MAJOR SITE DEVELOPMENT ISSUES REQUIRING GOVERNMENTAL/AGENCY VARIANCES & APPROVALS

MAJOR SITE DEVELOPMENT RELATED ISSUES REQUIRING GOVERNMENTAL/AGENCY VARIANCES & APPROVALS

United States Environmental Protection Agency
- Pollution Prevention Plan
- Endangered Species Habitat

United States Department of the Interior
- Fish and Wildlife Service

State of Texas-

Texas Natural Resources Conservation Commission
- Wastewater Treatment Plant
- Water Distribution and Treatment
- Well Permit

Texas Department of Transportation
- Lights and Signals at Bee Caves Rd.

Texas Historical Commission
- Clearance

Texas Education Agency
- Independent Code Compliance Review

Texas Health Department
- Water System Review

Texas Parks and Wild Life
- Endangered Species

City of Austin-

Department of Planning and Development

Site Plan Approval
- Water Quality Control
- Stormwater Management
- Tree and Natural Area Preservation
- Impervious Cover Limitation

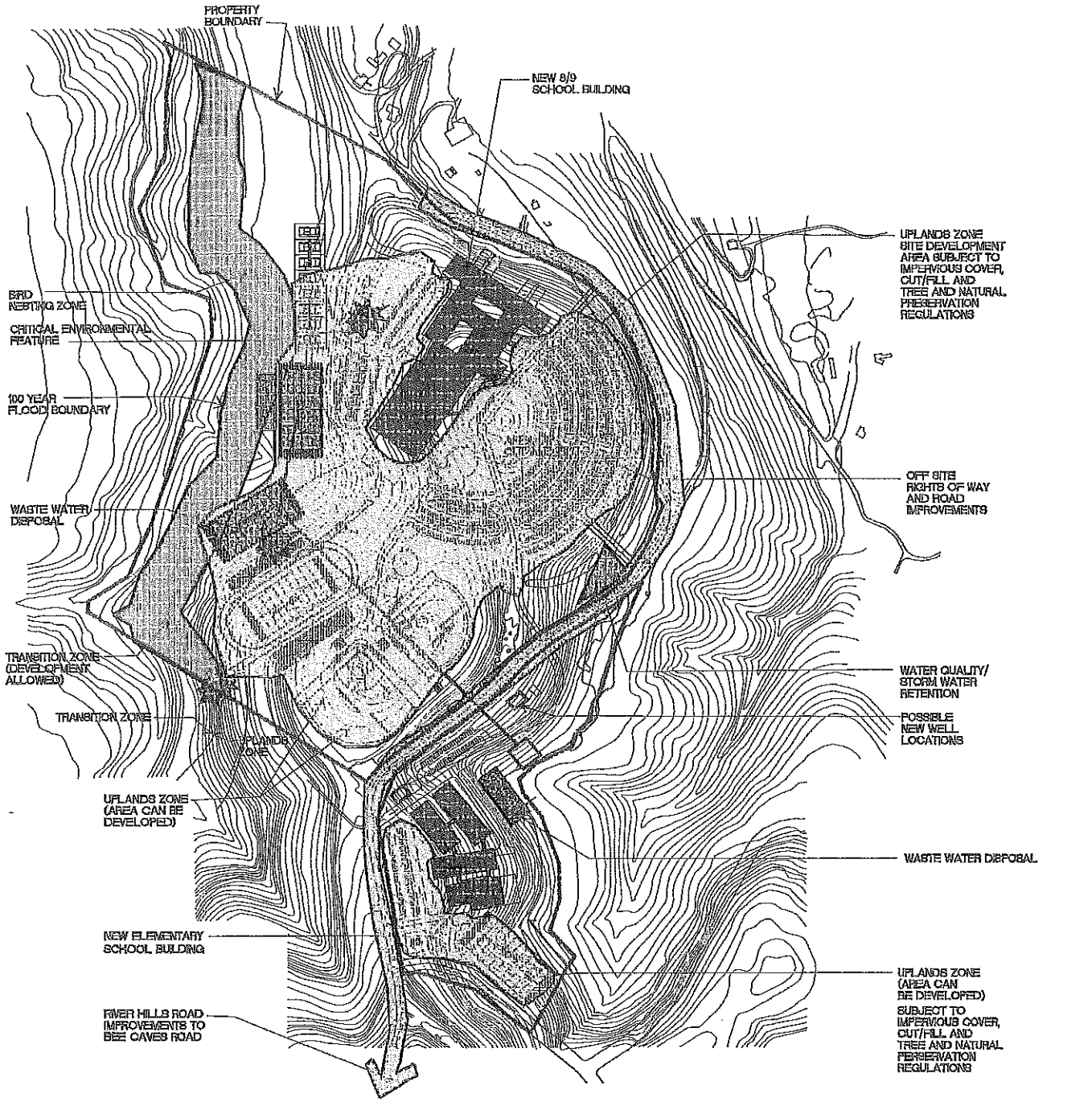
Variances-
- Cut and Fill
- Critical Environmental Features

Travis County
- River Hills Road Improvements
- Storm Water Piping in ROW
- Utility Crossing of ROW
- Signal Improvements

Austin-Travis county Health Dept.

Treatment and Disposal System

Recycle System



500 0 250 500 1000

(IN FEET)
1 inch = 500 ft.

MAJOR SITE DEVELOPMENT ISSUES REQUIRING GOVERNMENTAL AGENCY VARIANCES AND APPROVALS

MAJOR SITE DEVELOPMENT ISSUES:	GOVERNMENTAL ENTITY
SITE DEVELOPMENT REGULATIONS	CITY OF AUSTIN
AREA OF IMPERVIOUS COVER	CITY OF AUSTIN
CUT AND FILL LIMITATIONS	CITY OF AUSTIN
TREE AND NATURAL PRESERVATION REGULATIONS	CITY OF AUSTIN
ENDANGERED SPECIES	TEXAS PARKS AND WILDLIFE/EPA, USF-WL
CRITICAL ENVIRONMENTAL FEATURES	CITY OF AUSTIN
STORM WATER RETENTION	TEXAS NATURAL RESOURCE CONSERVATION COMMISSION (TNRCC)
WASTE WATER DISPOSAL	CITY OF AUSTIN/TRAVIS COUNTY HEALTH DEPT.
NEW WELLS FOR POTABLE WATER	CITY OF AUSTIN/EPA
RIVER HILL ROAD REDEVELOPMENT AND SIGNALS AT BEE CAVES ROAD	TRAVIS COUNTY, TEXAS DEPT. OF HIGHWAYS AND PUBLIC TRANSPORTATION
BUILDING CODE REGULATIONS	UNIFORM BUILDING CODE (LATEST EDITION) TEA AND TEXAS DEPT. OF LICENSING AND REGULATION
ANTIQUITIES SURVEY	TEXAS HISTORIC COMMISSION

MAJOR SITE DEVELOPMENT ISSUES REQUIRING OUTSIDE AGENCY VARIANCES AND APPROVAL

PFLUGER ASSOCIATES
ARCHITECTS/PLANNING CONSULTANTS
COLORADO CROSSING AUSTIN, TEXAS 78704
213 SOUTH LAMAR 512 / 476-4040

MARTINEZ & WRIGHT ENGINEERS, INC.
TWIN TOWERS 1106 CLAYTON LANE SUITE 400 W AUSTIN, TEXAS 78723

EXHIBIT 12.1 | SCALE: 1"=500' | DATE 12/11/95

ESTIMATE OF SITE DEVELOPMENT COSTS

ESTIMATE OF SITE DEVELOPMENT COSTS

Original Bond Site Development Budget		Cost/ Sq. Ft.	Tract II River Hills Road Site Development Budget for 8/9 School (1,500 Student Facility)			Cost/ Sq. Ft.	Tract II Expand to 2,000 Student Facility	Tract I Develop 850 Student Elementary School Site
1. Parking & Drives	$ 180,000	$ 0.80	1. Paving		$ 369,224	$ 1.65	$ 307,590	$ 241,222
2. Utility Development	$ 1,000,000	$ 4.47	2. Utility Development		$ 1,591,460	$ 7.11		
			a. Water	$ 752,300			$ -	$ 59,700
			b. Waste Water	$ 683,980			$ 40,000	$ 15,480
			c. Electric	$ 155,180			$ 97,330	$ 48,200
3. Site DevelopmentAllowance $1,230,702	$ 1,849,522	$ 8.27	3. Site Development		$ 2,510,556	$ 11.22		
Rock Excavation Allowance 618,820			a. Sitework	$ 1,359,000			$ 94,500	$ 103,000
			b. Storm Drainage	$ 128,080			$ 20,550	$ 75,690
			c. Athletic Fields	$ 562,000			$ 793,000	$ 100,000
			d. Misc. Construction	$ 461,476			$ 185,797	$ 88,829
4. On-Site Development Budget	$ 3,029,522	$ 13.54	4. On-Site Development Budget		$ 4,471,240	$ 19.98	$ 1,538,767	$ 732,121
5. Off-Site Development Budget	0.00		5. Off-Site Development Budget		$ 1,176,100	$ 5.25		
			Taylor Road Improvements	$ 142,200				
			River Hills Road Improvements (adjacent site)	$ 211,900				
			River Hills Road Improvements Beyond Site	$ 822,000				
TOTAL PROBABLE ON AND OFF SITE DEVELOPMENT COSTS	$ 3,029,522	$ 13.54			$ 5,647,340	$ 25.23	$ 1,538,767	$ 732,121

NOTES:

1. Costs per square foot are based on a 223,764 sq. ft. facility.
2. River Hills Road site improvements "beyond the site" are subject to negotiations with Travis County. County could possibly pay for part or all of these costs.

SUMMARY AND RECOMMENDATIONS

SUMMARY AND RECOMMENDATIONS

1. SUMMARY:

our opinion Yes

However

Significant Number of Variances Time Consum. & costly.

Can the site be developed as a 1500 student 8/9 school and provide for future expansion to a 2000-student facility?
It is our opinion that the River Hills Road Property could be developed as a new 1500-student 8/9 school and provide the necessary space for a future 2000-student facility; however, a significant number of governmental site development variances and approvals would be required. Approvals will be expensive and time consuming; consequently, there is risk that all or part of the required variances might be denied.

Play fields and parking Represent A Significant challenge cut & Fill & Imp. Cov.

Play fields and future expansion of parking requirements present a significant challange with respect to meeting current design regulations regarding cut & fill (grading) and impervious cover development limitations. Every effort would be required during the design phase to minimize adverse site impact.

Access River Hill Rd.

It is likely that River Hills Road will require improvements prior to the site being developed for school use. A traffic signaling system should be reviewed for the intersection of River Hills Road and Bee Caves Road.

Costs associated with the development will be significantly higher because of the site's geology and topography. The site also lacks existing basic utility service.

Utilities Develop Both tracts

With respect to providing well water, and processing/disposing of wastewater, it would be in the district's economic interest to at least plan for the development of both tracts of land simultaneously. The

development plan shown in this feasibility report locates a discharge location (drip irrigation system) for a elementary school site on the 8/9 school site. Likewise, location of new potable water wells would be located on the elementary school site and serve both school tracts.

sm. tract
Elem. sch

Can the smaller site be developed as an elementary school ?
The smaller tract of land east of River Hills Road can be developed into an 850-elementary school site, however it will be subject to the same development regulations, limitations and approvals as noted for the 8/9 school.

Can the smaller site be developed as a district warehouse facility?
Yes! Subject to existing regulatory site development limitations.

Can the smaller site be developed as a Bus Depot facility?
Yes! Subject to existing regulatory site development limitations.

RECOMMENDATIONS:

Although it is possible to develop the +/- 86-acre tract of land on River Hills Road into a 1500-student 8/9 school with future expansion capabilities, the cost and time required to acquire regulatory variance approvals is anticipated to be significant.

Although the site has many excellent features, there are some aspects about the site that make it less desirable for the proposed site use:

1. Site access on River Hills Road (although it loops back around to Cuernavaca to re-enter Bee Caves Road) is for all practical purposes limited to one direction on a narrow single road.
2. Secondary schools require large play field and parking areas. The

development of these areas will significantly impact the existing site and require variances and approvals from regulatory governmental agencies.

RECOMMENDATIONS:

1. If the district chooses to move forward with development of the River Hills Road property as an 8/9 school, it will require a complex governmental approval process that has risks. This process could affect the district's ability to develop all of the desired site and building program requirements. Development costs could be adversely affected, HOWEVER:

2. If another site can be found within the district that is in a good location, has better access, is not subject to all of the development regulations placed on this site, has good soils conditions and a reasonable topographic profile, the district should consider developing this newly found site as its 1500-student 8/9 school site with plans for future expansion to accommodate 2000 students.

3. The River Hills Road Property could be reserved for use for future Middle School / Elementary School Facilities

SUMMARY OF FINDINGS RELATING TO CRITICAL SITE EVALUATION CRITERIA FOR THE DEVELOPMENT OF A NEW 8/9 SCHOOL & FUTURE HIGH SCHOOL

IS SITE DEVELOPMENT FEASIBLE?

A. CIVIL ENGINEERING FACTORS:	YES	NO	MAYBE	OUTSIDE VARIANCES & APPROVALS REQUIRED
1. Ownership (Title Issues)	X	-	-	
2. Rights of Way Issues	-	-	X	Travis County for River Hills Road
3. Off Site Road Access	-	-	X	Travis County Review / Upgrade Costs
4. Developable Area (Size?)	-	-	X	COA Planning Commission Issues & Required Variances: * Impervious Cover * Cut / Fill (Grading) * WW Discharge
5. Development Setbacks	X	-	-	
6. On Site Access	X	-	-	
7. Fire Protection	X	-	-	
8. Water District Potable Water	-	-	X	Water District Agreements
9. Water Well Potable Water	X	-	-	TNRCC
10. Waste Water Disposal System	-	-	X	TNRCC
11. Electrical Power	X	-	-	
12. Propane	X	-	-	Natural Gas is not available
13. Telephone / Communication Systems	X	-	-	

IS SITE DEVELOPMENT FEASIBLE ?

B. ENVIRONMENTAL FACTORS:	YES	NO	MAYBE	OUTSIDE VARIANCES & APPROVALS REQUIRED
1. Developable Area	-	-	X	COA Planning Commission Issues & Required Variances: * Impervious Cover * Cut / Fill (Grading) * WW Discharge
2. Critical Environmental Features	-	-	X	(See B-1 Remarks)
3. Endangered Species	-	-	X	(Construction Setbacks)
4. Impervious Cover	-	-	X	(See B-1 Remarks)
5. Slope Analysis (Cut / Fill Grading)	-	-	X	(See B-1 Remarks)
6. Water Quality Retention	X	-	-	
7. Storm Water Retention	X	-	-	
8. Tree & Natural Area Preservation	X	-	-	
9. Waste Water Disposal	-	-	X	(See B-1 Remarks)
10. Landscape Requirements	X	-	-	

IS SITE DEVELOPMENT FEASIBLE?

C. EISD PROGRAM FACTORS:	YES	NO	MAYBE	OUTSIDE VARIANCES & APPROVALS REQUIRED
1. New 8/9 Center School	X	-	-	1500 w/ 2000 core
2. Exp. for 500	X	-	-	
3. Convert to HS	X	-	-	
4. Theatre Expansion	X	-	-	500 Auditorium & Black Box Theater
5. Athletic Field House	X	-	-	Included as part of the school building.
6. Future Natatorium	X	-	-	
7. Athletic Complex w/ Seat'g	-	-	X	(See B-1 Remarks) Football, Track, Baseball, Soccer & Softball. Also Concessions Facilities.
8. Tennis Courts	-	-	X	(See B-1 Remarks)
9. Practice Fields (2)	-	-	X	(See B-1 Remarks)
10. On Site Parking	-	-	X	(See B-1 Remarks)

APPENDIX ITEM NO. 1

CITY OF AUSTIN'S SITE DEVELOPMENT ASSESSMENT LETTER

DEVELOPMENT ASSESSMENT

Prepared for:
RIVER HILLS ROAD SCHOOL SITE
Eanes Independent School District

Prepared By:
RANDY GILBERT,
Environmental & Conservation Services Department
Customer Service, Development Assistance Center
City of Austin

Date: November 29, 1995

DEVELOPMENT SETBACKS - Based on the contributing drainage area of 376 acres the critical water quality zone has been established under the basis that the waterway is classified as intermediate. However the water quality transition zone has not been designated and would be required to be shown. The boundary distance of this zone would be based on the intermediate waterway classification and would extend 200 feet from the limits of the critical water quality zone.

IMPERVIOUS COVER - The Land Development Agreement between the City of Austin and Eanes Independent School District allows an imperious cover level of 65%. in the upland zone. In order to further evaluate the feasibility of this site for the proposed 8th/9th grade grade center, the net site area would need to be determined. The net site area is defined as 100% of slopes between 0 to 15%, 40% of the land area between slopes of 15% to 25%, and 20 % of all land area above 25% to 35%. This exclude all land area within the 100 year flood plain and the critical water quality zone. Perimeter roadway impervious cover calculations as per the agreement would not be required. { See

CONSTRUCTION ON SLOPES - On slopes between 15% to 25% construction would be limited to an impervious cover level of 10% utilizing terracing and revegetation techniques as outline in the City of Austins' Environmental Criteria Manual. Roadways or drives are prohibited on slopes in excess of 15% except where primary access to flatter slopes is necessary.

WATER QUALITY - As identified within the provisions of the agreement water quality controls (i.e. sedimentation/filtration ponds) shall be required for impervious cover levels which exceed 20% of the net site area. These structural controls would be required to capture , isolate, and filter the first half inch (.50) as well as one-tenth (.10) per 10% increment over 20% of impervious cover within the drainage area to the controls.

TWO-YEAR DETENTION- Development on this site would be require to provide on-site control (detention) of the two year storm event. The detention of this storm event can be incorporated within the water quality controls (i.e., sedimentation/filtration pond) if proposed as per this development.

CRITICAL ENVIRONMENTAL FEATURE - As defined by the City of Austin Land Development Code, the rimrock locations identified by the environmental asessment would be considered as Critical Environmental Features (CEF) . A 150 foot radius buffer zone would be required to be established around each feature. Construction within these areas would be prohibited. However, these buffers may be reduced administratively to 50 feet provided that the protection measures of the CEF are adequate.

TREE AND NATURAL AREA PRESERVATION - The proposed development on this site should demonstrate that the design intent has accomplished in preserving the existing natural character of the site. Special attention will be directed toward the preservation of existing trees eight (8) inches in diameter and greater to that extent that is reasonable and feasible. A tree survey would be required for submittal of all areas within the limits of construction or areas impacted due to the proposed construction activity of this development

LANDSCAPE - The intent of landscaping for the purposes of this development and as per the agreement focus on landscape measures that will provide screening of water quality ponds, parking lots and the general incorporation of trees in the designated street yard and perimeter areas. It is recommended that proposed use of plant materials be selected from the City of Austins' preferred plant list and the review of the landscape standard as illustrate within the agreement to insure proper compliance.

Randy Elliott

Reviewer's Signature - Initial Comments

11/30/95

Date:

Reviewer's Signature - Signoff

Date:

City of Austin
Founded by Congress, Republic of Texas, 1839
Municipal Building, Eighth at Colorado, P.O. Box 1088, Austin, Texas 78767 Telephone 512/499-2000

RECEIVED
DEC 11 1995
Martinez & Wright Engrs.

December 7, 1995

Mr. Michael Wright, PE
Martinez and Wright Engineers, Inc.
1106 Clayton Ln., Suite 400 W
Austin, Texas 78723

Dear Mike:

I have researched the questions you raised in our meeting yesterday regarding the Eanes School site on River Hills Road. Below are our interpretations of the requirements based on the adopted school district agreement:

Q1. Is a 40% downstream buffer required for development in this watershed?

A1. No, a 40% downstream buffer in the Uplands Zone is not required for Eanes School District projects in Water Supply Rural Watersheds.

Q2. What is the maximum allowed impervious cover for this site?

A2. Impervious cover in the Uplands Zone (as defined by the current Code) shall be that specified for commercial development under the Lake Austin Ordinance in effect prior to May 18, 1986 (assuming the site was acquired by the School District prior to May 18, 1986). Under Ordinance No. 841213-L impervious cover is limited to the following:

Slope Category	Impervious Cover
less than 15%	50%
15% to 25%	15%
25% to 35%	5%

Impervious cover in the Transition Zone shall not exceed 18% of the net site area in the zone and no impervious cover is allowed in the Critical Water Quality Zone. Construction of grass play fields is allowed in the Transition and Critical Zones ; however, such construction would limit the ability to transfer development to the Uplands portion of the site. A pesticide,

herbicide and fertilizer management plan is required for any recreational development in the Critical Zone.

Q3. Are there cut and fill limitations for driveways?

A3. Yes, all on-site drives and parking are subject to the cut and fill limits of the agreement (a maximum of 8 feet in the Uplands Zone with Michael administrative approval). Where public roadways are constructed by the School District, no cut and fill limits are imposed within the right-of-way. Please note that the agreement limits cut and fill to a maximum of 4 feet in the Transition and Critical Water Quality Zones.

Variances will be needed for cuts or fills greater than 8 feet in the Uplands Zone or 4 feet in the Transition or Critical Zone.

Please contact me at 499-2748 if you have any questions about these issues.

Sincerely,

Leslie G. Tull, PE, Deputy Environmental Officer
Environmental and Conservation Services Department

cc: Joe Calabrese
Charles Kanetzky

Transfer Table Multi-Family

Slope Category	Standard Impervious Cover Limit	Max. Impervious Cover With Transfer
Under 15% gradient	40%	50%
15-25% gradient	10%	15%
25-35% gradient	5%	5%

(c) Notwithstanding any of the foregoing, however, impervious cover allocations, limitations, restrictions or transfers imposed on land as a result of the process of subdividing the land under the City of Austin's special requirements for subdivision in the Lake Austin Watershed shall be controlling when in conflict with the provisions of this section.

Sec. 9-10-384. Commercial Development.

(a) No development of land for commercial purposes shall create impervious cover exceeding the following limitations within each slope category:

(1) Sixty-five (65) percent impervious cover on slopes under fifteen (15) percent gradient;

(2) Fifteen (15) percent impervious cover on slopes of fifteen (15) to twenty-five (25) percent gradient;

(3) Five (5) percent impervious cover on slopes of over twenty-five (25) and up to thirty-five (35) percent gradient.

(b) The transfer of allowable impervious cover from slopes in excess of fifteen (15) percent gradient to slopes under fifteen (15) percent gradient shall be permitted within individual lots, tracts or parcels. In such cases of transfer, the impervious cover allowed on slopes of under fifteen (15) percent gradient may be permitted to exceed sixty-five (65) percent but shall not exceed seventy (70) percent; and in such cases of transfer the impervious cover allowed on slopes of fifteen (15) percent to twenty-five (25) percent gradient may not be permitted to exceed ten (10) percent (see Transfer Table).

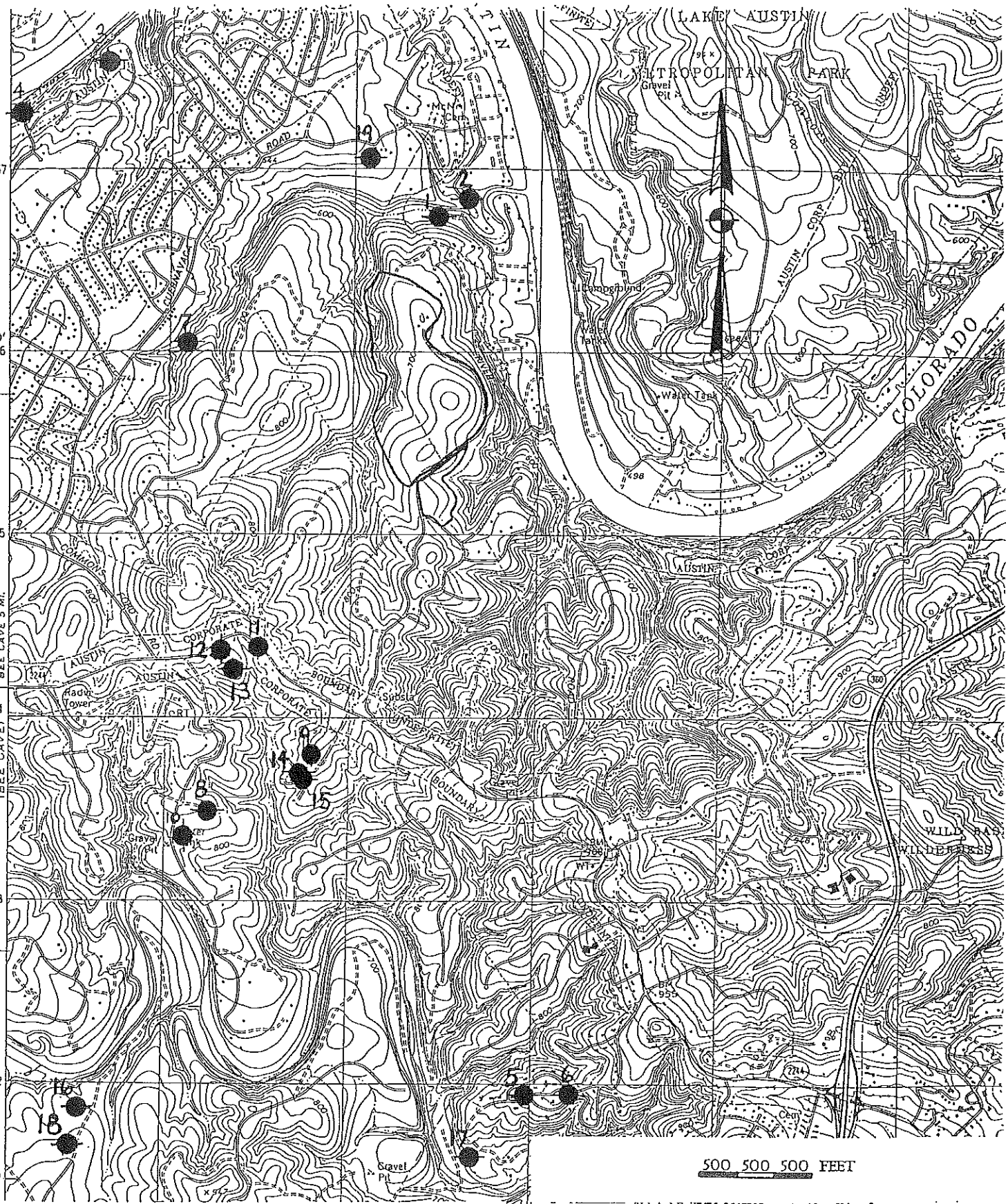
Transfer Table Commercial

Slope Category	Standard Impervious Cover Limit	Max. Impervious Cover With Transfer
Under 15% gradient	65%	70%

APPENDIX ITEM NO. 2

EXISTING SIGNIFICANT WATER WELLS

IN PROXIMITY TO SCHOOL TRACT



RIVER HILLS ROAD SITE STUDY
EANES INDEPENDENT SCHOOL DISTRICT

AUSTIN Significant Water Wells TEXAS

PFLUGER ASSOCIATES
ARCHITECTS/PLANNING CONSULTANTS
COLORADO CROSSING
AUSTIN, TEXAS 78704
213 SOUTH LAMAR
512 / 476-4040

MARTINEZ & WRIGHT ENGINEERS, INC.
1106 CLAYTON LANE SUITE 400W AUSTIN, TEXAS 78723
(512) 453-0767 FAX (512) 453-1734

Martinez and Wright Engineers

River Hills
School Sites Feasibility Studies

Well	Owner	Date Completed	Depth	Water Bearing Unit	Measurement from Land Surface (ft.)	Use of Water	Remarks
1	Frank Tull	1966	499	HF	31	Domestic	Measured flow 1.5 gal/min on May 30, 1966.
2	Joe Hanus	1959	490	HF	10 -1	Domestic	Estimated flow 3 gal/min on Nov. 18, 1966.
3	Devereux School	1950	466	HF	-125.92 -157.05	Domestic	Well C-79 in 1976 Travis County report.
4	Sam Crowther	1968	361	HS-TP	28.6	Domestic	Estimated flow 40 gal/min on Oct. 14, 1968. Cemented from 310 ft. to surface.
5	Camelot Subdivision	1950	716	HF	-212 -238.6	Public	Well deepened from 690 to 760 f in May 1951. Reported drawdown 65 ft. at 10 gal/min after pumping 1 hr. Well J-20 in 1957 Travis County report.
6	Camelot Subdivision	1962	930	HF	-240 -273.67	Public	Cemented from 449 ft to surface Well drilled to 1100 ft but plugg back to 930 ft.
7	Don Linley	1969	372	GRL	-185	Domestic	Cemented from 68 ft to surface.
8	Ross Patterson	1970	375	GRLL	-90	Domestic	
9	Grace Water Co.	1967	840	HF	-270 -349.6	Public	Reported yield 35 gal/min.
10	Barton Valley Subdv.	1973	712	GRHFL	-305	Unused	Cemented from 606 ft to surface Reported drawdown 0 ft after bailing 30 min at 150 gal/min in July 1972.
11	Charles Gilliam	1941	417	GRL	-162.4	Domestic	
12		1950	207	GRLU		Unused	
13	Jeff Wood	1974	550	HS-TP		Domestic	
14	Monte Dove	1976	800	HF		Domestic	
15	Roger Abrahans	1976	800	HF		Domestic	
16	Lost Creek Development	1981	850	GRLU		Public	
17	Leif Johnson Camelot	1985	900	HF		Public	
18	Community Texas Dev. Estates of Barton Creek	1981	840	HF HF		Public	
19			311				Steel casing. Cemented from 40 ft to surface, (8 in. diameter)

HF	Hosston Formation	GRLU	Upper Glenn Rose Limestone	GRHFL	Lower Glen Rose and Hosston Formation
GRL	Glenn Rose Limestone	HS-TP	Hensell Sand member of Travis Peak Formation		
GRLL	Lower Glenn Rose Limestone				

APPENDIX ITEM NO. 3

HORIZON ENVIRONMENTAL SERVICES, INC.

FILE COPY

Horizon

ENVIRONMENTAL SERVICES, INC.

6 February 1994

Maury Hood
IDM Corporation
9171 Capitol of Texas Hwy. North
Houston Bldg., Suite 300
Austin, Texas 78759

HJN 930062

RE: 18 ac and 80 ac Parcel on Riverhills Road

Dear Maury:

In 1991 and 1993 Horizon conducted endangered species studies on the subject tracts with particular attention to determining use of the sites by the golden-cheeked warbler (GCW). Both sites were determined not to exhibit the typical habitat characteristics for the black-capped vireo. However, portions of both tracts exhibited potentially suitable habitat conditions for the GCW but with variable habitat quality.

The 80-acre site located on the west side of Riverhills Road exhibits non-habitat or poor habitat characteristics over most of its extent. Good quality GCW habitat is present in the canyon along the southern boundary of the site. Our field studies in the springs of 1991 and 1993 revealed the presence of several GCWs in the canyon habitat area, but no where else on the site.

The 18-acre site located on the east side of Riverhills Road across from the 80-acre parcel exhibits marginal GCW habitat characteristics. This property is situated near a canyon habitat area, but does not include any of the good quality canyon habitat. In 1991 and 1993, no GCWs were observed on this tract, although GCWs were detected in the nearby canyon.

With respect to your proposed development of these two sites for single-family residences, it is my opinion that such development would not result in a "take" of the GCW as defined by Endangered Species Act and interpreted by various court rulings throughout the U.S. as long as the following guidelines are adhered to:

1. No clearing or development should occur within 250 feet of the good quality canyon habitat areas on or adjacent to the subject tracts;

2. Exterior construction (grading, excavation, clearing, framing, roofing or other noisy activities) should be restricted to the non-nesting season (1 August to 1 March) within 1000 feet of the canyon habitat areas;

P.O. Box 162017 • Austin, Texas 78716
5524 Bee Cave Rd., Suite E-3 • Austin, Texas 78746 • (512) 328-2430 • FAX (512) 328-1804

Horizon
ENVIRONMENTAL SERVICES, INC.

3. Clearing on lots bordering the 250 ft buffer zone should be minimized to only that which is necessary for home construction;

4. Re-vegetation of disturbed areas and residential landscaping should feature native trees, shrubs and lawn grass (prairie buffalo grass).

These types of restrictions have been shown to be effective in minimizing or eliminating disturbance to adjacent breeding/nesting GCWs. We have in fact observed GCWs utilizing residential yards with native vegetation within feet of existing homes in other developments that border GCW habitat areas. I believe these restrictions will also result in a high quality, environmentally conscious development that has become the vogue in Austin.

If you have any questions, please call.

Sincerely,

for: C. Lee Sherrod
Principal

CLS:gkc

Horizon
ENVIRONMENTAL SERVICES, INC.

7 May 1993

Maury Hood
IDM Corp.
9171 Capital of Texas Hwy.
Houston Bldg., Suite 300
Austin, Texas 78759

HJN-930062

RE: Results of endangered species survey on approximately 144 acres located on River Hills Road, Travis County, Texas.

Dear Maury:

This letter presents the results of the 1993 endangered species survey conducted by Horizon Environmental Services, Inc., (Horizon) on the subject 144 acres located on River Hills Road (Figure 1). The subject acreage is divided into land located on the east and west sides of River Hills Road. As indicated on Figure 2, suitable golden-cheeked warbler (GCW) habitat exists in only selected portions of the site. No suitable black-capped vireo (BCV) habitat exists on the site. Also, the site is not underlain by the Edward's formation and, therefore, not likely to contain subsurface voids which will be utilized by the species of endangered cave invertebrates. No karst features were located on the subject site during field investigations.

Surveys for the GCW were conducted by qualified Horizon personnel on 25 March, 8 and 30 April for a total time of 12 hours, 5 minutes during weather conditions conducive for bird activities. The GCW sightings consistently were documented in association with the canyons on the subject site on both sides of River Hills Road.

On the portion of the site located on the east side of the road, one GCW was documented on all three survey visits while one other GCW was sighted on two occasions and one other was heard singing on two occasions (see enclosed Figure).

While surveying the portion of the property located west of River Hills Road, a male and female GCW were documented during all three surveys and during the 30 April survey, this GCW pair was observed nurturing two young fledlings. A male GCW was heard singing on 25 March and 30 April.

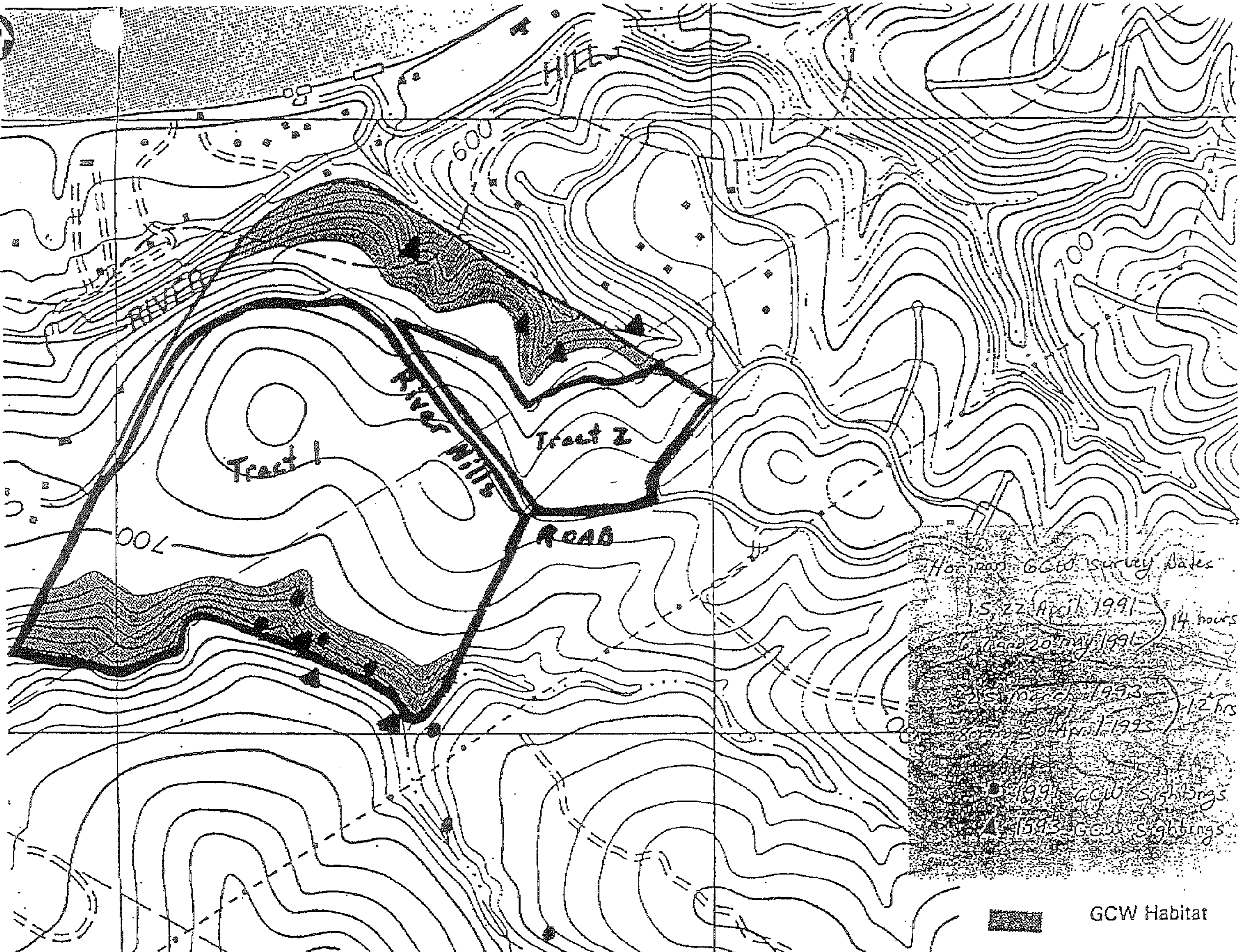
Horizon
ENVIRONMENTAL SERVICES, INC.

Due to the fact that several of these GCWs were documented in the same locations on different days, over several weeks, indicates that these GCW have likely established breeding territories and are not transient individuals. This idea is further substantiated by the documentation of two fledging GCWs. Previous years surveys on these properties have documented similar GCW occurrences.

Enclosed with this report are copies of the USGS topographic quadrangle showing GCW survey results and locations and an aerial photograph indicating suitable habitat.

Sincerely,

Mike Horvath
Environmental Specialist


HILL
600
700
RIVER
River Hills
ROAD
Tract 1
Tract 2
Horizon GCW Survey Dates
15, 22 April 1991
14 hours
20 May 1991
30 April 1993
12 hrs
1991 GCW Sightings
1993 GCW Sightings
GCW Habitat

FILE COPY

Horizon
ENVIRONMENTAL SERVICES, INC.

10 May 1993

Endangered Species Survey Ordinance
Ordinance No. 89-0817-H
Compliance Report
River Hills Road Property - 144 acres HJN 930062

This report provides the results of an endangered species habitat evaluation by Horizon Environmental Services, Inc. (Horizon).

The site was evaluated for its potential to provide suitable habitat for the federally listed endangered golden-cheeked warbler (GCW), black-capped vireo (BCV), cave-adapted invertebrates (CAI) and several rare plants. No suitable BCV habitat exists on the site, however; portions of the subject property exhibits vegetational characteristics suitable for utilization by the GCW (map enclosed).

A review of geologic maps indicates the subject site is underlain by the Glen Rose formation (Garner and Young, 1976) which is made up of alternating layers of limestone, dolomite and marl. Therefore, it is unlikely caves or voids that are utilized by the federally endangered CAIs would be found. No features were located during the reconnaissance.

Portions of the subject site exhibit habitat characteristics that are normally associated with the bracted twist-flower (*Streptanthus bracteatus*) and canyon mock-orange (*Philadelphus ernestii*), but not the Alabama croton (*Croton alabamensis*). Neither the bracted twist-flower or canyon mock-orange were encountered during Horizon's survey effort. The Alabama croton is known only to occur north and west of the subject property in the Post Oak Ridge area.

The slopes associated with the drainages on the subject property contain suitable habitat for the GCW and are dominated by Texas red oak (*Quercus buckleyi*), Ashe juniper (*Juniperus ashei*) and cedar elm (*Ulmus crassifolia*) with plateau live oak (*Quercus fusiformis*), escarpment black cherry (*Prunus serotina*) and Texas ash (*Fraxinus texensis*) interspersed on the slopes. The upper plateau area of the subject property is dominate by Ashe juniper and plateau live oak with the canopy coverage more widely dispersed than the slope areas on the site. Slope and canyon habitat is considered good for the GCW while the upper plateaus exhibit poor to non-suitable habitat characteristics.

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On 25 March, 8 and 30 April 1993, Horizon biologist spent a total of 12 hours, 5 minutes during weather conditions conducive for bird activities on the subject property conducting a survey for the presence/absence of the federally listed GCW. GCWs were encountered on the slope areas associated with the drainages on both the east and west portions of the subject property (map enclosed).

The assessment was conducted by Phil Frasier and Mike Horvath of Horizon. Mr. Frasier and Mr. Horvath hold Bachelor's degrees in Wildlife Science and have a combined 21 years of experience in ecological studies including surveys for threatened, endangered or rare plants and animals throughout Texas.

If you have any questions, please call.

Sincerely,

Phil Frasier

Phil Frasier
Staff Biologist

Horizon
ENVIRONMENTAL SERVICES, INC.

RECEIVED
OCT 23 1995
Martinez & Wright Engrs.

19 October 1995

Environmental Assessment
Comprehensive Watershed Ordinance
Compliance Report
80-acre property, west of River Hills Drive, Travis County, Texas. HJN 950194

This report provides the results of an environmental assessment conducted by Horizon Environmental Services, Inc. (Horizon) on the above-referenced site. The field reconnaissance was conducted on 12 and 14 October 1995. A total of 10 hours was spent on the site. The assessment process is completed by conducting a review of the existing literature and an on-site field reconnaissance.

This property is located about 4.5 miles west of the Edwards Aquifer Recharge Zone as mapped by the Texas Natural Resource Conservation Commission and City of Austin Watershed Regulation Areas Map.

Topographically, the property rises to maximum elevation of 776.3 feet MSL on one the two main hills located on site. The minimum elevation is about 560 feet above MSL in the unnamed tributary of the Colorado River that borders the site to the west. River Hills Road borders the property to the east and Taylor Road border the property to the north.

The slopes associated with drainages on the subject property are dominated by Texas red oak (*Quercus buckleyi*), Ashe juniper (*Juniperous ashei*), and cedar elm (*Ulmus crassifolia*) with plateau live oak (*Quercus fusiformis*), escarpment black cherry (*Prunus serotina*), and Texas ash (*Fraxinus tesensis*) interspersed on the slopes. The upper plateau of the area on the subject property is dominated by Ashe juniper and plateau live oak with the canopy coverage more widely dispersed than the slope areas. Ground cover is sparse and includes assorted grasses, prickly pear cactus (*Opuntia sp.*), twistleaf yucca (*Yucca sp.*), and greenbriar (*Smilax sp.*).

A review of the existing literature indicates the property is entirely underlain by the Glen Rose geologic formation (Garner and Young, 1976. Environmental Geology of the Austin Area: An Aid to Urban Planning, No. 86). This formation does not typically form the caves and voids that may contribute to aquifer recharge. No faults or known caves are located on or nearby the property. The nearest fault is the Mt. Bonnell Fault, located over 4 miles to the east. Stairstep topography, typical of the Glen Rose formation, is present on the property.

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Rimrock may occur locally in the Glen Rose geologic formation. Rimrock is described by the City of Austin as "a horizontal outcrop and vertical face of a hard limestone layer paralleling the side of a canyon or surrounding canyon head. Rimrock is further delimited by the presence of steep rock substrate (greater than 60 percent slope) which has a vertical extent of at least 4 feet, and a recognizable horizontal continuity of at least 50 feet."

The majority of slope on the above-referenced site is about 15 to 20 percent, but areas of rimrock occur above an unnamed tributary of the Colorado River on the western portion of the site. These areas have been located on the enclosed map and appear to occur between the elevation of 715 to 720 feet above MSL along the canyon and drainage heads about 140 feet above the unnamed tributary. Rimrock is not continuous; however, it is continuous for greater than 50 feet in several places on and adjacent to the property.

S-1 Rimrock (on-site) - about 50 in length, 4 to 5 foot vertical extent with slope greater than 60 percent.

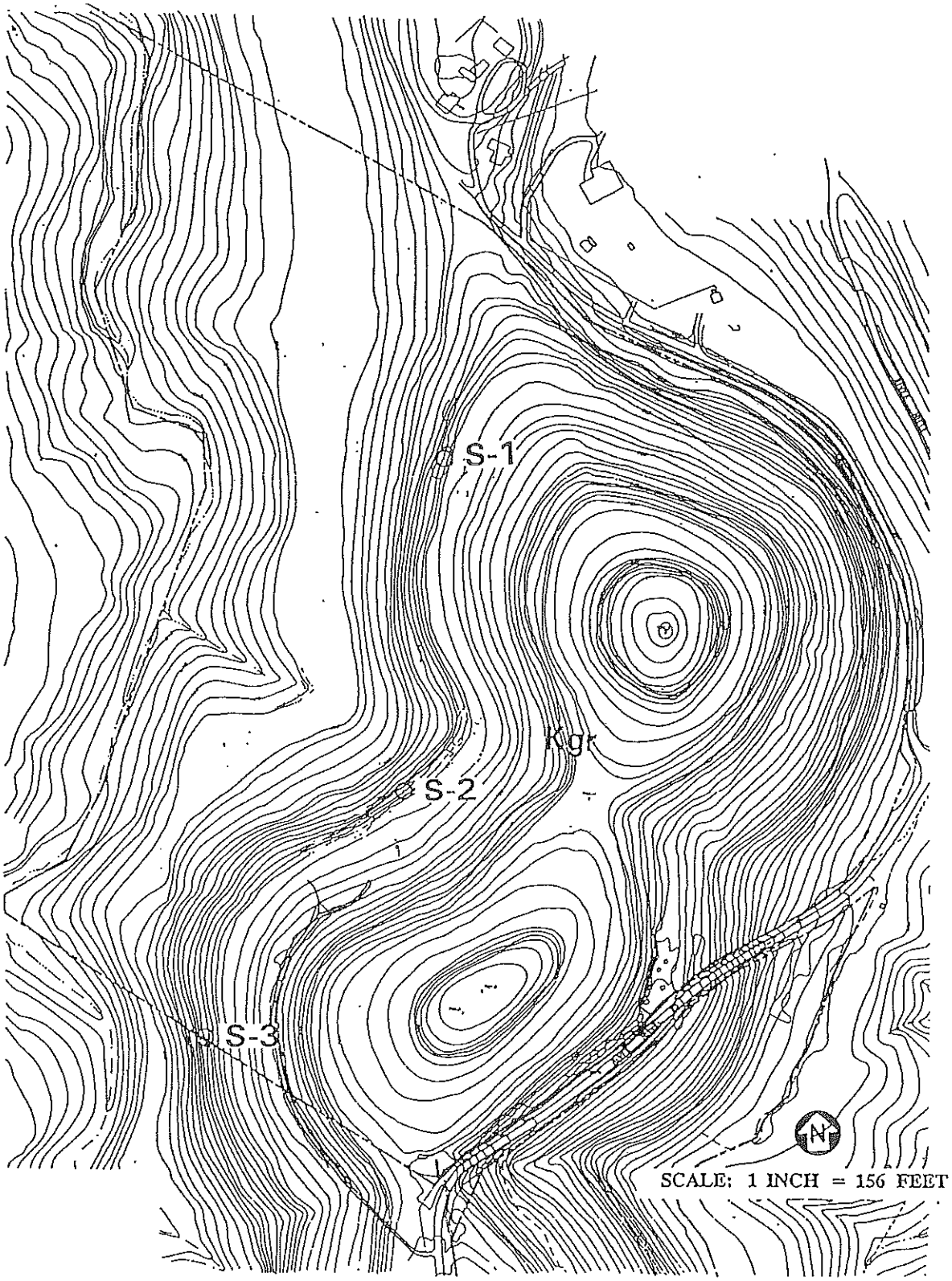
S-2 Rimrock (on-site) - about 100 in length, 4 to 5 foot vertical extent with slope greater than 60 percent.

S-3 Rimrock (on-site and adjacent) - about 150 in length, 4 to 5 foot vertical extent with slope greater than 60 percent.

No critical environmental features were located during Horizon's field reconnaissance that indicate enhanced rates of infiltration on the site. No seeps springs, wetlands, bluffs, significant recharge features (caves and sinkholes), or faults as defined by the City of Austin were found on the site. Areas of rimrock were identified on the southern portion of the tract; however these areas are not generally suitable for construction purposes and will be left in a natural state on the subject site.

Kristin Miller
Kristin Miller, Environmental Specialist

10-19-95
Date



LEGEND

GEOLOGIC FEATURES:

GLEN ROSE FORMATION	Kgr
RIMROCK	⊙

REFERENCES:

BUREAU OF ECONOMIC GEOLOGY, GEOLOGIC ATLAS OF TEXAS, AUSTIN SHEET, 1981.

Horizon
ENVIRONMENTAL SERVICES, INC.

SITE MAP

MAP 1 OF 1

HJN # 950194

RILVERHILLS ROAD PROPERTY
CITY OF AUSTIN ETJ
TRAVIS COUNTY, TEXAS

APPENDIX ITEM NO. 4

MINIMUM REQUIREMENTS FOR DRIP IRRIGATION TYPE ON-SITE WASTEWATER DISPOSAL SYSTEM

AUSTIN HEALTH AND HUMAN SERVICES DEPARTMENT
TRAVIS COUNTY HEALTH DEPARTMENT
Environmental Health Services Division
Engineering Services
15 Waller Street
Austin, Texas 78702

MINIMUM REQUIREMENTS FOR DRIP IRRIGATION TYPE ON-SITE WASTEWATER DISPOSAL SYSTEMS

These requirements are Departmental Policy and are subject to being changed without notice. The purpose of these requirements is to establish a minimum design criteria in order to review and approve plans for Drip Irrigation Type On-site Wastewater Disposal Systems.

1. Site Requirements

   A. Systems may be installed on slopes up to 30%. Sites with slopes greater than 30% will be considered on a case by case basis.

   B. No system may be located in fill material unless the fill material is approved by the Department prior to placement as part of the design for a Mounded System. Previously placed fill material will not be accepted.

   C. All drainfield sites shall have a minimum of 18 inches of good absorptive natural soil or a mounded type of drainfield must be designed utilizing a sewage application rate (R_a) not to exceed 0.1 gallons per sq. ft. per day with a minimum of 18 inches of total soil.

2. Minimum Drainfield Design Criteria

   A. All Drainfields will utilize a subsurface drip irrigation distribution system. The minimum drainfield area will be calculated by using the Soil Absorption Bed formulas found in Section 301.13.(c)(3)(C) of the Construction Standards For On-site Sewerage Facilities adopted by the Texas Department of Health on November 5, 1989. However, the following Sewage Application Rates must be utilized.

      1. Sites which slope 15% or more, the sewage application rate, "R_a", must be equal to or less than 0.1 gallons per sq. ft. per day.

AUSTIN HEALTH AND HUMAN SERVICES DEPARTMENT
TRAVIS COUNTY HEALTH DEPARTMENT
Environmental Health Services Division
Engineering Services
15 Waller Street
Austin, Texas 78702

MINIMUM REQUIREMENTS FOR DRIP IRRIGATION TYPE ON-SITE WASTEWATER DISPOSAL SYSTEMS

2. Sites which slope less than 15% may utilize sewage application rates not to exceed the following rates depending on the natural soil type.

Soil Type	Sewage Application Rate R_a gpd/ft^2
Sand, Loamy Sand, and Sandy Loam	0.3
Silt Loam, Sandy Clay Loam, and Clay Loam	0.2
Silty Clay Loam, Sandy Clay, Silty Clay, and Clay	0.1

* Other soil types will be evaluated on a case by case basis by Department Personnel.

B. Drainfield vegetation must be specified by each plan, established and maintained on all drainfields. In addition, all plans must specify erosion control procedures to prevent loss of top soil while vegetation is being established.

3. Minimum Required Separation Distances

A. Drip Irrigation Systems will be considered Soil Absorption Type of disposal systems and must comply with all applicable separation distances specified by Table 1 of Section 301.17 of the Construction Standards For On-site Sewerage Facilities adopted by the Texas Department of Health on November 5, 1989,

AUSTIN HEALTH AND HUMAN SERVICES DEPARTMENT
TRAVIS COUNTY HEALTH DEPARTMENT
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MINIMUM REQUIREMENTS FOR DRIP IRRIGATION TYPE ON-SITE WASTEWATER DISPOSAL SYSTEMS

Table 1 of the Rules Of Travis County, Texas For Private Sewage Facilities and Table 1 of City of Austin Ordinance No. 880310-H with the exception of the following paragraph.

B. The separation between the disposal field and sharp slopes and breaks may be reduced from 50 feet to 10 feet.

4. Other Requirements

A. A letter from the property owner stating that the property owner is aware that the proposed system is an experimental system and if it should fail, replacement will be required with a more conventional type of system. This letter must also state that the property owner is aware of the required maintenance of this system and will provide this maintenance as long as the system is used. Finally, if this property is sold, the current property owner must agree to inform the new property owner of the above requirements.

B. Each plan submitted to this Office for review must include a copy of the Operation and Maintenance Manual for the proposed system that is provided to the property owner.

C. Each design shall specify sufficient treatment of wastewater effluent to prevent the clogging of emitters of the subsurface drip irrigation distribution system.

APPENDIX ITEM NO. 5

WASTEWATER REDUCTION AND EQUIPMENT COST ESTIMATE BY ZENON FOR 2000 STUDENT HIGH SCHOOL

REF: 110295-01
WASTEWATER REDUCTION AND
EQUIPMENT COST ESTIMATE
November 2, 1995
Cycle-Let Model TW-18000-FE5-1.6

Mr. Mike Wright

TOTAL WASTEWATER REDUCTION

Description: High School in Texas
No. of People: 2,000

Conventional Blackwater Discharge	20,562 GPD
Conventional Greywater Discharge	9,500 GPD
Total	30,062 GPD
Blackwater Conserved with Cycle-Let	20,160 GPD
Greywater Conserved Using Low Water Use Fixtures	0 GPD
Total	20,160 GPD
DISCHARGE USING CYCLE-LET AND LOW WATER USE FIXTURES	9,902 GPD
WATER SAVINGS PER YEAR	4,637,260 GAL

CYCLE-LET DISCHARGE QUALITY: BOD≤ 5 mg/l, TSS ≤ 5 mg/l, Total Coliform ≤ 2.2/100 ml

ESTIMATED DESIGN AND TREATMENT FEES

Cycle-Let Model TW-18000-FE5-1.6

Design Fee (Payable as follows):	$ 253,100.00
Due With Order	$ 63,275.00
Due 30 Days After Shipment of Tanks	$ 63,275.00
Due 30 Days After Shipment of Components	$ 63,275.00
Due 30 Days after Installation Date	$ 63,275.00

Treatment Fee: $3,800.00 / Month At Start-up.

Estimated Lead Time for Delivery: 20 Weeks.

Design Fee includes Cycle-Let design, equipment delivered to site, installation technical support and start-up. Not included are pre-treatment trash and sump tanks, equipment installation and return water system. These costs can be estimated at approximately 40% of the Design Fee.

Additional Requirements of Installation and Operation:

Space Required for Equipment: 1,500 SF
Estimated Power Usage: 118,788 KWH/YR
Estimated Sludge Volume (hauled/sewered): 48,204 GAL/YR

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P.O. Box 1285, Ann Arbor, MI 48106 Telephone: (313) 769-0700 (800) 443-3006 Fax: (313) 761-7842

SCHOLFLO.XLS

Flow Calculations
High School Complex
Population 2000
Three (3) toilet or urinal uses per day per person

Males use urinal 76% & toilet 24%	Conventional: Toilet 4.5 gal/flush, urinal 1.5 gal/flush
Females use toilet 100%	Ultralow water use fixtures: 1.6 gal/flush toilet, 1.0 gal/flush urinal
Population: 50% male & 50% female	Wastewater Contribution .067 gal/flush

ULTRALOW WATER USE FIXTURES						Gal/day	Liters/day
Sex	Fixture	%male or female x	% fixture use x	gal/use x	uses/day =	Flow	Flow
male	urinal	50%	76%	1	6000	2,280	8,630
male	toilet	50%	24%	1.6	6000	1,152	4,360
female	toilet	50%	100%	1.6	6000	4,800	18,168
					Flushwater Flow	8,232	31,158
					Average gal/flush	1.372	5
					Contribution	402	1,522
					Total Blackwater Flow	8,634	32,680
					gal/flush	1.44	5
Greywater							
Lavatory Flow =.25gal/toilet or urinal use						1,500	5,678
Showers 2 gal/person/day						4,000	15, 40
Misc.Food Prep etc., Wash 2 gpd/person						4,000	15, 40
Total Process Flow						18,134	68,637
					per person flow	9	172

Conventional fixture flow calculations are shown for illustrative purposes only. Many regulatory flow criteria have not been revised to reflect the use of ultralow water use fixtures. These calculations are provided to show the comprative flow reductions with these fixtures.

Conventional Flows							
Sex	Fixture	%male or female x	% fixture use x	gal/use x	uses/day =	Flow	
male	urinal	50%	76%	1.5	6000	3420	12,945
male	toilet	50%	24%	4.5	6000	3240	12,263
female	toilet	50%	100%	4.5	6000	13500	51,098
					Flushwater Flow	20,160	76,306
						3,360	13
					Contribution	402	1,522
					Total Blackwater Flow	20,562	77,827
					gal/flush	3.43	13
Greywater							
Lavatory Flow =.25gal/toilet or urinal use						1,500	5,678
Showers 2 gal/person/day						4,000	15,140
Misc.Food Prep etc., Wash 2 gpd/person						4,000	15,140
Total Process Flow						30,062	113,785
					per person flow	15	348
Discharge (gpd) after recycling for flushwater						9,902	37,479

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KINETIC DESIGN

Cycle-Let System
Flow-Through Plant Kinetics

Application:	High School Complex
Client	Mike Wright
Rep	
Date:	11/2/95

Wastewater Characteristics

Concentrations	Total	Ratio:C/N
BOD5 (mg/l)	600	3.00
TSS (mg/l)	600	
TN (mg/l)	200	

Anoxic Process Rates

Denitrification	0.096	g no3-n r/day-g(mlvss) @ 21 deg C
BOD Removal	2.1	g BOD5 r/g-no3-n r
% BOD removed	63%	from denitrification

Aerobic Process Rates

Nitrification	0.09	g nh3-n r/day-g(mlvss)

Process Parameters

F/M start	0.169	seeded start low level
F/M waste	0.039	start wasting low level
MLSS start (grams/l)	5	seed plant at start
MLSS max (grams/l)	21	start wasting sludge
MLSS operating (grams/l)	5	after wasting sludge
% volatile solids	85%	mlvss/mlss
Sludge yield	16%	grams removed/day/influent BOD5 grams/day

Effluent Parameters

BOD5	<5mg/l	At membrane discharge
TSS	<5mg/l	At membrane discharge
NO3n+NO2n +NH3n+TKN	<10mg/l	At membrane discharge
pH	5.0<pH<9.0	At membrane discharge

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KINETIC DESIGN

Cycle-Let System Flow Through Plant Kinetics

Application:	High School Complex
Client	Mike Wright
Rep	
Date:	11/2/95

Process Tank Sizing

Note: Design based on operating MLVSS of: 5,000

Anoxic

Flow GPD	BOD5 grams/day	TSS grams/day	TN grams/day	Anoxic Tank Minimum Required Volume Gal	Anoxic Tank Volume Provided Gal
18,134	41,182	41,182	13,727	8,889	10,578
Safety Factor Provided					1

Aerobic

Flow GPD	BOD Removed in Anoxic grams	Ratio Carbon To Nitrogen at Aerobic Chamber	Aerobic Tanks Minimum Required Volume Gal	Aerobic Tanks Volume Provided Low level Gal	Aerobic Tanks Volume Provided High Level Gal	Total Process Volume Required Gal
18,134	25,945	1.11	9,482	15,112	24,179	34,757
Safety Factor Provided				2	3	

Sludge generation

Estimated MLSS Increase Per Week mg/l	Max Time Between Sludge Wasting weeks	Mixed Liquor Wasted At 2.5% solids gal/week
351	46	927

Total Working Volume Required Gal
34,757

Recycle Detention Times

Process circulation Qt=Qr+Qi gpd	Qt/Qi	Anoxic Tank detention per cycle hours	Anoxic Tank detention Total hours	Aerobic Tank detention per cycle low level hours	Aerobic Tank detention per cycle high level hours	Aerobic Tank total detention hours
380,814	21.00	0.67	14.00	0.95	1.52	32.00
390,814	21.55	0.65	14.00	0.93	1.48	32.00
400,814	22.10	0.63	14.00	0.90	1.45	32.00
410,814	22.65	0.62	14.00	0.88	1.41	32.00
420,814	23.21	0.60	14.00	0.86	1.38	32.00
430,814	23.76	0.59	14.00	0.84	1.35	32.00
440,814	24.31	0.58	14.00	0.82	1.32	32.00

SCHOLKIN.XLS

KINETIC DESIGN

Cycle-Jet System
Flow Through Plant Kinetics

Application:	High School Complex
Client	Mike Wright
Rep	
Date:	11/2/95

Calculated NH3n & NO3n in effluent

Process circulation Qt=Qr+Qi gpd	NH3n mg/l	NO3n mg/l	*Total Nitrogen mg/l
380,814	0.10	4.90	5.00
390,814	0.09	4.77	4.87
400,814	0.09	4.65	4.74
410,814	0.09	4.53	4.62
420,814	0.09	4.42	4.51
430,814	0.08	4.32	4.40
440,814	0.08	4.22	4.30

*Asumes that NO2n and TKN are negligible. Data supplied supports this assumption

Process Kinetics 'check'

Inf BOD5	Inf NH3n mg/l	Eff Nh3n mg/l	Eff NO3n mg/l	Temp C deg C	Yh mgvss per mg BOD	Kd /day
600	200	0.10	4.90	21	0.55	0.04

Udn(21 c) mgNO3-n/mgvss.day	DO mg/l	Xa mg/l mlvss	Oc days	Vaerobic	fvss
0.096	2	5,000	10.7	0.5	0.8

R	O'c days	fvss	Oa days	Oa hours
39.80	21.40	0.68	0.89	21.39
Safety Factors Provided				1.50

Odn days	Odn hours	O'dn days	O'dn hours
0.45	10.70	0.41	9.75
Safety Factors Provided			1.44

Yh=Maxium yield coefficient	Vaerobic = % aerobic volume
Kd= Endogenous decay coefficient	fvss= Degradable fraction of VSS
Udn=Substrate utilization rate	fvss=Degradable fraction of mlvss under aeration
DO= Dissolved oxygen	R=Recycle ratio
Xa=Mixed liquor concentration	Oa=Aerobic residence time
Oc=Mean cell residence time nitrification	Odn=Anoxic residence time
O'c=Overall sludge age	O'dn=The required anoxic residence time

References:

"Kinetics Combined Nitrification/Denitrification System"; Metcalf & Eddy, Inc.,
Third Edition, pages 715 thru 718
"Process Design Manual for Nitrogen Control", EPA Technology Transfer Oct. 1975
"Advances in Water and Wastewater Treatment Biological Nutrient Removal",
Ann Arbor Science, 1978

Zenon Municipal Systems Inc.
P.O. Box 1285, Ann Arbor, MI 48106 Telephone: (313) 769-0700 (800) 443-3006 Fax: (313) 761-7842

SCHOLKIN.XLS

KINETIC DESIGN

Application:	High School Complex
Client	Mike Wright
Rep	
Date:	11/2/95

Mass Balance Analysis

Qi	Ci tn	Qr	Qt	k	Ce no3n	Ce nh3n	Qt/Qi
18,134	200	362,680	380,814	0.99	4.90	0.10	21.00
18,134	200	372,680	390,814	0.99	4.77	0.09	21.55
18,134	200	382,680	400,814	0.99	4.65	0.09	22.10
18,134	200	392,680	410,814	0.99	4.53	0.09	22.65
18,134	200	402,680	420,814	0.99	4.42	0.09	23.21
18,134	200	412,680	430,814	0.99	4.32	0.08	23.76
18,134	200	422,680	440,814	0.99	4.22	0.08	24.31

Qi = influent gpd
Ci tn = influent tn mg/l
Qr = recycle gpd
Qt = recycle (Qr) + influent(Qi) gpd
k = reactor efficiency
Ce no3n = effluent no3n mg/l
Ce nh3n = effluent nh3n mg/l
Qt/Qi = ratio circulation flow /influent

Air Requirements

Flow GPD	BOD5 Treated in Aerobic Process pounds	Oxygen Required for BOD5 1.1# O2/# BOD5 pounds/day	Oxygen Required for Nitrification 4.6 # O2/#nh3n pounds/day	Oxygen Required Process Total pounds/day	Oxygen Membrane 0.15#/hr/diffuse at 4cfm pounds/day	Air Mixing Required 25 cfm/1000cf CFM
18,134	33.52	37	139	176	49	116
Membrane Air Required CFM	**Total Air Required Mix & Mem CFM**	**Oxygen Provided Mixing #/day**	**Total Oxygen Proveded Mix & Mem #/day**	**ZW135 2.22 gpm/mod 1.10 safety factor**	**Membrane 24 hr Process capability Gal**	**Membrane permeation rate gfd**
69	185	278.80	328	13.7	38,081	21

ENERGY

Flow GPD	Energy Blower hp 10 Kwh/mth	Energy Membrane Pump System Kwh/mth	Transfer Grinder Pump Kwh/mth	Aerobic to Arp hp 3 Kwh/mth	Control System & Misc. Kwh/mth	System Energy Requirements Kwh/mth
18,134	5,475	1,681	500	1,643	400	9,699

APPENDIX ITEM NO. 6

WASTEWATER REDUCTION AND EQUIPMENT COST ESTIMATE BY ZENON FOR 850 STUDENT ELEMENTARY SCHOOL

REF: 112995-02
WASTEWATER REDUCTION AND
EQUIPMENT COST ESTIMATE
November 29, 1995
Cycle-Let Model TW-4500-FE5-1.6

Mr. Mike Wright

TOTAL WASTEWATER REDUCTION

Description: ~~High~~ Elam School in Texas
No. of People: 937

Conventional Blackwater Discharge	9,445 GPD
Conventional Greywater Discharge	2,062 GPD
Total	11,507 GPD
Blackwater Conserved with Cycle-Let	9,445 GPD
Greywater Conserved Using Low Water Use Fixtures	0 GPD
Total	9,445 GPD
DISCHARGE USING CYCLE-LET AND LOW WATER USE FIXTURES	2,062 GPD
WATER SAVINGS PER YEAR	2,455,700 GAL

CYCLE-LET DISCHARGE QUALITY: BOD≤ 5 mg/l, TSS ≤ 5 mg/l, Total Coliform ≤ 2.2/100 ml

ESTIMATED DESIGN AND TREATMENT FEES

Cycle-Let Model TW-4500-FE5-1.6

Design Fee (Payable as follows):	$ 134,800.00
Due With Order	$ 33,700.00
Due 30 Days After Shipment of Tanks	$ 33,700.00
Due 30 Days After Shipment of Components	$ 33,700.00
Due 30 Days after Installation Date	$ 33,700.00

Treatment Fee: $3,080.00 / Month At Start-up.

Estimated Lead Time for Delivery: 20 Weeks.

Design Fee includes Cycle-Let design, equipment delivered to site, installation technical support and start-up. Not included are pre-treatment trash and sump tanks, equipment installation and return water system. These costs can be estimated at approximately 40% of the Design Fee.

Additional Requirements of Installation and Operation:

Space Required for Equipment: 1,200 SF
Estimated Power Usage: 49,000 KWH/YR
Estimated Sludge Volume (hauled/sewered): 11,000 GAL/YR

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P.O. Box 1285, Ann Arbor, MI 48106 Telephone: (313) 769-0700 (800) 443-3006 Fax: (313) 761-7842

BLKWTR.XLS

Flow Calculations
ellementary school
population 937

3 uses /day/perso toilet and urina se

Males use urinal 76% & toilet 24%	Conventional:toilet 4.5 g/flush, urinal 1.5 gal/flush
Females use toilet 100%	Ultralow water use fixtures: 1.6 gal/flush t 1.0 gal/flush urinal
Population: 50% male & 50% female	Wastewater Contribution .067 gal/flush

ULTRALOW WATER USE FIXTURES						Gal/day	Liters/day
Sex	Fixture	%male or female	% fixture use	gal/use x	uses/day =	Flow	Flow
male	urinal	50%	76%	1	2811	1,068	4,043
male	toilet	50%	24%	1.6	2811	540	2,043
female	toilet	50%	100%	1.6	2811	2,249	8,512
					Flushwater Flow	3,857	14,598
					Average gal/flush	1.372	5
					Contribution	188	713
					Total Blackwater Flow	4,045	15,310
					gal/flush	1.44	5
Greywater							
Lavatory Flow =.25gal/toilet or urinal use						703	2,660
Showers .25 gal/person/day						234	886
Misc. food prep etc. sh 1 gal/person/day						937	3,547
Total Process Flow						5,919	22,403
					per person flow	6	87

Conventional Flows							
Sex	Fixture	%male or female	% fixture use	gal/use x	uses/day =	Flow	
male	urinal	50%	76%	1.5	2811	1602.27	6,065
male	toilet	50%	24%	4.5	2811	1517.94	5,745
female	toilet	50%	100%	4.5	2811	6324.75	23,939
					Flushwater Flow	9,445	35,749
						3.360	13
					Contribution	188	713
					Total Blackwater Flow	9,633	36,462
					gal/flush	3.43	13
Greywater							
Lavatory Flow =.25gal/toilet or urinal use						703	2,660
Showers .25 gal/person/day						234	886
Misc. food prep etc. wash 1 gal/person/day						937	3,547
Total Process Flow						11,507	43,554
					per person flow	12.281	163

Discharge (gpd) after recycling for flushwater 2,062

NDNKIN.XLS

KINETIC DESIGN

Cycle-Let System
Flow Through Plant Kinetics

Application:	ELEMENTARY SCHOOL
Client	MIKE WRIGHT
Rep	
Date:	11/27/95

Wastewater Characteristics

Concentrations	Total	Ratio:C/N
BOD5 (mg/l)	600	3.00
TSS (mg/l)	600	
TN (mg/l)	200	

Anoxic Process Rates

Denitrification	0.096	g no3-n r/day-g(g/l @ 21 deg C
BOD Removal	2.1	g BOD5 r/g-no3-n r
% BOD removed	63%	from denitrification

Aerobic Process Rates

Nitrification	0.09	g nh3-n r/day-g(mlvss)

Process Parameters

F/M start	0.169	seeded start low level
F/M waste	0.039	start wasting low level
MLSS start (grams/l)	5	seed plant at start
MLSS max (grams/l)	21	start wasting sludge
MLSS operating (grams/l)	5	after wasting sludge
% volatile solids	85%	mlvss/mlss
Sludge yield	16%	grams removed/day/influent BOD5 grams/day

Effluent Parameters

BOD5	.5mg/l	At membrane discharge
TSS	<5 mg/l	At membrane discharge
NO3n+NO2n +NH3n+TKN	<10 mg/l	At membrane discharge
Ph	5.0<ph<9.0	At membrane discharge

NDNKIN.XLS

KINETIC DESIGN

Cycle-Let System
Flow Through Plant Kinetics

Application:	ELEMENTARY SCHOOL
Client	MIKE WRIGHT
Rep	
Date:	11/27/95

Process Tank Sizing

Anoxic — Note: Design based on operating MLVSS of : 10,000

Flow GPD	BOD5 grams/day	TSS grams/day	TN grams/day	Anoxic Tank Minimum Required Volume Gal	Anoxic Tank Volume Provided Gal
5,919	13,442	13,442	4,481	2,901	3,453
Safety Factor Provided					1

Aerobic

Flow GPD	BOD Removed in Anoxic grams	Ratio Carbon To Nitrogen at Aerobic Chamber	Aerobic Tanks Minimum Required Volume Gal	Aerobic Tanks Volume Provided Low level Gal	Aerobic Tanks Volume Provided High Level Gal	Total Process Volume Required Gal
5,919	8,468	1.11	3,095	4,933	7,892	11,345
Safety Factor Provided				2	3	

Sludge generation

Estimated MLSS Increase Per Week mg/l	Max Time Between Sludge Wasting weeks	Mixed Liquor Wasted At 2% solids gal/ week	Sludge Holding Volume Provided gal
351	80	378	0

Total Working Volume Required Gal
11,345

Recycle Detention Times

Process circulation Qt=Qr +Qi gpd	Qt/Qi	Anoxic Tank detention per cycle hours	Anoxic Tank detention Total hours	Aerobic Tank detention per cycle low leve hours	Aerobic Tank detention per cycle high leve hours	Aerobic Tank total detention hours
124,299	21.00	0.67	14.00	0.95	1.52	32.00
134,299	22.69	0.62	14.00	0.88	1.41	32.00
144,299	24.38	0.57	14.00	0.82	1.31	32.00
154,299	26.07	0.54	14.00	0.77	1.23	32.00
164,299	27.76	0.50	14.00	0.72	1.15	32.00
174,299	29.45	0.48	14.00	0.68	1.09	32.00
184,299	31.14	0.45	14.00	0.64	1.03	32.00

NDNKIN.XLS

KINETIC DESIGN

Cycle-Lift System
Flow Through Plant Kinetics

Application:	ELEMENTARY SCHOOL
Client	MIKE WRIGHT
Rep	
Date:	11/27/95

Mass Balance Analysis

Qi	Ci tn	Qr	Qt	k	Ce no3n	Ce nh3n
5,919	200	118,380	124,299	0.99	4.90	0.10
5,919	200	128,380	134,299	0.99	4.53	0.09
5,919	200	138,380	144,299	0.99	4.21	0.08
5,919	200	148,380	154,299	0.99	3.93	0.08
5,919	200	158,380	164,299	0.99	3.69	0.07
5,919	200	168,380	174,299	0.99	3.47	0.07
5,919	200	178,380	184,299	0.99	3.28	0.06

Qi = influent gpd
Ci tn = influent tn mg/l
Qr = recycle gpd
Qt = recycle (Qr) + influent(Qi) gpd
k = reactor efficiency
Ce no3n = effluent no3n mg/l
Ce nh3n = effluent nh3n mg/l
Qt/Qi = ratio circulation flow /influent

Air Requirements

Flow GPD	BOD5 Treated In Aerobic Process pounds	Oxygen Required for BOD5 1.1# O2/# BOD5 pounds/day	Oxygen Required for Nitrification .6 # O2/#nh3 pounds/day	Oxygen Required Process Total pounds/day	Oxygen Membrane .15#/hr/diffuse at 4cfm pounds/day	Air Mixing Required 25 cfm/100 cf CFM:
5,919	10.94	12	45	57	17	38
Membrane Air Required CFM	**Total Air Require Mix & Mem CFM**	**Oxygen Provided Mixing #/day**	**Total Oxygen Proveded Mix & Mem #/day**	**ZW135 2 gpm/mod 100% safety factor**	**Membrane 24 hr Process capability Gal**	**Membrane permeation rate gfd**
24	62	91.00	108	4.7	11,838	18

ENERGY

Flow GPD	Energy Blower hp 5 Kwh/mth	Energy Membrane Pump System Kwh/mth	Transfer Grinder Pump Kwh/mth	Aerobic to Arp hp 3 Kwh/mth	Control System & Misc. Kwh/mth	System Energy Requirements Kwh/mth
5,919	2,738	649	0	1,643	400	5,429

	A	B	C	D	E
1	ZENOGEM COST DEVELOPMENT				
2	Project EMENTARY SCHOOL				
3	Rep/Engineer MIKE WRIGHT				
4	Client				
5	Date	11/27/95			
6	Flow gpd	5,919			
7	EQUIPMENT	Units	Cost each	Qty.	Cost
8	Sump Transfer Pump	piece	$1,500	1	$1,500
9	Waste Treatment Tank	gal	$2.50	11,345	$28,363
10	Waste treatment tank accessories	each	$100	4	$400
11	Blower	piece	$2,518	2	$5,036
12	Membrane Clean in place system	piece	$750	1	$750
13	Membrane operating system	piece	$3,200	1	$3,200
14	Membrane mounting system	each	$125	1	$125
15	membrane removal system	each	$2,000	1	$2,000
16	Zeeweed Zw-135 Modules	piece	$2,000	5	$10,000
17	pH Automatic Control	piece	$942	1	$942
18	Sodium Hydrox Feed Pump	piece	$355	1	$355
19	15 gal drum NAOX (1 yr supply)	piece	$73	6	$435
20	Denit Internal Recirc Pump	piece	$1,400	1	$1,400
21	Methanol Feed Pump Anoxic	piece	$355	1	$355
22	Methanol 55 gal Drum (1 yr suppl	piece	$97	6	$582
23	55 Gal S.S. Methanol Drum	piece	$400	1	$400
24	UV System Overflow	piece	$1,600		
25	UV System Water Storage	piece	$3,900	1	$3,900
26	UV Circulation Pump	piece	$725	1	$725
27	Electrical Control Panel	piece	$6,500	1	$6,500
28	Chatterbox	piece	$1,200	1	$1,200
29	Carbon Adsorbers	piece	$430	4	$1,720
30	Water Storage Tank	gal	$2	5500	$8,250
31	WST Sub Assemblies	piece	$250	1	$250
32	cl2 DISINFECTION SYSTEM		$35,000		
33					
34	TOTAL				$76,388
35					

	A	B	C	D	E
36					
37	SERVICE MATERIALS	% Replaced/yr	Cost each	Qty.	Cost/mth
38	Parts & Repairs	3%	$65,651	1	$164
39	Tank Recoating(10 year Schedule)	10%	$8,000	1	$67
40	UF Replacement (5 year schedule)	20%	$10,000	1	$167
41	Carbon	100%	$430	4	$143
42	Sodium Hydroxide	100%	$73	6	$36
43	Methanol	100%	$97	6	$49
44	SERVICE LABOR	Hrs/visit	Cost/hr	Visit/yr	Cost/mth
45	Emergency Service ($45.00/hr)	1.5	$45	18	$101
46	Routine Service ($45.00/hr)	1.5	$45	104	$585
47	Yearly Service ($45.00/hr)	1	$45	20	$75
48	TOTAL				$1,387
49					
50	Design Fee with	Design Fee with			
51	10% com Can	10% com US	% GM	DESIGN FEE	TREATMENT
52	$132,568	$96,775	10%	$87,097	$1,541
53	$140,366	$102,467	15%	$92,221	$1,632
54	$149,139	$108,872	20%	$97,984	$1,733
55	$159,082	$116,130	25%	$104,517	$1,849
56	$170,445	$124,425	30%	$111,982	$1,981
57	$183,556	$133,996	35%	$120,596	$2,134
58	$198,852	$145,162	40%	$130,646	$2,311
59	$216,930	$158,359	45%	$142,523	$2,521
60	$238,623	$174,194	50%	$156,775	$2,774
61	$265,136	$193,549	55%	$174,194	$3,082
62	$298,278	$217,743	60%	$195,969	$3,467

APPENDIX ITEM NO. 7

SITE DEVELOPMENT COST ESTIMATE SCHEDULE

Preliminary Engineers' Opinion of Construction Value

Dec. 20, 1995

EISD River Hills Schools

Base Cost for 1,500 Student Option

Bid Item	Quantity	Unit	Description	Unit Price	Amount
Sitework	34	Ac.	Clear, Grub, Strip and Store Topsoil	$ 3,500.00	$ 119,000.00
	200,000	C.Y.	Earthwork (Cut, Fill, Regrade, Recompact)	$ 6.00	$ 1,200,000.00
			subtotal		**$ 1,319,000.00**
Storm Drain	1	L.S.	Detention/Filtration Ponds 2 ea total 5214 CY	$ 50,000.00	$ 50,000.00
	1,580	L.F.	18" RCP	$ 26.00	$ 41,080.00
	160	L.F.	24" RCP	$ 30.00	$ 4,800.00
	2,000	S.F.	5" Concrete Rip-Rap with Wire Mesh	$ 3.50	$ 7,000.00
	11	Ea.	Precast Curb or Area Inlet	$ 1,200.00	$ 13,200.00
	2	Ea.	Energy Dissipater, Splitter Box	$ 6,000.00	$ 12,000.00
			subtotal		**$ 128,080.00**
Pavement	21,000	S.Y.	Excavation (Fine Grading) for Streets	$ 2.00	$ 42,000.00
	20,000	S.Y.	Asphalt Pavement	$ 4.23	$ 84,600.00
	20,600	S.Y.	8" Flexible Base, Including Subgrade Preparation	$ 8.00	$ 164,800.00
	7,660	L.F.	Concrete Curb and Gutter (Laydown and Standard)	$ 8.28	$ 63,424.80
	4,800	S.F.	5' Concrete Sidewalk	$ 3.00	$ 14,400.00
			subtotal		**$ 369,224.80**
Water			**See Secondary School of combined system**		**$ 752,300.00**
Wastewater	1	L.S.	31,000 gal Treatment Plant, Bldg, Relift Pumps	$ 472,000.00	$ 472,000.00
	1	L.S.	WW Storage Facility with trash rack, 31,000 gal	$ 45,000.00	$ 45,000.00
	1	L.S.	Recycle Pump Station at Treatment Plant	$ 25,000.00	$ 25,000.00
	1	ea	Duplex Grinder Pump Station at School	$ 20,000.00	$ 20,000.00
	1,080	lf	3" Force Main	$ 6.00	$ 6,480.00
	1	ea	31000 Gal Gray Water Storage w/Bldg&PS&Press Tank	$ 30,000.00	$ 30,000.00
	2,700	LF	2" gray Water Return Lines	$ 5.00	$ 13,500.00
	3	Ea	Field Disposal System with filter rack&Backflush	$ 24,000.00	$ 72,000.00
			Subtotal		**$ 683,980.00**
Athletics	2	ea	Practices Fields with 18" Sandy Loam	$ 24,000.00	$ 48,000.00
	1	ea	Football field with 6' Sandy Loam and Crosebars,etc	$ 20,000.00	$ 20,000.00
	4	ea	Tennis courts/ with fence and nets	$ 30,000.00	$ 120,000.00
	1	ea	Athletic track with surfacing , drainage	$ 210,000.00	$ 210,000.00
	1	ea	Baseball Field with Fencing, 18" Sandy Loam	$ 91,000.00	$ 91,000.00
	1	ea	Softball Field with fencing, 18" Sandy Loam	$ 73,000.00	$ 73,000.00
			Subtotal		**$ 562,000.00**
Retaining	800	lf	4 ft Retaining walls.	$ 50.00	$ 40,000.00
			Subtotal		**$ 40,000.00**
Elect&Com	1,350	L.F.	Primary Elect. Conduit3/4"	$ 25.00	$ 33,750.00
	1	Ea.	Primary Transformer Pad	$ 2,000.00	$ 1,200.00
	1	Ea.	Primary Riser Pole	$ 1,200.00	$ 2,000.00
	1,350	Ea.	Tel conduit- 2-4"	$ 20.00	$ 27,000.00
	7	Ea	Tel Pull Boxes	$ 500.00	$ 3,500.00
	7	Ea.	48" Pull Box Elect.	$ 700.00	$ 4,900.00
	1,470	Ea.	2-2" Elect Secondary conduit	$ 19.00	$ 27,930.00
	6	da	24"' Secondary P.B.	$ 350.00	$ 2,100.00
	11	ea	400 watt Sodium Vapor,	$ 4,800.00	$ 52,800.00
			Subtotal		**$ 155,180.00**
Misc	1	L.S.	Temporary Erosion Control	$ 35,000.00	$ 35,000.00
	1	L.S.	Irrigation and Landscape allowance	$ 20,000.00	$ 20,000.00
	1	L.S.	Parking Striping/Signage	$ 3,500.00	$ 3,500.00
	2,000	L.F.	Trench Safety	$ 1.00	$ 2,000.00
	1	L.S.	Miscellaneous Construction Costs	$ 400,976.48	$ 400,976.48
			Subtotal		**$ 461,476.48**
			TOTAL		**$ 4,471,241.28**

Values reflect construction costs only and do not include professional, regulatory or fees.

Preliminary Engineers' Opinion of Construction Value

Dec. 20, 1995

EISD River Hills Schools

Additional Cost for 850 Student Option

Bid Item	Quantity	Unit	Description	Unit Price	Amount
Sitework	14	Ac.	Clear, Grub, Strip and Store Topsoil	$ 3,500.00	$ 49,000.00
	9,000	C.Y.	Earthwork (Cut, Fill, Regrade, Recompact)	$ 6.00	$ 54,000.00
			Subtotal		**$ 103,000.00**
Storm Drain	1	LS	Detention/Filtration Pond 3,200 CY	$ 25,000.00	$ 25,000.00
	1,140	L.F.	18" RCP	$ 26.00	$ 29,640.00
	25	L.F.	24" RCP	$ 30.00	$ 750.00
	1,000	S.F.	5" Concrete Rip-Rap with Wire Mesh	$ 3.50	$ 3,500.00
	9	Ea.	Precast Curb or Area Inlet	$ 1,200.00	$ 10,800.00
	1	Ea.	Energy Dissipater, Splitter Box	$ 6,000.00	$ 6,000.00
			Subtotal		**$ 75,690.00**
Pavement	14,000	S.Y.	Excavation (Fine Grading) for Streets	$ 2.00	$ 28,000.00
	13,000	S.Y.	Asphalt Pavement	$ 4.23	$ 54,990.00
	13,200	S.Y.	8" Flexible Base, Including Subgrade Preparation	$ 8.00	$ 105,600.00
	4,400	L.F.	Concrete Curb and Gutter (Laydown and Standard)	$ 8.28	$ 36,432.00
	5,400	S.F.	5' Concrete Sidewalk	$ 3.00	$ 16,200.00
			Subtotal		**$ 241,222.00**
Athletics	1	LS	Playfield	$ 20,000.00	$ 20,000.00
	1	LS	Playcourt	$ 80,000.00	$ 80,000.00
			Subtotal		**$ 100,000.00**
Wastewater	1	Ea.	8" Wastewater Manhole (0'-8' Deep)	$ 1,800.00	$ 1,800.00
	200	L.F.	8" Wastewater PVC Pipe SDR-35	$ 30.00	$ 6,000.00
	2	Ea.	6" Wastewater Services Including Fittings, Single and Clean Outs	$ 1,200.00	$ 2,400.00
	1	Ea.	Recycle WasteWater System , See WW Treatment	$	
	220	L.F.	6" Water PVC C-900 Pipe, Class 150, Including	$ 24.00	$ 5,280.00
			Subtotal		**$ 15,480.00**
Water	1,850	L.F.	8" Water PVC C-900 Pipe, Class 150, Including C.I. Fittings and Blocking	$ 26.00	$ 48,100.00
	50	L.F.	8" DIP Pipe, Class 350, Water Crossing	$ 30.00	$ 1,500.00
	3	Ea.	5-1/4" Fire Hydrant/with valves	$ 1,700.00	$ 5,100.00
	2	Ea.	1" Air Release (Automatic)	$ 1,000.00	$ 2,000.00
	2	Ea.	8" Gate Valve	$ 500.00	$ 1,000.00
	1	Ea.	2 Water PVC Pipe, Including 2" Bronze valve	$ 1,000.00	$ 1,000.00
	2	Ea.	8" Gate Valves with Valve Box	$ 500.00	$ 1,000.00
			Subtotal		**$ 59,700.00**
Elect&Com	200	L.F.	Primary Elect. Conduit2/4"	$ 25.00	$ 5,000.00
	1	Ea.	Primary Transformer Pad	$ 2,000.00	$ 1,200.00
	1	Ea.	Primary Riser Pole	$ 1,200.00	$ 2,000.00
	200	Ea.	Tel conduit- 2-4"	$ 20.00	$ 4,000.00
	2	Ea	Tel Pull Boxes	$ 500.00	$ 1,000.00
	7	Ea	Street Lights	$ 4,800.00	$ 33,600.00
	2	Ea.	48" Pull Box Elect.	$ 700.00	$ 1,400.00
			Subtotal		**$ 48,200.00**
Misc	1	L.S.	Temporary Erosion Control	$ 10,000.00	$ 10,000.00
	1	L.S.	Irrigation and Landscape allowance	$ 10,000.00	$ 10,000.00
	1	L.S.	Parking Striping/Signage	$ 2,500.00	$ 2,500.00
	2,000	L.F.	Trench Safety	$ 1.00	$ 2,000.00
	1	L.S.	Miscellaneous Construction Costs	$ 64,329.20	$ 64,329.20
			Subtotal		**$ 88,829.20**
			TOTAL		**$ 732,121.20**

Values reflect construction costs only and do not include professional, regulatory or fees.

Preliminary Engineers' Opinion of Construction Value

Dec. 20, 1995

EISD River Hills Schools

Additional Cost for 2,000 Student Option

Bid Item	Quantity	Unit	Description	Unit Price	Amount
Sitework	7	Ac.	Clear, Grub, Strip and Store Topsoil	$ 3,500.00	$ 24,500.00
	5,000	C.Y.	Earthwork (Cut, Fill, Regrade, Recompact)	$ 6.00	$ 30,000.00
			Subtotal		**$ 54,500.00**
Storm Drain	400	L.F.	18" RCP	$ 26.00	$ 10,400.00
	500	S.F.	5" Concrete Rip-Rap with Wire Mesh	$ 3.50	$ 1,750.00
	2	Ea.	Precast Curb or Area Inlet	$ 1,200.00	$ 2,400.00
	1	Ea.	Energy Dissipater, Splitter Box	$ 6,000.00	$ 6,000.00
			Subtotal		**$ 20,550.00**
Pavement	20,000	S.Y.	Excavation (Fine Grading) for Streets	$ 2.00	$ 40,000.00
	17,000	S.Y.	Asphalt Pavement	$ 4.23	$ 71,910.00
	17,500	S.Y.	8" Flexible Base, Including Subgrade Preparation	$ 8.00	$ 140,000.00
	6,000	L.F.	Concrete Curb and Gutter (Laydown and Standard)	$ 8.28	$ 49,680.00
	2,000	S.F.	5' Concrete Sidewalk	$ 3.00	$ 6,000.00
			Subtotal		**$ 307,590.00**
Wastewater	1	L.S.	Gray Water System Storage Improvements	$ 40,000.00	$ 40,000.00
			Subtotal		**$ 40,000.00**
Athletics	1	Ea.	Field sports Additions	$ 20,000.00	$ 20,000.00
	4	Ea.	Tennis Courts/ with Fence and Nets	$ 25,000.00	$ 100,000.00
	1	Ea.	Ball Field Lighting	$ 40,000.00	$ 40,000.00
	1	Ea.	Soft Ball Field Lighting	$ 36,000.00	$ 36,000.00
	1	Ea.	Concession Stand/Restrooms	$ 72,000.00	$ 72,000.00
	1	Ea.	Stadium Seating, 6,000 @ $75	$ 450,000.00	$ 450,000.00
	1	Ea.	Ball Field Seating 1,000 @ 75	$ 75,000.00	$ 75,000.00
			Subtotal		**$ 793,000.00**
Retaining	800	L.F.	4 ft Retaining Walls	$ 50.00	$ 40,000.00
			Subtotal		**$ 40,000.00**
Elect&Com	1	Ea.	Primary Riser Pole	$ 1,200.00	$ 1,200.00
	1	Ea.	Transformer Pad	$ 1,200.00	$ 1,200.00
	3	Ea.	48" Pull Box Elect.	$ 700.00	$ 2,100.00
	400	L.F.	2-4" Primary Conduit	$ 25.00	$ 10,000.00
	1,470	Ea.	2-2" Elect Secondary conduit	$ 19.00	$ 27,930.00
	6	Ea.	24'" Secondary P.B.	$ 350.00	$ 2,100.00
	11	Ea.	400 Watt Sodium Vapor	$ 4,800.00	$ 52,800.00
			Subtotal		**$ 97,330.00**
Misc	1	L.S.	Temporary Erosion Control	$ 25,000.00	$ 25,000.00
	1	L.S.	Irrigation and Landscape allowance	$ 20,000.00	$ 20,000.00
	1	L.S.	Parking Striping/Signage	$ 3,500.00	$ 3,500.00
	2,000	L.F.	Trench Safety	$ 1.00	$ 2,000.00
	1	L.S.	Miscellaneous Construction Cost	$ 135,297.00	$ 135,297.00
			Subtotal		**$ 185,797.00**
			TOTAL		**$ 1,538,767.00**

Values reflect construction costs only and do not include professional, regulatory or fees.

Preliminary Engineers' Opinion of Construction Value — Dec. 20, 1995

EISD River Hills Schools

Both Schools

Bid Item	Quantity	Unit	Description	Unit Price	Amount
			WASTEWATER SYSTEM		
1	1	ea	WW treatment unit, 42,000 GPD, With Bldg, incl lift Pumps	$ 471,000.00	$ 471,000.00
2	1	ea	WW Storage Tank, 42,000 Gal , incl trash rack	$ 60,000.00	$ 60,000.00
3	1	ea	Recycle Pump Station At Treatment Plant	$25,000.00	$ 25,000.00
4	1	ea	Duplex Grinder Pump Station At Secondary School	$ 20,000.00	$ 20,000.00
5	1,080	lf	3" Force Main at Secondary School	$ 6.00	$ 6,480.00
6	6	ea.	Wastewater manholes	$ 1,200.00	$ 7,200.00
7	1,070	lf	8" Wastewater (0-6)	$ 30.00	$ 32,100.00
8	1,500	lf	3" Recycle Line to Storage Tank	$ 6.00	$ 9,000.00
9	1	ea	42,000 Gal Gray Water Storage Tank w/Bldg, & PS, Pres. Tank	$ 30,000.00	$ 30,000.00
10	3,700	lf	2" Gray Water Recycle Line to Bldgs, Fields	$ 5.00	$ 18,500.00
11	4	Ea	Field Disposal of Effluent incl 18" Loam, Irrigators, Backflush	$ 24,000.00	$ 96,000.00
12	350	lf	6" ww line	$ 15.00	$ 5,250.00
			Subtotal		**$ 780,530.00**
			WATER SYSTEM		
1	1	LS	630,000 GAL Elevated Storage Tank	$ 630,000.00	$ 630,000.00
2	370	lf	12"C 900 water line at Secondary Sch	$ 30.00	$ 11,100.00
3	2,530	lf	8 " C900 water line at Secondary Sch	$ 20.00	$ 50,600.00
4	6	ea	Fire Hydrants at Secondary Sch	$ 1,700.00	$ 10,200.00
5		ton	DI Fittings	$ 1,700.00	$ -
6	70	lf	4" water line service with valve at Secondary Sch	$ 20.00	$ 1,400.00
7	4	ea	Wells -800 ft. 4/6", with Pump&Motor	$ 8,000.00	$ 32,000.00
8	1		10,000 gal well storage, chlorinator & Repump w /30x20 bldg.	$ 33,000.00	$ 33,000.00
9	1,850	lf	8" c-900 Water PVC C-900, Cl 150, incl Fittings and Block, Elem	$ 26.00	$ 48,100.00
10	50	lf	8" DIP pipe Crossing, Elem	$ 40.00	$ 2,000.00
11	1	ea	2" service Line, with valves and fittings, Elem	$ 1,000.00	$ 1,000.00
12	2	ea	8" Gate Valve, Elem	$ 600.00	$ 1,200.00
13	3	ea	Fire Hydrants with Gate Valves	$ 1,700.00	$ 5,100.00
14	1	ea	Air Release Valve	$ 1,000.00	$ 1,000.00
			Subtotal		**$ 826,700.00**
			TOTAL		**$ 1,607,230.00**

Values reflect construction costs only and do not include professional, regulatory or fees.

Landscape, Site Restoration and Irrigation System costs are not included pending coordination with Landscape consultant.

Preliminary Engineers' Opinion of Construction Value

Dec. 20, 1995

EISD River Hills Schools

W&WW Requirements for 1500 Student Option

Bid Item	Quantity	Unit	Description	Unit Price	Amount
			WASTEWATER SYSTEM		
1	1	ea	WW tratemnt unit, 42,000GPD, With Bldg, incl lift Pumps	$ 425,000.00	$ 425,000.00
2	1	ea	WW Storage Tank, 42,000 Gal , incl trash rack	$ 60,000.00	$ 60,000.00
3	1	ea	Reclcle Pump Station At Treatment Plant	$25,000.00	$ 25,000.00
4	1	ea	Duplex Grinder Pump Station At Secondary School	$ 20,000.00	$ 20,000.00
5	1,080	lf	3" Force Main at Secondary School	$ 6.00	$ 6,480.00
6	6	ea.	Wastewater manholes	$ 1,200.00	$ 7,200.00
7	1,070	lf	8" Wastewater (0-6)	$ 30.00	$ 32,100.00
8	1,500	lf	3" Recycle Line to Storage Tank	$ 6.00	$ 9,000.00
9	1	ea	32,000 Gal Grey Water Storge Tank w/Bldg, & PS, Pres. Tank	$ 25,000.00	$ 25,000.00
10	3,700	lf	2" Grey Water Recycle Line to Bldgs, Fields	$ 5.00	$ 18,500.00
11	3	Ea	Field Disposal of Effluent incl 18" Loam, irrigators, Back Flush	$ 24,000.00	$ 72,000.00
12	50	lf	6" ww line	$ 15.00	$ 750.00
			Subtotal		**$ 701,030.00**
			WATER SYSTEM		
1	1	LS	630,000 GAL Elevated Storage Tank	$ 630,000.00	$ 630,000.00
2	370	lf	12"C 900 water line at Secondary Sch	$ 30.00	$ 11,100.00
3	2,530	lf	8 " C900 water line at Secondary Sch	$ 20.00	$ 50,600.00
4	6	ea	Fire Hydrants at Secondary Sch	$ 1,700.00	$ 10,200.00
6	70	lf	4" water line service with valve at Secondary Sch	$ 20.00	$ 1,400.00
7	4	ea	Wells -800 ft. 4/6", with Pump&Motor	$ 8,000.00	$ 32,000.00
8	1		10,000 gal well storage, chlorinator & Repump w /30x20 bldg.	$ 33,000.00	$ 33,000.00
14	1	ea	air release valve	$ 1,000.00	$ 1,000.00
			Subtotal		**$ 769,300.00**
			TOTAL		**$ 1,470,330.00**

Values reflect construction costs only and do not include professional, regulatory or fees.

APPENDIX ITEM NO. 8

TRAVIS COUNTY LETTER REGARDING ROADWAY IMPROVEMENTS

TRANSPORTATION AND NATURAL RESOURCES
JOSEPH P. GIESELMAN, EXECUTIVE MANAGER

411 West 13th Street
Executive Office Building, 11th Floor
P.O. Box 1748
Austin, Texas 78767
(513) 473-9383
FAX (512) 708-4697

December 6, 1995

Mr. Mike Wright, P.E.
Martinez and Wright Engineers, Inc.
1106 Clayton Lane, Suite 400W
Austin, Texas 78723

Re: River Hills Road Improvements

Dear Mr. Wright:

As a follow up to our November 17, 1995 meeting about the proposed school site on River Hills Road, please find attached a cost estimate for reconstruction of River Hills Road from RM 2244 to Taylor Road. The existing roadway alignment and pavement width would need to be improved to accommodate the increased school bus traffic and higher traffic volumes produced by the introduction of a new school. The minimum acceptable roadway section is a two lane, thirty foot wide non curb and gutter roadway. The accompanying construction cost estimate was prepared based upon this proposed section. Additionally, approximately 1,300 linear feet of new right of way will be needed to improve the alignment of River Hills Road between Sumner Court and Barrett Lane.

The accompanying cost estimate represents construction and right of way acquisition costs. The costs for engineering, surveying and geotechnical investigations are not included in the total estimated cost.

Once again, I would like to thank you for the opportunity to review your proposed project in the early stages of development. If you need any further assistance please feel free to contact me at 473-9383.

Sincerely,

Donald Grigsby
Engineering Associate II

4100 River Hills Road

CC Commissioner Valarie Bristol
Steve Manilla

RIVER HILLS ROAD RECONSTRUCTION

(30' Pavement Width - No Sidewalk)

06-Dec-95

DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL PRICE
Subgrade Widening (Density Control)	42	STA	$1,000.00	$42,000.00
Excavation/Embankment	25480	CY	$15.00	$382,200.00
Reworking Base Material	42	STA	$850.00	$35,700.00
Seeding/Erosion Control	9160	SY	$1.00	$9,160.00
Flexible Base (8")	8700	SY	$5.50	$47,850.00
Asphaltic Conc. (c)(2")	18983	SY	$5.00	$94,915.00
Mobilization	1	LS	$40,000.00	$40,000.00
Barricades, Signs, Traffic Handling	1	LS	$8,000.00	$8,000.00
Constructing Detours, Class 2	1	LS	$15,000.00	$15,000.00
Pvmt. Markings (4" Refl. Paint, White)	11250	LF	$0.36	$4,050.00
Pvmt. Markings (4" Refl. Paint, Yellow)	11250	LF	$0.36	$4,050.00
Capital Improvement Program Sign	2	EA	$400.00	$800.00
Asphalt Driveway	230	SY	$15.00	$3,450.00
Concrete Driveway	150	SY	$29.00	$4,350.00
Concrete Rip-Rap	300	SY	$30.00	$9,000.00
Topsoil	4500	CY	$4.00	$18,000.00
Testing & Inspection	1	LS	$23,200.00	$23,200.00
Contingency	1	LS	$80,000.00	$80,000.00
New right of way	1.8	AC	$25,000.00	$45,000.00
Total Improvement Costs				*$821,725.00*