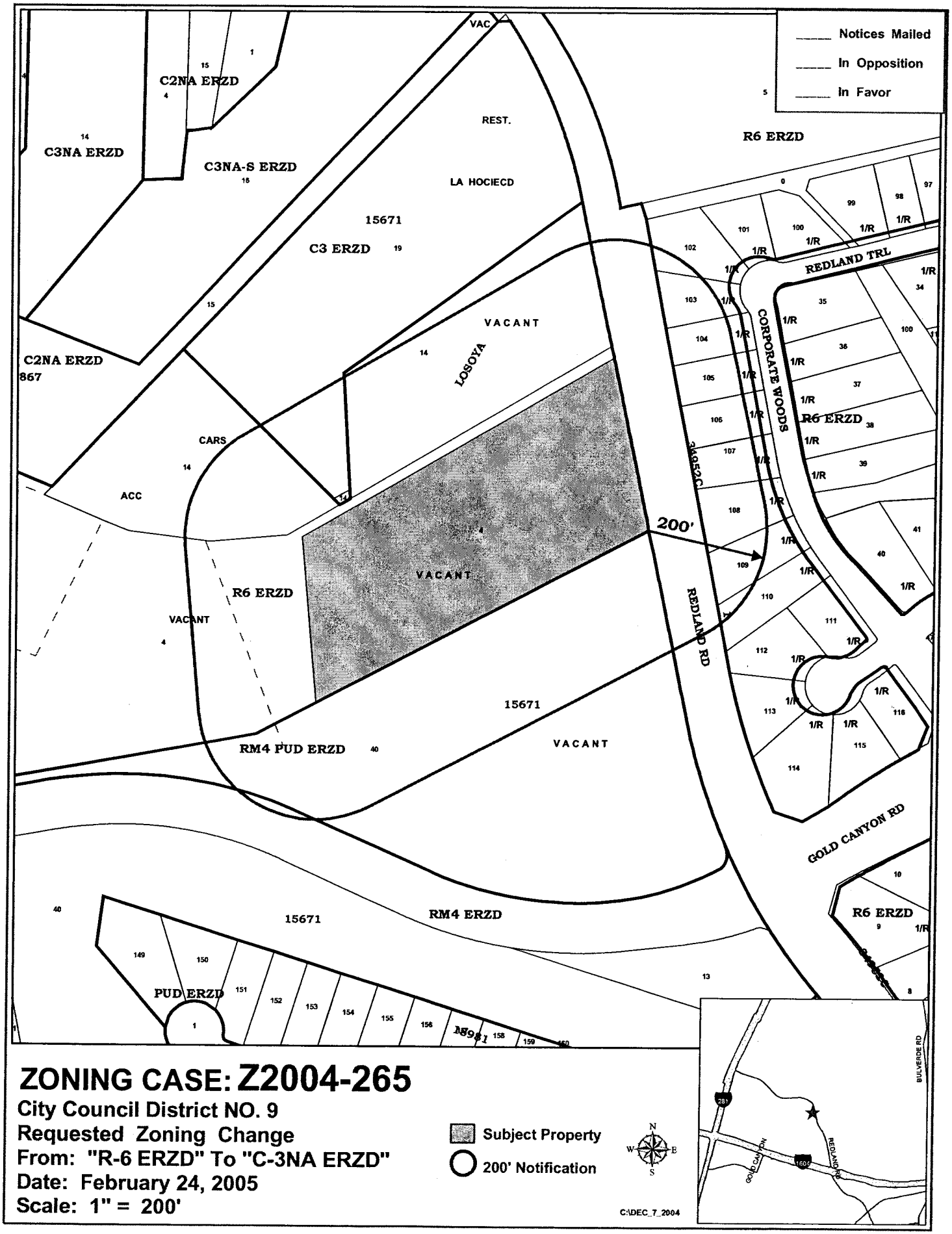


ZONING CASE: Z2004-265

City Council District NO. 9
Requested Zoning Change
From: "R-6 ERZD" To "C-3NA ERZD"
Date: February 24, 2005
Scale: 1" = 200'

Subject Property
200' Notification

C:\DEC_7_2004

CASE NO: Z2004265

Staff and Zoning Commission Recommendation - City Council

Continuance from Zoning Commission December 21, 2004,
Continuance from City Council January 27, 2005

Date: February 24, 2005

Zoning Commission Meeting Date: January 04, 2005

Council District: 9

Ferguson Map: 517 D1

Appeal: No

Applicant:	**Owner**
Randy Schumacher	Monterey Adair

Zoning Request:	From R-6 ERZD Residential Single-Family Edwards Recharge Zone District to C-3NA ERZD General Commercial District, Nonalcoholic Sales Edwards Recharge Zone District P-4F, NCB 15671
Property Location:	18581 Redland Road
Proposal:	To develop as office use
Neighborhood Association:	Redland Woods Neighborhood Association
Neighborhood Plan:	None
TIA Statement:	A Traffic Impact Analysis (TIA) is not required. A TIA may be required at the plat or building permit level.

Staff Recommendation:

Approval. The subject property is in an area bound by Redland Road to the north and east, and three subdivisions to the west, south and east. This commercial area contains a mix of C-3, C-2 and Residential zoning and uses. The requested zoning is for a low-density office facility. Many of the intense uses that are normally allowed in C-3 would be prohibited at this location in the ERZD. The request is consistent with the development pattern along this segment of Redland Road. A landscape buffer will be required adjacent to the residential property.

Zoning Commission Recommendation

Approval

VOTE	
FOR	8
AGAINST	0
ABSTAIN	2
RECUSAL	1

CASE MANAGER : Richard Ramirez 207-5018

Z2004265

ZONING CASE NO. Z2004265 – December 21, 2004

Commissioner Dutmer has been recused for this zoning case.

Applicant: Randy Schumacher

Zoning Request: "R-6" ERZD Residential Single Family Edwards Recharge Zone District to "C-3NA" ERZD General Commercial District, Nonalcoholic Edwards Recharge Zone District.

Applicant/Representative not present.

OPPOSE

Richard Alles, 1809 Blanco Road, representing AGUA, stated their concern is that this would increase the development intensity of the land if it is found to be a category 2 property which SAWS reports indicates it is. The allowed impervious cover will increase from 30% to 65%, which is contrary to the City Master Plan Policies. He stated at this time they would like to request this case be continued in order to negotiate with the applicant on impervious coverage limits before consideration of this case.

Staff stated there were 16 notices mailed out to the surrounding property owners, 0 returned in opposition and 3 returned in favor and no response from Redland Woods Neighborhood Association.

Everyone present, for and against having been heard and the results of the written notices having been received, the Chairman declared the public hearing closed.

COMMISSION ACTION

The motion was made by Commissioner Peel and seconded by Commissioner Dixson to recommend a continuance until January 4, 2005.

1. Property is located on Lot P-4F, NCB 15671 at 18581 Redland Road.
2. There were 16 notices mailed, 0 returned in opposition and 3 in favor.
3. Staff recommends approval.

AYES: Robbins, Cardenas-Gamez, Dixson, Sherrill, McAden, Avila, Stribling, Peel
NAYS: None
RECUSED: Dutmer

THE MOTION CARRIED

Z2004265

ZONING CASE NO. Z2004265 – January 4, 2005

Commissioner Dutmer has been recused for this zoning case.

Applicant: Randy Schumacher

Zoning Request: "R-6" ERZD Residential Single Family Edwards Recharge Zone District to "C-3NA" ERZD General Commercial District, Nonalcoholic Edwards Recharge Zone District.

Randy Schumacher, 11202 Disco, applicant, stated the purpose of this request is to build 3 low-density office building on the subject property. He stated they would be operating a doctor's office (Lot 1, 50 parking spaces), lawyer's office (Lot 2, 25 parking spaces) and a media company (Lot 3, 25 parking spaces). He further stated these businesses do not require much parking which would minimize the impervious cover to about 45%. He stated they intend to preserve as much green area. He stated he has agreed to provide deed restrictions.

OPPOSE

Richard Alles, 1809 Blanco Road, representing AGUA, stated their concern is that this would increase the development intensity of the land if it is found to be a category 2 property which SAWS reports indicates it is. He stated before this zoning request is granted he would like to have a written agreement that impervious cover would be limited to 30% on this tract.

REBUTTAL

Randy Schumacher, 11202 Disco, applicant, stated he cannot support Mr. Alles request of limited the impervious cover to 30%. He stated the requirement is at 65 % and they are at 46%, which he feels they have made an effort in limiting the impervious cover. He further stated they have agreed to comply with SAWS requires.
Staff stated there were 16 notices mailed out to the surrounding property owners, 0 returned in opposition and 3 returned in favor and no response from Redland Woods Neighborhood Association.

Everyone present, for and against having been heard and the results of the written notices having been received, the Chairman declared the public hearing closed.

COMMISSION ACTION

The motion was made by Commissioner McAden and seconded by Commissioner Dixson to recommend approval.

Z2004265

1. Property is located on Lot P-4F, NCB 15671 at 18581 Redland Road.
2. There were 16 notices mailed, 0 returned in opposition and 3 in favor.
3. Staff recommends approval.

AYES: Martinez, Robbins, Cardenas-Gamez, Dixson, McAden, Avila, Stribling, Peel
NAYS: None
RECUSED: Dutmer
ABSTAIN: Kissling, Sherrill

THE MOTION CARRIED

RESULTS OF COUNCIL HEARING January 27, 2005

City Council granted a continuance until February 24, 2005

RESULTS OF NOTICE FOR COUNCIL HEARING

To be provided at Council hearing.

SAN ANTONIO WATER SYSTEM
Interdepartment Correspondence Sheet

To: Zoning Commission Members

From: Kirk M. Nixon, Manager, Resource Protection Division, San Antonio Water System

Copies To: Scott R. Halty, Director, Resource Protection & Compliance Department, Julia I. Mireles, PE, Karen Schubert, Resource Protection Specialist II, Aquifer Protection & Evaluation Section, File

Subject: Zoning Case Z2004265 (4 acre Office\Warehouse)

Date: November 30, 2004

SUMMARY

A request for a change in zoning has been made for an approximate 4-acre tract located on the city's north side. A change in zoning from **"R-6 ERZD"** to **"C-3 NA ERZD"** is being requested by the applicant, Randy Schumacher. The change in zoning has been requested to allow for the development of an office and warehouse complex.

As of the date of this report, an official request for a category determination or an official request for a "substantial alteration" determination has not been received by the Aquifer Protection & Evaluation Section. Based on the information provided, this property is a Category 2 property and shall be developed in accordance with all the provisions stated in Ordinance No. 81491 governing development on the Edwards Aquifer Recharge Zone. However, if the appropriate information is provided to the Aquifer Protection & Evaluation Section, this property may be determined to be a Category 1 property. If the property is determined to be a Category 1 property, staff recommends that the owner/operator use criteria outlined in Section 34-970 "Best Management Practices".

Based on the site evaluation of the property, and the information submitted by the applicant, staff recommends approval provided that the applicant agrees to abide by all recommendations contained in this document.

LOCATION

The subject property is located in City Council District 9, along the west side of Redland Road, north of Gold Canyon. The property lies within the Edwards Aquifer Recharge Zone (Figures 1 and 2).

SITE EVALUATION

1. Development Description:

   The property is currently undeveloped. The proposed change is from 'R-6 ERZD' to 'C-3 NA ERZD' and will allow for the construction of an office\warehouse complex. Three office buildings with associated parking are proposed for construction to equal forty-six percent impervious cover.

2. Surrounding Land Uses:

   Out on a Limb Tree Trimming Service offices are located north of the property. The remaining surrounding properties consist of residential lots and undeveloped areas.

3. Geologic Features:

   The Resource Protection Division of SAWS conducted an investigation on November 5, 2004 of the referenced property to assess the geologic conditions and evaluate any environmental concerns present at the site. Two barns were located on the site along with several old and rusting tractor frames. SAWS staff geologist, Mr. Gregory James P.G., evaluated the geology on the site during our site evaluation.

   Using U.S. Geological Survey Water-Resources Investigations Report 95-4030 it was determined that the subject site is underlain by the Leached and Collapsed Member of the Edwards Limestone. This could not be verified by field observation due to coverage by alluvium, fill material and vegetation. This formation is known to possess the potential for lateral caverns. Therefore, it is possible that during excavation and development karst features may be found. No sensitive features were observed during our site evaluation. According to FEMA flood insurance maps, the property is not within the 100-year floodplain.

   Records indicate the possible presence of a cave on or near the subject property. *The Caves of Bexar County, Second Edition, 1988*, by George Veni, shows "Council Cave" (BCS #131) as being located within the USGS Longhorn Quadrangle near the subject property. In the description of "Council Cave", of the same report (Attachment 1), it identifies USGS Bulverde Quadrangle as the location. The upper portion of the sinkhole has since been filled with dirt and leveled. The cave is overlain by a sinkhole.

   In *Significant Edwards Aquifer Karst Recharge Features of Bexar County, Texas 1989*, a report prepared by George Veni for the city of San Antonio , it states that the drainage area for the cave is approximately 22.04 acres and that the surrounding property is of low gradient. In addition, it states that included in the drainage is runoff from a nearby business via a pipe leading to the sinkhole. This report places the cave within the Longhorn Quadrangle. Additionally, the report notes three sinkholes, Redland Tri-Sinks (Basin 37, 38 and 39), in the area on and adjacent to the subject property. (Attachment 2).

Professional Geologists employed by the San Antonio Water System and Frost GeoSciences investigated the aforementioned discrepancy between cave locations. While transects of the subject property did not identify any surface expression of a cave, it was noted that a large sinkhole is partially located in the northwest portion of the property. In addition, the surrounding property exhibits fairly subdued topography.

The proposed location for Council Cave within the Bulverde Quadrangle was also examined. This location possesses a large trash pile within the floodplain of Cibolo Creek. Also a depression was observed on the property in the proposed location of the cave. The evidence for this being a sinkhole was inconclusive. In addition, no evidence of the nearby business, noted in the 1989 Veni report, was observed. The topography of this site was well defined by Cibolo Creek. No cave entrance was noted. Soils in the area did not appear to have been disturbed.

George Veni, author of the previously mentioned reports, stated that he could not divulge a caves location without following procedure required by the Texas Speleological Survey. The Texas Speleological Survey has been contacted to obtain the location of the cave. As of this time no reply has been received. San Antonio U.S.G.S. staff produced a topographic map with a location for Council Cave that is north of the subject property in the Longhorn Quadrangle (Attachment 3).

Available data indicates that Council Cave is located north of, and not adjacent to, the property. It is possible that during construction and excavation other features may be exposed. All procedures currently in place, with regards to reporting of karst features, should be observed.

4. Water Pollution Abatement Plan (WPAP):

   As of the date of this report a Water Pollution Abatement Plan has not been submitted to the Texas Commission on Environmental Quality (TCEQ). A WPAP will be required to be submitted to and approved by the TCEQ prior to construction.

ENVIRONMENTAL CONCERNS

The environmental concerns associated with this commercial development being constructed on the Edwards Aquifer Recharge Zone are:

1. Standard Pollution/Abatement Concerns:

   A. The improper use of pesticides, herbicides, or fertilizers needed for landscape maintenance that may be carried off in the first flush of stormwater run-off.

   B. The build-up of hydrocarbons and other pollutants on streets, parking lots and other paved areas that are then carried off in the first flush of stormwater run-off.

ENVIRONMENTAL RECOMMENDATIONS

The following recommendations address the environmental concerns raised by the construction of this commercial development on the Edwards Aquifer Recharge Zone:

1. The applicant shall notify the Construction Compliance Section of the Resource Compliance Division of SAWS at (210) 704-1158 no later than 48 hours prior to the commencement of construction at the site.

2. All persons leasing a storage building or facility shall be informed, in the lease agreement, that storage of chemicals and\or hazardous materials is not permitted. Staff from the Aquifer Protection and Evaluation Section of SAWS reserves the right to randomly inspect, without notice, any or all facilities to ensure compliance.

3. The owner or agent shall provide a copy of the standard lease agreement to the Aquifer Protection and Evaluation Section of the San Antonio Water System for their approval.

4. Prior to the release of building permits, two borings must be drilled to determine subsurface conditions. The Resource Protection Division of SAWS must approve the location of the borings.

5. If any significant geologic features such as, but not limited to, solution openings, caves, sinkholes, or wells are found during the excavation, construction, or blasting, the developer shall notify the Texas Commission on Environmental Quality at (210) 490-3096 and the Resource Protection Division of the San Antonio Water System at (210) 704-7305.

6. All Category 2 properties must be developed in accordance with all provisions stated in the Aquifer Protection Ordinance No. 81491. These provisions include restrictions on impervious cover, restrictions on the sealing of sensitive features and development restrictions in floodplains and floodplain buffer zones.

7. Prior to the release of any building permits the owner/operator of any Category 2 property shall submit an Aquifer Protection Plan to the Resource Protection Division of the San Antonio Water System.

8. All stormwater run-off from the development shall be directed to a stormwater abatement system that shall be approved by the Aquifer Protection & Evaluation Division of the San Antonio Water System prior to the release of any building permits.

9. After the water pollution abatement structure construction is complete and prior to the start of business, the owner shall notify the Resource Protection & Compliance Department at (210) 704-7392 to schedule a site inspection.

10. All water pollution abatement structures shall be properly maintained and kept free of trash and debris.

11. If a water quality basin is constructed on the property, the following is required:

    A. Prior to the start of the basin construction, the owner will notify the Aquifer Protection and Evaluation Section of SAWS at (210) 704-7305 to schedule a site inspection.

    B. After basin construction is complete and prior to the start of business, the owner will notify the SAWS Aquifer Protection and Evaluation Section at (210) 704-7305 to schedule a site inspection. Additionally, we recommend a maintenance plan and schedule be developed and submitted to SAWS Aquifer Protection and Evaluation Section.

    C. If the basin fails to drain properly, the owner will notify the Construction Section of the Resource Compliance Division at (210) 704-1158 prior to any discharge of water.

    D. If at any time the ownership of the property changes, the seller must inform the buyer of all requirements for maintenance of the Basin. A signed basin maintenance plan and schedule agreement, from the new owner, must be submitted to the Resource Protection Division of SAWS.

12. The land uses within the commercial zoned areas shall be in conformance with the table of permitted uses at the time the re-zoning is approved. Should a proposed use be listed as requiring City Council approval, the owner/operator shall apply for re-zoning for that particular use at that site. If the land use is listed as special use, a special permit must be obtained for that use. If the land use is listed as prohibited, that land use will not be permitted on that site.

13. Prior to the release of any building permits, the following shall be submitted to the SAWS Aquifer Protection & Evaluation Section of the Resource Protection Division:

    A. A copy of the Water Pollution Abatement Plan (WPAP) shall be submitted for each particular development/use within the area being considered for re-zoning,

    B. A set of site specific plans which must have a signed Engineers Seal from the State of Texas,

    C. A WPAP approval letter from the Texas Commission on Environmental Quality (TCEQ),

    D. A copy of the approved Water Pollution Abatement Plan.

14. The storage, handling, use and disposal of all over the counter hazardous materials within this development shall be consistent with the labeling of those materials. Failure to comply with the label warnings may constitute a violation of Federal law.

15. Landscaped areas shall be sensitive to minimizing water needs (i.e. use of native plants). The owner/operator of this development and each purchaser or occupant of an individual lot within this development shall be informed in writing about Best Management Practices (BMP) of pesticide and fertilizer application. Preventing Groundwater Pollution, A Practical Guide to Pest Control, available from the Edwards Aquifer Authority (210/222-2204), or equivalent information produced by recognized authorities such as the Natural Resource Conservation Service, Texas Department of Agriculture, U.S. Department of Agriculture, etc. shall be used.

16. The City of San Antonio shall inspect all future construction of the sewage collection system to include service laterals and sewer mains for proper construction according to State and City Regulations and Code.

17. The Resource Protection Division staff shall have the authority to inspect the site to ensure that the approved recommendations are being strictly adhered to during and after construction of the project.

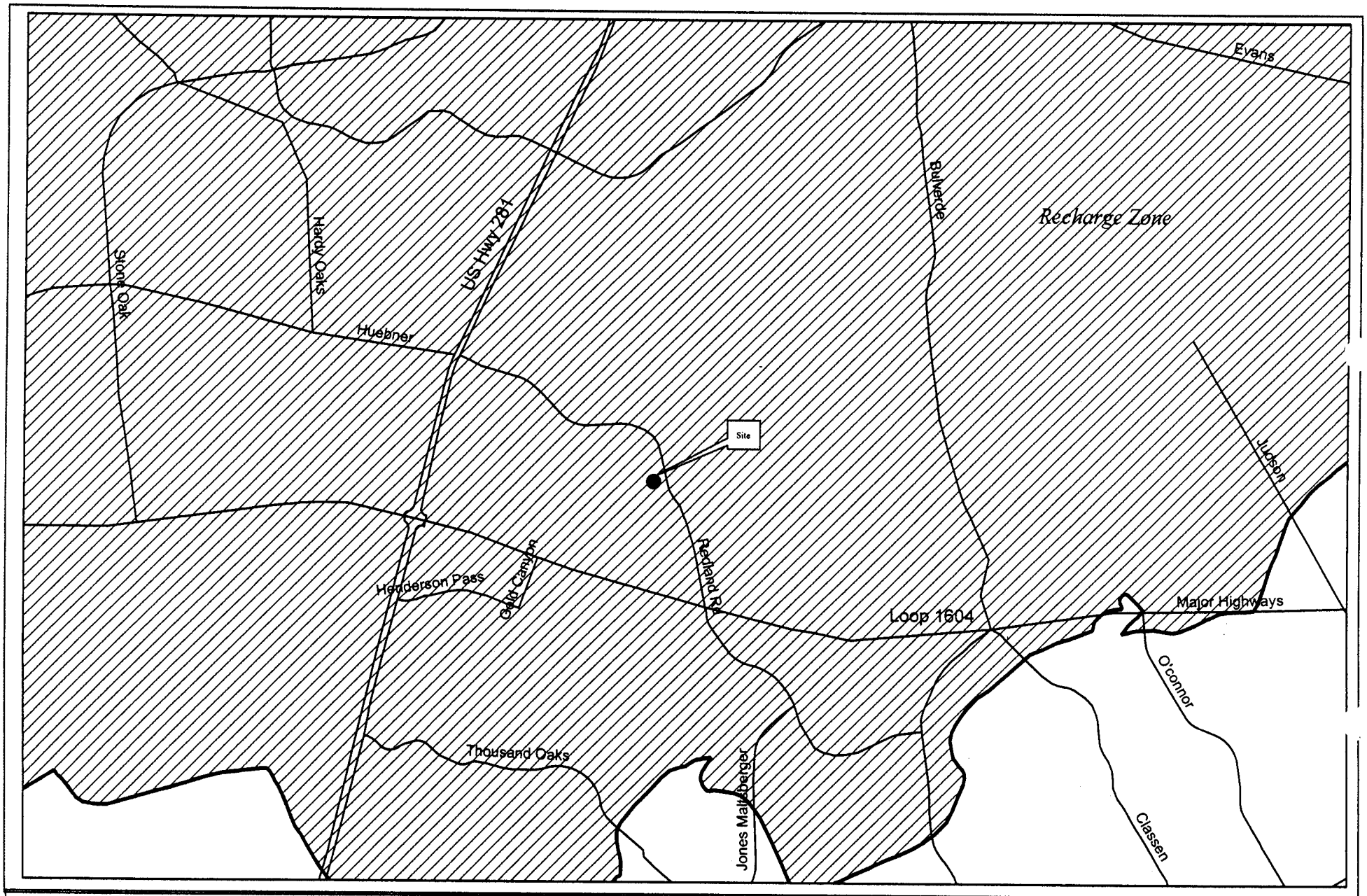
Based on the site evaluation of the property, and the information submitted by the applicant, staff recommends approval provided that the applicant agrees to abide by all recommendations contained in this document.

Kirk M. Nixon
Manager
Resource Protection Division

APPROVED:

Scott R. Halty
Director,
Resource Protection & Compliance Department

KMN:KJS



Zoning Case Z2004265 **Figure 1**

4 acre Office\Warehouse

Map Page 517 E2

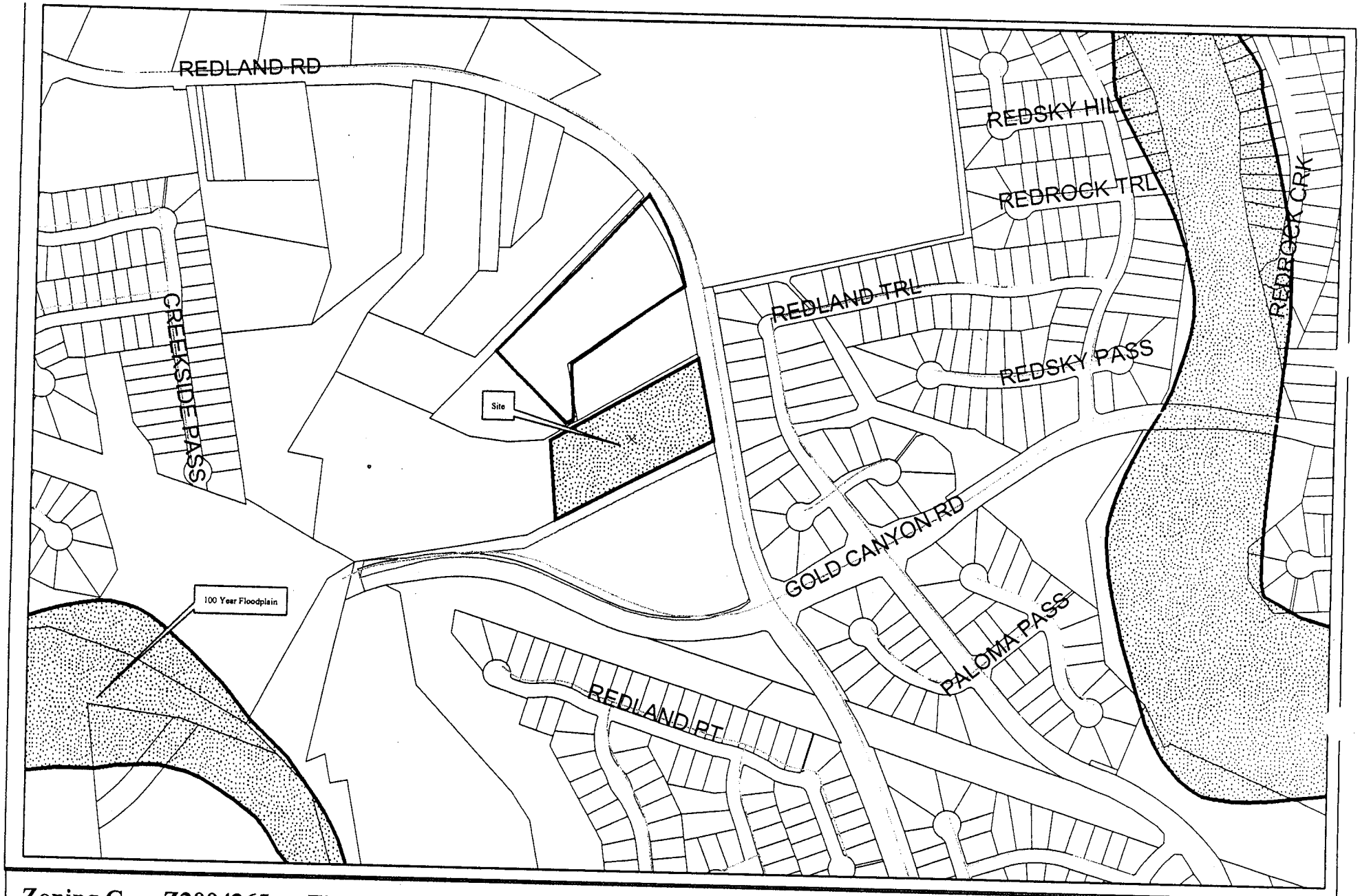
X =2143792 Y=13771216

Map Prepared by Aquifer Protection and Evaluation KJS 11/12/2004

N

0 0.3 0.6 1.2 1.8 2.4 Miles

1:44,569



Zoning Case Z2004265 **Figure 2**

4 acre Office\Warehouse

Map Page 517 E2

X =2143792 Y=13771216

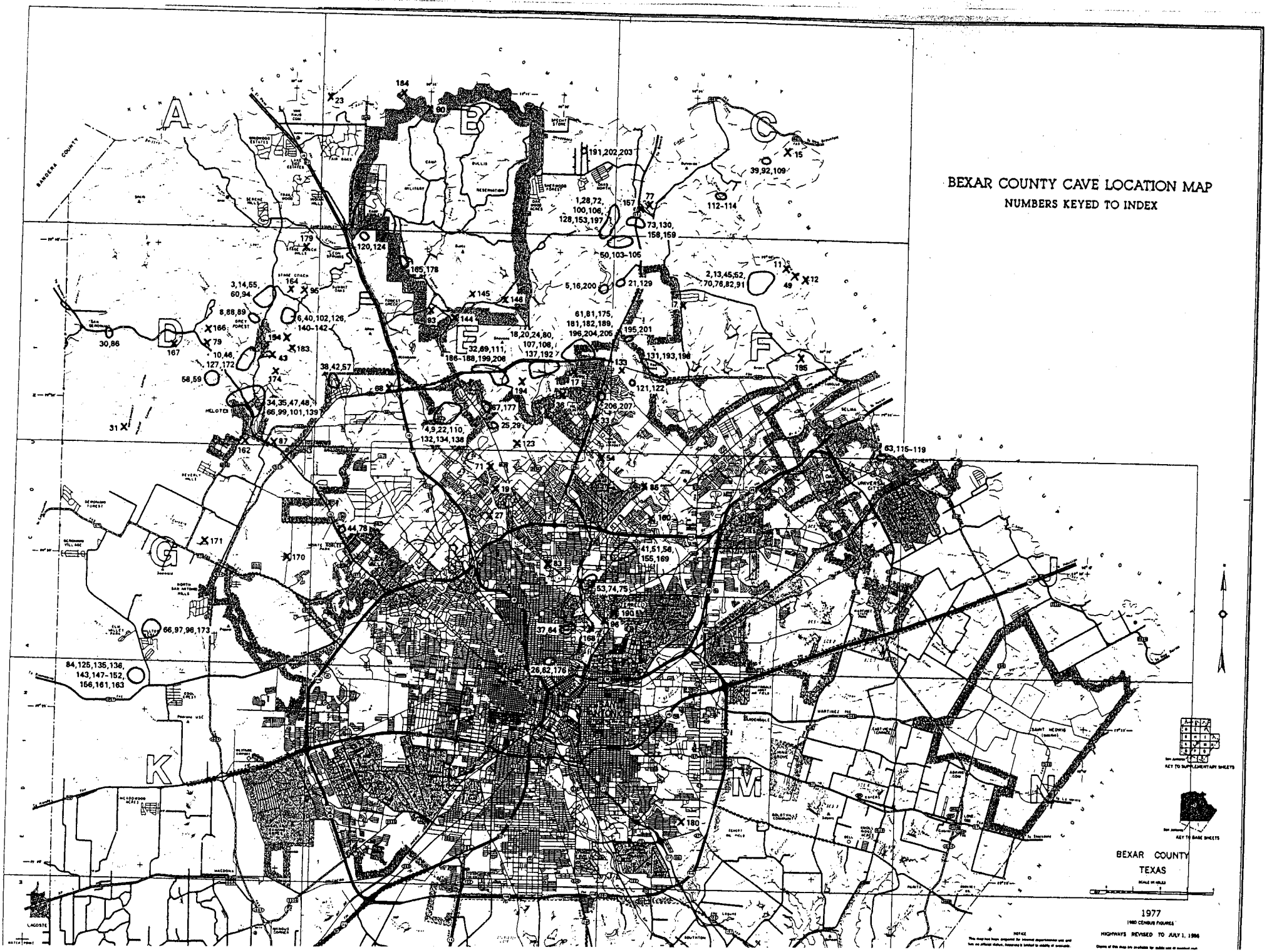
Map Prepared by Aquifer Protection and Evaluation KJS 11/12/2004

N

0 215 430 860 1,290 1,720 Feet

1:5,694

Attachment 1


BEXAR COUNTY CAVE LOCATION MAP
NUMBERS KEYED TO INDEX
A
B
C
D
E
F
G
K
M
N
BANDERA COUNTY
SAN ANTONIO
1,28,72, 100,106, 128,153,197
191,202,203
39,92,109
112-114
73,130, 158,159
50,103-106
2,13,45,52, 70,78,82,91
3,14,55, 60,94
8,88,89
6,40,102,126, 140-142
30,86
10,46, 127,172
58,59
34,35,47,48, 65,99,101,139
38,42,57
4,9,22,110, 132,134,138
18,20,24,80, 107,108, 137,192
32,69,111, 186-188,199,208
61,81,175 181,182,189, 196,204,205
195,201
131,193,196
121,122
206,207
63,115-119
41,51,56 155,169
53,74,75
37,84
26,62,176
66,97,98,173
84,125,135,136, 143,147-152, 156,161,163
KEY TO SUPPLEMENTARY SHEETS
KEY TO BASE SHEETS
BEXAR COUNTY
TEXAS
1977
1980 CENSUS FIGURES
HIGHWAYS REVISED TO JULY 1, 1986
NOTICE

In the western part of the cave, along the route from the entrance to the watercrawl, NE-SW joints guide passage development. This area has been developed and modified by aggressive stormwater runoff entering through the large sink. In sharp contrast, the middle and eastern portion of the cave has developed from the confluence of many small groundwater courses. These mud-floored passages and rooms are probably older than the western portion of the cave. They are developed along northwest-southeast fractures which probably predate the northeast-southwest fractures of the Balcones fault system. The western portion of the cave was probably a minor infeeder to the local base level to which the eastern portion of the cave drained. The western passages were later enlarged and modified by vadose water, while the enlarging entrance sink pirated water from the older eastern passages. Corkscrew Cave is developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer. It is one of the few caves in Bexar County that provides human access to the local water table. In this case the water level averages 21 m below the floor of nearby Cibolo Creek (a major stream valley which is usually dry because it loses its water as recharge into the Edwards Aquifer). No research has determined if the recharge water from the cave is maintained in conduit flow or if it disperses into small fractures when under phreatic conditions. Based on the low success rate of drilling productive water wells in that region, the assumption that recharge in the Corkscrew Cave area enters and maintins itself as conduit flow is not unreasonable. The consequences of such a flow regime should be carefully weighed in considering problems of water quality for the regional groundwater supply.

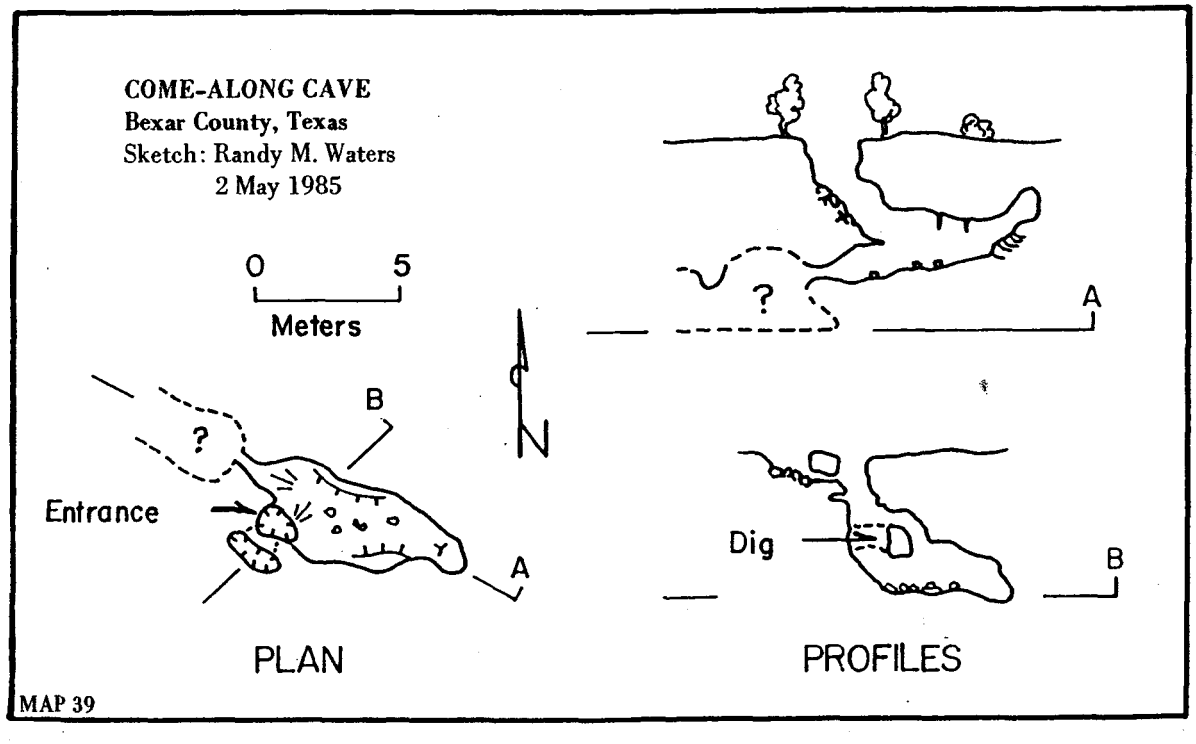
Technique: A 20 m rope or cable ladder is needed for the entrance pits, and another 15 m of rope or ladder is needed for the 9.1 m drop into the 10.7 m high room. Much of the cave is muddy, wet, and offers a fine variety of walking, crawling, and climbing experiences. No one has attempted to push the watercrawl with diving gear. Because of the sump's small dimensions and the overabundance of mud, a dive would probably not be fruitful.

Bibliography: Anonymous (1963c:16; 1965b:102; 1965c:122; 1966a:162; 1966c:127; 1967b:75-76; 1968d:147-148; 1968f:85; 1969a:25; 1973d:4; 1973q:11); Druding (1966:162); Fleming (1973b: 223; 1975:14); Litsinger (1973a:18-19); Miller (1975:25); O'Neill (1973b:158); Owens (1966:10; 1967:14); Passmore (1977:17); Pate (n.d.:32); Reddell (1961b:1); Reddell and Knox (1962:3-4, 11); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Streng (1974:58); Teates (n.d.:38); Veni (1978a:5; 1978e:4; 1978f:6; 1985).

COUNCIL CAVE (BCS #131)

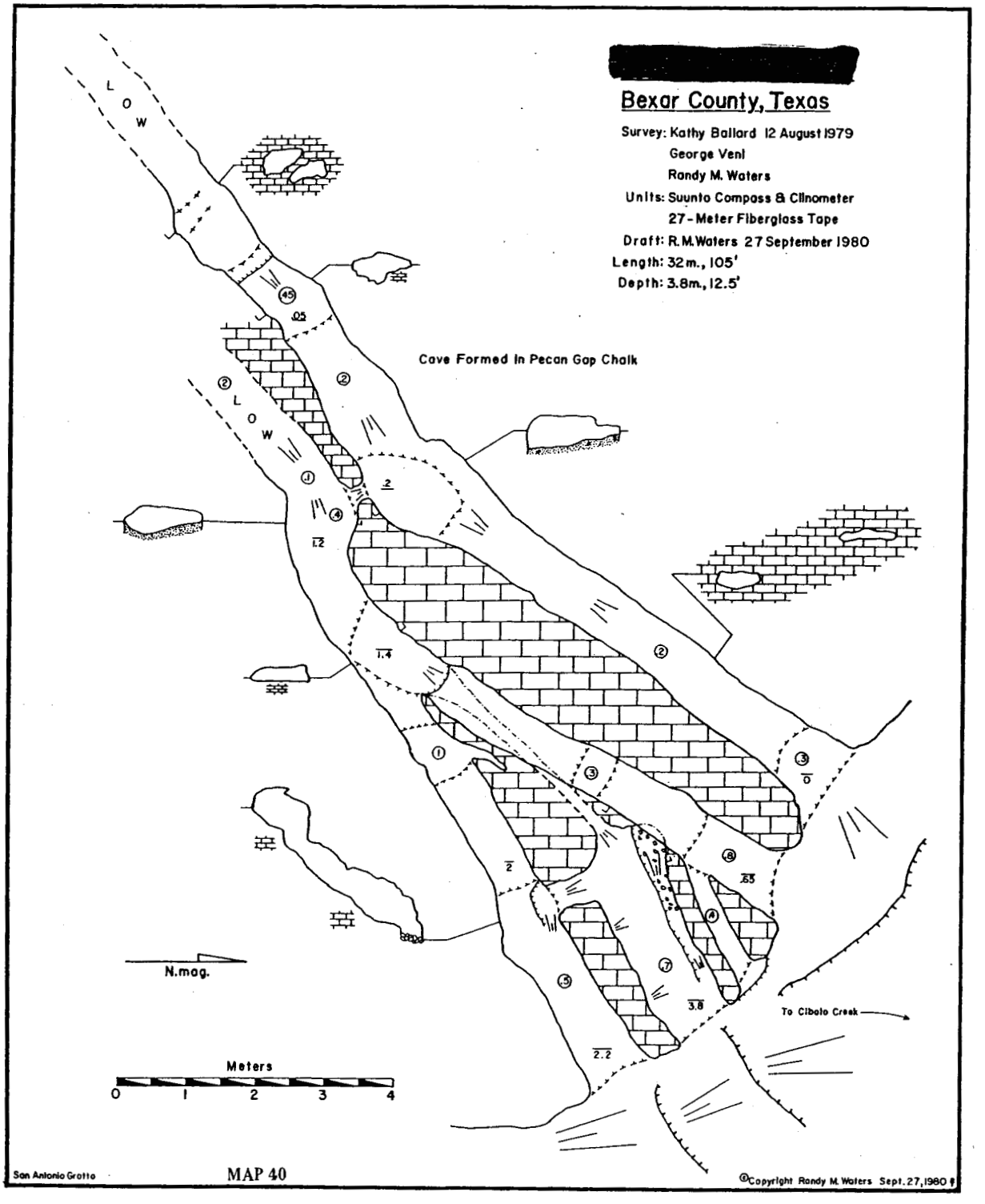
Location: Bulverde 7.5' (508, 285)

Description: The 5 m diameter trash-filled entrance sinkhole of Council Cave has been completely filled



with dirt and rocks. A small hole in the now-covered trash pile led into the cave. The wall indicated on the sketch map, separating the small entrance area from the "Council Chamber" (a half-moon-shaped room approximately 11 m long, 4 m wide, and 0.3 to 1.5 m high), was actually trash. Along the west wall of the Council Chamber was an adjoining small room, 4 m by 2.5 m by 1.5 m high. (See Map 42.)

History: It is not known who used the sinkhole as a trash dump. Land developers found the cave in late 1979 and excavated enough trash to gain access. Chuck Stuehm received permission to explore and



made the only known exploration on 2 December 1979 with Dottie and Teeni Kern, Gary A. Poole, George Veni, and Randy M. Waters. The comfortable soft dirt floor seated a discussion of speleo-politics which inspired the cave's name.

Biology: Spiders, cave crickets (*Ceuthophilus* sp.), and beetles were observed.

Geology: The west wall of the small room, off the Council Chamber, is a recemented paleo-breccia whose collapse is not evident on the surface. As a one-time uncontrolled refuse dump in a sinkhole of the Edwards (Balcones Fault Zone) Aquifer recharge zone, Council Cave represents a potential source of contamination for the regional groundwater supply. A drainage pipe to the subsurface maintains some access to the cave for stormwater runoff collected from the roof and grounds of a nearby business.

Bibliography: Veni (1985).

CRANE BAT CAVE (BCS #14)

Alternate name: Crane's Cave

Location: Van Raub 7.5′ (049, 228)

Description: A 2.5 m deep elongate sink leads into a room 22 m long, 1 to 5 m high, and 5 to 7 m wide. Crawlways extend into the breakdown- and guano-covered floor but do not lead into any true solution passages. At the west end of the room is an opening to a second smaller room 8 m long, 3 m wide, and 1.6 m high. It is rumored that in early 1977 this area suffered some collapse, the extent of which is not known. Five meters from the entrance is a skylight that is too small to enter. Some small speleothems are present in the cave. (See Map 43.)

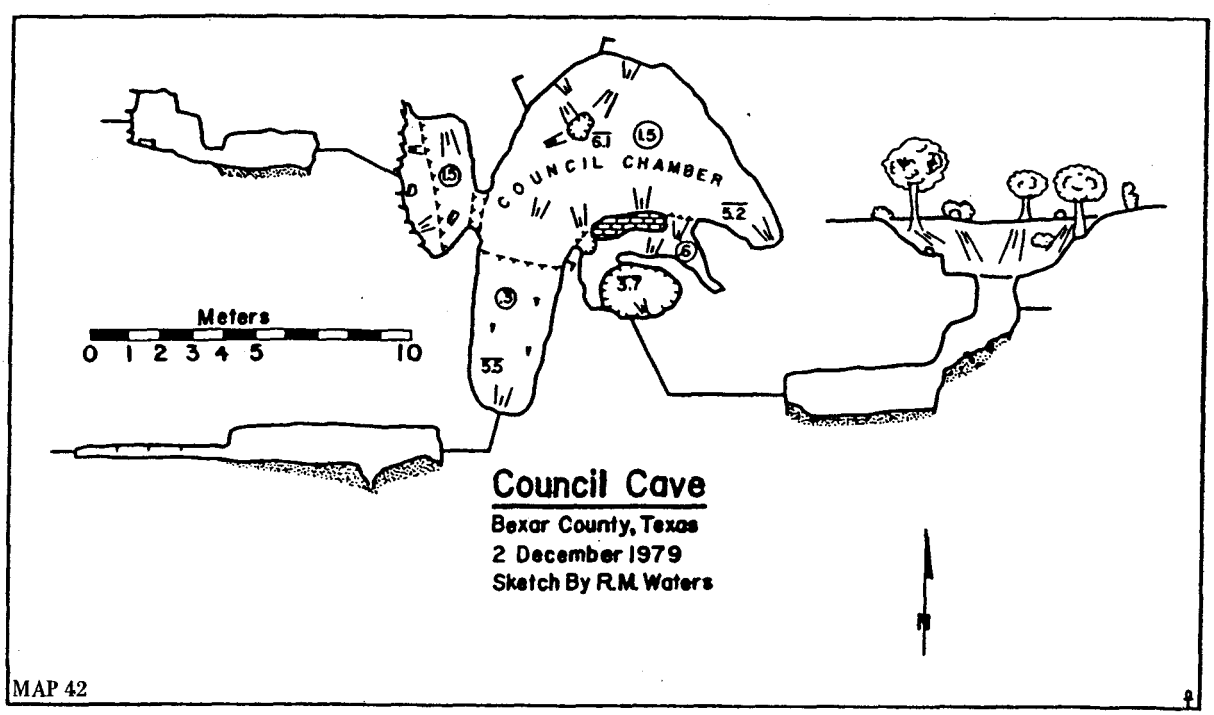
History: Carl Crane made the first reported entry into the cave in 1919. In later years, Greg Crane also explored the cave. Not until about 1960 did cavers first visit the cave when St. Mary's University Speleological Society took the Jefferson High School Science Club (San Antonio) to the cave. On 22 November 1964 the cave was surveyed by James Jasek, Dick Scherrer, and Ron Winfrey. A resurvey took place in 1982 by Duane Canny, Steve Gutting, and other members of the Alamo Chapter of the National Speleological Society, but a new map has not yet been drafted.

Biology: The small bat population inhabiting the cave is probably *Myotis velifer incautus*. Other observed fauna includes spiders, harvestmen (prob. *Leiobunum townsendii*), and cave crickets (*Ceuthophilus* sp.).

Geology: Located on a hilltop, the cave is developed along a predominant east-west joint trend in the upper Glen Rose Formation.

Technique: Caution should be observed in the area of potentially unstable breakdown.

Bibliography: Anonymous (1969a:25; 1973j:9; 1973q:11); Austin (1977:12); Passmore (1975c:28); Reddell (1961b:1); Reddell and Knox (1962:3-4, 12); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Veni (1978a:5; 1983:98).



MAP 42

Attachment 2

Zoning Case Z2004265
Veni's Feature Map (Longhorn Quad)
Map Page 517 E2
X=2143792 Y=13771216
Map Prepared by Aquifer Protection and Evaluation KJS 12/1/2004

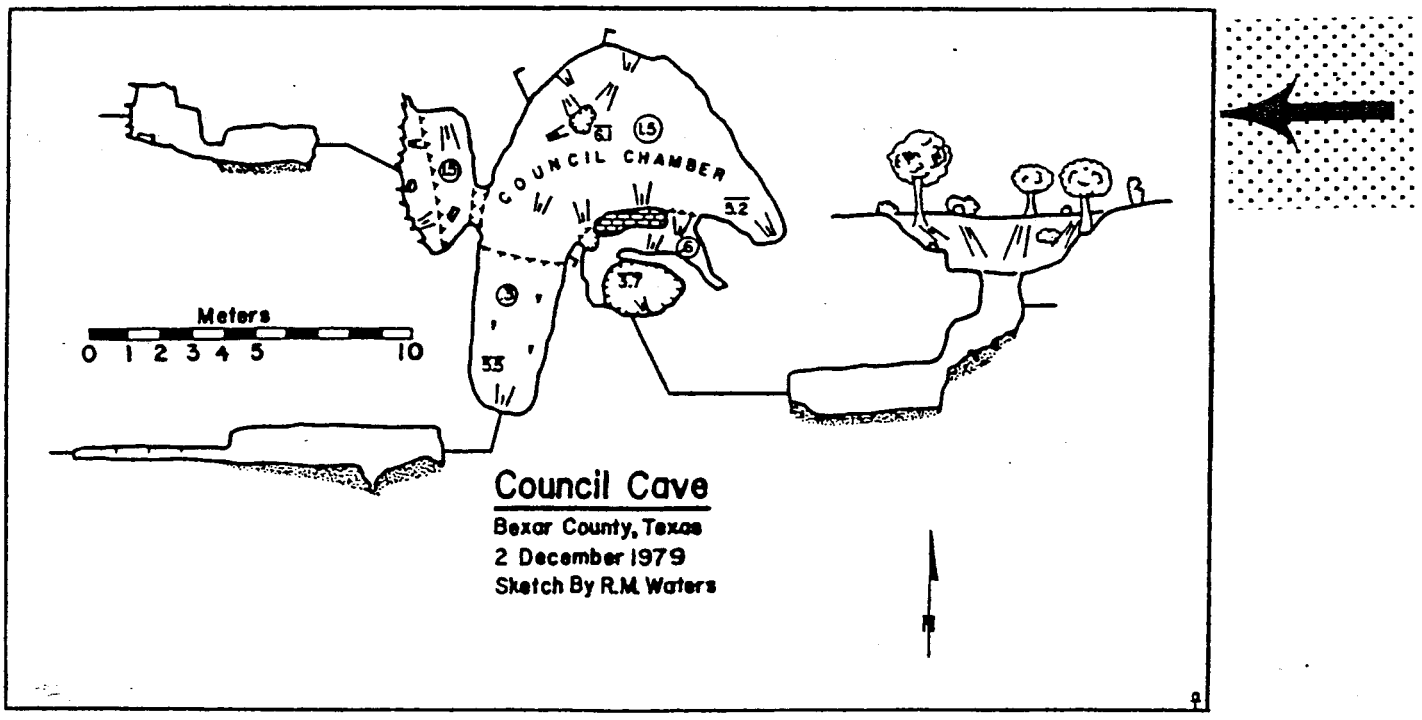
9. Council Cave

Location: Longhorn 7.5' USGS Quadrangle

Description: A 5 m diameter by estimated 2 m deep trash filled sinkhole served as the cave's entrance. Access through the refuse led into a semicircular chamber, concentric to the sinkhole, that was 11 m long, 4 m wide and up to 1.5 m high. Other portions of the cave were undoubtably blocked off by the trash. By 1985 the sinkhole had been filled in and leveled with dirt.

Hydrogeology: Only a small portion of the cave was accessible for study. The portion examined did not appear to serve as a significant recharge site to the Edwards Aquifer. The sinkhole's drainage area, however, may be large enough to classify the site as significant. Precise topographic surveying is needed, of the low gradient terrain surrounding the sinkhole, to support or refute the estimate below.

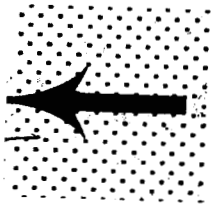
Recharge: The cave's estimated drainage area is 89,196 sq m (22.04 acres). Its annual recharge, based on that estimate would be 2.30 acre-feet. Part of the cave's drainage includes runoff from a nearby business that is channeled into a pipe leading into the sinkhole.



36-38. Redland Tri-Sinks #1-3

Location: Longhorn 7.5' USGS Quadrangle

Description: Three sinkholes are situated close together near Redland Road. The largest sinkhole (Redland Tri-Sink #1) is 250 m long by 150 m wide, the second largest sinkhole (Redland Tri-Sink #2) is about 150 m in diameter, and the third sinkhole (Redland Tri-Sink #3) is about 60 m in diameter. None of them are more than 3 m deep. The two largest sinkholes serve seasonally as ponds.



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Hydrogeology: The sinkholes formed as recharge sites to the Edwards Aquifer. The ponds in the larger sinkholes could be either directly man-made or a result of livestock trampling the soil and greatly diminishing its permeability.

Recharge: The three sinkholes, largest to smallest, drain areas of 63,174 sq m (15.61 acres), 170,581 sq m (42.15 acres) and 38,285 sq m (9.46 acres). Their respective annual recharge is 1.63 acre-feet, 4.39 acre-feet and 0.99 acre-feet.

Attachment 3

Rec'd 7/201

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