

Department of Health and Environmental Sciences
STATE OF MONTANA HELENA, MONTANA 59601

A. C. Knight, M.D. F.C.C.P.
Director

June 16, 1980

Governor's Office, Helena, MT 59601
Gallatin City-County Health Dept., Courthouse - Room 3, Basement, Bozeman, Mt 59715
Gallatin City-County Planning Board, Courthouse, Bozeman, MT 59715
Montana State Library, Helena, MT 59601
Environmental Quality Council, Helena, MT 59601
Department of Community Affairs, Helena, MT 59601
Department of Fish, Wildlife & Parks, Helena, MT 59601
Department of Highways, Helena, MT 59601
Department of Natural Resources and Conservation, Helena, MT 59601
Montana Bureau of Mines & Geology, c/o Montana Tech, W. Park St., Butte, MT 59701
Fire Marshal Bureau, Department of Justice, 1409 Helena Ave., Helena, MT 59601
Soil Conservation Service, Federal Building, Bozeman, MT 59715
Office of Interstate Landsales Registration, ATTN: Carlton Goodwin, Title Bldg.,
Room 324, 909 17th St., Denver, CO 80202
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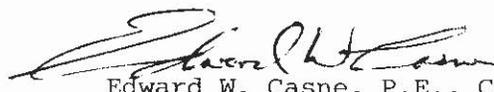
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RE: SYPES CANYON SUBDIVISION NO. 1
GALLATIN COUNTY

Ladies and Gentlemen:

The enclosed preliminary environmental review has been prepared for Sypes Canyon Subdivision No. 1 in Gallatin County, and is submitted for your consideration. Questions and comments will be accepted until July 1, 1980. One extension of time not to exceed seven days will be granted upon request if there is sufficient reason for the request. All comments should be sent to the undersigned.

Sincerely,


Edward W. Casne, P.E., Chief
Subdivision Bureau
Environmental Sciences Division

EWC/APK/TME/vmf

Enc.

DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES
Cogswell Building, Helena, Montana 59601
(406)449-3946

PRELIMINARY ENVIRONMENTAL REVIEW

Division/Bureau Environmental Sciences Division/Subdivision Bureau

Project or Application Sypes Canyon Subdivision No. 1

Description of Project This is a proposed subdivision located at the base of the Bridger Range west slope foothills approximately four miles north of Bozeman in Gallatin County. It is proposed to subdivide 58.06 acres into 27 lots ranging in size from 3.75 to 1.18 acres. The property is presently divided into seven parcels. The subdivision would be served by individual water and sewer systems.

POTENTIAL IMPACT ON PHYSICAL ENVIRONMENT

	Major	Moderate	Minor	None	Unknown	Comments on Attached Pages
1. Terrestrial & aquatic life and habitats	←-----→					
2. Water quality, quantity and distribution		←-----→				
3. Geology & soil quality, stability and moisture			X			
4. Vegetation cover, quantity and quality			X			
5. Aesthetics			X			
6. Air quality		X				
7. Unique, endangered, fragile, or limited environmental resources		X			X	
8. Demands on environmental resources of land, water, air & energy			X			
9. Historical and archaeological sites					X	

POTENTIAL IMPACTS ON HUMAN ENVIRONMENT

	Major	Moderate	Minor	None	Unknown	Comments on Attached Pages
1. Social structures and mores			x			
2. Cultural uniqueness and diversity			x			
3. Local and state tax base & tax revenue			x			
4. Agricultural or industrial production			x			
5. Human health		←-----→				
6. Quantity and distribution of community and personal income			x			
7. Access to and quality of recreational and wilderness activities		←-----→				
8. Quantity and distribution of employment			x			
9. Distribution and density of population and housing			x			
10. Demands for government services			x			
11. Industrial & commercial activity			x			
12. Demands for energy			x			
13. Locally adopted environmental plans & goals					x	
14. Transportation networks & traffic flows		x				

Other groups or agencies contacted or which may have overlapping jurisdiction Gallatin County Commissioners

Individuals or groups contributing to this PER. see next sheet

Recommendation concerning preparation of EIS Recommend not to prepare an
EIS.

PER Prepared by: Thomas Ellerhoff and Alfred P. Keppner

Date: June 2, 1980

Individuals or Groups contributing to this PER.

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Dr. Richard Mackie
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D.H.E.S. Air Quality Bureau
Gallatin County Classification and Appraisal Office
Montana State Department of Revenue
Gallatin County Commissioners
D.H.E.S. Solid Waste Bureau
Kountz Sanitation
Ray Shackelford, Bozeman School District No. 7
Gallatin County Sheriff's Office
Montana Power Co.
Mountain Bell
Montana State Department of Highways
Rich Mayfield Associates, Inc.
Morrison-Maierle, Inc.
U. S. Forest Service
State Department of Lands

POTENTIAL IMPACTS ON THE PHYSICAL ENVIRONMENT

1. Terrestrial and Aquatic Life and Habitats

Sypes Canyon No. 1 is a proposed subdivision situated on rolling land at the base of the Bridger Mountains' west slope foothills, approximately four miles north of Bozeman. The developer proposes to subdivide 58.06 acres into 27 lots, ranging in size from 3.75 acres to 1.18 acres (Map #1).

The Montana Department of Health & Environmental Sciences (DHES) hired Robert Beall, Ph.D., of the Wildlife Research Institute, Bozeman, to study, review and evaluate existing wildlife information pertaining to the Bridger Mountains, and assess the extent and importance of the mule deer winter range in and near the proposed subdivision. Additionally, Dr. Beall evaluated the impact of the proposed subdivision on the mule deer herd in the development and surrounding area.

Numerous studies conducted by the Montana Department of Fish, Wildlife and Parks (DFWP), under the direction of Richard Mackie, Ph.D., Montana State University (MSU) have shown that the western foothills of the Bridger Mountains are important wintering areas for deer that live in the Bridgers. The studies also found that the majority of the wintering mule deer herds move well up into the Bridgers during the summer, thus moving away from impacts caused by subdivisions. None of these studies were conducted in the Sypes Canyon area, although one (Steerey 1979) was conducted in the Schafer Creek winter range approximately three miles north.

To determine if there were mule deer wintering in the Sypes Canyon foothill vicinity, Dr. Beall spent approximately 30 hours observing and evaluating mule deer and mule deer sign within one-half mile of the proposed subdivision.

FINDINGS

The proposed Sypes Canyon No. 1 subdivision is now a wheat field. Since the terrain is reasonably level with no overstory vegetation, it is prone to deep accumulations of snow in the winter. The snow depth and lack of vegetation would make the proposed subdivision both inaccessible and undesirable to mule deer during most of an average winter, Dr. Beall said. However, he added, deer and deer sign were observed within 200 yards of the east boundary of the subdivision, and it would be likely that these deer would use the subdivision area to some extent in the fall and following snow melt and "green-up" of lower vegetation in the spring. This use would be a result of the normal wanderings of the deer, occupying the space within their winter range, he said.

The area immediately east of the proposed subdivision is privately owned, with a section of Montana School Trust land behind it (Map #2). The terrain in this area is predominantly ridges extending in a westerly direction from the Bridger Mountains, and a series of finger ridges emanating in a southwesterly direction from the main ridges.

This topography produces a series of south, southeast and southwest facing slopes, and creates a land pattern essential for the survival of the mule deer herd indigenous to the Sypes Canyon area.

The studies conducted by the DFWP indicate the mule deer in the Bridger Mountains return to the same winter range each year. Once the deer reach their wintering area in the Sypes Canyon vicinity, the deep snows on the higher ridges and north facing slopes reduce movement north or south to other wintering areas.

The area available to wintering deer is small. The majority of land is covered by deep snow which covers forage vegetation and hinders travel. The deer concentrate on southerly slopes. These small areas are relatively free of timber, and due to their exposure have less snow than the surrounding areas.

On April 12, 1980, a feces pellet group survey was conducted by Dr. Beall to evaluate the use these concentration areas received last winter. The number of pellet groups deposited by deer is an indication of the amount of time spent in an area. While the resulting figures are not absolute, they can be used to evaluate animal distribution, Dr. Beall said. The deer concentration areas within one-half mile above the proposed subdivision had approximately 460 deer pellet groups per acre, indicating the areas received about 35 deer days use per acre, he said. (Note: Ten deer days use can be produced by one deer occupying an area for ten days, or ten deer occupying the area for one day.)

The pellet group survey also indicated that the higher portions of these concentration areas received heavier use than the lower. The portions had 310 pellet groups per acre, indicating 24 deer days use per acre, Dr. Beall said.

This survey points out that the exposed southerly slopes receive extensive winter use by a number of mule deer (Estimated at 50 to 70 animals), and should be considered essential to the survival of the deer, Dr. Beall said.

Since January 1, 1980, the DFWP trapped and marked 10 deer in the Sypes Canyon area as a continuation of its Bridger Mountain deer studies. To date, there have been more than 100 aerial sightings of these marked and other unmarked deer in the Sypes Canyon wintering area. The sightings conform with the information generated by the pellet group surveys, and also indicate that these deer are confined to the Sypes Canyon area during the winter months, utilizing the limited exposed southerly slopes, Dr. Beall noted.

The terrain and normal winter snow depths of the Bridger foothills would not allow any large scale movement of deer to another wintering area if conditions became unsuitable, Dr. Beall said. In addition, the small distances deer have been found to travel during the winter months, in the Bridger deer studies, would preclude their learning of other suitable wintering areas. It must be concluded then, that the limited existing wintering areas are of utmost importance for the survival of the mule deer population indigenous to the Sypes Canyon wintering area, he said.

IMPACT

It is not possible to discuss the potential impact of Sypes Canyon No. 1 subdivision without considering the development activity that has taken place. According to DHES, there are three subdivisions in the general

area, with a total of 172 lots. Grandview No. 1 (56 lots) is immediately adjacent to the proposed subdivision, and has tracts which extend into the foothill wintering area. There are 26 tracts in the area, not included in the major subdivisions, of 20 acres or less, and 9 tracts of more than 20 acres.

This means there are 207 residential tracts within 2 miles of Sypes Canyon, 160 of which are less than 5 acres. Of the possible 207 homes, 128 have been built. Within one mile of the proposed subdivision there are 98 residential tracts, on which 45 houses have been built. Within a half mile of the proposed subdivision, there are 52 available tracts with 21 houses currently built. This information does not include those tracts of land developed prior to existing subdivision laws.

The deer are subject to the sight and sound of human activity in nearby subdivisions. Dr. Beall said the most noticeable sound heard while standing on the winter range was barking dogs.

According to the developer's protective covenants and a provision in the county's zoning plan for the area, owners of lots in Sypes Canyon No. 1 will not be allowed to own dogs.

While there are no previous studies to indicate the distribution of the deer prior to the establishment of the existing subdivisions, current pellet group patterns, and deer observations indicate the deer are currently using the majority of the available winter habitat, however, the lower portions immediately adjacent to the existing subdivision appear to be used less than they could be, he said.

The physical presence of the proposed subdivision should have a limited impact on the mule deer, Dr. Beall said. The potential impact would develop from deer avoiding the sight and sounds of human activity, causing them to move deeper into the winter range to the east, thereby decreasing the size of the wintering area used, he said. This would further concentrate the deer on the limited suitable areas, and could become a serious survival problem during severe winters, he added.

The intrusion of people into the wintering area poses a potentially severe impact situation. Dr. Beall explained:

People, on the average, enjoy viewing and photographing wildlife. The closer the better. The close proximity of the mule deer will present a tempting opportunity to try and view the deer at close range. In addition, the area has several places which would provide excellent cross country skiing, snowshoeing and hiking conditions. These types of human activities would displace mule deer each time they were disturbed. Because of the small size of the concentration areas, they would be forced to escape through deep snow zones. This would place an abnormally high amount of physical stress on the deer, already experiencing stress from the normal winter conditions. Higher overwinter mortality, and an eventual disappearance of the indigenous herd could result. If the subdivision is approved, it is recommended that the State owned land immediately adjacent to the proposed subdivision be managed, in the winter, as a critical mule deer winter range, and all human activity excluded.

According to the proposed subdivision plans, a public road and park will be developed. The road will lead from the county road along the southern boundary of the subdivision, into Sypes Canyon, terminating at the 5.27 acre park.

The U.S. Forest Service (USFS) in a March 27, 1980, letter to the DHES said it plans to provide public access to federal forest lands if the subdivision is approved. To do so the USFS must obtain an easement across a section of State School Trust Land (Section 16, Township 1 South, Range 6 East). Since school trust land is closed to all uses except those permitted by the Montana Board of Land Commissioners, approval by the commissioners would permit people to cross land now closed to the public. Presently Section 16 is permitted for grazing 11 animal units. The grazing permit doesn't come up for renewal until February 28, 1985.

SUMMARY

Impacts on Mule Deer

The proposed Sypes Canyon No. 1 subdivision will have an impact on the indigenous mule deer population that winters in the Sypes Canyon area according to Dr. Beall. He said:

There are two essential elements that make up a deer winter range, space and quality. The development of Sypes Canyon No. 1 subdivision would reduce the use deer make of the foothills immediately adjacent to and visible from the subdivision. This would reduce the space available to wintering deer and further concentrate them to the east. This would place additional use on forage vegetation which could result in overbrowsing, and an ultimate decrease in the amount and quality of forage available to wintering deer.

Quality can also be defined as the freedom from abnormal stress. Numerous scientific studies on deer have shown that they normally experience nutritional stress during winter months, and have a negative energy balance for several months. Any additional stress, such as continual human harassment, will increase the negative energy balance. This will result in higher overwinter mortality, lower fawn crops, and lower fawn survival, with an ultimate decrease in the size of the indigenous mule deer herd.

The development of this and other subdivisions in the area will reduce the space and quality of habitat available to the indigenous mule deer herd. With proper controls on human activity and domestic pets, this impact, while still detrimental, can be reduced. Without human activity controls, the impact could become severe.

Mitigating Impacts to Deer

According to the DFWP, the importance of the proposed subdivision to the existing mule deer winter range is its buffering effect. In a letter to the DHES, March 7, 1980, then Acting Director Fletcher E. Newby said, ". . .this proposed subdivision lies on, or within a buffer zone adjacent to, critical deer winter range and if approved and developed would be detrimental to mule deer."

If the proposed subdivision is approved and does remove the alleged buffer, there are two possible ways to lessen the impacts of the development.

The first would be for the developer to find another area for a park and to redesign the development in such a manner to block public access to federal and state lands.

The other possibility was alluded to by Dr. Beall, keep people and animals out of the winter range during the time of year the mule deer depend on it for food and shelter. The Forest Service and Montana Board of Land Commissioners might be able to work out a cooperative arrangement, as part of an access permit, which would restrict the public from the land during that part of the winter the deer depend on the range. In terms of domestic pets, particularly dogs, the proposed subdivision will not be of any consequence since dogs are restricted, however persons who presently own dogs and future homeowners outside the subdivision will have to come up with some means of keeping their animals out of the area during the restricted period.

Other Wildlife Considerations

In addition to his comments concerning possible impacts to mule deer, Dr. Beall discussed other wildlife questions.

Although his wildlife investigation found no written or physical evidence of rare or endangered species in the immediate area, Dr. Beall did say wildlife in general can be considered fragile, even though the wildlife known to exist in the area could not be considered unique to the vicinity.

The proposed development should not adversely affect aquatic or terrestrial wildlife within the bounds of the subdivision, according to Dr. Beall. In fact, since the site is now a wheat field, the planting of shrubs and ground vegetation might increase the habitat for small mammals and birds, he said.

2. Water Quality, Quantity and Distribution

The only surface water in the subdivision occurs during spring runoff in the small stream that crosses through lots 16 through 20. There are no proposed alterations of the stream channel for subdivision development.

Earth Science Services conducted a groundwater resource investigation and a report was prepared. Following is the conclusions from that report concerning the effects of groundwater in the proposed Sypes Canyon Subdivision.

Effects Of Ground Water Development

The effect of pumping the wells in the Subdivision on wells outside of the Subdivision should be acceptable. Calculations yield an estimate that the greatest drawdown at the north, west, and southern boundaries of the Subdivision due to Subdivision pumping will be less than 30.30 feet. This drawdown was calculated for the west edge of lot 21. Calculations also yield estimates that the drawdowns at $\frac{1}{2}$ mile, 1 mile, and 2 miles from the center of the Subdivision will be less than 5.96 feet, 2.39 feet, and .36 feet respectively. Available data does not suggest that such drawdowns would reduce the capability of wells in the area to supply adequate flows of water. These calculations included the effect of pumping water for lawns and gardens.

The expected effect of the subdivision water wells on the hydrologic system is that they would divert some water for beneficial use that would otherwise travel to a discharge area and either be lost to the atmosphere or enter a stream. The water wells will slightly modify the system so that a new ground water regimen is established. Pumping will not cause water levels to decline forever; they will only decline until a new quasi-equilibrium is established in the system. This quasi-equilibrium will occur when the drawdowns induced by the Subdivision wells have caused increases in ground water recharge and decreases in discharge sufficient to balance the consumptive use of the water wells. It should be noted that most of the domestic water and some of the irrigation water pumped from the wells is not consumptively used; rather, it is returned to the ground water system by seepage. Quasi-equilibrium may actually occur within a few months after the Subdivision is fully developed. Consequently, the 20-year drawdowns used above are thought to be conservative numbers that allow a considerable margin for error.

Earth Science Services, Inc. has addressed the question as to whether the fault that is thought to be present along the west side of the Bridger Range would be a hazard to ground water supplies in the Sypes Canyon area if septic tanks and drainfields were installed. The conclusion was that the presence of the fault at the range front would not be hazardous to the quality of groundwater supplies. Following is a report from Earth Science Services, Inc. detailing how they reached this conclusion.

This opinion is based on several considerations. One consideration is that the fault may not reach the ground surface in this area (see the following paragraph) but if it is present at the surface, at least one wall of the fault, and probably both walls, would be composed of alluvium and/or colluvium consisting of gravel, sand, silt, clay and rock fragments. Such material would collapse into any open fractures created by faulting below the water table. (This is why casing must be driven as water wells are drilled in these materials.) Consequently, the fault zone would retain filterability and other properties needed for removing hazardous substances from domestic wastewater. Pulverization and mineralization along the

fault might even increase the capability for removing hazardous substances.

With regard to whether a fault is actually present in the alluvial material, you should be aware of the fact that Bill McMannis made a fairly detailed study of the geology of the Bridger Range. We published his findings in 1955 (see the attached list of references), and he happened to draw a cross section through the Sypes Canyon area. I have attached a copy of his cross section. Note that he does not show the fault passing through the alluvium. Rather, he indicates that the fault occurred before the alluvium. A map published by the U.S. Geological Survey (Professional Paper 526-C) also shows the fault to be buried beneath the alluvium. McMannis (p. 1428) states:

"The late Pleistocene fans along the west side of the range show no signs of disturbance by movement on the normal faults."

I saw nothing during my field inspections that would indicate McMannis' interpretation is wrong in the vicinity of Sypes Canyon.

It is of course possible that a fault passes through the alluvium and has not been detected. However, even if it does, it may be relatively impermeable and not conduct ground water as well as the unaffected alluvium. The following discussion of this point is from a textbook on ground water geology by Davis and DeWiest (p. 346):

"A number of factors undoubtedly account for the fact that faults in unconsolidated deposits tend to form barriers. First, fault action will tend to pulverize rocks and minerals along the fault plane. This will be particularly effective at greater depths where confining pressure will increase the interparticle friction. Second, impermeable beds may be offset along the fault to block permeable beds. This effect will be most important where the number of permeable zones are limited. Third, elongated and flat clasts will tend to be rotated parallel with the fault surface and will reduce permeability perpendicular to the fault. Fourth, deposition of minerals along the fault surface will also reduce permeability."

Davis and DeWiest also indicate (p. 266) that springs develop along faults in alluvium at mountain fronts because the reduced permeability of the fault zone creates a ground water dam (a barrier to movement of ground water).

I would like to make a couple of additional comments on ground water conditions near mountain fronts. First, where a fault cuts brittle rocks, the fault zone is sometimes permeable. This is not the case with the fault I have been discussing, because it is not in brittle rock near the ground surface. However, permeable fault zones may be present back within the

range where the rocks are crystalline or well indurated sedimentary rocks. Indeed, Hackett (1960, p. 55) mentions that Ross Creek rises where a major fault zone transects limestone. It is noteworthy in this regard, that permeable faults in brittle rocks near the base of mountain ranges are likely to conduct water from aquifers to the surface, rather than conducting water from the surface to subsurface aquifers.

My last comment is that mountain streams do tend to lose water after they flow onto alluvium along mountain fronts. This loss of water occurs because the alluvium is relatively permeable and the water table is often below the stream beds near mountain fronts. This loss may be expected to occur whether a fault is present or not. The Sypes Canyon Stream, for example, ceased to flow on the date of my field inspection in a reach that is a considerable distance downstream from the area where the mountain front fault is probably located.

Regarding the location of the mountain front fault near Sypes Canyon, McMannis' map shows the approximate location as being near the break in the slope at the base of the mountains. Roberts' map has a line indicating a concealed fault (ie covered by alluvial material) about one tenth of a mile from the base of the mountains. It is doubtful if either author intended for these lines to be used as the actual location of the fault. It seems likely to me that a fault is located close to the base of the mountains because the well at the "Beck Ranch" near the base of the mountains in the SE $\frac{1}{4}$ of section 17 is reported to be 50 feet deep and to have encountered "almost all gravel" when drilled. This depth of alluvium suggests that the well is west of the fault line, but it could also indicate a bedrock valley of Sypes Canyon that is deeper than expected. The mountain front in the immediate vicinity of Sypes Canyon is fairly straight, suggesting (but not proving) that the front has not retreated far from the original fault line. Slow retreat seems reasonable because the metamorphic rocks of the mountains should be relatively resistant to destruction by weathering.

Various reports prepared by Earth Sciences Inc. were summarized as follows:

Summary

An analysis of available data indicates that the risk related to finding adequate supplies of good quality ground water in the Subdivision is normal and acceptable. It is always good procedure to drill and test a well before constructing an expensive home.

The hazard of septic tank effluents and lawn and garden fertilizer to the ground water seems to be acceptable if the septic tank systems are properly designed, installed, and maintained. Nitrate hazard can be minimized by designing and constructing the water wells to prevent the entrance of shallow ground water.

3. Geology and Soil Quality, Stability and Moisture.

Eleven soil test holes were dug to a depth of greater than seven feet. Percolation tests were taken on each lot. The results of the soil test holes and the percolation tests indicate that soil conditions are suitable for on-site sewage disposal. Slopes at the proposed drainfield and drainfield replacement area sites are less than 15 percent.

Earth Science Services, Inc. studied the stability of the slopes in the range immediately above the subdivision. Following is a summary of the resultant report:

The slopes within the subdivision are too low to be likely to fail. The slopes on the mountain front east of the subdivision vary from 17° near the base of the slope to 33° on the higher, steeper part of the slope. These slopes were measured with a Brunton Compass. The bedrock beneath the mountain slopes is gneissic material. The outcrops I saw were not good enough to allow me to determine the inclination of its layering. McMannis (1955) shows a strike parallel to the mountain front and a westward dip of 57°. Since the friction angle for joint surfaces in gneissic rocks is about 44° to 49° (Duncan, 1969, Table VI), the slopes are probably safe. I flew the entire length of the west slope of the Bridger Range at low altitude and looked for evidence of slope failure near the base of the range. I saw no clear evidence. Consequently, the slopes in the range immediately above the subdivision may be considered acceptably safe.

See comments in item #2 in Potential Impacts on the Physical Environment - Water Quality Quantity and Distribution.

4. Vegetation Cover Quantity and Quality

The area comprising the Sypes Canyon Subdivision, for the most part, has been in cropland for many years. The area now is in grain stubble. A part of the area extending west from the mouth of the canyon is in native vegetation. Various native grasses and wildrose are the dominant species. In the draw can be found chokecherry, hawthorne, snowberry and some serviceberry.

5. Aesthetics

The major aesthetic impact would be to develop rural land into 27 residential lots. According to a study done by Survco there are 52 available tracts with 21 houses currently built within one-half mile of the proposed subdivision. Within one mile there are 98 available tracts on which 45 houses have been built. The addition of 27 tracts from Sypes Canyon Subdivision (7 tracts already exist) would not be a major aesthetic impact should all tracts in the area be developed. The protective covenants do provide some control of building materials and setbacks.

6. Air Quality

The Air Quality Bureau Analyzed the effect Sypes Canyon Subdivision would have on air quality, especially dust problems along the Sypes Canyon Road. Following is their analysis of the situation:

1. The information in the environmental assessment indicates that the proposed subdivision, when completely developed will generate 168 vehicles per day. Past experience indicates that this level of traffic by itself should not cause significant road dust problems unless the road surface has an extremely high silt content. However, if the existing traffic is already causing a road dust problem for residents living along the road, then it must be assumed that the additional 168 vehicles per day will exacerbate the problem.
2. If complaints about road dust persist or increase, the County may wish to put this road high on their priority list for paving. However, it is quite possible that the county has many other unpaved roads with much higher traffic counts.
3. Ideally, the Sypes Canyon road should be paved. However, the cost-benefit must be determined by the county. Realigning and widening the road prior to paving may be cost prohibitive in themselves.
4. Past experience indicates that applying dust suppressant oil is not usually cost-effective. Oil must be applied once or twice a season and the cost of oil soon exceeds the cost of paving.

In short, the Air Quality Bureau does not have any ready solutions for this type of potential problem. In general, the moneys needed to control dust on unpaved county roads must be supplied by the county. Therefore, the county is probably the best unit to determine how this problem fits in with their other priorities.

See comments in item #5 in Potential Impacts on the Human Environment-Human Health.

7. Unique, Endangered, Fragile or Limited Environmental Resources

See comments in item #1 in Potential Impacts on the Physical Environment - Terrestrial and Aquatic Life and Habitats.

8. Demands on Environmental Resources of Land, Water, Air and Energy

See comments in items #2, 4, 6 in Potential Impacts on the Physical Environment and items 4 and 12 in Potential Impacts on the Human Environment.

9. Historical and Archaeological Sites

There are no known historical or archaeological sites on the property. However an on-site historical and archaeological survey has not been made to date.

POTENTIAL IMPACTS ON THE HUMAN ENVIRONMENT

1. Social Structures and Mores

While it is difficult to determine the final impact development will have on social structures and mores since it is not known who would purchase lots, it does not seem reasonable to believe that these lots would be purchased by people whose social or moral values are atypical of the general community.

2. Cultural Uniqueness and Diversity

See comments in item #1 in Potential Impacts on the Human Environment - Social Structures and Mores.

3. Local and State Tax Base and Tax Revenue

According to the Gallatin County Classification and Appraisal Office, the property of the proposed subdivision is classified as nonirrigated agricultural and grazing lands with an assessed value of \$625. Taxes paid in 1978 were approximately \$200. If each of the proposed lots were appraised at \$3,600 by the Classification and Appraisal Office, which is typical for lots of this size, each lot would generate \$69.59 in tax revenue. The total tax revenue for the undeveloped residential lots would be \$1878.93.

Assuming the average appraised value of each house in the proposed subdivision is \$30,000, which is typical for subdivisions of this kind according to the Gallatin County Classification and Appraisal Office, total tax revenue for the subdivision at full development would be \$15,600.

According to Ralph A. Krieg, Chief of Real Property Bureau, Property Assessment Division, Montana State Department of Revenue, a rollback tax would be due when a change of use from agricultural to residential occurs. The tax would be payable for a period of four years. The computation requires an average levy for the four years rollback period less any tax that has been paid. The levy changes from year to year and the average would depend upon the year of use change.

4. Agricultural or Industrial Production

In Gallatin County Commissioner's Findings of Fact and Order dated the 7th day of November 1979 it was stated: "This development consists of 52.799 (56.08) acres, only a portion of which has ever been under agriculture production. Removing this land from the agricultural sector will have no effect on the production of the Nation, State or County."

In a public hearing on 26 October 1979 the developer stated that he received less than \$500 per year for the grain produced on the proposed subdivision.

5. Human Health

Concern has been expressed regarding vehicles creating a dust problem along Sypes Canyon Road. The full development of the existing Harvest Hills, Grandview I and Grandview II subdivisions and the existing parcels in the area would result in vehicles from over 200 residences contributing to the dust problem. The development of Sypes Canyon Subdivision would result in vehicles from 27 additional residences contributing to the dust problem.

See comments in item #6 in Potential Impacts on the Physical Environment-Air Quality.

Because the development is not within a five district there may be some additional risk to health and safety due to fire. There is an effort in the area to obtain fire protection.

6. Quantity and Distribution of Community and Personal Income

This is a difficult impact to access as it is not known from where future residents might come or where they would be employed. Some may already live in the Bozeman area and have little if any impact with respect to distribution of income. Residents coming from areas outside the Bozeman area would cause an increase in community income and an increase in employment and commercial activity. Considering the population of the area as a whole development of these 27 lots (7 lots already have been created) on Sypes Canyon Subdivision would have only a minor impact on income distribution, employment, industrial or commercial activity.

7. Access To and Quality of Recreational and Wilderness Activities

See comments in item #1 in Potential Impacts on the Physical Environment - Terrestrial and Aquatic Life and Habitats.

8. Quantity and Distribution of Employment

See comments in item #6 in Potential Impacts on the Human Environment. Quantity and Distribution of Community and Personal Income.

9. Distribution and Density of Population and Housing

If Sypes Canyon No. 1 Subdivision is developed there would be 27 residences where now there exists 7 undeveloped lots. Approval of the subdivision would result in an increase of population and housing density in the localized area of the proposed subdivision. When you consider the fact that over 200 lots are already created in the area and have a potential for development, the increase in density of population and housing caused by Sypes Canyon Subdivision would not be significant.

10. Demands for Government Services

Children in grades K-12 would attend classes in Bozeman Public Schools - School District No. 7. In the environmental assessment it was estimated

the subdivision has a potential of 34 school age children. Ray Shackelford, assistant superintendent for administration for the school district, stated in a letter: "The proposed subdivision with the projected number of school age children can be accommodated by the present personnel and facilities as well as with the existing bus service."

Dick Kountz of Kountz Sanitation in a letter to Rick Mayfield Associates, Inc. stated: "This is to advise you that Kountz Sanitation will collect, remove and dispose of all solid waste from the above referenced proposed subdivision (Sypes Canyon No. 1) on a regular basis, as development requires. The changes for our services will be determined at such time as development is instituted and solid waste occurs." Kountz Sanitation utilizes the Logan landfill which is approved by the Solid Waste Bureau of the DHES.

Police protection would be provided by the Gallatin County Sheriff's Department. In a telephone conversation with DHES deputy sheriff Lee Gee stated that "new subdivisions make more work for everyone concerned."

Ambulance service will be provided by the Gallatin County Ambulance Service.

The proposed subdivision is not within the boundary of a rural fire district. Therefore fire protection will not be available without formation of a fire protection district or extension of the boundaries of an existing district.

11. Industrial and Commercial Activity

See comments in item #6 in Potential Impacts on the Human Environment - Quantity and Distribution of Community and Personal Income.

12. Demands For Energy

Dale Ellison, Montana Power Co. Division Engineer, in a letter to Rick Mayfield and Associates stated: "I have reviewed the preliminary plat of the proposed Mt. Baldy (Sypes Canyon No. 1) Subdivision, located in Section 17, North of Bozeman, and I can see no major problems in serving this area. A subdivision of this size will certainly have an impact on our electrical system in the area, but we can however, adequately serve this development. The utility easements as indicated are quite adequate, and could in fact be reduced to 10 feet along all property lines instead of 20 feet on the exterior lines as shown.

Clifford D. Rossberg, Mountain Bell facilities manager, stated in a letter to Rick Mayfield and Associates: "In regards to the Mt. Baldy (Sypes Canyon No. 1) Subdivision located in Gallatin County, this is to advise you that this subdivision is located in an area served by Mountain Bell. Our normal service offering in this area is multi-party rural. Facilities for this type of service are available on the perimeter of the subdivision upon request of the applicants according to our tariffs on file with the Montana Public Service Commission. If the subdivider wants to insure that one or two party service is available for his buyers, he should contact this office for a real estate agreement. The easements shown on the plat are sufficient for our needs."

It is not proposed to service this subdivision with natural gas.

It can be assumed that most residences would travel to Bozeman for employment, shopping or other basic needs. It is four miles from the proposed subdivision to the Bozeman city limits. In traveling this eight mile round trip gasoline consumption would be greater for residents of Sypes Canyon Subdivision than for residents of the City of Bozeman.

13. Locally Adopted Environmental Plans and Goals

Michael D. and Susan B. Copeland petitioned the Gallatin County Commissioners to form a county planning and zoning district. The district is described as the N $\frac{1}{2}$ S $\frac{1}{2}$ SE $\frac{1}{4}$ and the N $\frac{1}{2}$ SE $\frac{1}{4}$ Section 17, T1S, R6E, M.P.M. Gallatin County. After an amendment to the proposed regulations and development pattern the county commissioners zoned 54 acres RS-1, 30 acres RS-30 and the park PLL. The RS-1 is the proposed Sypes Canyon Subdivision.

The Montana Wildlife Federation and Gallatin Wildlife Association initiated an action for injunctive relief against the Gallatin County Commissioners. After the court hearing the following Conclusions of Law were issued:

I.

That Section 27-19-104 is constitutional.

II.

That Sypes Canyon Zoning District No. 1 was lawfully and validly created by the County Commissioners of Gallatin County, Montana.

III.

That the Plaintiffs did not appeal the decision of the County Commissioners in creation of the Planning and Zoning District.

IV.

That the Plaintiffs did not appeal the decision of the Planning and Zoning Commission in the creation of a density of twenty-eight (28) lots for eighty-four (84) acres.

V.

That the County Planning and Zoning Commission was not arbitrarily capricious in the establishment of the density of twenty-eight (28) lots for the proposed zoning of eighty-four (84) acres contained in the zoning district.

VI.

That the Planning and Zoning Commission was not arbitrary or capricious in the adoption of a complex act of regulations for the physical and economic development of the zoning district.

VII.

That the zoning district does not constitute spot zoning in that the Legislature specifically stated that these County Commissioners may create a zoning district when the district is greater than forty (40) acres in size.

VIII.

That there was sufficient information and data compiled by the Planning staff and presented by Michael D. Copeland and Susan B. Copeland for the County Commissioners and for the County Planning and Zoning Commission to act on the proposed regulations and development patterns for Sypes Canyon District No. 1.

IX.

That no declaratory judgment shall be granted to the Plaintiffs.

It could be concluded from the Conclusions of Law that the proposed Sypes Canyon Subdivision would be compatible with locally adopted environmental plans and goals. However, the decision has been appealed to the Supreme Court by Plaintiffs. Until the case is placed on the court calendar, heard by the justices, and a decision handed down the effect of the proposed Sypes Canyon Subdivision on locally adopted environmental plans and goals is unknown. At the time of this writing the case had not been placed on the court calendar.

14. Transportation Networks and Traffic Flows

Wayne Speelman of the Montana Highway Department stated that traffic impacts of the proposed subdivision appear to be adequately addressed in the Environmental Assessment and Community Impact Statement. The section on roads was prepared by Morrison - Maierle, Inc.

Traffic counts were taken on Sypes Canyon Road by the Montana Department of Highways on April 2, 3 and 4, 1979. The results are summarized as follows:

Location	ADT	Residences	Calculated Daily Vehicle Trips/Res.
Above McIlhattan Road	246	44	5.6
Above Summer Cutoff	178	22	5.6

Existing subdivisions that utilize Sypes Canyon Road for access are Harvest Hills, Grandview I and Grandview II. Although they are not fully developed at present they would generate 360 vehicle trips per day from each when developed. It was estimated that Sypes Canyon Subdivision could generate approximately 168 vehicle trips per day. This would be a modest increase in traffic compared to the potential that already exists.

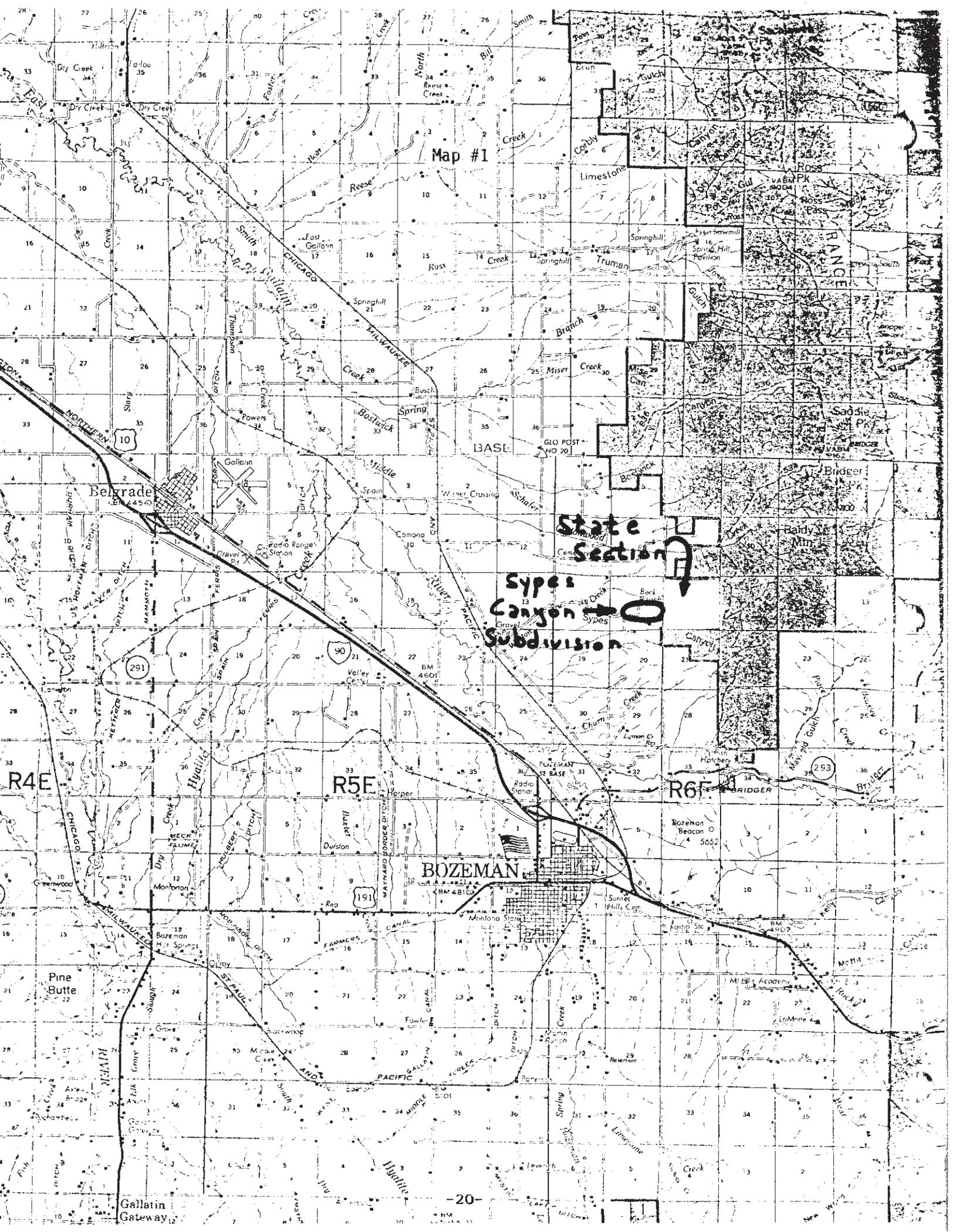
Although this road is ploughed during the winter, there is a potential of having this road closed for periods of time due to heavy snowfall.

Sypes Canyon Road is a narrow, graveled road which has been cut into the side of the foothills. The right-of-way is narrow and the removal of relatively heavy snowfall is difficult and results in narrowing the road further. Two curves above the Summer Cutoff have substandard sight distances. The "Y" intersection at the Summer Cutoff presents a potential hazard as visibility is restricted and control of vehicles coming down the Summer Cutoff could be impaired during inclement weather.

The environmental assessment report on roads suggests Sypes Canyon Road is adequate for present vehicle use. However, a letter from Robert Babb, county engineer, read at the 26 October, 1979 public hearing, stated that his office considered this a dangerous road, but because of the small number of accidents they couldn't get state funds to study the road.

Even without the development of Sypes Canyon Subdivision the development of existing lots in the area would necessitate improvement of the road. Consideration must be given to improving sight distances on curves, improving the Summer Cutoff intersection and upgrading the roadway surface.

The effect of Sypes Canyon Subdivision on Springhill Road is not significant. The combined effect of all present and future subdivisions in the area will necessitate increased maintenance and possible improvements.



Map #1

State Section

Sydes Canyon Subdivision

RANGE

BOZEMAN

