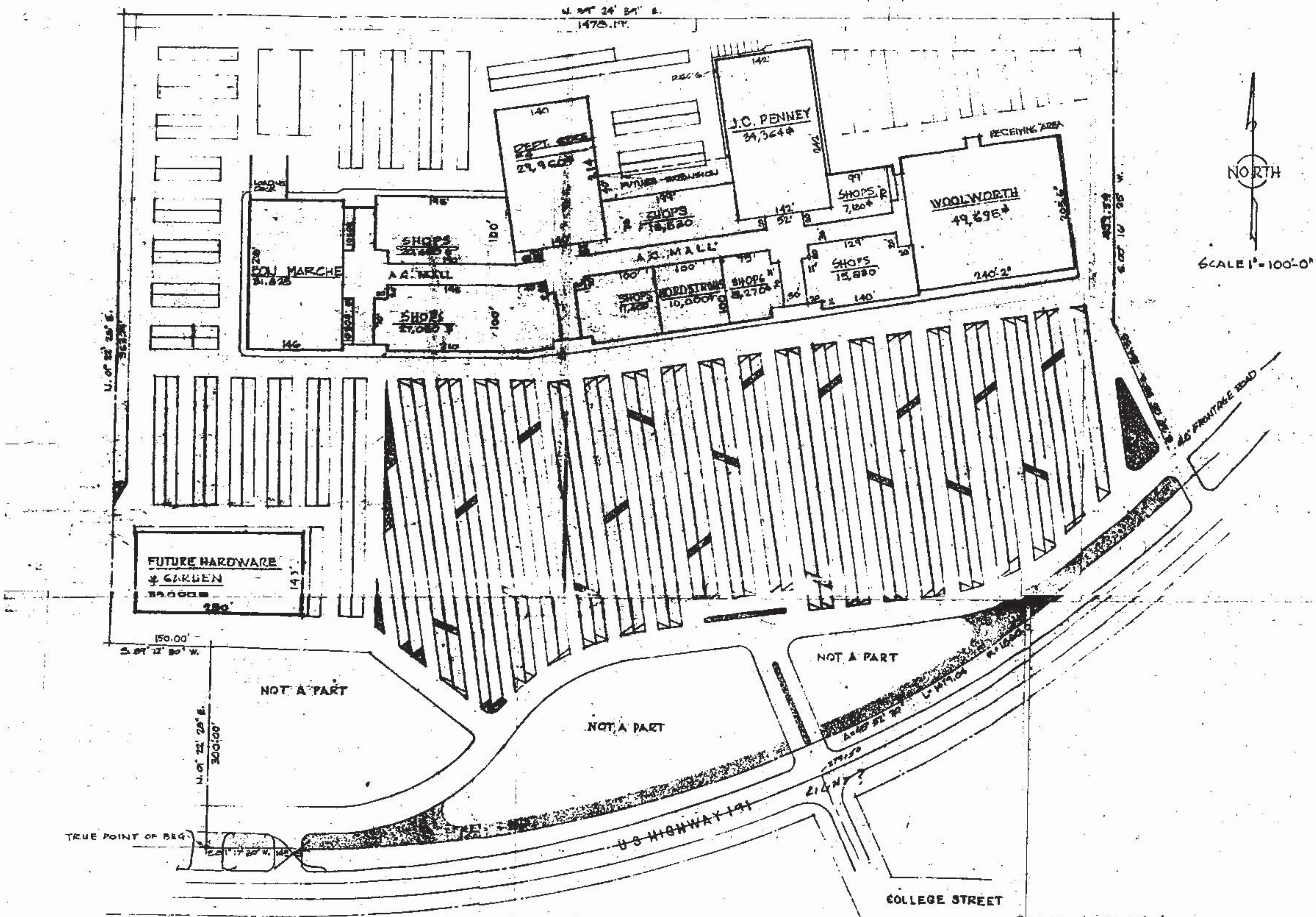

SITE PLAN

MAP #2

MALL ANALYSIS	
DEPT. STORES	155,847 S.F.
SHOPS	107,960 S.F.
GROSS LEASABLE	263,807 S.F.
NON LEASABLE AREA	42,280 S.F.
GROSS BUILDING AREA	306,087 S.F.
FUTURE BUILDING	35,000 S.F.

Since the site if adjacent to the city, the animal life consists mainly of nongame species, such as mice, ground squirrels, song birds and occasionally, birds of prey.

The Fish & Game Department's ponds are stocked with perch and rainbow trout and reportedly are popular with anglers of all ages.

The construction of the proposed mall should not physically alter the ponds, however, the development will have a negative impact on the aesthetic qualities of the area. It's possible the aesthetic impact of the commercial area could be lessened if the land bordering the ponds were landscaped.

Water Quality, Quantity and Distribution:

If Bozeman continues at a steady rate of population growth through the year 2000 (Figure 1), there will be a corresponding increase in the city's water supply needs and sewage flows. Additionally, storm water control and treatment may be needed in newly developed areas.

Most of Bozeman's population growth probably will occur along the west edge of the city (Lorang, October 26, 1977). This area will be served first by the University Interceptor sewer line, and later by the Far West Trunk Line as the city continues to grow (Facilities Plan, November 1974).

An estimated population of 14,370 people will be served by the University Interceptor at full development. This estimate is based on a design flow rate of 1.44 million gallons per day (Wetstein, August 18, 1977) divided by an assumed per person contribution of 100 gallons per day. Michael Lorang, Bozeman's assistant city engineer (October 26, 1977), estimated 8,400 people would be served by the University Interceptor within 10 to 15 years, and the city's population would be 36,900 persons by 1990. Therefore, 60% of the city's projected population growth through 1990 will occur in the University Interceptor service area. This growth is greater than the medium series projections by Dodge (August 1977), which generally was used for this report.

Water Supply

Water needs for Bozeman will increase in proportion to the anticipated population growth (Figure 2). Based on a medium population growth by Richard Dodge in Montana Population Projections, 1975-2000 (August 1977), the city's present water rights should provide enough water to meet demands generated by future growth until about 1994. Water demand will equal supply by 1984 if the city's population projections are used, in either instance, the effect of the Main Mall is small (Figure 2).

Impact of Construction on a Perennial Stream

A small perennial stream flows through the site of the proposed Main Mall. Stream channel alteration plus runoff from construction areas will adversely impact the stream. A Form 272 permit under Montana's Natural Streambed and Land Preservation Act is required for the channel change. A permit application for this change to pipe the stream beneath the mall complex was received by the Gallatin County Soil Conservation District (SCD) October 20, 1977 (Cox, November 28, 1977).

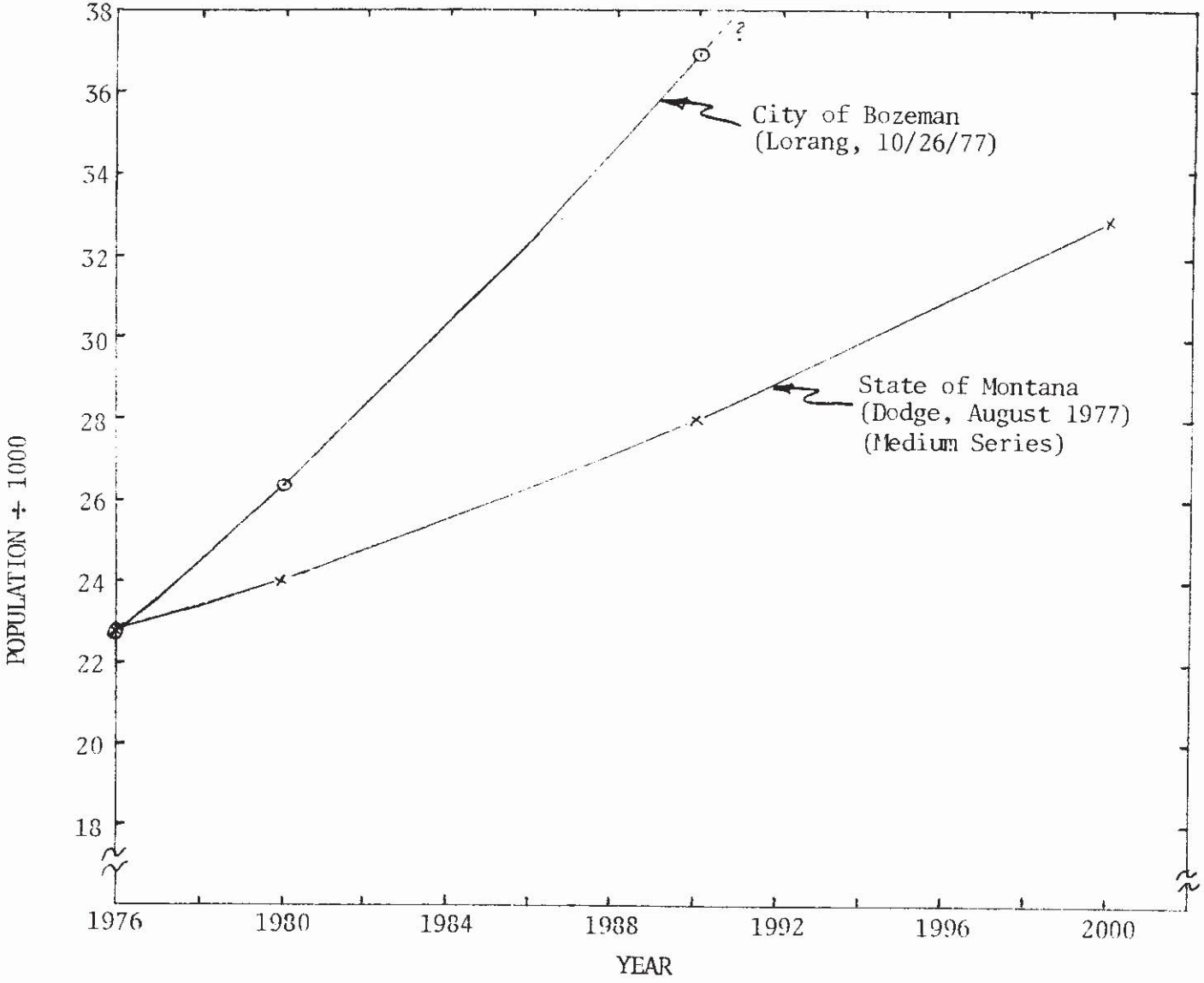

FIGURE 1. CITY OF BOZEMAN POPULATION PROJECTIONS

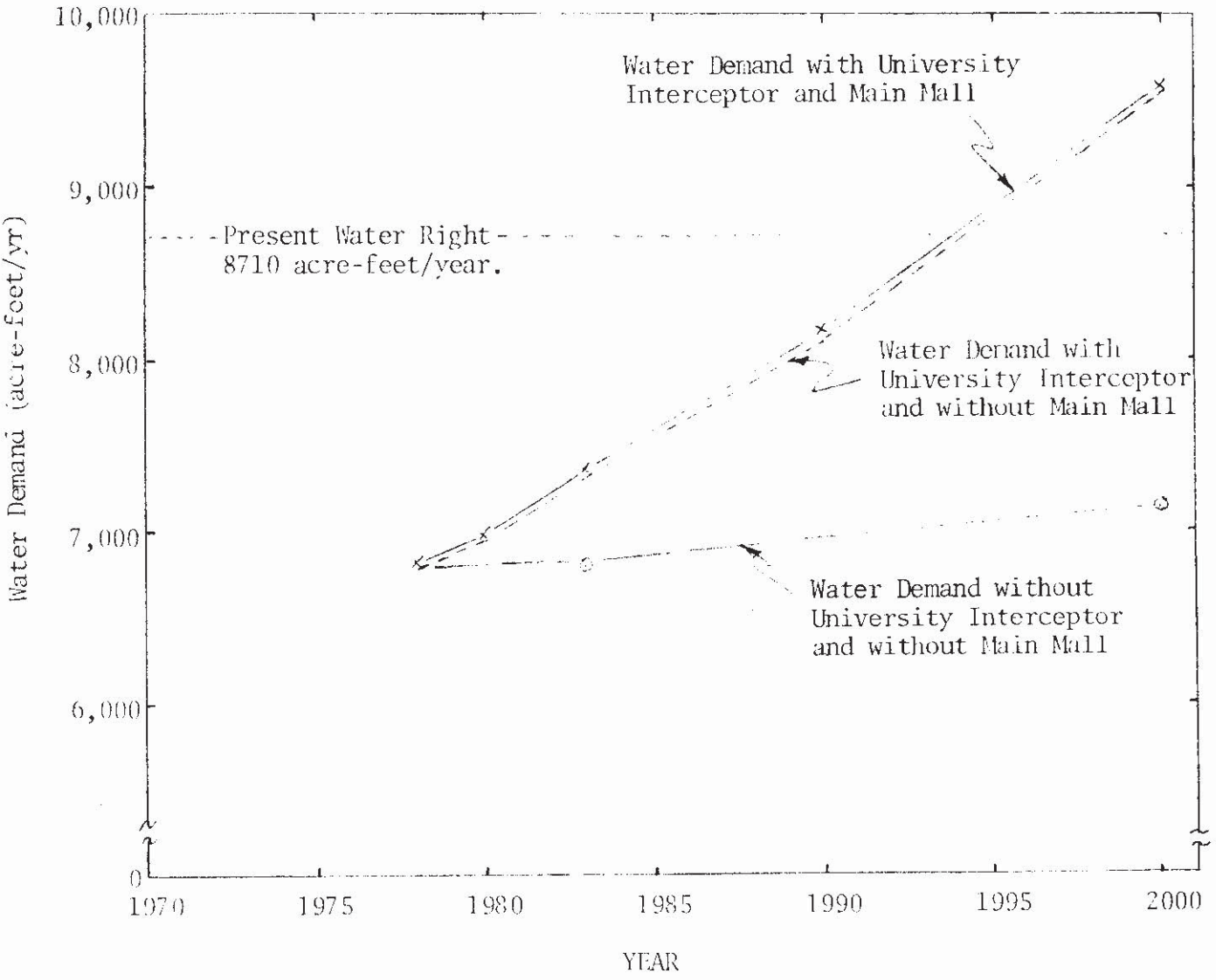

Figure 2. Estimated City of Bozeman Water Demand (1,2,3)

(1) Water demand was computed using 260 gallons/person/day (SCS meeting 8/11/77) This figure includes commercial demand.

(2) Main Mall water demand was assumed equal to average daily sewage flow (Table 2).

(3) Water demand for the Far West Trunk service area was assumed to include some light commercial useage (e.g. the Main Mall).

At the request of the SCD, the Soil Conservation Service (SCS) reviewed the Form 272 permit application with the following comments (Jones, November 18, 1977):

1. The proposed 26 inch culvert would be adequate to carry normal streamflows.
2. Erosion control measures (structures) will be needed at the culvert overflow.

The Department of Fish & Game expressed a similar concern for erosion control at the culvert outlet (Marcoux, November 28, 1977). In addition, the Fish & Game Department suggested using the stream to create a greenway through the mall and recommended a plan be prepared which assesses construction impacts on the stream (Marcoux, November 28, 1977). The DHES concurs with the recommendation to assess construction impacts on the stream.

Impact of Stormwater on Perennial Stream

Considerable research has been conducted on stormwater impact and treatment methods. Many of these publications are available from the U.S. Environmental Protection Agency (EPA). Keith Brown and William Garvin (unpublished draft) have prepared an urban stormwater assessment for many Montana communities; a literature review is included and various treatment techniques are discussed.

Untreated stormwater carries a significant amount of pollution. Most of this pollution is derived from the flushing of materials on impervious surfaces and from streambank erosion (Economic Systems Corporation, July 1970). Therefore, to maintain water quality it is necessary to control excessive flows, suspended solids and oils in stormwater.

The combination of dry wells and surface water discharge proposed in plans and specifications submitted by the developer to the DHES are not adequate for treating stormwater from the mall complex. Dry wells or catch basins have been shown to be ineffective for small particulates (less than 43 microns) which make up a significant amount of the pollution load (Sertor, et.al, March 1974). Water remaining in the basins usually becomes septic and the settled solids become an anaerobic sludge (Thelen, et. al, March 1972), which can solubilize heavy metals. Some of this poor quality water and solids could be flushed into the stream by a relatively small rainfall. Oils would not be removed by the catch basins and might adversely affect performance of the dry wells.

For a rainfall rate of 0.5 inches/hour lasting for one hour, approximately 12,500 cubic feet of water must be discharged to the stream if 50% of the precipitation is injected into the groundwater by the dry wells. Using data collected by The Blue Ribbons Big Sky Country Areawide Planning Organization (Matney, December 6, 1977) on Bozeman stormwater discharges (total lead concentrations from 0.16 milligrams/liter (mg/l) to 1.12 mg/l), Montana Water Quality Standards for lead (0.05 mg/l) probably will be violated if this water is not treated. A stream flow of 3 cubic feet/second (cfs) was assumed. According to G. Sparks (November 1975), lead contaminants tend to remain in solid form. So, if adequate suspended solids removal facilities are provided, water quality standards for lead should not be violated. Treatment for lead will remove other trace metals which are in particulate form.

Montana Water Quality Standards state in part:

> ...State surface waters are to be free from substances attributable to municipal, industrial, agricultural practices or other discharges that will:
>
> (i) Settle to form objectionable sludge deposits or emulsions beneath the the surface of the water or upon adjoining shorelines.
> (ii) Create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrans per liter) or globules of grease or other floating materials.

Information submitted as part of the Form 272 permit application included oil separation devices. The SCS review (Jones, November 18, 1977) suggested the DHES review the oil separation equipment. Similarly, Fish & Game (Marcoux, November 28, 1977) requested the DHES review the project with respect to compliance with water quality law, including oil separation equipment. However, plans and specifications received by the DHES do not include oil separation equipment, thus proposed oil separation equipment has not been evaluated.

The possibility of the Main Mall connecting to an existing city storm sewer system is remote, according to Lorang (November 29, 1977). Existing systems are not close and are uphill from the mall site. Therefore, the developer should submit a design (including supporting rationale) for his method of dealing with stormwater, which includes consideration of the constraints discussed. Discharge to surface waters is possible with adequate treatment.

Impact of Main Mall on Groundwater (Sherman, December 30, 1977)

Groundwater disposal of stormwater is not expected to adversely affect downstream water users if adequate treatment for settleable solids and oils is provided prior to discharge. The impact of construction of the Main Mall on groundwater quality is expected to be slight.

Effect of Sewage Flows on Treatment Plant and East Gallatin River

Bozeman holds valid Montana Pollutant Discharge Elimination System (MPDES) Permit No. MT-0022608 for the discharge from its sewage treatment plant. However, the level of treatment provided by this plant is not sufficient to meet water quality standards. For this reason, the City of Bozeman was issued an Enforcement Compliance Schedule Letter (ECSL) on May 2, 1977, by the DHES. Listed below are the 15 steps in the ECSL, each with deadline dates for upgrading Bozeman's sewage treatment plant and sewer collection system so water quality standards could be met by September 1, 1983:

Enforcement Compliance Schedule Steps

1. Submit the final plans and specifications for phase II of the sewer rehabilitation program to the department by June 1, 1977.
2. Begin phase II of the sewer rehabilitation program by September 1, 1977.
3. Complete phase II of the sewer rehabilitation program by December 1, 1977.
4. Submit completed facility plan by January 1, 1978.
5. Submit the final plans and specifications for the wastewater treatment facilities (stage 1 improvements) by April 1, 1978.

6. Award the contract for construction of the wastewater treatment facilities by September 1, 1978.
7. Begin construction of the new wastewater treatment facilities by October 1, 1978.
8. Complete construction of new wastewater treatment facilities by January 1, 1980.
9. Attain operational status of the new wastewater treatment facilities by March 1, 1980.
10. Begin final design of ammonia conversion or nitrogen removal by October 15, 1981.
11. Complete plans and specifications for ammonia conversion by April 1, 1982.
12. Award the contract for construction of the ammonia conversion facilities by June 22, 1982.
13. Begin construction of the ammonia conversion facilities by July 15, 1982.
14. Complete construction of the ammonia conversion facilities by August 1, 1983.
15. Begin operational status of ammonia conversion facilities by September 1, 1983.

Because the City of Bozeman did not meet the deadlines for steps 1 and 2, and probably will not meet the deadlines for steps 3, 4 and 5, the DHES requested the EPA to take appropriate enforcement action (Willems, November 23, 1977). The effect of this request is unknown.

Step 1 of the ESCL was met on October 21, 1977. Phase II sewer rehabilitation plans and specifications were subsequently approved by the DHES and the EPA. The EPA authorization to award the construction contract is dated December 30, 1977. Since the start of construction is dependent on the weather, the actual date for the completion of step 2 is unknown.

A waste load allocation study (Stuart, et.al, July 25, 1974) has been conducted to assess the impact of Bozeman's sewage treatment plant on the East Gallatin River. Attainment of secondary treatment by 1980 (90% five-day biochemical oxygen demand (BOD_5) and 85% suspended solids removal) was assumed. Estimated population growth was also higher than projected by Dodge (August, 1977). Conclusions of this study were:

1. The plant provides secondary treatment to less than half of the effluent.
2. Waste loads to the East Gallatin River for 1973 would exceed all the limits proposed in this report during the projected 7day-10 year and 7 day-3 year low flows (Table 1).
3. Ammonia concentrations were critical for the 3 year low flow situation immediately preceding the study. (The flow for this situation is greater than the statistically determined 7 day-3 year low flow for the period of record because the authors felt we are at the peak of a 30-50 year water cycle.)
4. Total nitrogen would likely remain a possible problem if additional treatment is not provided.
5. Total phosphorous levels would exceed the proposed standard by 1990.
6. BOD_5 levels do not pose any problem for the foreseeable future.
7. In order to protect the fishery and prevent excessive algae growth, the ammonia load should be reduced to the lowest possible level.

Table 1 PRESENT AND SUGGESTED MAXIMUM ALLOWABLE DISCHARGED FROM THE BOZEMAN SEWAGE TREATMENT PLANT (Stuart, et.al. July 25, 1974)

	Present Stream Concentration at 7-day, 10-year low flow (in ppm)	Present Effluent Concentration at 4.5 MGD (in ppm)	Suggested Stream Limits (in ppm)	Suggested Effluent Limits @4.5 MGD (in ppm)	Suggested Effluent Limits @4.5 MGD (in lbs./day)
BOD_5	14.8	54.81	10	35.12	1,318
Total N*(inorganic)	3.6	13	1.5	5.25	161
Total NH_3 - N	2.9	11	1.0	3.50	131
NO_2 - N**	?	?	0.1	0.35	13.1
Total Phosphorus*	1.6	6	1.0	3.50	131

* These limits are tentative due to their uncertain effects on stream biota and should be corrected and enforced based on observations made after the plant is upgraded to satisfy the other limits.

** Stream levels have exceeded 0.1 mg/l in a very local area below the discharge.

Because the sewage treatment plants cannot provide adequate treatment, any population increase before corrective measures are implemented would increase the load on the East Gallatin River.

However, since measures are being taken to decrease the hydraulic load on the plant (extraneous groundwater is being excluded), then some of the hydraulic load due to increased population would be offset (Figure 3) so the level of treatment should improve (Figure 4).

James A. Cummings, Thomas, Dean and Hoskins, Inc., (September 23, 1977) estimated average groundwater infiltration reduction due to phase I sewer rehabilitation (completed January 1977) is estimated to be 0.3 million gallons per day (mgd). Wayne Dean, Thomas, Dean and Hoskins, Inc., (March 1977) estimated flow reduction due to proposed phase II sewer rehabilitation is 1.3 mgd. Based on an average daily flow of 4.32 mgd in 1976 (DHES permit files), the average daily flow after phase II work is completed would be about 2.72 mgd.

Construction of the University Interceptor will make approximately 900 acres of land available for development after the construction of many lateral sewers (Wetstein, August 18, 1977). Estimated average daily flow from this area at full development is 1.44 mgd including 0.041 mgd from the Main Mall (Wetstein August 18, 1977). Lorang (October 26, 1977) estimates the population served by the interceptor north of U.S. Highway 191 will be 2,300 persons within five years. Ten to 15 years after the interceptor is constructed an additional 6,100 persons south of the highway would be connected to the University Interceptor.

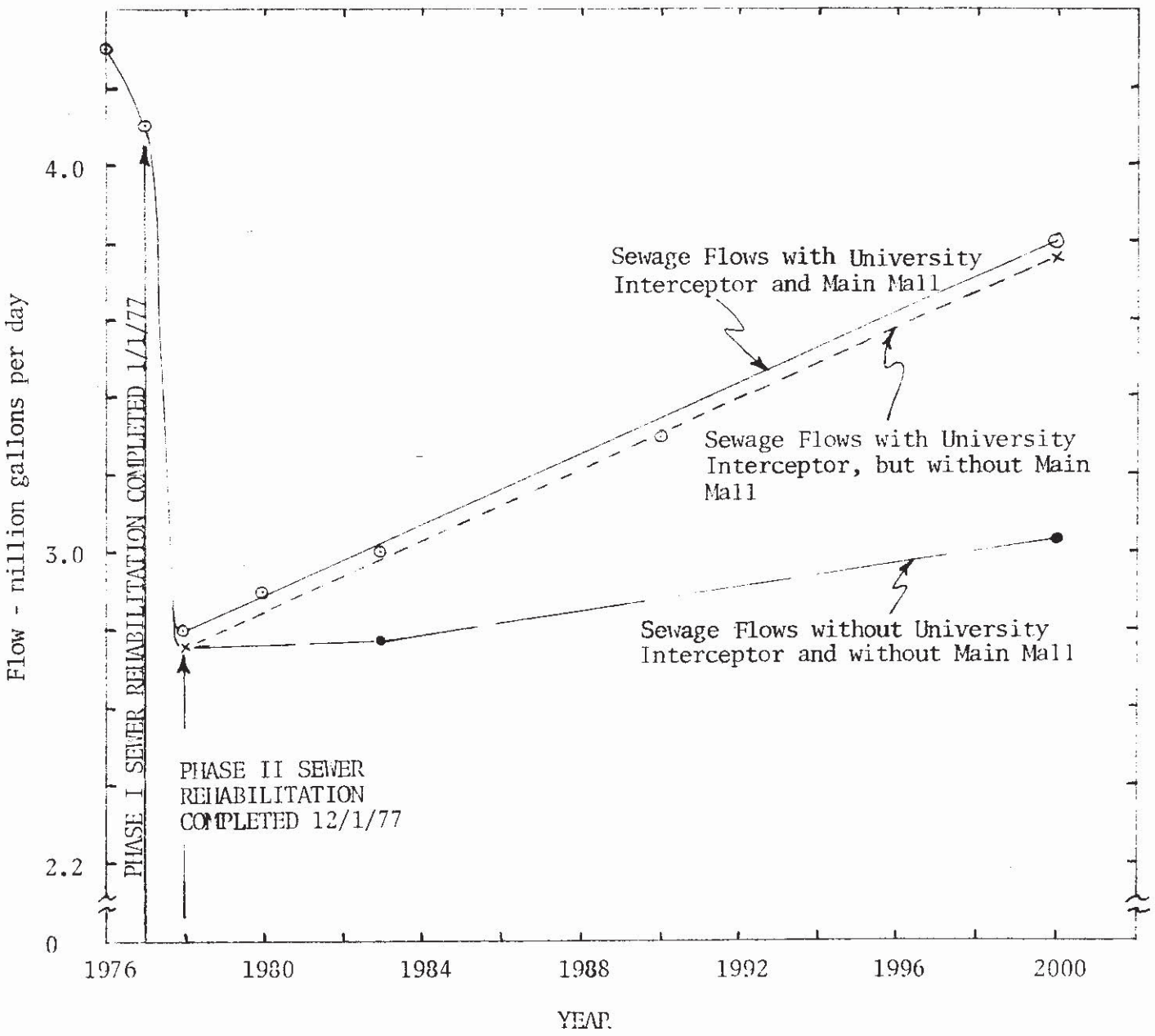

FIGURE 3. ESTIMATED SEWAGE FLOWS ENTERING BOZEMAN SEWAGE TREATMENT PLANT FOR VARIOUS LEVELS OF POPULATION GROWTH.

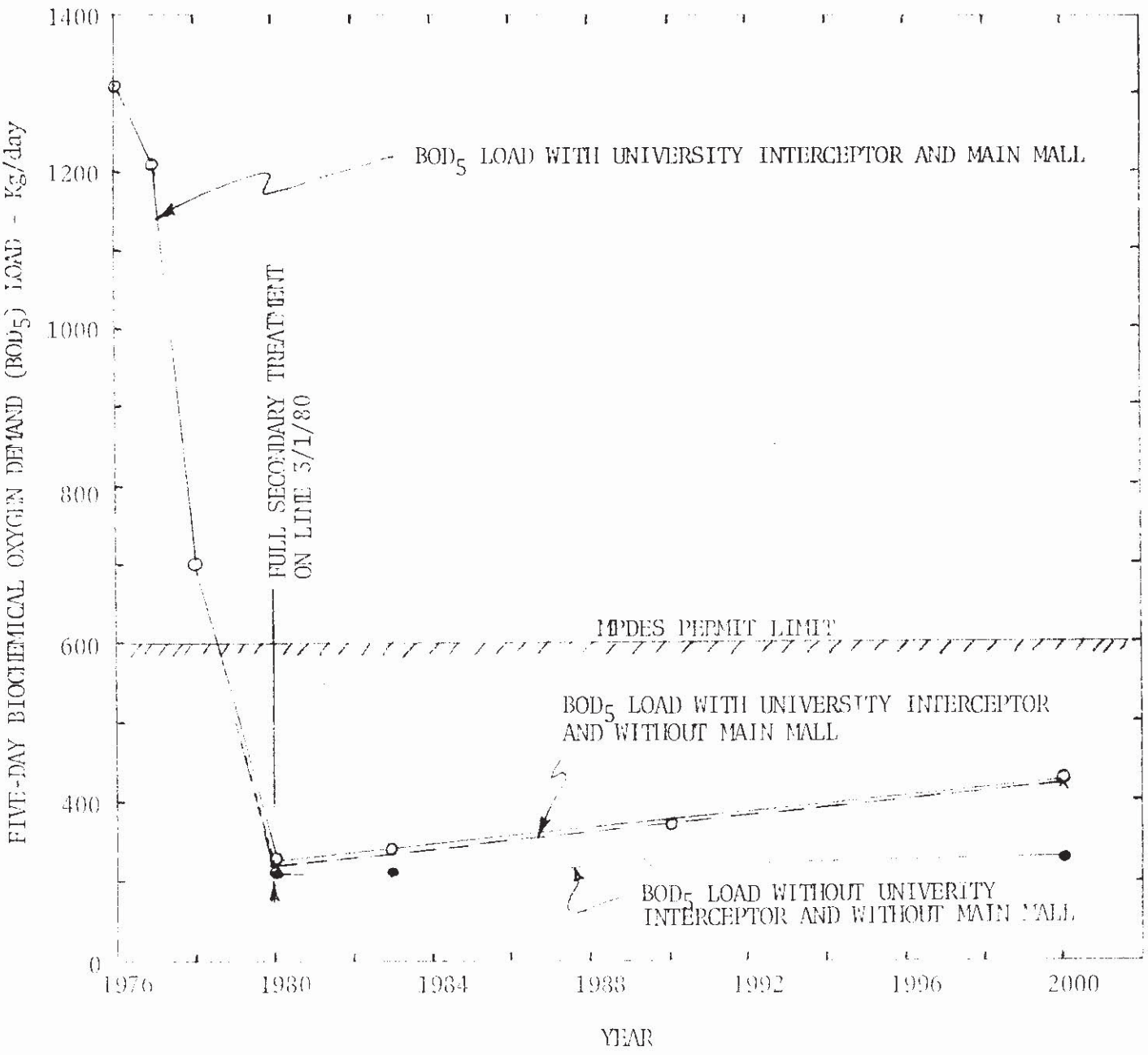

FIGURE 4. ESTIMATED BOD_5 LOADS TO EAST GALLATIN RIVER FROM BOZEMAN SEWAGE TREATMENT PLANT FOR VARIOUS LEVELS OF POPULATION GROWTH

The impact of increased sewage flows on the treatment plant and the East Gallatin River due to construction of the University Interceptor cannot be accurately assessed because the City of Bozeman has not met conditions in the ECSL. However, if ECSL steps had been met, hydraulic, biochemical oxygen demand and ammonia loads to the East Gallatin River should be as estimated in Figures 3, 4 and 5, and Table 2.

If city sewer and water services are not provided by the University Interceptor, the service area would not be annexed to the city and the development of homes with individual sewer and water system might occur (Van't Hul December 22, 1977).

Geology and Soil Quality, Stability and Moisture:

Geology

The Geologic Map of Montana, prepared by the U.S. Geological Survey, indicates the predominant geological formation for Bozeman and the land adjacent to the city is alluvium. More specifically, it is "...valley fill consisting of silt, sand and gravel; including some terrace deposits and glacial drift of Pleistocene age in some areas...The older part of the alluvium...is probably of Pliocene age."

Soils

According to the SCS, the dominant soil type at the proposed site is Huffine silt loam. This silt loam is a well drained soil, generally found on broad fan terraces and from 8 to 14 inches thick. It is used primarily for growing small grains, hay, pasture and by wildlife for food and cover.

There is a hundred foot strip of soil along the western boundary of the property which is Slocum loam. This soil is generally shallow and found in areas with high groundwater.

The Huffine and Slocum soils are subject to severe frost upheavel, thus the SCS recommends that the developer remove the topsoil before constructing the buildings or parking lot. It is possible some soil can be stockpiled and used for landscaping, but this would be up to the discretion of the developer.

Vegetation Cover, Quantity and Quality:

It is believed the predominant native vegetation was bluebunch wheatgrass, and a lesser mixture of western wheatgrass, needle-and-thread grass and green needle-grass.

The proposed development will pose a major impact on the quality and quantity of vegetation because construction and paving will permanently replace the hay fields with an asphalt parking lot and buildings.

Aesthetics:

The aesthetic quality of the area is in a state of transition. Originally the proposed development was in an agricultural setting, however, with the advent of residential and commerical growth, the land use is changing from agricultural to urban. South of the site is U.S. Highway 191; to the east are commercial developments; north is a growing residential area, and due west is a commercial building and the Department of Fish & Game property.

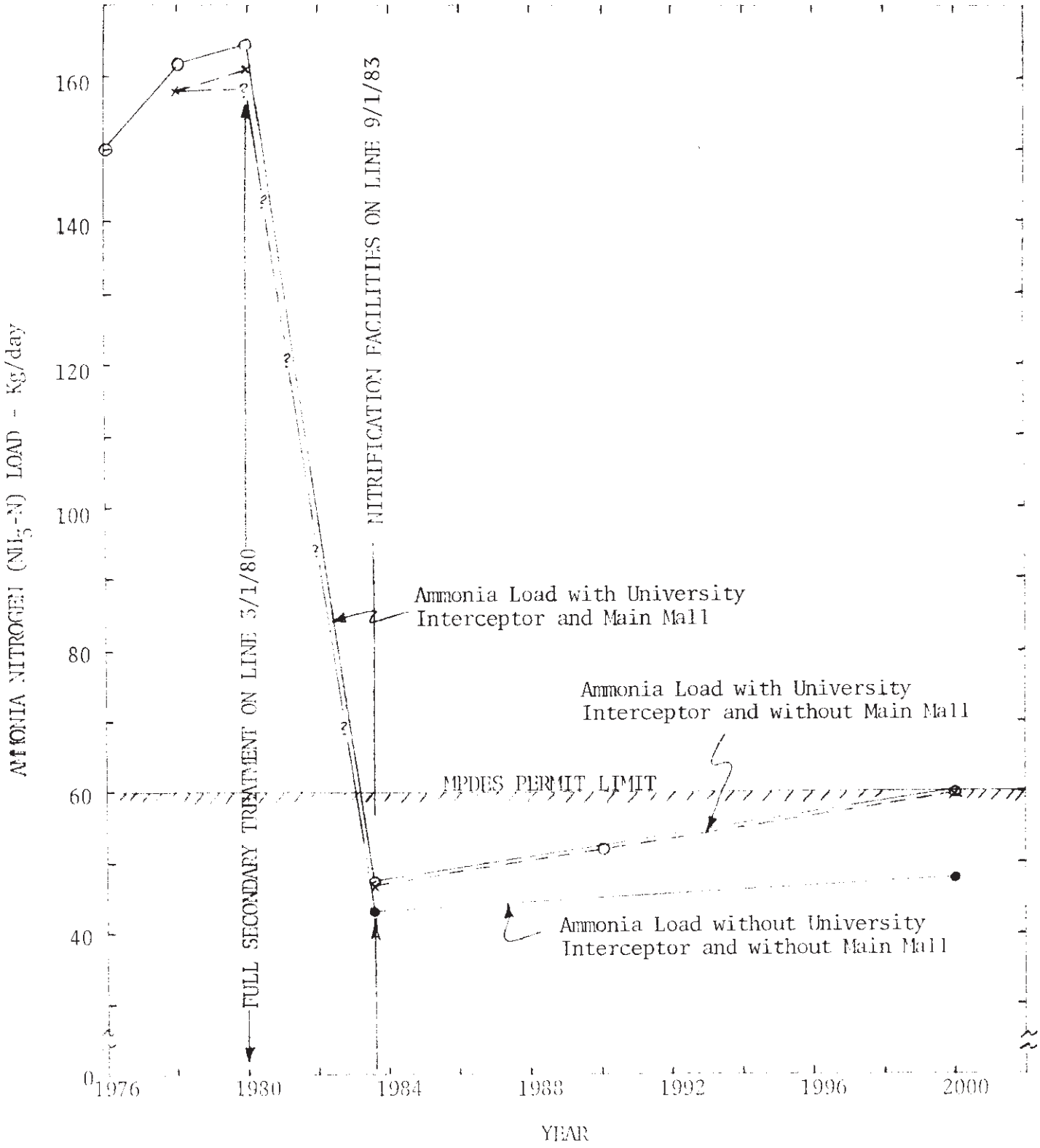

FIGURE 5. ESTIMATED AMMONIA LOADS TO EAST GALLATIN RIVER FROM BOZEMAN SEWAGE TREATMENT PLANT FOR VARIOUS LEVELS OF POPULATION GROWTH

TABLE 2. ESTIMATED EFFECTS OF VARIOUS LEVELS OF DEVELOPMENT

YEAR	TOTAL				FAR WEST TRUNK WITHOUT MAIN MALL				MAIN MALL ONLY		
	SEWERED POPULATION(1)	AVERAGE FLOW-MGD	BOD_5 LOAD-Kg/day	NH_3-N LOAD Kg/day	SEWERED POPULATION(16)	AVERAGE FLOW-MGD	BOD_5 LOAD-Kg/day	NH_3-N LOAD-Kg/day	FLOW-mgd	BOD_5 LOAD-Kg/day	NH_3-N LOAD-Kg/day
1975	22,100(2)	4.58(5)	1023 (8)	130(13)	-	0	0	0	0	-	-
1976	22,800(3)	4.32(5)	1309 (9)	150(13)	-	0	0	0	0	-	-
1977	-	4.10(5)	1211(10)	160(13)	-	0	0	0	0	-	-
1978	23,400(4)	2.82(6)	700 (11)	162(14)	?	?	?	?	0.041(19)	12.4 (11)	3.10(20)
1980	24,000(2)	2.88(7)	327 (12)	164 (14)	?	?	?	?	"	4.66(12)	3.10(20)
1983	25,300(4)	2.99(7)	340(12)	47(15)	2300	0.18(17)	20.4(12)	3.4 (18)	"	"	0.65(18)
1990	28,000(2)	3.28(7)	372(12)	52(15)	-	-			"	"	"
2000	32,900(2)	3.77(7)	428(12)	60(15)	8400	0.67(17)	76.1(12)	12.2(18)	"	"	"

(1) University populations are not included.
(2) Data were taken from Dodge (August 1977).
(3) Data were taken from Lorang (October 26, 1977).
(4) Proportioned between dates for which data are available.
(5) Date were obtained from MPDES Permit # MT-0022608.
(6) Using Dean (April 7, 1977), an average infiltration reduction of 1.3 MDG for Phase II was assumed.
(7) The estimate is based on a flow increase of 100 gallons per person per day (gpcd) times the population increase. One hundred gallons per person per day is a commonly used figure for estimating sewage flows (Recocommended Standards for Sewage Works, 1973). The estimated flow for 1978 was used as the base.
(8) A BOD_5 concentration of 59 mg/l was obtained from self-monitoring data (MPDES Permit # MT-0022608).
(9) A BOD_5 concentration of 80 mg/l was obtained from self-monitoring data (MPDES Permit # MT-0022608)
(10) A BOD_5 concentration of 78 mg/l was obtained from self-monitoring data (MPDES Permit # MT-0022608)
(11) A BOD_5 concentration of 80 mg/l was assumed from self-monitoring data from 1976 and 1977 (MPDES Permit # MT-0022608) in computing loads.
(12) A BOD_5 concentration of 30 mg/l, the permit limit after full secondary treatment, was assumed in computing loads.
(13) The NH_3-N load was computed by multiplying the average NH_3-N concentration obtained from self-monitoring data (MPDES Permit # MT-0022608) times the average flow
(14) An estimated average NH_3-N concentration of 9.7 mg/l was based on average of NH_3-N concentrations for 1976 and 1977 (MPDES Permit # MT-0022608).
(15) The maximum permissible NH_3-N load is 60 Kg/day (MPDES Permit # MT-0022608). This figure was used for the year 2000 (the probable design year) and then prorated for 1983 and 1990 on the basis of population.
(16) A rough approximation based on a conversation with M. Lorang (October 26, 1977).
(17) An average per capita flow of 80 gpcd was assumed. A flow of 100 gpcd typically includes an allowance for the light commercial segment of a community and, therefore, probably would have been too high for strictly residential.
(18) These estimates were obtained by pro-rating the 60 Kg/day load on the basis of population ($\frac{8400}{32,900}$ x 60 Kg/day = 15.3) and flow ($\frac{80}{100}$ x 15.3 Kg/day = 12.2 Kg/day).
(19) This flow estimate was obtained from Willis Wetstein (August 18, 1977).
(20) This value is an approximation based on an assumed effluent value of 20 mg/l NH_3-N (Process Design Manual for Nitrogen Control, October 1975) Secondary treatment is reported to remove less than 10% of the ammonia-nitrogen in sewage (Process Design Manual for Nitrogen Control, October 1975).

Even though the area is zoned for highway commercial development,[1] the fact remains the transformation of hay fields to a commercial mall will be visibility disagreeable to some persons.

Due to the great change in land use, the aesthetic qualities of an agricultural setting will be lost forever. However, depending on the discretion of the developer, the visual impact could be softened by doing such things as leaving natural borders on either side of the stream, screening the border between the development and the Bozeman Ponds and other similar things to retain the essence of a natural setting.

Air Quality:

Due to Bozeman's geographic location, it is subject to weather inversions, however, the absence of large industries lessens the problems created by such conditions.

After the proposed mall is built it should not pose a problem to air quality, but during building, areas of active construction should be watered to reduce blowing dirt--particularly since the top soil must be removed before the parking lot can be surfaced.

Unique, Endangered, Fragile or Limited Environmental Resources:

The stream running through the property is a fragile resource which, unless left in a natural state, will be altered by the proposed development. In many cases, streams which run through residential or commercial areas are considered detriments rather than assets. The preservation of these waterways can do much to soften the visual impact of new developments, but the decision to constructively use such streams rests with the developer.

Demands on Environmental Resources of Land, Water, Air and Energy:

The elimination of 38.6 acres from the agricultural land base may seem insignificant, but the cumulative effect of such a change results in a substantial loss of productive farm land. In the case of the Main Mall, local planners recognized that commercial and residential growth was expanding west of town and indicated in the 1972 Bozeman Area Plan that the best use for the land would be highway commercial development. Thus, even though the use of the land will be permanently changed, the choice is in conjunction with local planning goals.

Historical and Archaeological Sites:

There are no known historical or archaeological sites on the property.

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[1]The proposed site for the Main Mall was zoned for highway commercial development in November 1974 by the Bozeman City Commission.

IV. HUMAN ENVIRONMENT

Social and Cultural:

In terms of social/cultural orientation, people living near the proposed development are closely tied to Bozeman for jobs, schooling, shopping and entertainment. This dependence on the city indicates that the transition from a rural to urban way of life has occurred. The urbanization of the area will be further reinforced when the city incorporates a large tract of land, including the mall site, in the near future.

Local and State Tax Base and Tax Revenue:

The site of the proposed mall is being taxed as both agricultural and suburban land. About 38 of the 39.69 acres is listed as agricultural land, while the remainder is a suburban tract.

An official in the county assessor's office said the property owners paid a total of $384.29 for real estate taxes in 1977.

Ted Kelly, head of the county's appraisal office, said if the mall is constructed the reclassification of the property would increase taxes appreciably.

Until the proposed development is built, it is impossible to accurately project what the actual taxes will be since much of the information needed to calculate taxes (such as market value, mill levies, etc.) fluctuates.

Agricultural or Industrial Production:

The Agricultural Stabilization and Conservation Service (ASCS) was not able to find any record of crop production. The land has apparently been in hay and pasture for a number of years.

Although there are no official production records, the ASCS described the proposed site as "good" hay land.

Human Health:

If the development is serviced by city sewer and water, storm water runoff is properly controlled, and efforts are made to control dust generated from construction, there should be no threat to human health.

Quantity and Distribution of Community and Personal Income:

The major source of personal income in Gallatin County comes from nonfarm industries, according to information from the U.S. Bureau of Economic Analysis.

Nonfarm industries are divided into private industry and government. The largest source of personal income for all nonfarm categories is in state and local governments. Payrolls for the two levels of government grew from $17,698,000 in 1970 to $30,318,000 in 1975, an increase of 58 percent. The payroll for the Montana State University is a major reason for this category being the leading source of personal income.

Wholesale and retail businesses generate the second highest amount of income. From 1970 to 1975 wages from these sources increased 56 percent, $12,538,000 to $22,567,000. Such growth indicates wholesale and retail trade appears to be strong in Gallatin County. Assuming nothing happens to slow down or change the current growth pattern, the construction of the Main Mall should add to this source of personal income.

Services and contract construction are allied to wholesale and retail trade and likewise, both showed increases during the same period of more than 50 percent for personal income. This further bolsters the assumption that the country is in a period of economic growth.

Access To and Quality of Recreational and Wilderness Activities:

The proposed development should not interfere with angling at the Bozeman Ponds, but, as previously mentioned, if some sort of landscaping isn't done to screen the mall from the Bozeman Fishing Ponds, the proposed development will affect the aesthetic qualities of the fishing area.

Quantity and Distribution of Employment:

The university and Bozeman's geographic location play major roles in creating an "employers market" for the business community. Students and their spouses often look for work to help defray college costs. Coupled with the large pool of university related job seekers are the persons who like the quality of life which exists in the Bozeman area.

Information gathered in the 1970 census indicated that employment in Gallatin County totaled 12,129 persons, with professional and technical people listed as the largest category of employment, 2,533 persons. Again, the university probably had a direct influence on the number of persons in this group.

Business related areas of employment (sales and service workers) totaled 2,511 workers, with 52 percent of the workforce being women.

Due to the apparently large number of persons looking for work in the Bozeman area, future store managers in the Main Mall should not find it difficult to hire sales and service employees.

Distribution and Density of Population and Housing:

According to U.S. Census Bureau figures, Bozeman's population has grown steadily since 1950. The 1950 census listed Bozeman as having 11,325 residents. Twenty years later the population increased to 18,670.

Montana Population Projections 1975-2000, prepared by the Division of Research and Information Systems, Department of Community Affairs (DCA), projected the city's population at around 22,130 in 1975 and, assuming an average growth projection, more than 32,800 by the turn of the century.

Bozeman's steady growth has affected the availability of housing. Local planners note that family housing is not keeping up with the growing population. Homes and home sites are scarce and prices for both are increasing rapidly. Similarly, rental

properties are in demand, particularly in the case of MSU students who wish to live off campus.

Demands for Government Services:

The Main Mall should not place a serious demand on local government services, such as schools, law enforcement or fire protection.

Bozeman Police Chief William Nelson said the proposed development might provide a new environment for shoplifters, adding to the police department's present work load. However, the chief didn't feel the development would directly lead to the hiring of an additional officer, even though it would add to the cumulative need for more personnel.

In terms of fire control, the mall will require protection, but since the buildings will be constructed according to local building codes, the possibility of a major fire should be minimal.

Undoubtedly some government services will be used by the mall or the individual store owners, however, over a period of years the amount of money paid in taxes will likely offset the cost of those public services.

Industrial and Commercial Activity:

The Main Mall's impact on local commercial business is a concern to some persons and groups.

A group of businessmen from the central business district (known as the Downtown Development Association) asked the Bozeman City Commission, August 11, 1977, to reject final approval of the mall's building permit. The permit was not issued and the question of whether to issue the permit taken to district court. The matter was ultimately dropped after both parties agreed to wait for the publication of the draft EIS before taking further action. The city, in a similar move, decided not to issue the permit until it had reviewed the impact statement.

The association feels the mall would not only draw trade away from the central business district, but might entice some of the major downtown businesses to move to the mall. The relocation of such businesses would be counter to the association's efforts to revitalize the central business district.

The Main Mall isn't the only large shopping center proposed for the western part of the city. Several blocks east of the mall is the site of the proposed University Mall. According to preliminary plans, the University Mall will be about the same size as the Main Mall.

Demands for Energy:

The Main Mall should not affect electrical and natural gas service to Bozeman. A representative of the Montana Power Company said it has an "...adequate capacity to service the Main Mall."

Another energy consideration is the use of gasoline. Most persons shopping at the proposed mall will probably drive to the shopping center. It is not unusual for

customers to drive to shopping areas in Bozeman, thus the mall should not alter current shopping patterns or use of automobiles.

When considering energy demands such as heating, lighting and transportation, it is important to consider they are nearly all derived from fossil fuels--finite resources. Even though the creation of the Main Mall will not be the decisive factor in limiting these resources, it will add to the growing stress put on the use of these fuels.

Locally Adopted Environmental Plans and Goals:

In 1974 the zoning designation for 38 acres was changed from agricultural suburban to highway business.

The proposed development presently complies with the city's master plan for the area.

Transportation Networks and Traffic Flows:

The city is cooperatively engaged with Gallatin County and the State of Montana in developing a comprehensive transportation plan for the Bozeman urban area. The final work prospectus for this update was approved and work began on October 6, 1977. Computerized traffic assignment modeling has not been developed for the Bozeman urban area, but will be available within a year.

For this evaluation, simplified methods were used for generation, distribution and assignment of traffic. These simplified methods are based on the best available data for the proposed complex and its traffic circulation pattern. Since the mall proposal does not exist, some assumptions were necessary. Therefore, it is likely the final data produced through the extensive and intensive development of the Bozeman Transportation Plan will vary from the data provided here.

Estimation of Mall Related Traffic

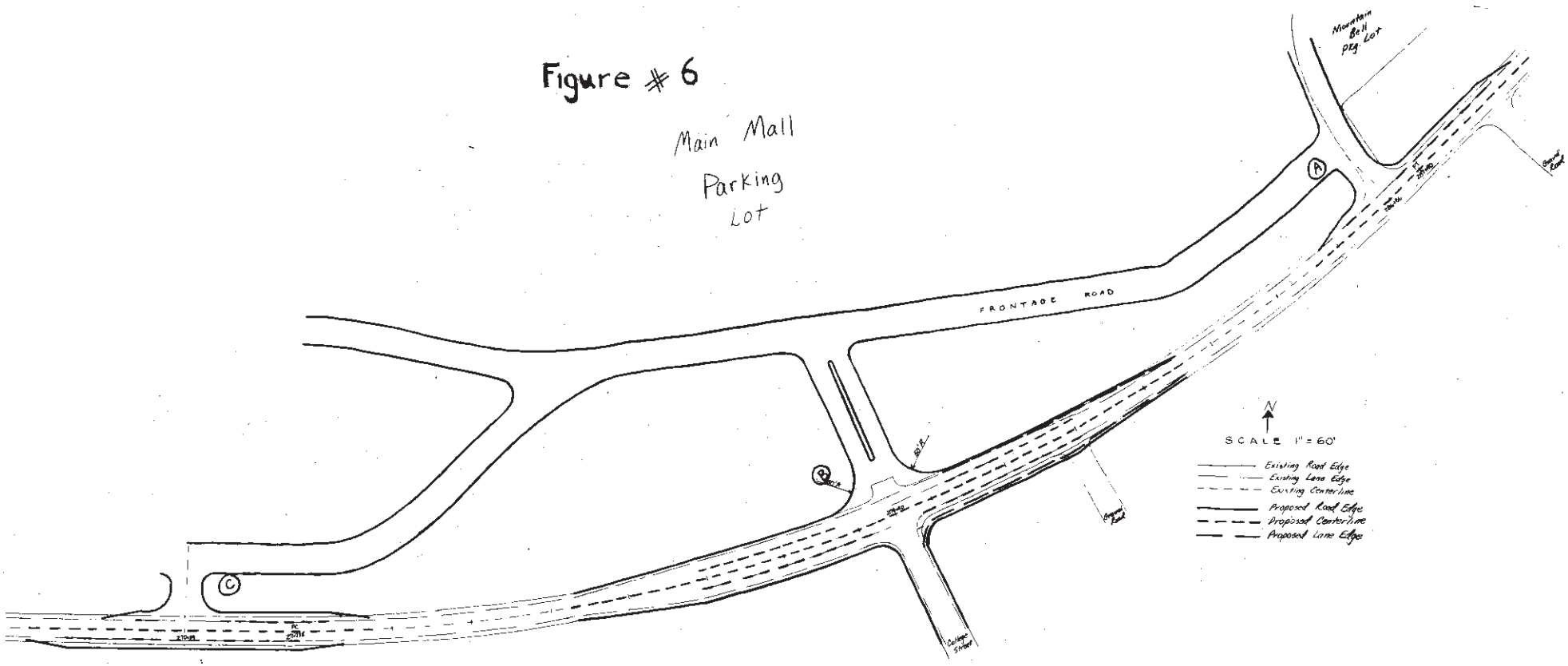
Three approaches are proposed from U. S. Highway 191 (Figure 6).

According to the DOH's traffic trip analysis, the projected estimate of weekday traffic will be 14,233 average daily trips (ADT) when the mall and surrounding residential neighborhoods are fully developed within the next 20 years (Appendix A - Trip Generation Statistics and Projections).

In terms of distribution of the 14,233 ADT, the DOH estimates 2,847 ADT will be from shoppers within a mile radius northwest of the mall; 4,270 ADT will be from persons living in Bozeman, northeast of the mall; 4,981 ADT will be generated by shoppers in an area which includes the MSU campus southeast of the mall, and 2,135 ADT from persons living southwest of the mall in the Four Corners and Gallatin Gateway areas (also, regional attraction from Gallatin Canyon to West Yellowstone can be considered in this sphere of influence) (Appendix A - Trip Distribution).

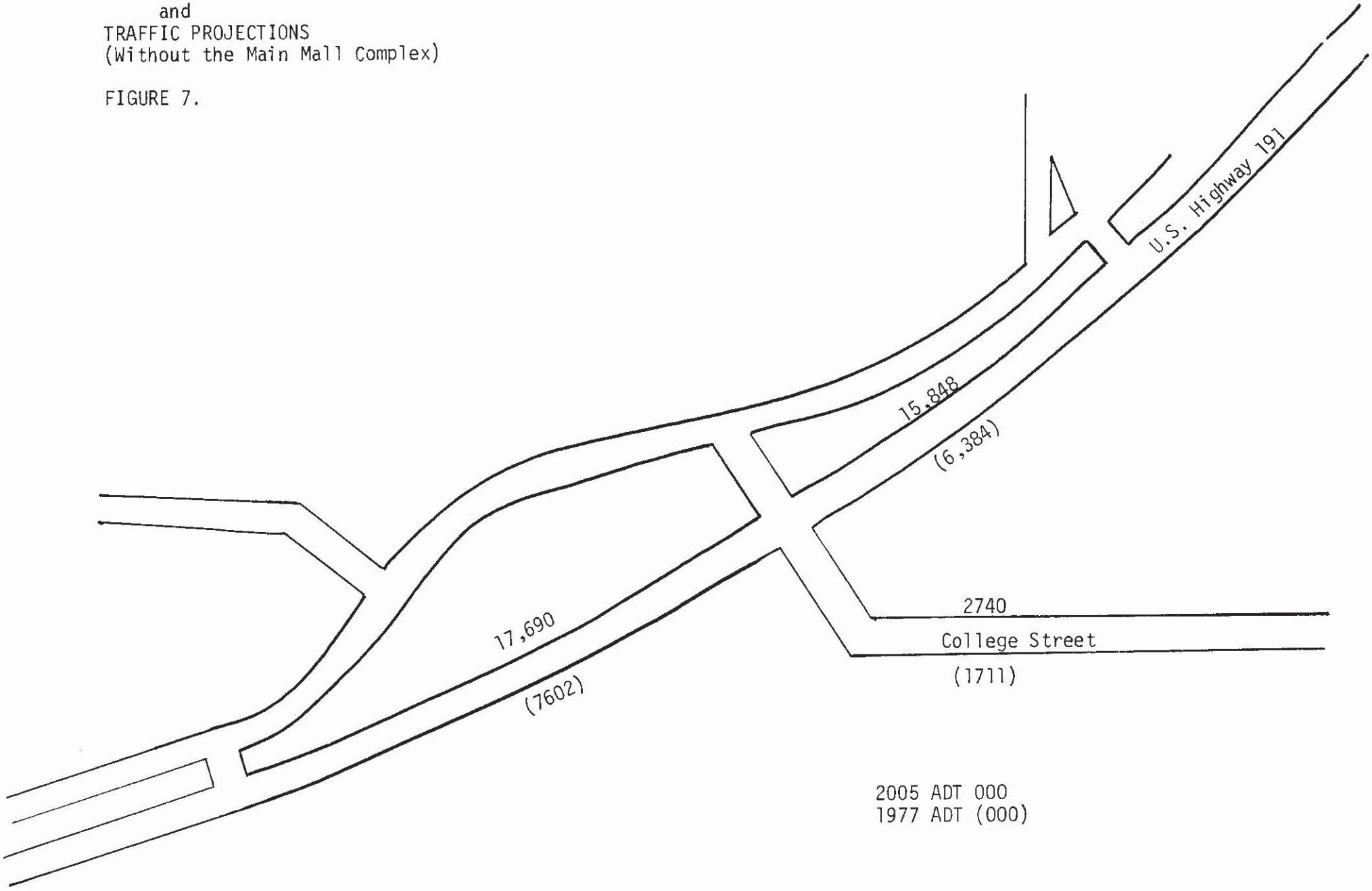
Future traffic estimates from the DOH indicate the ADT will increase appreciably by the year 2005 even if the mall is not built (Figure 7). Figure 8 shows what the estimated increase will be in 2005 if the mall is constructed. It appears the greatest increase in ADT will be on College Street.

Figure # 6


Main Mall
Parking
Lot
FRONTAGE ROAD
Mountain Bell Pkg Lot
A
B
C
SCALE 1" = 60'
Existing Road Edge
Existing Lane Edge
Existing Centerline
Proposed Road Edge
Proposed Centerline
Proposed Lane Edge

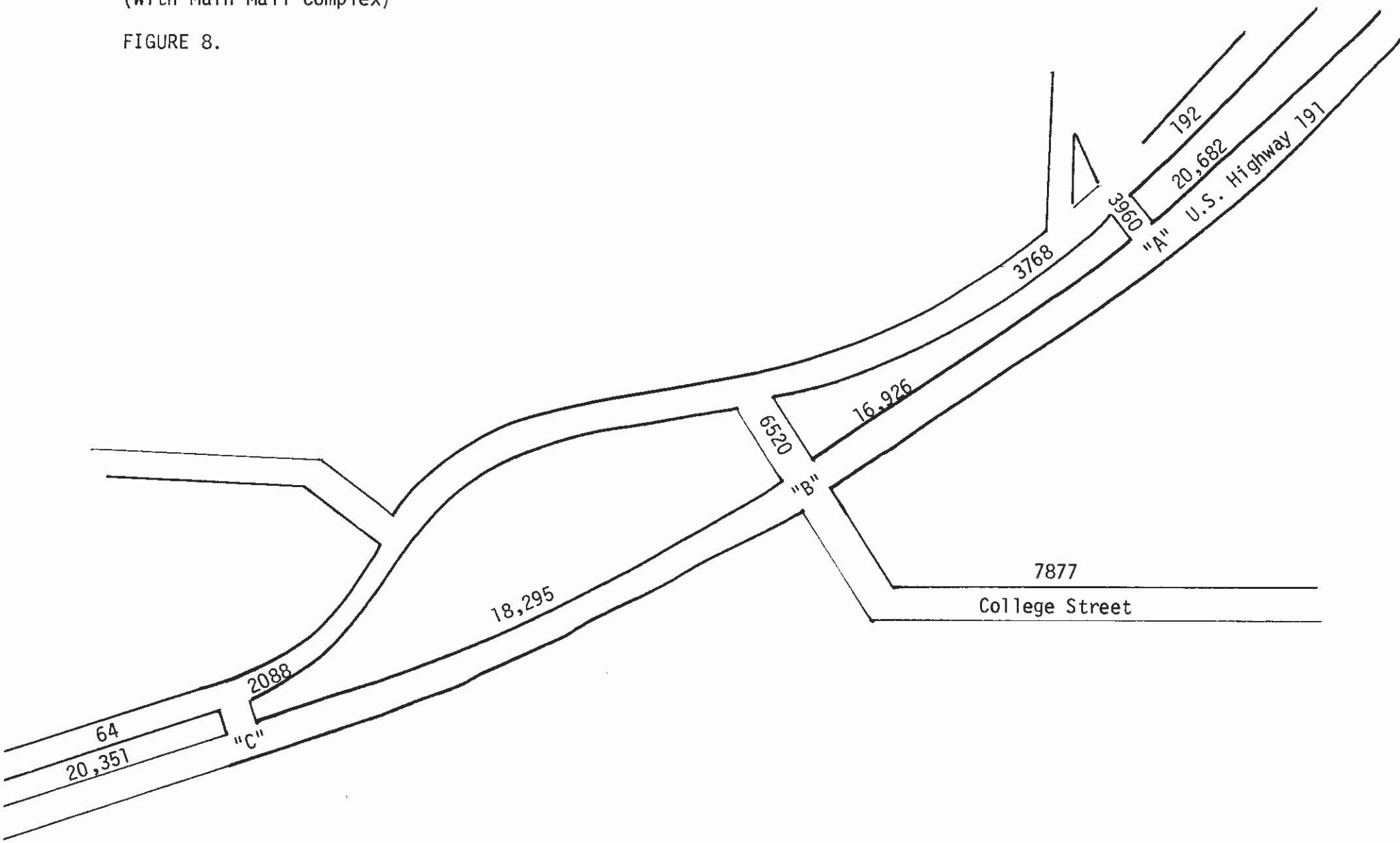
TRAFFIC COUNTS
and
TRAFFIC PROJECTIONS
(Without the Main Mall Complex)

FIGURE 7.



YEAR 2005
TRAFFIC PROJECTIONS
TOTAL TRAFFIC
(With Main Mall Complex)

FIGURE 8.



The DOH notes that as with any 28 year projection, the ADT shown here should be associated with a range of values. It is not unreasonable to assume the range associated here could vary 10% either way for the volume numbers shown in the Figures 7 and 8.

Main Mall's Relationship to Future Transportation Planning

At present, the Bozeman Transportation Plan is in the initial stages of its development. A Technical Advisory Committee (TAC) and Policy Coordinating Committee (PCC) were recently (September 1977) established, and an existing street network has been selected for study. At the December 1, 1977 TAC meeting, the Main Mall proposal was discussed. The TAC indicated that the mall concept could be worked into the future street network planning. They expressed concern for studying the need for additional access from the north and west. They referenced the need to plan for a four lane facility on U.S. Highway 191, a possible signal at U.S. Highway 191 at College, and possibly an arterial or collector street to the west. It was added that at the present time, the developer will provide the necessary interim improvements to provide safe access to the mall complex. This includes signals, signing, and acceleration and deceleration lanes where warranted.

Main Mall's Relationship to Land Use Patterns

The growing trend in land use for the area has been a westward movement of commercial strip development adjacent to U.S. Highway 191. Strip development is not always desirable since it produces a large demand for access to transportation facilities, often leads to inefficient travel patterns, limits the potential expansion of transportation facilities, leads to excessive traffic congestion and high accident exposure and many other undesirable environmental and land use impacts. The proposed mall development would concentrate some of this commerical expansion, but as shopping demand develops for this west area, more and more demand will be experienced to "fill in" the commerical zoned properties projected for this west end area.

The proposed residential development north and west of the mall site should not be significantly impacted by the mall development. It may be reasonable to assume that these areas would develop more rapidly after the mall is completed, but with little variation in density or use. The rate of development and time frame of the development may have some impact on the time table projection for other residential areas surrounding Bozeman as shown in the 1972 plan. If the ratio between residential and commercial development remains as projected in the comprehensive plan, there is no apparent reason to expect any significant shift in land use and development resulting from the Main Mall development. The future year land use projection as shown in the 1972 Bozeman Comprehensive Plan should remain unchanged by the mall's development, and the proposed West Area Zoning plan could implement a development pattern consistent with this land use projection and West Main Mall concept.

Bozeman Main Mall Impact on "Through" Traffic

Currently "through" traffic moves freely along U.S. Highway 191 at speeds approaching 55 M.P.H. The existing right and left turn bays at the College Street at U.S. Highway 191 intersection provide storage for southeast bound traffic and allows for efficient movement of through traffic.

Approach traffic from College Street is controlled by a stop sign. Some congestion along College Street is experienced at peak hours and following special events at the MSU campus.

The proposed Main Mall intersection design would encourage a substantial increase in conflicting turning movements and traffic congestion. These conditions would slow the through traffic. As traffic volumes grow, it would seem reasonable to assume that accidents would be experienced from the conflicting traffic movements. Warrants for slower legal speeds and traffic control devices could be met. Slower speeds and traffic control devices will impact the travel time of the through traveler. As indicated by the projected intersection volume summaries, 85% of the traffic on U.S. Highway 191 is through traffic.

Approach traffic from College Street to U.S. Highway 191 could benefit from slower speeds and signals.

Historic Review of Department of Highways Efforts to Review the Proposed Main Mall Approach Designs

The Main Mall development corporation requested a DOH review of its proposed access plan requiring three approaches to U.S. Highway 191. The DOH requested review of the proposed mall complex proposal from the Bozeman City-County Planning Board and the DOH Traffic Unit. The Bozeman City-County Planning Board (BCCPB) prepared a review report and transmitted it to the DOH Bozeman Division office on May 19, 1977. The Traffic Unit provided its review to the assistant administrator--engineering division, who responded to the DOH Bozeman Division office by memorandum, June 17, 1977. The DOH Division office replied to William G. Fielder Associates by letter dated June 23, 1977. To date, the Division office has received a request for approach permits, but none have been granted.

There presently exists three approaches from U.S. Highway 191 at approximately the same locations as proposed by the mall developer. The proposed improvements to these access locations will require a "duly executed permit from the department."[2]

V. PRIMARY, SECONDARY AND CUMULATIVE IMPACTS

Primary

The proposed mall would permanently change the land's aesthetic qualities and use. The property would be forever lost to agricultural production, and would change from a rural to urban setting.

It is true the loss of about 40 acres of hayland should not pose a serious impact to the agricultural community, however, the change is another small step towards urbanization in the Bozeman area.

Secondary

The creation of the mall will lead to a variety of secondary impacts, such as: stream alteration, economic competition, the proper disposal of runoff and sewage, access to a certified water supply, municipal incorporation and more complex traffic patterns.

[2]Approach Standards for Montana Highways - prepared by the Montana Department of Highways - 1974

Cumulative

Local planners anticipate that much of the future growth in Bozeman will be west of the city. It appears the Main Mall is one of the first of possibly many developments.

The cumulative effect of this growth will be a permanent change in the land use. However, this change has not come unexpectedly. The owners of the Main Mall property recognized the development trend and had the land rezoned in 1974. Additionally, the mall complies with the city's master plan for the area, which calls for highway business development.

In terms of sewage collection and treatment, if the city does not make a genuine effort to bring its collection system and treatment plant into compliance to meet water quality standards, the installation of the University Interceptor sewer line would pose serious problems for the entire system. The potential amount of sewage generated by the Main Mall would be small compared to the possible amount of sewage generated by the many residential dwellings which would be able to hook onto the new trunk line.

Concerning the approach permits, the DOH's road approach standards will be used to address questions of reasonable access to the public highway (U.S. Highway 191). Whether this proposal is approved or disapproved there is reason to assume that access for commercial purposes will again be requested of the DOH, but perhaps on a much smaller scale and for more individual businesses, each with a road approach. The cumulative effect of many road approaches causes more points of conflict, more hazards to safety and more problems to through traffic than a few well planned road approaches.

VI. POTENTIAL GROWTH INDUCING OR INHIBITING IMPACTS

As part of the projected growth for the western part of the city, the proposed development can be viewed as being growth inducing, yet if it attracts a number of major businesses from the downtown area, it can also be considered--economically--as being growth inhibiting.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF ENVIRONMENTAL RESOURCES

The land will be irreparably altered, as will the configuration of the stream running through the property. This has already been discussed. Also, the nature of the development will add to the growing stress put on the supply of fossil fuels.

VIII. ECONOMIC AND ENVIRONMENTAL BENEFITS AND COSTS

Economic Benefits and Costs

Benefits:

1. An increase in tax revenues for Gallatin County.
2. For customers, a greater selection of goods and services.
3. Increased job opportunities during and after the construction of the mall.

4. The availability of city sewage service will stimulate business and residential growth.

Costs:

1. A possible negative effect on attempts to revitalize the downtown business district.
2. The permanent loss of crop land.
3. Customer transportation costs to and from the shopping center.
4. Government services, such as state and local efforts to properly design and implement a traffic control plan for the mall.

Environmental Benefits and Costs

Benefits: (unknown)

Costs:

1. Alteration of the stream.
2. A change in the aesthetics, particularly in the case of the Fish & Game Department's Bozeman Ponds.
3. Vegetation removal.
4. An increase in stormwater runoff.
5. More pressure to increase the rate of development in the area.

IX. SHORT-TERM vs. LONG-TERM COSTS AND BENEFITS

Short-Term Costs and Benefits

Costs:

Construction of the mall will create some short-term costs in terms of degradation of air quality and possible traffic hazards. Dust abatement measures should be taken to reduce the occurrence of blowing dust. As for traffic, until the approaches to the mall are completed, caution must be exercised, particularly when entering or leaving the highway.

Benefits:

The work generated by the construction will benefit local building material supplies, contractors and laborers.

Long-Term Costs and Benefits

Costs:

The mall could adversely impact the economic efforts of the downtown business district. Additionally, the stream and land will be irrevocably altered.

Benefits:

The proposed development will generate more taxes, jobs, and provide shoppers a greater selection of places to shop.

X. ALTERNATIVES

Department of Health and Environmental Sciences:

1. Disapprove the proposal: Due to the site's conformance with local planning goals, the property will likely be used for some other type of highway commercial development.
2. Unconditional approval: This would not ensure that considerations such as stormwater and stream alteration will be properly addressed.
3. Conditional approval: Approval after completion of the following conditions:

    A. Approval by the DHES of plans and specifications for the proper disposal of stormwater runoff.
    B. Approval of a Form 272 permit for the alteration of the stream running through the property.

XI. RECOMMENDATIONS

Department of Health and Environmental Sciences:

The DHES, after reviewing the proposed options, recommends the Main Mall be granted approval after the development corporation complies with the conditions stated in Part X., Alternatives, No. 3.

Department of Highways:

Assuming that some type of commercial/business interests will develop the area, the negative effects on user and through traffic are minimized by proper planning for traffic, with few access points to the public highway and common "off highway" parking considering safety. Therefore, the DOH recommends the proposal under discussion or similar large scale composite developments over the typical strip type individual business development.

APPENDIX A

TRIP GENERATION STATISTICS - BOZEMAN MAIN MALL

Development description: - A Zero Generator Regional Shopping Center with no single business establishment with 100,000 or more sq. ft. of Commercial floor area. The proposed site is 38 acres in size. The following break down in structure sq. ft. is provided:

Mall Analysis - Department Stores - 155,847 S.F.

Shops - 107,960 S.F.

Gross Leasable - 263,807 S.F.

Non Leasable Area - 42,280 S.F.

Gross Building Area - 306,087 S.F.

Future Building - 35,000 S.F.

TRIP GENERATION PROJECTIONS:

There are numerous texts on trip generation projection technique. The three that are commonly used by the Planning and Research Bureau, Montana Department of Highways, are listed below:

1) "Traffic Circulation Planning for Communities" - by Gruen Associates, April 1974
2) "Trip Generation by Land Use" - Maricopa Association of Governments, April 1974
3) "Technical Report No. 9 - Billings Heights Shopping Center Traffic Generator Analysis" - Planning and Research Bureau - Montana Department of Highways, January 1974

An analysis of the Bozeman Main Mall trip generation characteristics follows. All three sources will be used.

1) Gruen Associates

Given: - site area = 38 acres

gross floor area = 306,087 sq. ft.

commercial floor area = 263,807 sq. ft.

Assumption: - Regional retail shopping centers with site areas of 30+ acres will produce Vehicle trip <u>end</u> as follows:

	Vehicle trip ends/acre	Vehicle trip ends/1000 sq.ft. of commercial floor area
Range	400-700	30-50
Typical	600	40

Bozeman Mall Calculations:

Site are Method

38 X 400 = 15,200 trip ends

38 X 700 = 26,600 trip ends

38 X 600 = 22,800 trip ends

Sq. ft. Method

$\frac{263,807}{1,000}$ X 30 = 7,914 trip ends

$\frac{263,807}{1,000}$ X 50 =13,190 trip ends

$\frac{263,807}{1,000}$ X 40 =10,552 trip ends

A trip end is defined by Gruen Assoc. as either a production or attraction to or from the special generator, and therefore these figures would relate directly to Average Daily Traffic into and out of the shopping center. It is also stated on page 217; "Commercial land exhibits a high intensity of traffic generation. Traffic generation rates range widely, especially when expressed in terms of acreage. A more meaningful measure is in terms of floor area and type of use."

2) MAG, Urban Area of Maricopa County, Arizona

Given: site area 38 acres

gross floor area: - 306,087 sq. ft.

Assumption: -

DEFINITION: A zero generator shopping center is a complex of retail stores with a common parking area where no one store has more than 100,000 sq. ft. of gross floor area. (A major generator store has 100,000 sq. ft. GFA or greater.)

CHARACTERISTICS: A zero generator shopping center is characterized by a group of normally small specialty shops and possibly a supermarket and/or theater. Typically the number of stores is under 30 and total floor area of the shopping center is normally under 200,000 SQ. FT. Land area is typically 10-15 acres but may be more depending on the number of floors and parking levels.

TRIP RATE: The average trip rate for 19 studies (157.4 acres) was 816.57 trips per acre.

TRIP RATE: The average trip rate for 54 studies (4,618,910 sq. ft. GFA) was 63.77 trips per 1000 GFA.

Bozeman Mall Calculation:

$$38 \times 816.57 = 31{,}303 \text{ trips/acre}$$

$$\frac{306{,}087}{1{,}000} \times 63.77 = 19.519 \text{ trips/1000 Gross Sq. Ft. Area.}$$

3) P & R Bureau, MDOH

Given: Gross Floor Area: - 306,087 sq. ft.

Montana Shopping Center Trip Generation Statistics:

Regional Shopping Center	Location	O & D Trip Ends/1000 Gross Sq. Ft.
Lundy Center	Helena	55
Capital Hill	Helena	55
West Gate	Great Falls	28
Buttreys	Great Falls	67
Northgate	Great Falls	65
Value-Mart	Great Falls	34
Holiday Village	Great Falls	33
West Park Plaza	Billings	35

Average O & D trip ends/1000 GAF of the 8 Montana Shopping Centers = 46.5

ASSUMPTION: - The Bozeman Mall will have similar trip Generation characteristics as the sample shopping centers identified in the Given statement above.

Bozeman Mall Calculations:

$$\frac{306,087}{1,000} \times 46.5 = 14,233 \text{ trips beginning or ending at the facility}$$

Trip Generation Statistics provided in the May 19, 1977 report from the Bozeman City-County Planning Board are as follows:

*Shopping Centers - one generator equals 362.3 trips per acre.

38 X 362.3 = 13,767 trips

Summary: - Trip Generation from the Bozeman Main Mall compares as follows.

	Gruen	MAG	DOH	BCCPB
Sq. Ft. Method	10,552	19,519	14,233	
Area Method	22,800	30,030		13,767

As noted in the Gruen documentation the square foot method is considered a more desirable estimate of commercial trip generation. In evaluating the ~~In evaluating the range produced by these projection techniques~~ range produced by this projection technique (10,552 to 19,519) it would appear logical to assume that the 14,233 figure would be a logical compromise. This 14,233 figure should be viewed as a projected estimate of average week-day traffic that will be reached only with full development of the Mall Complex and the residential neighborhoods (Service Area) which will eventually surround it. The present urban sprawl growth pattern identified in the 1975 Bozeman Area Growth Study shows that residential development is moving westward. It would not seem unreasonable to assume that sufficient development would occur within the next 20 years to provide a sufficient consumer market to produce the estimated 14,233 ADT.

* Trip Generation Intensity Factors, Arizona Department of Transportation and U.S. Department of Transportation, Federal Highway Administration, 1976, pages B1 and G4.

The frontage road and access design as presented in figure 2 includes the access revision to two existing commercial establishments; the Mountain Bell Maintenance facility to the east, the Montana Woolen Shop complex to the west. Traffic generation estimates for these two facilities can be made using the Gruen documentation or the MAG, documentation as follows.

The Gruen Report Estimates

Site	Area	No. of Employees	Trip Per Employees/Site Activity	Total ADT
Mountain Bell	5 ac.	43	16 trips/employee/acre	137.6
Montana Woolen	1.3 ac.	2	NA. *	NA.

The MAG Report Estimates

Site	Area	No. of Employees	Trips/Employee/Site Activity	Total ADT In & Out
Mountain Bell	5 ac.	43	4.47/employee	192.21
Montana Woolen	1.3 ac.	2	32/employee	64

Because the Maricopa Association of Government statistics do not require the use of acreage, it is felt that these estimates are best.

TRIP DISTRIBUTION

Trip distribution can be described as an assessment of where trips start and finish. A trip can be defined as a vehicular movement between two locations. Every visit to the Mall complex has two trips associated with it, one comming and one going. The previous trip generation analysis associates 14,200± trip with Mall complex, 7,100 comming to the complex and 7,100 leaving. This distribution assessment attempts to estimate where these trips come from and where they are going to.

* Generation estimates for facilities of this small size were not provided in the report.

Trip distribution characteristics can best be associated with the relationship of the proposed development to its service area. The proposed Mall location on the Western edge of Bozeman would indicate that most of the trip movements would come from the east. Medium density residential development has been projected to occur all around the Mall. /1 As this residential development is completed trip attraction will begin from these north, south, and west directions. Remember also from the trip generation section that the project 14,200 ADT estimate is based upon full development of these residential areas.

An evaluation of the service area follows:

Given: - The Bozeman Main Mall location on the West edge of the City of Bozeman.

Assumed: - 1) Mall and Residential development within 1 mile radius of Mall will be totally developed as projected in the 1972 Bozeman Comp. Plan.

2) Remaining Commercial floor area within existing greater Bozeman is not substantailly reduced; and this remaining floor area remains competitive with the proposed shopping Mall, in supply, selection and price of retail goods.

3) Estimated trip attraction:

Figure 3 shows the service area divided in Quadrants. Each quadrant is assigned a percentage of trip attraction, at the planners discretion, after an evaluation of the Quadrant's residential density, number and location of competitive commercial facilities, and existing access or travel facilities:

Quad 1 = 20%

Quad 2 = 30%

Quad 3 = 35%

Quad 4 = 15%

/1 Bozeman Area Plan 1972 - Prepared by Bozeman City-County Planning Board Staff (No Publication Date)

Quadrant 1 is projected to develop as Medium Density Residential within the 1st Ring (1mi. radius). Beyond this 1st ring the land use is projected to remain Agricultural. The Main Mall is being promoted as a Regional shopping center and the rural communities of Belgrade, Manhattan and Three Forks would be included in this Northwest Quadrant. Regional shopping trips are not made frequently and therefore most trips would come from within the 1st ring. It is felt that 20% of the total trips would come from Quadrant 1. Quadrant 2 contains the largest portion of existing City development. This quadrant also contains most of the existing shopping facilities which will compete with the Bozeman Mall complex. Most of the transportation corridors, which would bring shoppers outside the 1st ring from quadrant 2 to the Main Mall, would draw them first through the existing commercial development along North 7th Ave. and Main Street. If assumption 2 holds true, a trip attraction rate less than Quad 3 seems reasonable. Thirty percent of the total trips is assumed for Quadrant 2.

Quadrant 3 has the largest potential for Main Mall attraction. It is projected to grow rapidly with a combination of Low, Medium and High Density residential development. The MSU Campus and its related living quarters can also be found in this Quadrant. There is little commercial development projected for this Quadrant and transportation facilities for Southeast to Northwest are available. Thirty-five percent of the total trips is assumed for Quadrant 3.

Quadrant 4 is sparcely populated and is projected to remain that way. There is increasing rural subdivision activity occurring along U.S. 191 in the Four Corners area and south. Regional attractions from the West Yellowstone, Big Sky and Madison River area can also be considered. Fifteen percent of the total trips is assumed for Quadrant 4.

Now that the distribution percentages have been derived, the remaining step is to apply them to the 14,233 trip generation figure and assign the trips to a Network.

Quad 1 - 20% X 14,233 = 2,847

Quad 2 - 30% X 14,233 = 4,270

Quad 3 - 35% X 14,233 = 4,981

Quad 4 - 15% X 14,233 = 2,135

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CONTRIBUTORS

Homer Wheeler, P.E., assistant administrator, Engineering Division, DOH.
James Hahn, chief, Planning Bureau, DOH.
Richard Howell, supervisor, Urban Transportation Section, DOH
Don Willems, P.E., chief, Water Quality Bureau, DHES.
Robert Braico, P.E., Water Quality Bureau, DHES.
Tom Ellerhoff, Environmental Sciences Division, DHES.