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THE UNIVERSITY OF TENNESSEE
KNOXVILLE 37916
DEPARTMENT OF CIVIL ENGINEERING

January 24, 1970

Mr. James E. Sherman
Geologist
806 West Grand Road
P.O. Box 5671
Tucson, Arizona 85703

Dear Jim:

I appreciate your quick reporting on the geological reconnaisance we undertook in the Tortolita Mountains recently. Here is something else that may be of interest to you.

I believe I mentioned to you that I sometimes do engineering work for Mr. Lloyd W. Golder III who is in the land development business N. of Tucson. During a recent telephone conversation he mentioned that he would like to get in touch with a geologist with the following objectives (as I understood them):

a. To get some help in carrying out reconnaisance of real estate in New Mexico, related to possible future exploration of copper, uranium, silver, and other mineral deposits.
b. To do some classification and perhaps mapping work in that same area, between Datil and Magdalena, New Mexico.
c. To give him a little tutoring in basic geology.

Since you appeared quite familiar with New Mexico, in connection with your book, and also knowledgeable about geology, I thought this might be an assignment worth exploring. If you agree give Mr. Golder a ring at 297-1196. He will be aware of you by copy of this letter.

With best regards,

Remy L.A. de Jong
Asst. Professor

cc: Lloyd W. Golder III

RLAdJ;sr

7 January 1970

Dr. Remy L. A. DeJong
Dept. of Civil Engineering
114 Perkins Hall
University of Tennessee
Knoxville, Tennessee 37916

Re: Geologic Evaluation
of Verelieb Property

Dear Dr. DeJong:

Enclosed is the original copy of the geological evaluation of the Verelieb property at the south end of the Tortolita Mountains some 20 miles north of Tucson, Arizona. If you have any questions do not hesitate to contact me. I indicated in the summary that in my opinion there is probably some ground water to be found on the property but I would not estimate how much without additional geologic and hydrologic information.

It was a pleasure to visit with you once again after it being some six years since we roomed in the same house. Best of luck with the new semester.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

James E. Sherman
Consulting Geologist

JES/plp
Enslosure

7 January 1970

Dr. Remy L. A. DeJong
Dept. of Civil Engineering
114 Perkins Hall
University of Tennessee
Knoxville, Tennessee 27916

Re: Geologic Evaluation
of N 3/4, Section 30
T. 11 S., R. 13 E.,
Salt River P. M.
GEOEX Job #502-69

INTRODUCTION

On December 31, 1969, James E. Sherman, Geologist and Dr. Remy L. A. DeJong, Hydrologist, visited the above designated site at the south end of the Tortolita Mountaines some 20 miles northwest of Tucson, Arizona. The area was examined geologically during the time of about two hours to determine the potential of the property for underground and surface water resources.

DESCRIPTION OF THE PROPERTY

The area of land consists primarily of an outwash pediment of alluvium overlying precambrian granite. At the eastern portion of the property some outcrops of moderately fractured granite extend to some 100 feet above the surrounding pediment. Immediately to the north and northeast of the property are the Tortolita Mountains with peaks of some 800 feet above the surrounding desert floor. These mountains cover an area of several square miles and are composed primarily of precambrian granite, granodiorite and other varieties of phaneritic (coarse grained) igneous rocks. This rock appears to be moderately fractured and substantially weathered and provides the source of pediment alluvium that has deposited in the desert basins surrounding the mountains. It is one of the contact areas between mountains and desert pediment that exists at the property under consideration.

From a hydrologic view point, the surface drainage in the northeast portion of the property is form northeast to southwest. The underground drainage would be in approximately the same direction. This main NE to SW drainage channel consists of well sorted irregular sand-sized grains that would provide for good permeability. It is possible, however, that more clay sized particles may be present at depth in the main drainage channel thus having a negative affect on the permeability of the channel. The main drainage channel serves approximately three square miles (Area I) of drainage in the south end of the Tortolita Mountains. The drainage in the northwest portion of the property is predominately from northwest to southeast and intersects the major NE to SW drainage channel at about the center of the property. This minor channel serves a drainage area of about one square mile (Area II) of land surface with its stream bed consisting of irregular sand-sized grains.

ADDITIONAL INFORMATION

In 1960 Heinrichs GEOEX did some work in the vicinity of the property under discussion and the following information is furnished on the basis of this work and wells located in Section 28, 32 and 33, T. 11 S., R. 13 E.

At the center of N 1/2, Section 32, T. 11 S., R. 13 E. - the approximate depth to bedrock is 400 feet. The approximate depth to water below ground surface is 250 feet (See N1, enclosed map). At the center of S 1/2, Section 28, T. 11 N., R. 13 E. - the approximate depth to bedrock is 500 feet. The approximate depth to water below the ground surface is 350 feet (See N2, enclosed map). At the SE 1/4, Sec. 33, T. 11 N., R 13 E. - the approximate depth to water below the ground surface is 500 feet (See N3, enclosed map). Note that as the distance from the contact between the mountains and the pediment becomes greater the depth to bedrock and the water table becomes greater and at a fairly rapid gradient. This is usually true within a few miles adjacent to the mountains. The water table then levels off at a fairly uniform depth below the ground surface.

CONCLUSIONS AND RECOMMENDATIONS

In conclusion it is believed that of the two drainage areas, the NE to SW drainage channel supplied by Area I would be the most favorable source of both ground water and surface water. The recommended location of wells for ground water on the property would be in the NE 1/4, NE 1/4, Section 30, T. 11 S., T. 13 E. Actual volumes of ground water from such wells would be difficult to predict without further study. It was noted that certain phreatophytes such as mesquite trees are in relative abundance along the stream bed in NE 1/4, NE 1/4, Section 30, T. 11 S., R. 13 E., and it is indicated from this that ground water in that area would probably not exceed 200 feet in depth below the ground surface. It is not possible to know from this investigation what the fluctuation of ground water level would be throughout the year.

The possibility of constructing one or more small dams across the valley at the northeast corner of the property should also be considered as providing a water source for the property. This consideration, however, would require a rather detailed geologic and hydrologic investigation of the area.

If there are any questions that you may have do not hesitate to contact us.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

James E. Sherman
Geologist

JES/md

CC: Mr. David Leonard
Miller, Pitt & Feldman
201 N. Stone Avenue
Tucson, Arizona 85701

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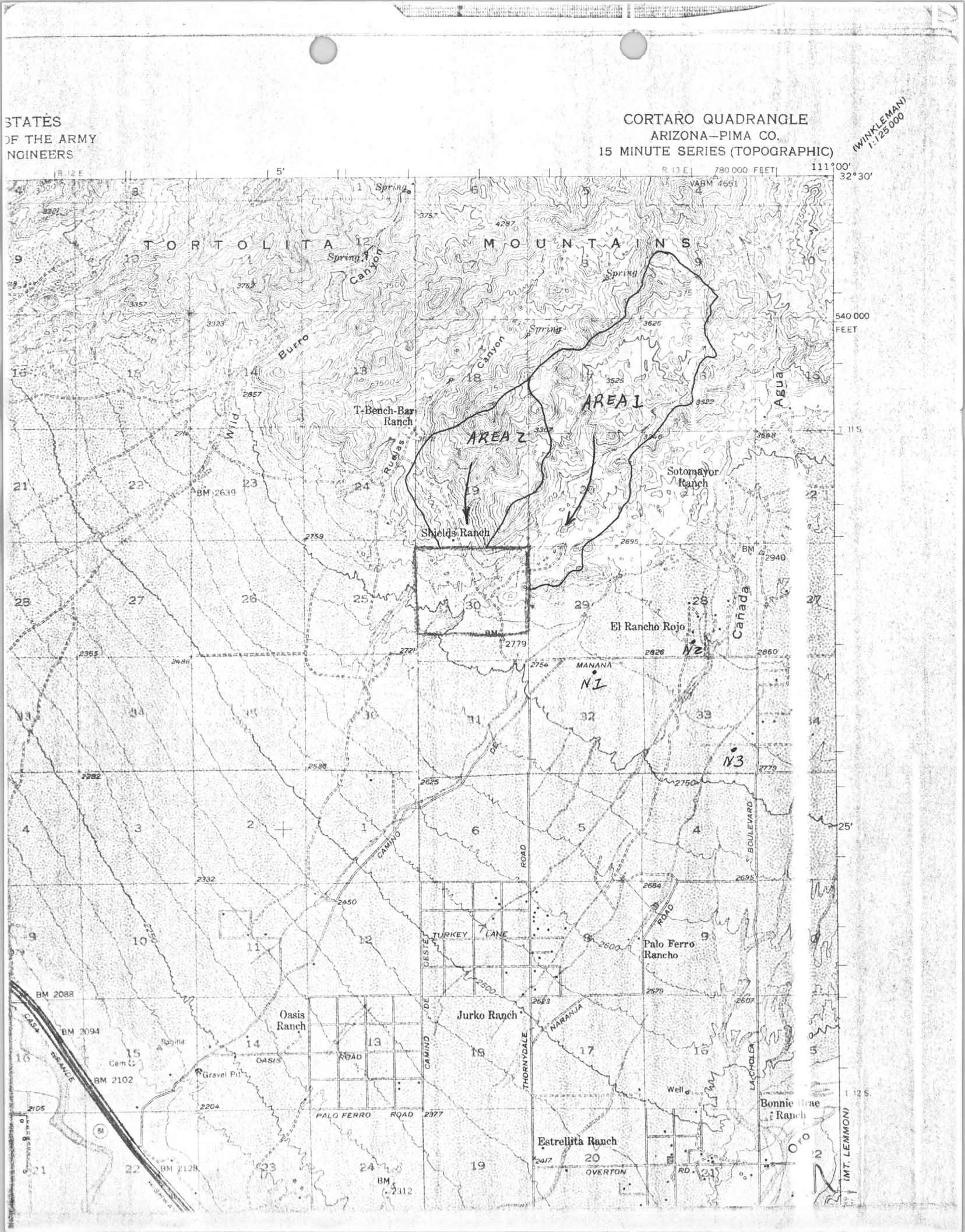

REMY L. A. DE JONG, PH.D., P.E.

ASSISTANT PROFESSOR OF CIVIL ENGINEERING

HYDROLOGIST

114 A PERKINS HALL
THE UNIVERSITY OF TENNESSEE
KNOXVILLE, TENNESSEE 37916

OFFICE PHONE: 615:974-5254
(IF NO ANSWER, CALL): 615:974-2503
RESIDENCE: 615:689-5154

January 6, 1970

Dr. Remy L.A. DeJong
Department of Civil Engineering
114 Perkins Hall
University of Tennessee
Knoxville, Tennessee 37916

Re. Geologic Evaluation of
N3/4, Sec. 30, T.11S.,
R. 13 E., Salt River P.M.;
GEOEX Job. 502-69

INTRODUCTION

On December 31, 1969, James E. Sherman, geologist and Dr. Remy L.A. DeJong, hydrologist, visited the above designated site at the south end of the Tortolita Mountains some 20 miles northwest of Tucson, Arizona. The area was examined geologically during the time of about two hours to determine the potential of the property for underground and surface water resources.

DESCRIPTION OF PROPERTY

The area of land consists primarily of an outwash pediment of alluvium overlying precambrian granite. At the eastern portion of the property some outcrops of moderately fractured granite extend to some 100 feet above the surrounding pediment. Immediately to the north and northeast of the property are the Tortolita Mountains with peaks of some 800 feet above the surrounding desert floor. These mountains cover an area of several square miles and are composed primarily of precambrian granite, graniodiorite and other varieties of phaneritic (coarse grained) igneous rocks. This rock appears to be moderately fractured and substantially weathered and provides the source of pediment alluvium ~~material~~ that has deposited in the desert basins

January 6, 1970

Dr. Remy L.A. DeJong
Department of Civil Engineering
114 Perkins Hall
University of Tennessee
Knoxville, Tennessee 37916

Re. Geologic Evaluation of Verelieb Property

Dear Dr. DeJong:

Enclosed is the original copy of the geological evaluation of the Verelieb property at the south end of the Tortolita Mountains some 20 miles north of Tucson, Arizona. If you have any questions ~~with regard to some statements not~~ being clear or ~~information not present~~ do not hesitate to contact me. I indicated in the summary that ~~it was~~ in my opinion ~~that~~ there is probably some ground water ~~and surface water~~ to be found on the property but I would not ~~have~~ estimate how much without ~~considerable~~ additional more geologic and hydrologic information.

It was a pleasure to visit with you once again after it being some six years since we roomed in the same house. Best of luck with the new semester.

Sincerely,

James E. Sherman

surrounding the mountains. It is one of the contact areas between mountains and desert pediment that exists at the porperty under consideration.

From a hydrologic view point, the surface drainage in the north east portion of the property is from north east to south west. The underground drainage would be in approximately the same direction. This main NE to SW drainage channel consists of well sorted irregular sand-sized grains that would provide for good permeability. It is possible, however, that more clay sized particles may be present at depth in the main drainage channel thus having a negative affect on the permeability of the channel. The main drainage channel serves approximately three square miles (Area 1) of drainage in the south end of the Tortolita Mountains. The drainage in the north west portion of the property is predominately from northwest to southeast and intersects the major NE to SW drainage channel at about the center of the property. This minor channel serves a drainage area of about one square mile (Area 2) of land surface with its stream bed consisting of irregular sand-sized grains. ~~on the surface.~~

ADDITIONAL INFORMATION

In 1960 Heinrichs GEOEX did some work in the vicinity of the property under discussion and the following information is furnished on the basis of this work and wells located in Sec. 28, 32 and 33 T. 11 S., R. 13 E.

At the center of N½, Sec. 32, T. 11 S., R. 13 E. - the approximate depth to bedrock is 400 feet. The approximate depth to water below ground surface is 250 feet (See N1, enclosed map). At the center of S½, Sec. 28, T. 11 N., R. 13 E. - the approximate depth to bedrock is 500 feet. The approximate depth to water below the ground surface is 350 feet (see N2, enclosed map). At the SE¼, Sec. 33, T. 11 N., R. 13 E. - the approximate depth to bedrock is 700 feet. The approximate depth to water below the ground surface is 500 feet (see N3, enclosed map). Note that as the distance from the contact between the mountains and the pediment becomes greater

the depth to bedrock and the water table becomes greater and at a fairly rapid ~~rate~~ gradient. This is usually true within a few miles adjacent to the mountains, ~~then~~ The water table then levels off at a fairly uniform depth below the ground surface.

CONCLUSIONS AND RECOMMENDATIONS

In conclusion it is believed that of the two drainage areas, the NE to SW drainage channel supplied by Area 1 would be the most favorable source of both ground water and surface water, ~~on the property.~~ The recommended location of wells ~~would~~ for ground water on the property would be in the NE¼, NE¼, Sec 30, T. 11 S., T. 13 E., Actual volumes of ground water from such wells would be difficult to predict without further study. It was noted that certain phreatophytes such as mesquite trees are ~~in the northeast corner~~ in relative abundance along the stream bed in NE¼, NE¼, Sec. 30, T. 11 S., R. 13 E., and it is indicated from this that ground water in that area would probably not exceed 200 feet in depth below the ground surface. It is not possible to know from this investigation what the fluctuation of ground water level would be throughout the year.

The possibility of constructing one or more small dams across the valley at the northeast corner of the property should also be considered as providing a water source for the property. This consideration, however, would require a rather detailed geologic and hydrologic investigation of the area.

If there are any questions that you may have do not hesitate to contact us.

Very truly yours,

James E. Sherman
Geologist

Heinrichs GEOExploration Co.

cc. David Leonard
Miller, Pitt & Feldman
201 N. Stone Ave. Tucson, Arizona 85701