

The Planning Commission is an advisory body to the City Council. One of the Commission's functions is to hold public hearings and make recommendations to the City Council. The City Council makes all final decisions on these matters.

Lake Elmo Ordinances require that certain documents and information be included in applications. The Planning Commission may postpone consideration of an application that is incomplete and may for other reasons postpone final action on an application.

For each item, the Commission will receive reports prepared by the City Staff, open the hearing to the public, and discuss and act on the application. If you are aware of information that hasn't been discussed, please fill out a "Request to Appear Before the Planning Commission" slip; or if you came late, raise your hand to be recognized. Comments that are pertinent are appreciated.

#### AGENDA

#### LAKE ELMO PLANNING COMMISSION

July 22, 1991

7:30 p.m. MEETING CONVENES

1. AGENDA
2. MINUTES: July 8, 1991
3. PUBLIC HEARING: COMPREHENSIVE PLAN AMENDMENT  
FOR EXTENSION ON MUNICIPAL URBAN SERVICE AREA.
4. SITE & PLAN REVIEW: CARMELITE MONASTERY
5. SITE & PLAN REVIEW: KUNZ PEOPLES PLUS

} *POSTPONED*

If time allows:

6. THOROUGHFARE PLAN
7. LENGTH OF CUL-DE-SACS
8. ECONOMIC DEVELOPMENT COMMITTEE
9. OTHER
10. ADJOURN

} *TABLED*

LAKE ELMO PLANNING COMMISSION MINUTES

JULY 8, 1991

Chairman John Called the Planning Commission meeting to order at 7:40 p.m. in the City Council Chambers. Present: John, Johnston, McLeod, Conlin, Schubert, Weeks, Stevens, DeLapp, Bucheck (departed 10:35), Enes (arrived 8:20), City Planner Black, Administrator Kueffner. Absent: Thomas.

1. AGENDA

Add - 8. Other - a. Address cul-de-sac lengths, b. discuss an Economic Development Committee of Planning Commission members. M/S/P DeLapp/Stevens - to approve the Agenda as amended. (Motion carried 9-0).

2. MINUTES: June 10, 1991 & June 24, 1991

M/S/P Stevens/DeLapp - to approve the June 10, 1991 minutes as amended. (Motion carried 8-0-1, abstian: McLeod).

M/S/P McLeod/DeLapp - to approve the June 24, 1991 minutes as presented. (Motion carried 8-0-1, abstain: Conlin).

3. PUBLIC HEARING: STONEGATE

Chairman John opened the public hearing at 7:50 p.m. Notice of the public hearing was published in the St. Croix Valley Press on June 26, 1991, and all property owners within 350 feet were notified. Chairman John acknowledged receipt of the City Planner's report, dated July 2, 1991, and the City Engineer's report, dated July 2, 1991, made part of the minutes by reference.

Jim Peterson, Trail Head Development, presented the preliminary plat of "Stonegate", a 67 lot subdivision of approximately 235 acres, legally described in part as that part of the Northwest 1/4 and the North 1/2 of the Northeast 1/4 of Section 34, Township 29 N, Range 21 W, Washington County. Mr. Peterson is requesting rezoning from RR (1 house per 10 acres) to RE (1 house per 2.5 acres minimum) as provided for in the City's Comprehensive Plan, and preliminary plat approval.

Nancy Hansen, Chairperson of the City's Parks Commission, stated the Parks Commission had a new recommendation for this preliminary plat as of their special meeting on July 8, 1991, which is to recommend approximately 5-6 acres of land on the West side of the plat (suggested Lots 10 & 11, Block 1), and an easement for a trail connecting the proposed park on the west side to the east side of the development, and approx. 3.7 acres of land, above the Ordinary High Water Mark on the southeast side and north end of Goose Lake, and the remaining percentage in cash to be used to develop the trail easement.

Diane Zimmerhagl, 9200 10th St., asked Mr. Peterson what will happen to the trees currently along 10th street in his development, what about traffic, and what are the home values expected to be? Mr. Peterson answered the trees are in the County Right-of-Way and beyond his control, the traffic generated from the two county roads is also beyond his control, and home values will be determined by the current market.

Robert Andrews, 529 S. 7th St., Mpls, owns property on 10th St., asked if the lots meet the requirement of the zone, can the developer include the wetland when figuring density/number of lots allowed? The Commission answered yes. Mr. Andrews then stated he would prefer to see \$250,000 value homes (in this development) rather than \$150,000 value homes then everyone will follow this higher value. Mr. Peterson stated he sees a minimum of \$150,000 to \$170,000 value homes, but must keep options open due to the economy, and does not want to be called elitest.

Marge Williams, 3025 Lake Elmo Ave., asked how wide will the nature trail be, and how wide will the roads be? Mr. Peterson answered the trail will be 8 feet wide with a 20 feet wide easement and the roads will be 28 feet of blacktop per the City's requirements. Mrs. Williams then asked how many acres in size is Goose Lake and the surrounding area? Mr. Peterson stated the surface area of Goose Lake is 22.1 acres and the surrounding land is 11.84 acres below the Ordinary High Water Mark and 3.73 acres above the Ordinary High Water Mark.

Mr. Zimmerhagl asked if this plat is approved how soon would Mr. Peterson start this project? Mr. Peterson stated he would like to start this fall.

Dennis Geffre, 9140 10th Street, asked if Mr. Peterson was going to bring in any special services? Mr. Peterson stated the homes will be on septic and wells, but he will bring natural gas up 10th Street into the project and stated to the neighbors they're all welcome to hook up to it, and phone and electrical will be underground. Mr. Geffre then asked what if the City decides to put in city sewer and water after the development is started? Mr. Peterson stated that is a good question for the City, he was not requested by the City to do a sewer & water overlay plan.

Dorothy Lyons, 10th Street, stated covenants can increase the value of the homes. Mrs. Lyons stated she feels we should be making the ultimate and best use of this land by giving more people the opportunity to use this land, you're down valuing this land. Mrs. Lyons asked why are we rushing this development through when the City is talking of extending the MUSA line, the City should be looking at or making a future plan for this whole area. Mrs. Lyons stated the city is advocating an annexation by not planning for the future.

Dave Johnson, 11291 30th Street, suggested a buffer area be created between the I-94 business area and this development. Mr. Johnson's suggestion is to cluster the 67 homes on 130 acres toward 10th Street and leave a buffer/open space of 63 acres toward I-94 to be used as a golf course or whatever. Mr. Johnson stated the buffer is for incompatible uses, such as this where a mining area borders a residential area.

Chairman John formally objected to Mr. Johnson's statement as inappropriate at this time due to the fact Mr. Peterson has been following our Comprehensive Plan meetings for some months and now that he has introduced his proposed plat, in accordance with the Future Land Use Map in the Comp. Plan, suddenly Mr. Johnson, as Mayor of Lake Elmo, produces a totally new concept without any warning or prior discussion.

Mr. Johnson stated this is a public hearing and its purpose is to listen to public comment on this development being proposed. Mr. Johnson stated he wanted to make public comment at the public hearing and not behind closed doors. Mr. Johnson stated he has talked with Mr. Peterson before and suggested there are alternatives to the way he has his plat layed out, but we do not currently allow for transfers of density. Mr. Johnson's feeling is Mr. Peterson can do the job at less expense to him and insure less expense to the City in the future.

Jess Mottaz, 8770 Demontreville Tr., stated he is offended that Chairman John implied that elected officials cannot make public comment at a public hearing. Mr. Mottaz stated this is a preliminary plat, which means this is the first exposure to the public and the first request for public comment, and we're all part of the public and if we choose to make a comment as part of the public we shouldn't lose that right because we're elected officials.

Chairman John thanked Mr. Mottaz and stated it was not his intent to eliminate that right, but the Mayor's comment was a complete surprise since he felt the Mayor was aware of what was developing.

Ed Szachowicz, 1867 Saunders Ave., St. Paul, owns property on 10th Street, asked what wetland allowances Mr. Peterson made? Mr. Peterson stated Goose Lake is a DNR protected wetland and he must abide by the DNR and the Watershed rules and regulations. Setbacks from the water, septic, ponding and sedimentation, run-off requirements, etc., are all part of the engineering. Mr. Peterson stated he will adhere to any and all requirements where the lake and wetlands are concerned, he wants to see them protected.

Mrs. Williams stated she would like to speak in favor of the development because it meets the City's Comprehensive Plan and Ordinances, but is surprised that wetlands can be included when figuring the density. Mrs. Williams stated she would prefer the buffer area suggested by the Mayor be made by commercial development than by residential development. Mrs. Williams suggested the mining company adjacent to the development will play out and that land will be able to be used for other purposes.

Mr. Andrews suggested staff find out the exact ordinance on DNR protected waters and have Mr. Peterson put the ordinance in his covenants.

Chairman John closed the public hearing at 9:10 p.m.

The Planning Commission discussed lawn fertilizer, golf course fertilizer and farm fertilizer. The Commission also discussed minimum building elevations, the MUSA public hearing and the engineer's recommendation on street lights.

M/S/P DeLapp/Johnston - to recommend the rezone from RR (rural residential) to RE (residential estates) of the 235.8 acres known as the Stongate preliminary plat property based on the following findings of fact: (1) property is designated as RE on the Future Land Use Map, (2) residential development is compatible to surrounding properties, (3) will not be a negative impact, (4) configuration is suitable, (5) there is more than 20 acres. (Motion carried 9-0).

M/S/P DeLapp/Enes - to recommend approval of the preliminary plat of "Stonegate" subject to: (1) developer must obtain access permits from Washington County, (2) developer must obtain a permit from the Valley Branch Watershed District, (3) final grading, drainage and erosion control plan must be approved by the City Engineer, (4) the two through streets on the south end of the development shall be named as streets and not courts, (5) parkland dedication shall be 7% of the land or cash in lieu of land as recommended by the Parks Commission, (6) the streets on Julep Ct. and Jasmine Ct. shall be extended to the edge of the plat, (7) curbs are to be bituminous, (8) the dead end street over 800 feet is recognized as temporary and does not require a variance, (9) restrictive covenants should contain the City of Lake Elmo shoreland ordinance, notification of operating businesses in the area, i.e. Oakdale Gun Club, Hammes Mining, I-94 corridor, (10) all other conditions on City Engineer Tom Prew's report, dated July 2, 1991, except seven street lights. (Motion carried 6-2, against: Stevens - inadequate protection for the lake, McLeod - should table until after the public hearing on the MUSA proposal as it could affect this development).

Commissioner Bucheck stated for the record that she is very concerned about the wetlands.

M/S/P DeLapp/Stevens - encourage the City Council to allow the developer to create his own street names. (Motion carried 4-3-1, against: Conlin, Johnston, Schubert)

#### 4. JOHN M. DAY FARM ADDITION FINAL PLAT

M/S/P Bucheck/Conlin - to recommend approval of the Final Plat of the John M. Day Farm Addition subject to the conditions stated in City Planner Mike Black's report dated July 1, 1991, and subject to the conditions stated in City Engineer Tom Prew's report dated June 28, 1991. (Motion carried 8-0-1, abstian: Enes - neighboring property owner).

5. EVERETT BEAUBIEN CONCEPT

Mr. Beaubien, 3691 Kelvin, has asked for a concept review of a proposed subdivision and variance to the required frontage on a city improved street. The Planning Commission received a drawing indicating Mr. Beaubien's request for another homesite allowed off of the private road, and all commissioner's were encouraged to visit the site to better understand the proposal.

The consensus of the Planning Commission was approval of the 10 acre subdivision with no variance required. Commissioner Stevens did not approve of the subdivision as it creates a crazy lot shape. City Planner Black stated the strip of land between the Harstead property should be legally included in the plat and replat this piece or an RLS.

M/S/P DeLapp/Conlin - to table the remaining agenda items until the next planning commission meeting. (Motion carried 9-0).

6. RECOMMENDATION ON PLANNER

At the last city council meeting the council received a print out of the current budget - what was budgeted vs. what has been spent. This budget review showed the city has almost expended its funds for our Planner. However, escrow fees have been increased.

M/S/P Johnston/DeLapp - recommend the City Council give until the end of the year to build the Planner Fund from escrows based on the finding of fact that the City is running more smoothly and in the long run will be saving money by using a professional planner. (Motion carried 9-0).

The meeting was adjourned at 11:20 p.m.

REQUEST FOR PLANNING COMMISSION REVIEW

Meeting Date: July 22, 1991

AGENDA TOPIC: PUBLIC HEARING: Comprehensive Plan Amendment for extension on MUSA.	ITEM NO. 3.
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Attached is the application prepared by our planner, Mike Black, for an extension to the MUSA. Mike Black, Tom Prew and Rob Tautges will be at the meeting to answer any questions you may have.

I would like the following statement included in the minutes of tonight's meeting as an addendum:

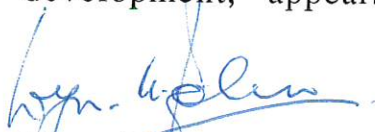
I, as Chair of the Planning Commission, want to express my dissatisfaction with the Lake Elmo City Council, in their Council meeting of July 16, when their assessment of the Goose Lake (Stonegate) Development failed to gain the required majority for rezoning.

This development complied with both the City approved Comprehensive Plan and the Residential Estate Ordinance. If neither of these City approved documents are acceptable to the Council, it places in question all City approved Plans and Ordinances, at a time when Lake Elmo is trying to correct an image of being anti-development.

As Chair of a volunteer organization, I request the City Council to provide explicit guidelines so that our decisions can be reached after proper consideration of all facts. Time wasting of volunteers, interested in carrying out the Council's wishes can then be avoided.

The Commission spends a lot of time assessing development and changes within the city. The Goose Lake development was discussed for at least 10 hours in three or four planning meetings, minutes of which were supplied to the council. Further time was spent discussing the program with the Parks Commission. The developer responded to all our suggestions, and had earlier attended planning sessions when the proposed Residential Estate Ordinances were debated at length. Rejection of our recommendations on a development which meets City standards, after what was a relatively short examination by the Council, is unsatisfactory.

The Council has already approved other Residential Estate Developments which complied with the ordinance. To reject this development, appears arbitrary.



Wyn. M. John  
Chair, Lake Elmo Planning Commission.



## Guidelines For A Public Hearing

### MUSA Line Extension

- **Mike Black - of James Hill & Associates - our consulting planner, will explain the proposal to extend the Metropolitan Urban Services Area to the area in the South of Lake Elmo along the I-94 Freeway.**
- **The City Engineer from TKDA will explain technical details.**
- **Rob Tautges, City Auditor of Voto, Tautges & Redpath will make additional comments.**
- **The Chair will then open the Public Hearing.**
- **AT THIS TIME QUESTIONS SHOULD BE ADDRESSED TOWARDS CLARIFYING DETAILS OF THE PROPOSAL, AND NOT FOR EXPRESSING COMMENT FOR, OR AGAINST IT.**
- **The Chair will then ask for comments, from the public in support of the proposal. When these are exhausted, comments from the public, against the proposal will be requested. Write in comments will be added to the record.**
- **IN THE INTEREST OF THE EFFECTIVE USE OF TIME, A TIMEKEEPER WILL BE APPOINTED WHO WILL LIMIT ALL COMMENT AND QUESTIONS FROM THE PUBLIC TO THREE MINUTES FOR EACH SPEAKER.**
- **PLEASE ADDRESS ALL YOUR COMMENT AND QUESTIONS TO THE CHAIR.**
- **WE ALSO ASK THAT BEFORE SPEAKING, THE REQUEST TO SPEAK FORM BE COMPLETED AND PASSED TO THE CHAIR, SO THAT PROCEEDINGS CAN BE CONDUCTED IN AN ORDERLY FASHION.**
- **After all comments and questions from the public have been made, the Chair will close the public hearing.**
- **The members of the Planning Commission will then discuss the proposal and any public comment that has been made before reaching a conclusion on recommendations to be given to the City Council.**



BUILDING MATERIALS • LUMBER

# LAMPERTS

1850 COMO AVENUE • BOX 64076 • ST. PAUL, MN 55164  
(612) 645-8155 • FAX# (612) 645-8155

JUL 19 1991

July 18, 1991

Lake Elmo Planning Commission  
3800 Laverne Ave. N.  
Lake Elmo, MN 55042

Re: Public Hearing to consider amendment to the 1990  
comprehensive plan for extension of the Municipal Urban  
Service Area (M.U.S.A.)

Dear Sirs:

We are in the process of purchasing the property located at 9220  
Hudson Blvd. This is the lumber yard that was owned by Lampert  
Lumber Company.

We are not currently in favor of extending the municipal  
utility service to the area until we have further information as  
to what this entails, could entail in the future, and especially  
the cost of the proposed project.

I am sorry I cannot attend the scheduled meeting, but I will be  
out of town on July 22, 1991. Even though we do not currently  
own the property, I would hope that you would take our feelings  
and consider our statements as though we are the current owner.

If you have any questions, please call.

Thank you for your consideration in this matter.

Sincerely,  
LAMPERT YARDS, Inc.

Robert T. Ungerman  
President

RTU/mbo

JUL 15 1991



MARINE • SPORTING GOODS • LEASING  
600 WEST 7TH ST. (FORT ROAD) • ST. PAUL, MN 55102 • (612) 227-6653  
9200 HUDSON BLVD. • LAKE ELMO, MN 55042 • (612) 738-3102

July 11, 1991

City of Lake Elmo  
3800 Laverne Ave. No.  
Lake Elmo, MN 55042

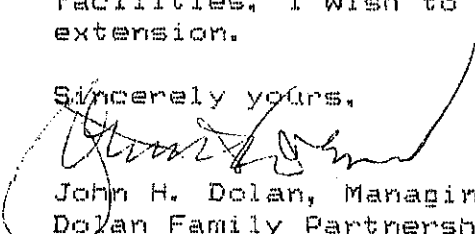
RE: Notice to extend the M.U.S.A.

Gentlemen or Ladies:

I am writing representing the Dolan Family Partnership which owns land between County Road 13 and County Road 19 in Lake Elmo.

I called the administrators office and a very nice lady briefly explained the M.U.S.A. situation to me. In as much as we are already paying substantial R.E. taxes on our property and we personally have no immediate use for sewer facilities, I wish to express my opposition to the M.U.S.A. extension.

Sincerely yours,



John H. Dolan, Managing Partner  
Dolan Family Partnership

JHD/kee

JUL 15 1991



# Federal Land Company

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Yankee Square Office II • 3470 Washington Drive • Suite 102 • Eagan, Minnesota 55122  
Tel. 612-452-3303 FAX 612-452-3362

July 11, 1991

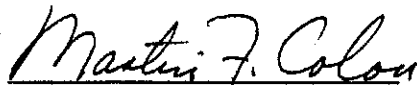
The Honorable David Johnson,  
Planning Commission Chairman Steve DeLapp,  
and Members of the Lake Elmo City Council  
and Planning Commission  
c/o Mary Kueffner, City Administrator  
3800 Laverne Avenue North  
Lake Elmo, MN 55042

Dear Mayor Johnson, Chairman DeLapp,  
Members of the Lake Elmo City Council  
and Planning Commission,

Federal Land Company hereby acknowledges receipt of Notice of a Public Hearing to consider the extension of the Municipal Urban Service Area ("MUSA"). As the Lake Elmo City Council is aware, Federal Land Company has for some time encouraged the City to extend the MUSA to its property located in the northwest quadrant of the intersection of Interstate 94 and County Road 19. The lack of extension of the MUSA caused Federal Land Company to propose a two phase development plan, first submitted in 1979, for its property. The extension of the MUSA as proposed conforms to our plan and will, in our opinion, benefit the City due to the quality development which will occur along the I-94 corridor. The implementation of quality development should, in turn, further benefit the City by providing a significantly increased taxbase, thereby giving the City greater revenues especially in these times of fiscal shortfalls.

The extension of the MUSA is long overdue and Federal Land Company supports its extension. We look forward to attending the public hearing and to providing you with further testimony in support of the extension of the MUSA.

Sincerely,



Martin F. Colon, Partner

MFC/lds

JULY 22, 1991

WE, THE UNDEPSIGNED RESIDENTS OF LAKE ELMO, RECOGNIZING THE CRITICAL NEED TO DEVELOP A COMMERCIAL TAX REVENUE BASE ALONG THE I94 CORRIDOR, SUPPORT THE EXTENSION OF THE MUSA AREA TO ONE HALF MILE EAST OF COUNTY ROAD 19 AND ONE HALF MILE NORTH OF I94, AND WE FURTHER SUPPORT THE SUBSEQUENT AMENDMENT TO THE LAKE ELMO COMPREHENSIVE PLAN. WE URGE THE CITY COUNCIL OF LAKE ELMO TO ADOPT THESE MEASURES.

<u>NAME</u>	<u>ADDRESS</u>
<i>D. Long</i>	5451 Hilltop Ave.
<i>Mary Long</i>	"
<i>Al Webster</i>	5460 Hilltop Ave.
<i>D. J. S. [Signature]</i>	5471 HILLTOP AVE
<i>Carol Schmitt</i>	5471 Hilltop
<i>J. [Signature]</i>	5500 Hilltop Ave.
<i>[Signature]</i>	" " "
<i>Joseph T. Connolly</i>	5440 Hilltop Ave N.
<i>Pamela J. Connolly</i>	5440 Hilltop Av N.
<i>G. S. [Signature]</i>	5420 Hill Top Ave. N,
<i>James B. Anderson</i>	"

Martha & Chuck Ross

Mark R. Beward

Jean E. Beward

Ron Ditzmeyer

Bill & Armstrong

Jack Pulovich

Sandra D. Nozani

Corinne J. Reed

Valis Brokman

Ronald Hughes

Jean M. Reed  
Jim Carpenter

*[Signature]*

Chris White

(STRICKEN BY REQUEST  
AT PZ MTG 8/12/91.)

5291 Hilltop Ave. N.

5290 Hilltop Ave N.

5290 Hilltop Ave. N.

7851 50th St. No.

7824 Demonteville Dr.

7832 Demonteville Tr.

5458 Highlands Tr. N.

11020 32nd St. N.

3385 Lake Elm Ave N.

9191 44th St N.

2543 Lake Elm Ave.

4911 N 030th (K-T) abto Elm

11291 30th

~~Stillwater Valley Area CofC.~~

2111 + Landis Ave

INTERESTED IN THE FUTURE  
OF LAKE ELMO? GOOD!!!!

YOU MUST ATTEND  
THE PUBLIC HEARING FOR THE  
PROPOSED EXTENSION OF THE  
METROPOLITAN URBAN SERVICES AREA

WHEN: MONDAY, JULY 22 at 7 PM

WHERE: LAKE ELMO CITY HALL

\* MUSA EXTENSION IS THE MOST CRITICAL ISSUE IN LAKE ELMO IF YOU TRULY WANT TO PRESERVE YOUR RURAL LIFE

\* MUSA EXTENSION IS THE MOST CRITICAL ISSUE IN LAKE ELMO IF YOU TRULY WANT TO CONTROL PROPERTY TAXES

\* MUSA EXTENSION IS THE MOST CRITICAL ISSUE IN LAKE ELMO IF YOU TRULY WANT TO PREVENT FURTHER LOSS OF OUR VALUABLE LAND TO NEIGHBORING COMMUNITIES

\* MUSA EXTENSION IS THE MOST CRITICAL ISSUE IN LAKE ELMO IF YOU TRULY WANT TO HAVE A PLANNED COMMUNITY WITH RATIONAL, REVENUE-PRODUCING DEVELOPMENTS. I94 IS OUR ONLY CHANCE FOR REAL PLANNING.

\* MUSA EXTENSION IS THE MOST CRITICAL ISSUE IN LAKE ELMO IF YOU TRULY WANT YOUR CITY IN HEALTHY FISCAL CONDITION. TODAY ITS CONDITION IS GUARDED. NEXT YEAR IT MAY BE FATAL.

MUSA  
MUSA  
MUSA  
MUSA  
MUSA  
MUSA  
MUSA

RESIDENT  
LAKE ELMO, MN 55042

Distributed by Concerned Citizens of Lake Elmo

#### WHAT IS MUSA

MUSA is the Metropolitan Urban Services Area. It is that area of a community approved and designated by the Metro Council and the community's council for the future installation of urban services, primarily sewer and water. MUSA designation is deemed essential for any meaningful, revenue-producing commercial development. Actual installation of MUSA services is authorized by our city council.

Lake Elmo currently has no acreage within the MUSA area.

Lake Elmo is convening a public hearing to consider an extension of the MUSA line into Lake Elmo from the Oakdale section that only 1 year ago was also Lake Elmo. The proposal is intended to extend the MUSA area into Lake Elmo one half mile east of County Road 19 and one half mile north of I94. This narrow zone along I94 would be designated the development area for a business park concept in Lake Elmo. Express your favorable support for this MUSA extension at the public hearing if you want to:

- \* STABILIZE YOUR PROPERTY TAXES
- \* PROTECT LAKE ELMO'S BOUNDARIES AND FUTURE DESTINY
- \* CREATE MINNESOTA'S OPTIMUM PLANNED COMMUNITY
- \* PRESERVE OUR ENVIABLE LAKE ELMO RURAL LIFESTYLE
- \* HAVE THE CAPACITY TO BEGIN APPROPRIATE CITY SERVICES

THIS IS A PUBLIC HEARING!  
IT'S TIME WE HEAR WHAT THE PUBLIC REALLY WANTS.



# WHO PAYS FOR CHANGE?

A public hearing is scheduled for Monday night, July 22, 1991 at the Lake Elmo City Hall regarding a proposed change to the 1990 Lake Elmo Comprehensive Plan which would bring sewer to an area along I-94. This extension of the MUSA line could change the character of Lake Elmo and have long term effects for our city. Before a major change is made to a comprehensive plan, many questions need to be asked and answered. Come to the meeting and make sure that these kinds of questions are answered -- they relate to some of the most important issues facing the citizens of our city.

1. Who will pay for the extension of the MUSA? Will the city finance a bond for it? Will the citizens have an increase in their currently low taxes? Will the developers pay all the costs? Who will pay the sewer bonds if development fails?
2. Why is the area for business development being expanded to  $\frac{1}{2}$  mile north of I-94 and  $\frac{1}{4}$  mile east of Co. Road 19 from the  $\frac{1}{4}$  mile boundaries in the Comprehensive Plan? Is the city being "held hostage" by I-94 landowners to fund sewers or they will plead annexation to Woodbury?
3. Will a densely developed commercial area be detrimental in any way to the rural life style we now enjoy in Lake Elmo? Will the city be forced to provide urban services demanded by this action and how much will it cost the taxpayers?
4. What kind of development will be allowed in this new area? Will it be a business park or one strip mall after another? Who decides and when (before or after development starts)?
5. Is there a proposed development for the area which is stimulating this action? What is it? Will the city "promote" development by hiring a Public Relations firm? How much has been spent already?
6. Could we have business development without extension of the MUSA? How will a sewerred business area bring a lower tax rate to the citizens when fully developed and sewerred communities have higher tax rates than Lake Elmo?

**Plan to attend the public hearing  
for the proposed extension of the  
MUSA at 7:30 PM, July 22, 1991  
at the Lake Elmo City Hall.**

REQUEST FOR PLANNING COMMISSION REVIEW

Meeting Date: July 22, 1991

AGENDA TOPIC: Site & Bldg. Review: Carmelite Monastery	ITEM NO. 4.
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Rev, John Burns, Carmelite Monastery, has applied for a Site & Bldg. Plan Review for construction of additional monastery buildings for a mens community on their property at 8251 DeMontreville Trail N. Attached is the information submitted for your review.

There will be a representative for the Carmelites at the meeting to answer any questions you may have.

A portion of the plat map is also attached to the packet to help you understand exactly where the property is located.

Jim McNamara  
Building Official

**CKDA**

ENGINEERS ARCHITECTS PLANNERS

TOLTZ, KING, DUVALL, ANDERSON  
AND ASSOCIATES, INCORPORATED2500 AMERICAN NATIONAL BANK BUILDING  
SAINT PAUL, MINNESOTA 55101-1883  
612/292-4400  
FAX 612/292-0053

July 18, 1991

Planning and Zoning Commission  
Lake Elmo, MinnesotaRe: Site Plan Review  
Carmelite Monastery  
Lake Elmo, Minnesota  
Commission No. 9150-001

Dear Commission Members:

I have reviewed this site plan, the following are my comments.

1. The applicant should submit a 100 scale topographic site plan with 2' contours. It is difficult to tell the exact relationship of all the improvements from the submitted material. Erosion control should be shown on this plan.
2. The septic system has been sized based on 14 people. A second drainfield site of 10,000 S.F. should be identified for future use.
3. They are proposing a dike across part of the gully leading to Lake Demontreville. This will reduce the peak flows through the gully.
4. There is an erosion problem with the gully. A plan to restore and provide erosion control within the gully should be submitted.
5. All trash should be cleaned out of the gully and removed from the site.
6. A permit from the Valley Branch Watershed District should be acquired before beginning any site work.

Sincerely,



Thomas D. Prew, P.E.

TDP/mha

cc: Father John Burns

100 Elm  
2500 Elmwood



# City of Lake Elmo

3800 Laverne Avenue North  
Lake Elmo, Minnesota 55042

## DEVELOPMENT APPLICATION FORM

- COMPREHENSIVE PLAN AMENDMENT
- ZONING DISTRICT AMENDMENT
- TEXT AMENDMENT
- CONDITIONAL USE PERMIT
- VARIANCE \* (See Below)
- APPEALS
- SITE & BLDG. PLAN REVIEW
- SHORELAND PERMIT
- SIMPLE LOT DIVISION
- LARGE LOT SUBDIVISION
- SUBDIVISION SKETCH
- PRELIMINARY
- FINAL
- SUBDIVISION VARIANCE
- FLOOD PLAIN CONDITIONAL USE PERMIT

APPLICANT: FATHER JOHN BURNS 8251 DEMONTREVILLE TRAIL LAKE ELMO MN 55042  
(Name) (Address) (Zip)

TELEPHONE: 779-7351 (Work) SAME (Home)

OWNER: CARMELITE MONASTERY 8251 DEMONTREVILLE TRAIL LAKE ELMO MN 55042  
(Name) (Address) (Zip)

TELEPHONE: 779-7351 (Work) SAME (Home)

PROPERTY LOCATION (Street Address and Legal Description):

8251 DEMONTREVILLE TRAIL LAKE ELMO MN 55042 (NEW ADDRESS PENDING)

SEE ATTACHED FOR LEGAL DESCRIPTION

Carmel of the Blessed Virgin Mary  
8251 De Montreville Tr., N.  
Lake Elmo, Mn 55042

1392

June 28 1991

22-10/960

Pay to the Order of City of Lake Elmo \$ 350.00  
Three Hundred Fifty and No/100 Dollars



Norwest Bank Minnesota, N.A.  
Maplewood Office  
2945 White Bear Avenue  
Maplewood, MN 55109

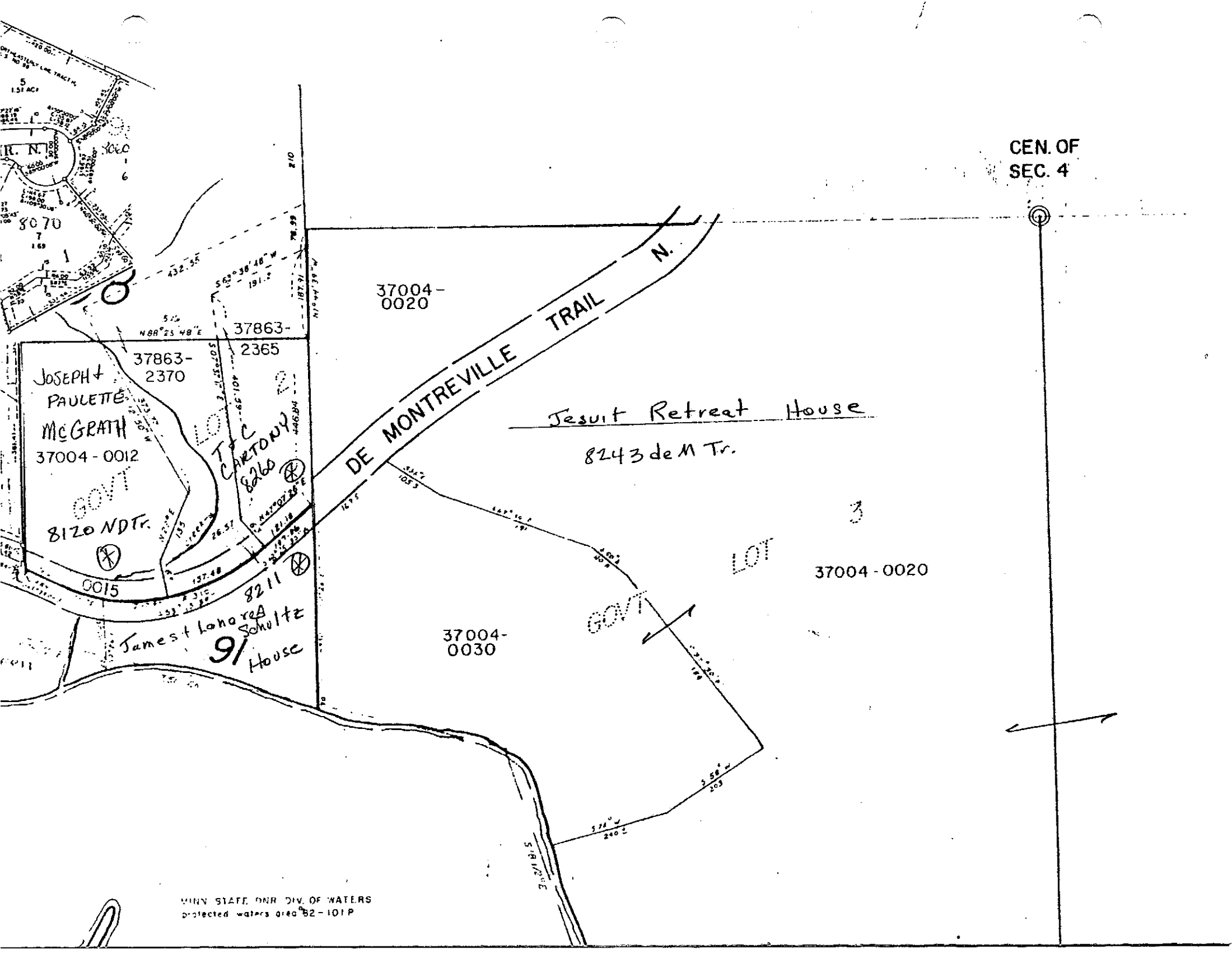
Memo

Site PLAN Review Res John Burns



All of Government Lot 4 in section 9, Township 29, Range 21, according to government survey containing 59.4 acres of land. Also south 30.6 acres of lot 4 in section 4, and of the South West quarter of the South East quarter of said section 4, all in Township 29, Range 21, being the South 688 feet, more or less, thereof.

CEN. OF  
SEC. 4



37004-0020

37863-2365

37863-2370

JOSEPH +  
PAULETTE  
McGRATH  
37004-0012

T. C.  
CARTONNY  
8260

Jesuit Retreat House  
8243 de M Tr.

GOVT  
8120 NDT  
0015

GOVT

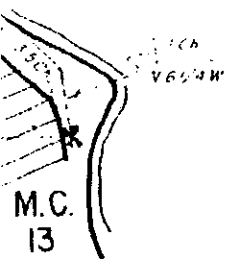
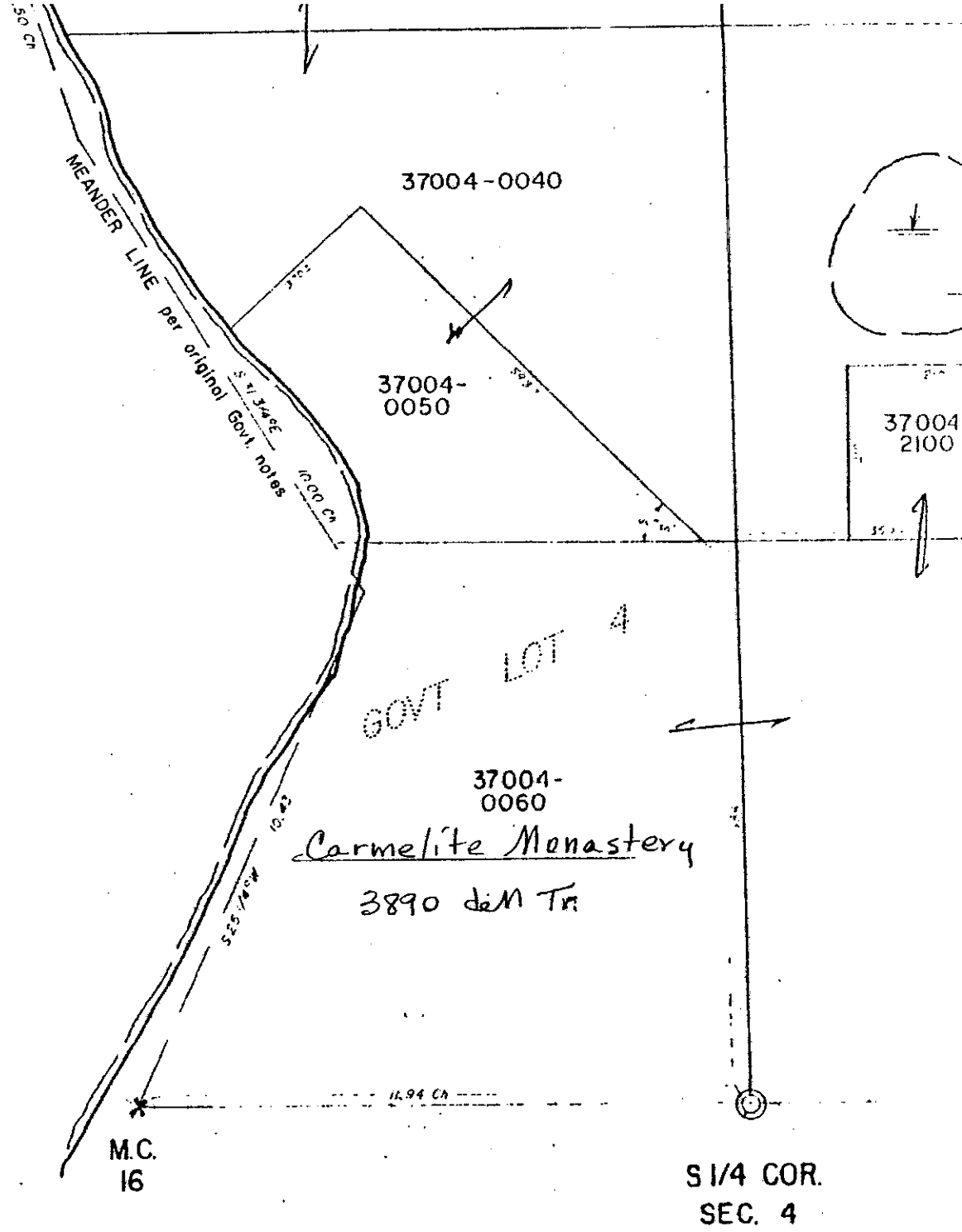
LOT

37004-0020

37004-0030

James + Lorraine  
Schultz  
91 House

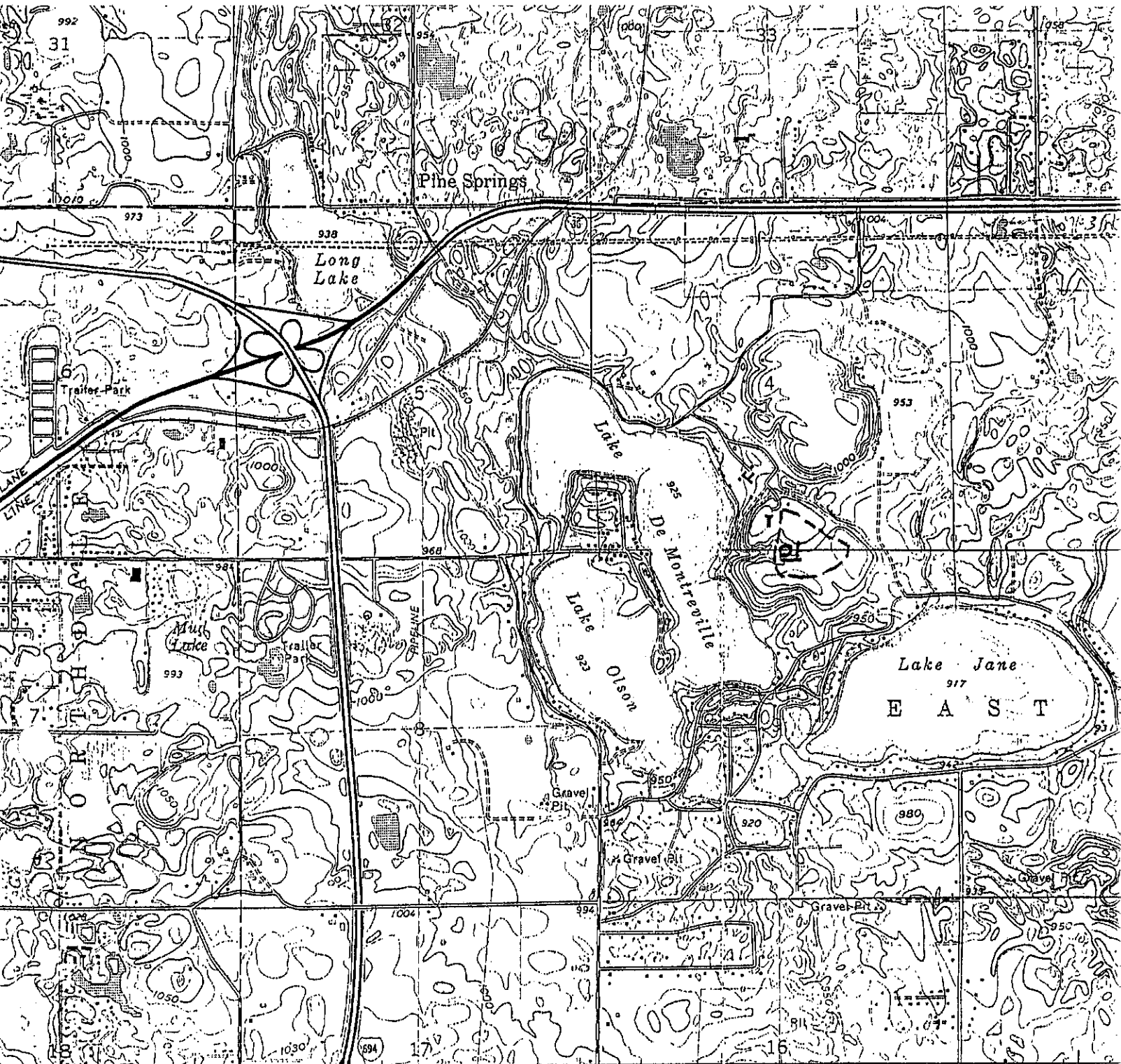
DE MONTREVILLE



BY APPEAR IN THE

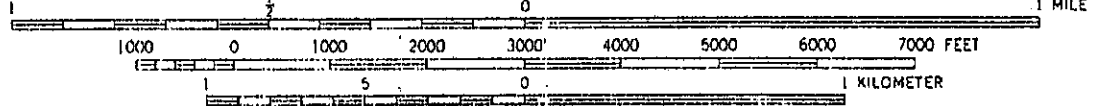
□ STONE MONUMENT



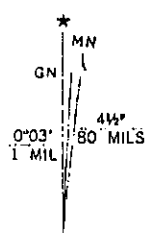


STATE 94 R. 21 W. 503 57'30" 1504 (LAKE ELMO) 506 155'  
 al Survey Administration 3.5 MI. TO INTERSTATE 94 & 494 7473 IV NW

SCALE 1:24 000



CONTOUR INTERVAL 10 FEET  
 NATIONAL GEODETIC VERTICAL DATUM OF 1929



UTM GRID AND 1980 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092 A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Revision: photogr. This inf. Purple t

SUB-BASIN MAP CARMELITE MONASTERY

are shown

INDIVIDUAL SEWAGE TREATMENT SYSTEM MINIMUM SPECIFICATIONS SHEET

NAME: CARMEL OF THE BLESSED VIRGIN MARY

ADDRESS AND/OR LEGAL DESCRIPTION: 8251 DEMONTAUVILLE TRAIL  
LAKE ELMO

WASTEWATER FLOW

Estimated 900-1100 gal/day, or  
Measured \_\_\_\_\_ gal/day

Spacing of trenches 7'6" ft oc  
Distribution (check one):  
 drop box  
 pressurized laterals - complete  
PRESSURE DISTRIBUTION SYSTEM section below

SEPTIC TANK

Volume 3000 gal  
2-1500 GAL TANKS

BED

Minimum depth of bed \_\_\_\_\_ inch  
Maximum depth of bed \_\_\_\_\_ inch  
Bottom area for bed having 12 inch  
of rock below the distribution pipe  
\_\_\_\_\_ sq ft

LIFT STATION

Volume 1500 gal

Pump:

delivery rate 45 gal/min  
total head 6-12 ft  
discharge per pumping event 225 gal  
Inside diameter of pressure line from pump  
to treatment area 2 inches

Bed Width \_\_\_\_\_ ft

Bed Length \_\_\_\_\_ ft

MOUND

Bottom area for bed having 9 inch of rock  
below the distribution pipe \_\_\_\_\_ sq ft  
Bed Width \_\_\_\_\_ ft  
Bed Length \_\_\_\_\_ ft  
Upslope sand base depth \_\_\_\_\_ ft  
Upslope dike width \_\_\_\_\_ ft  
Downslope sand base depth \_\_\_\_\_ ft  
Downslope dike width \_\_\_\_\_ ft

SOIL

Depth to restricting layer 6'6"  
Percolation rate:  
26 min/in at 18 inch depth  
40 min/in at 24 inch depth  
30 min/in at 24 inch depth  
Land Slope 1-2 %

DRAINFIELD TRENCHES

Minimum depth of trench 18 inch  
Maximum depth of trench 30 inch  
Bottom area for trenches having 12  
inch of rock below the distribution pipe  
2400 sq ft  
Trench width 3 ft  
Total trench length 100 ft  
Number of trenches 8

PRESSURE DISTRIBUTION SYSTEM

Inside diameter of manifold pipe \_\_\_\_\_ in  
Perforated lateral \_\_\_\_\_ in  
inside diameter \_\_\_\_\_ in  
length \_\_\_\_\_ ft  
number \_\_\_\_\_  
spacing \_\_\_\_\_ in oc  
Perforation:  
diameter \_\_\_\_\_ in  
spacing \_\_\_\_\_ in oc

LAYOUT (Site Plan)

1. Use an appropriate scale and indicate direction by use of a north arrow.
2. Show pertinent property boundaries, rights-of-way, easements, etc.
3. Show location of house, garage, driveway and all other improvements existing or proposed.
4. Show location and layout of sewage treatment system including tanks, trenches, etc.
5. Show location of water supply well.

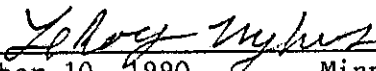
Specifications and layout have been designed by DALE EKLIH Date 6-21-91

Minnesota Pollution Control Agency Certification No. 695 Exp. Date 1992

DRAINAGE REPORT  
FOR THE  
CARMELITE MONASTERY  
LAKE ELMO, MINNESOTA  
December 10, 1990

NYHUS ENGINEERING  
2745 WINNETKA AV. N., SUITE 243  
GOLDEN VALLEY, MN 55427  
TELE: 1-800-446-5038

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

  
DATE: December 10, 1990      Minn. Reg. No. 10981

DRAINAGE REPORT  
FOR THE  
CARMELITE MONASTERY  
LAKE BLMO, MINNESOTA  
December 10, 1990

INTRODUCTION

This report covers the 1 year-24 hour, 10 year-24 hour, 50 year-24 hour, 100 year-24 hour and the 100 year-10 day storms and the 100 year snow melt for a single 12 acre drainage basin for the Carmelite Monastery in Sections 4 & 9, t. 29, r 21, Washington County Minnesota. The embankment for the driveway will serve as a dike for the pond. The purpose of the pond is to decrease the rate of flow downstream to DeMontreville Lake to help alleviate the erosion problem.

The project lies within the Valley Branch Watershed District. The drainage sub-basin is shown on the attached map.

CONCLUSIONS

The peak rate of runoff will be reduced from 38 cfs to 2.1 cfs when the driveway-dike is constructed. The peak rate is generated by the 100 year-24 hour storm. The 100 year elevation will be 82.4 feet.

The outlet from the pond will be by a 12" R.C.P. with an orifice plate with a 6" dia. opening over the outlet to C.B. No. 1

DESIGN DATA

The "Soil Survey of Washington and Ramsey Counties, Minnesota" prepared by the United States Department of Agriculture Soil Conservation Service was used to determine the type of soil and hydrologic group.

The rainfall data for the 1 year-24 hour, 10 year-24 hour, 50 year-24 hour, 100 year-24 hour, snowmelt, and the 100 year-10day storms was obtained from the "Hydrology Guide For Minnesota", Fig. 1-2, 1-5,1-7, 1-8,1-12, and 1-11 respectively and are tabulated as follows:

STORM	RAINFALL (in)
1 year-24 hour	2.4
10 year-24 hour	4.2
50 year-24 hour	5.2
100 year-24 hour	5.9
Snow Melt	7.2
100 year-10 day	11.0

The run-off rate and volume for the storms were determined using the TR-20 Computer Program for "Project Formulation - Hydrology" (1982 Version).

The Curve Numbers (CN) were determined using Fig. 3-1 and 3-2 in the "Hydrology Guide For Minnesota".

The time of concentration was calculated by using the formulas in Eq. 15.3 and Eq. 15.4 in the "National Engineering Handbook, Section 4, Hydrology"

## CALCULATIONS

Soils within the plat.

SOILS NAME	MAP NO.	HYD. GROUP
EMMERT	12C	A
EMMERT	12D	A
ANTIGO	49B	B
RICHWOOD	298	B
RICHWOOD	298B	B
LINDSTROM	301B	B
WAUKEGAN	411B	B
WAUKEGAN	411C	B
MAHTOMEDI	454F	A

The soil hydrologic group is B was used for the calculations.

### Hydrologic Curve Number Computations

SUB-BASIN NO.	COVER	PRACTICE ROTATION	CONDITION	ACRES PER PRACTICE	CURVE NO. CN	PRODUCT
1	ROW CROP	STR. ROW	GOOD	10.00	78	780.00
	FOREST		POOR	2.00	66	132.00
			TOTAL =	12.00		912.00
					WEIGHTED RUNOFF CURVE NO. =	76.0

### TIME OF CONCENTRATION

SUB-BASIN NO.						
1	LENGTH 1 =	600	FALL 1 =	14	CN =	76
	LENGTH 2 =	300	FALL 2 =	8	CN =	76
	TIME C1 =	0.26	HR			
	TIME C2 =	0.14	HR			
	TOTAL TC =	0.40	HR			

The run-off rate and volume for the storms were determined using the TR-20 Computer Program for "Project Formulation - Hydrology" (1982 Version). The computer printouts are in the appendix.

### APPENDIX

1 YEAR-24 HOUR STORM  
10 YEAR-24 HOUR STORM  
50 YEAR-24 HOUR STORM  
100 YEAR-24 HOUR STORM  
SNOWMELT  
100 YEAR-24 HOUR STORM  
Sub-basin Map

# DALE EKLIN

1986 Ridgewood Avenue  
White Bear Lake, Minn. 55110  
(612) 429-1090

Rev. John Burns  
Carmel of the Blessed Virgin Mary  
8251 Demontreville Trail  
Lake Elmo, MN 55042

June 21, 1991

Dear Rev. Burns,

At your request, on June 20, 1991, soil borings and percolation tests were performed at your proposed building at 8251 DeMontreville Trail, Lake Elmo. This part of the building will be Phase I. It is my understanding that 14 people will be living at this building.

I understand that low flush toilets and showers heads will be installed. This should reduce your water use by about 40%. I estimate your daily water use to be approximately 900 to 1100 gallons per day for 14 people.

I would recommend installing a water meter to determine how much water use is generated. This will be helpful for future expansion.

The soils on the site are sandy loam and loam for the first 3 to 4 feet, then medium sand and silty sand at 6 feet. This silty sand has iron and mottled soil at the depth of 6 to 6½ feet. The soil was wet at this depth.

For your building I am recommending the following:

1. Two 1500 gallon septic tanks
2. 2400 square feet of drainfield - 8 trenches, 100 feet long, 36" wide and 18" to 30" deep.

If needed, there should be a 1500 gallon lift station with a 24" manhole to grade for servicing the pump. The pump should be a 1/3 HP submersible sump pump with a 2" discharge pipe going to the drainfield. The pump should be placed 6" off of the bottom of the lift station. The 2" discharge pipe should have back pitch on it so water does not stand in the pipe and freeze during winter months. A warning device should be installed at the lift station to warn you of pump failure. The pumping cycle should be 225 gallons per cycle. This cycle will also allow for run back from the 2" discharge pipe. The pumping rate should be no more than 45 gallons per minute.

If a water softener is installed, it can drain directly to a wetland or a low spot on the site. There are no harmful chemicals and it is legal.

See the attached papers for suggested design and boring and percolation logs.

continued.....

DURING CONSTRUCTION IT IS IMPORTANT TO KEEP ALL TRAFFIC OFF OF THE DRAIN-FIELD AREA SO THE GROUND WILL NOT BECOME COMPACTED. YOU SHOULD FENCE OR LAG OFF THE TESTED AREA BEFORE ANY EXCAVATION IS DONE ON THE SITE.

It is important to maintain your septic system by pumping the septic tank periodically. The size of the family will determine how often this has to be done. If the septic tank is not pumped when needed, sludge can build up and work over into the drainfield and cause the field to stop up. Always try to conserve on water use.

During winter months it is also very important to keep all traffic off of the drainfield area; snowmobiles, skiing, sliding, etc. If snow becomes compacted it could cause your drainfield to freeze up.

This report does not mean that you have a permit to install the job. Your local inspector will have to first approve the suggested design and logs. In some cases other agencies may require a permit. Your local authorities should be able to inform you of this.

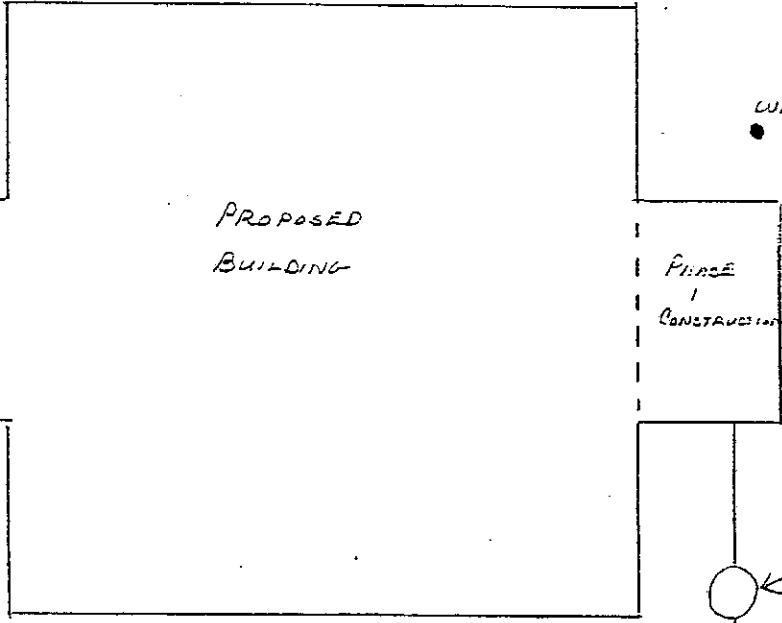
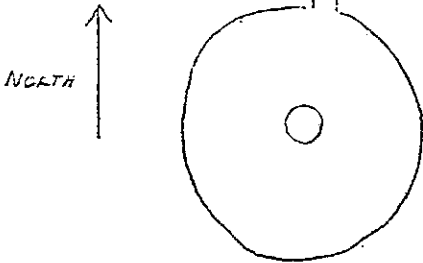
If I can be of any further assistance please feel free to call me.

Yours truly,



Dale Eklin  
Certification No. 695

DESIGN  
 CARMEL OF THE UNFINISHED  
 VIRGIN M.  
 8251 DEWITTREVILLE  
 TRAIL  
 LAKE ELMO  
 SCALE - 1" = APPROX. 50'



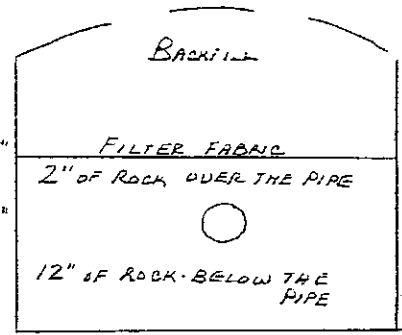
WELL

2400 SQ. FT. OF DRAINFIELD  
 8 TRENCHES - 106' LONG  
 36" WIDE - 18" TO 30" DEEP  
 7'6" CENTER TO CENTER TRENCH SPACING  
 FOLLOW THE CONTOURS  
 KEEP BOTTOM OF TRENCH LEVEL

NOTE - SET BOXES 18" DEEP. THERE IS A SLIGHT RISE IN THE GROUND TO THE SOUTH.

TWO 1500 GAL. SEPTIC TANKS WITH 6" CLEAN OUT TO GRADE

IT MAY BE NECESSARY TO INSTALL A 1500 GAL. LIFT STATION WITH A 24" MANHOLE TO GRADE. BASEMENT AND 1<sup>ST</sup> FLOOR ELEVATIONS WILL DETERMINE IF THE LIFT IS NEEDED.



DRAINFIELD CROSS SECTION  
 NO SCALE

OPEN FIELD

1-2% SLOPE

1-2% SLOPE

BH6

P3

FUTURE DRAIN FIELD EXPANSION AREA

BH3

4" CLEAN OUTS ON DROP BOXES

BH2

P1

BH4

4" INSPECTION PIPES

BH5

THE GROUND IS UNEVEN. THERE MAY BE PLACES WHERE ADDITIONAL FILL MAY BE NEEDED OVER THE TRENCHES

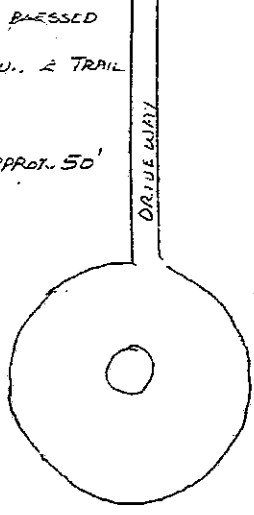
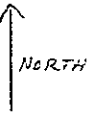
TREES

BH7

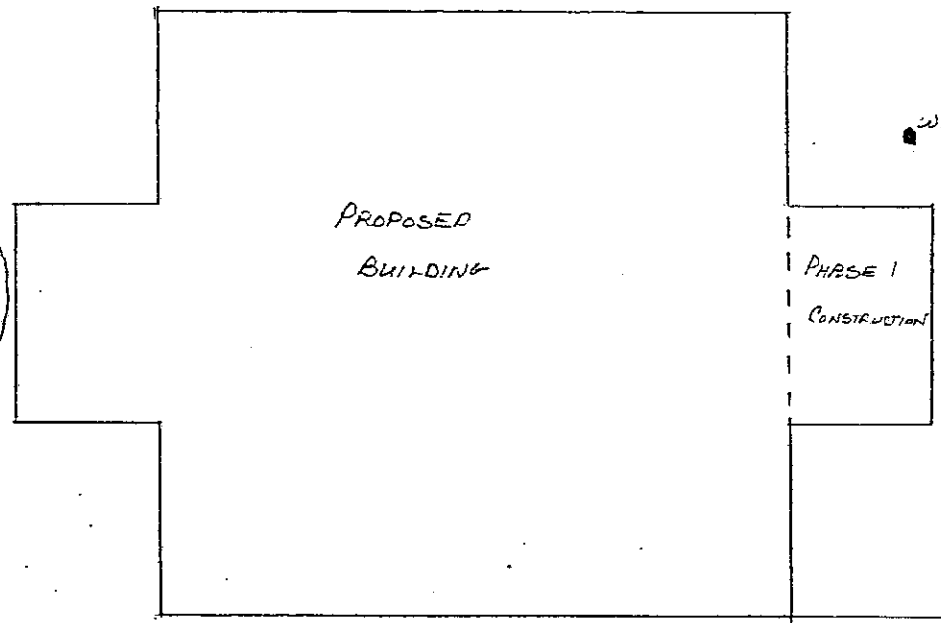


ARMEL OF THE BLESSED  
VIRGIN MARY  
251 DEMONTREU... & TRAIL  
LAKE ELMO

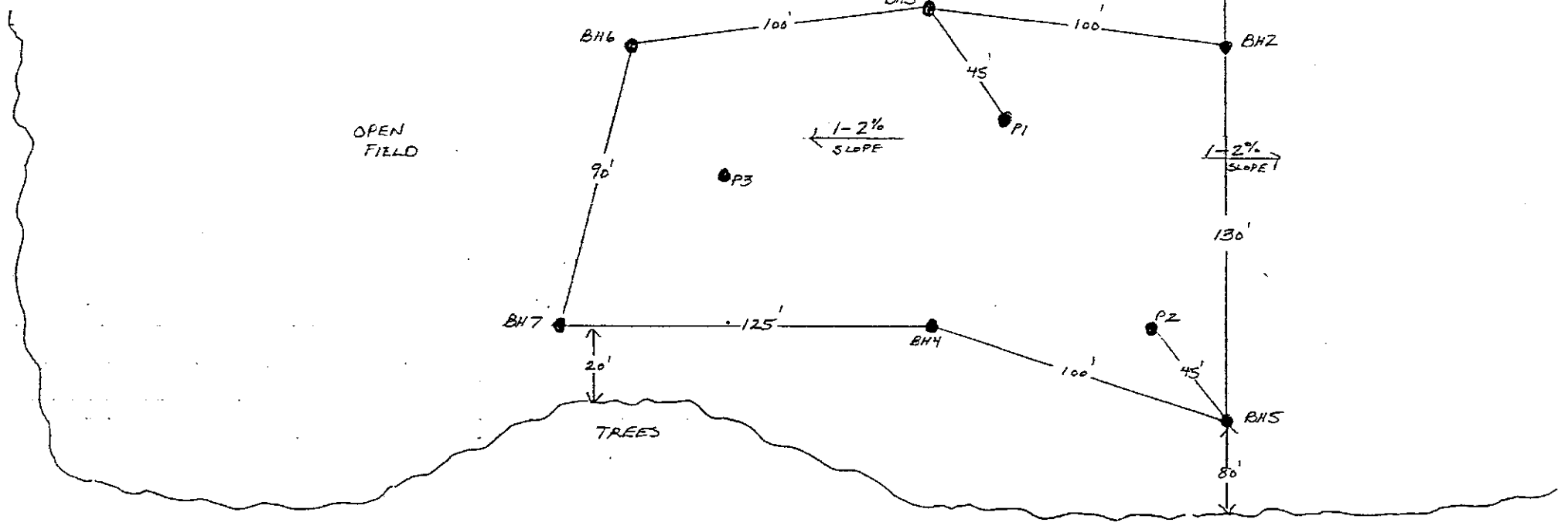
SCALE - 1" = APPROX. 50'

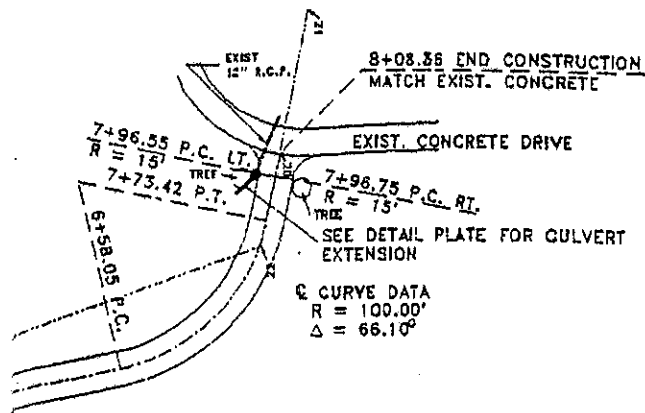


DRIVEWAY



WELL



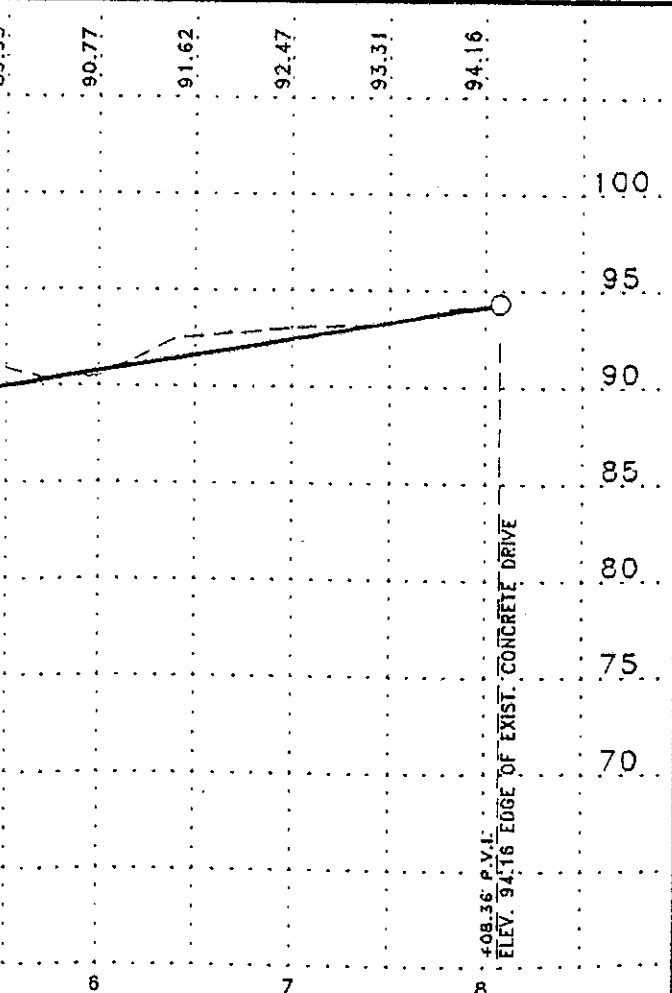
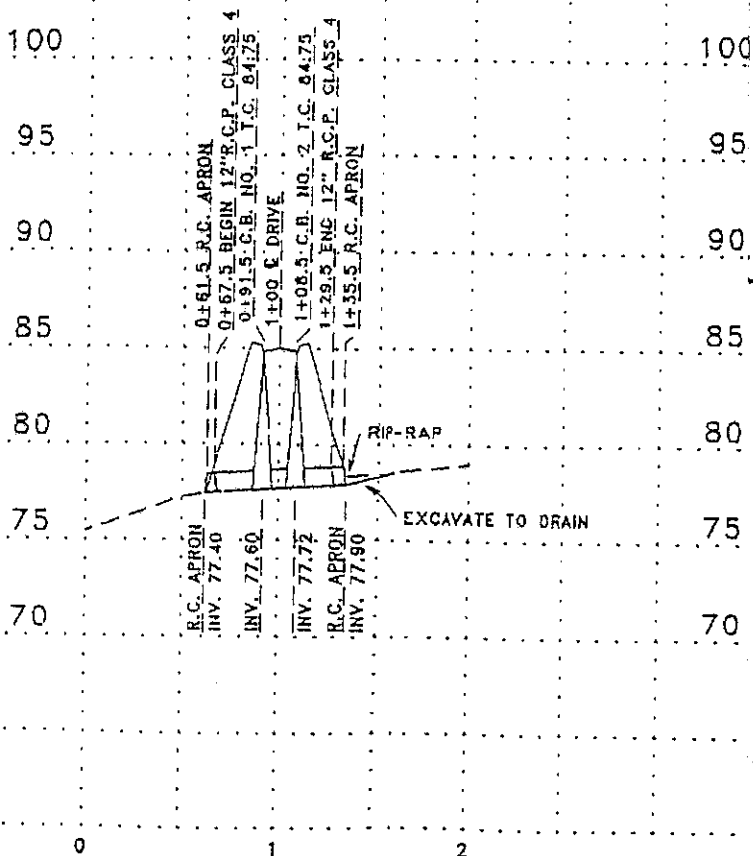


I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DUTY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE 8-10-90 REG. NO. 10981 *Chas. Nyhus*  
LEROY NYHUS

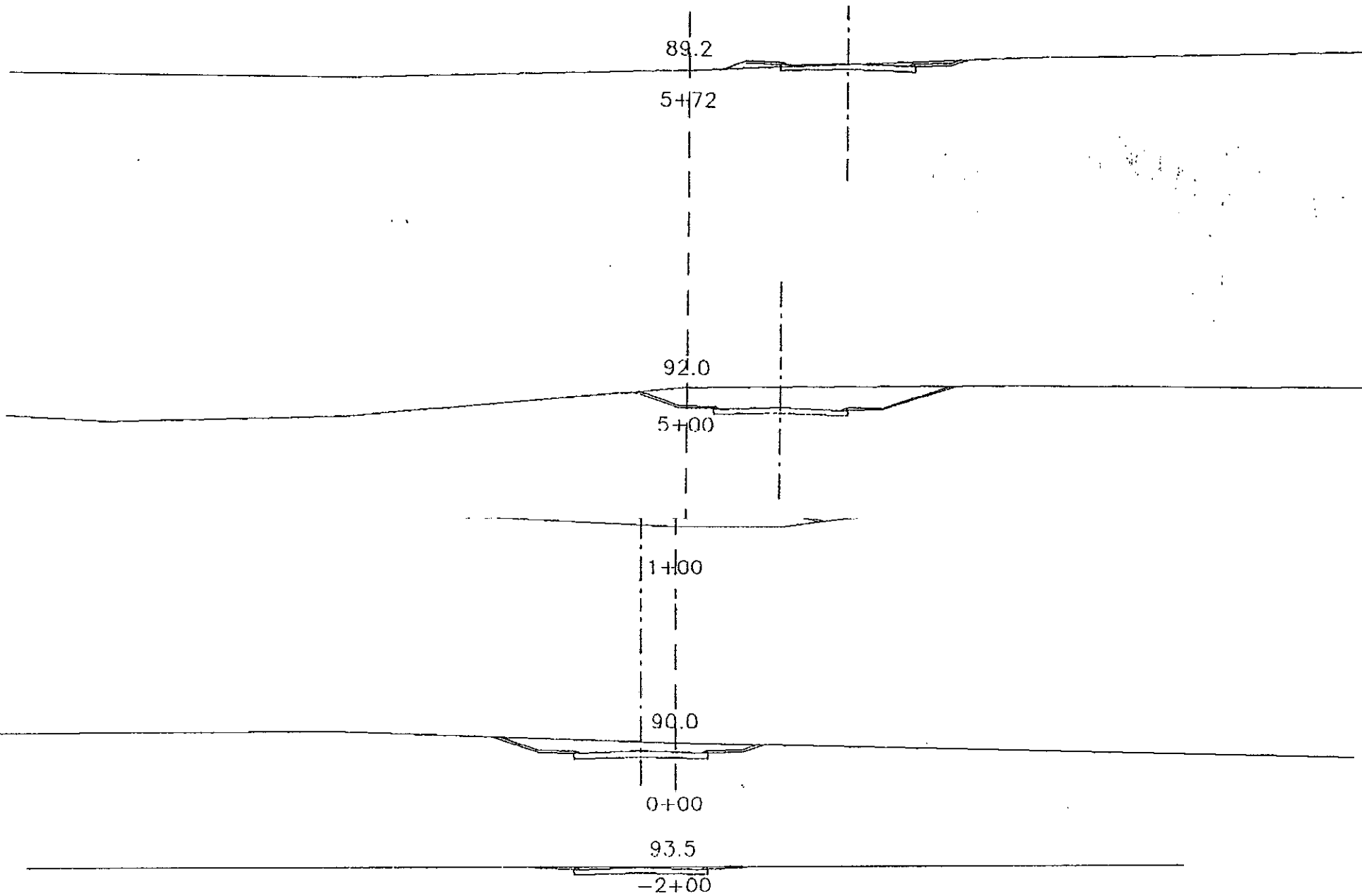
REVISED 12-11-90

STORM POND OUTLET



4+08.36 P.V.I.  
ELEV. 94.16 EDGE OF EXIST. CONCRETE DRIVE

MINNESOTA REGISTERED PROFESSIONAL ENGINEER



REV. 12-05-90

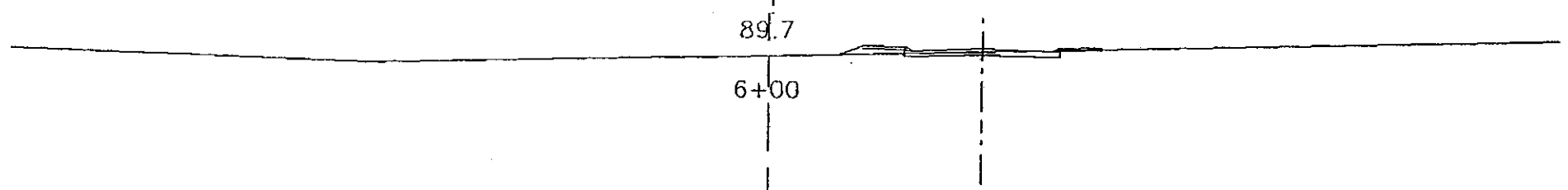
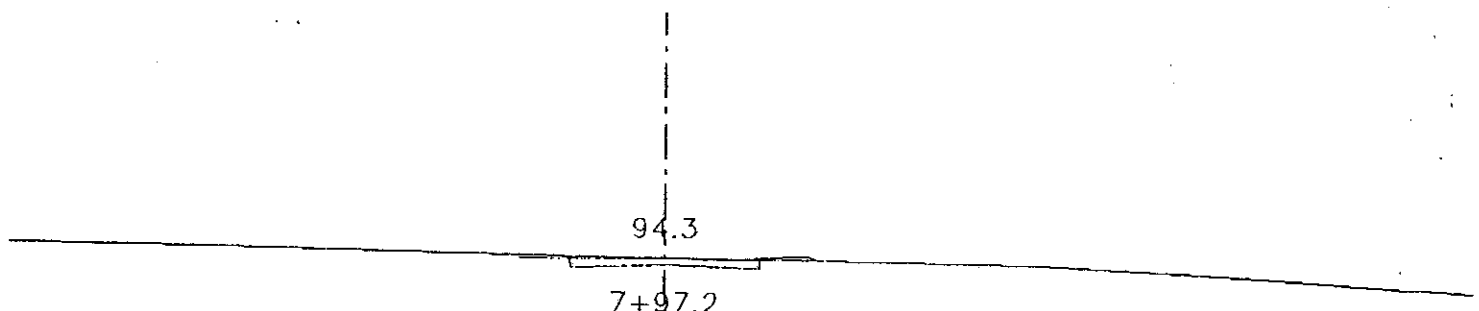
Sheet 2  
of  
2 Sheets

**NHUS ENGINEERING**

1-800-446-5038

**CHARLOTTE MONASTERY**

8251 DEMONTREVILLE TRAIL, LAKE ELMO, MN

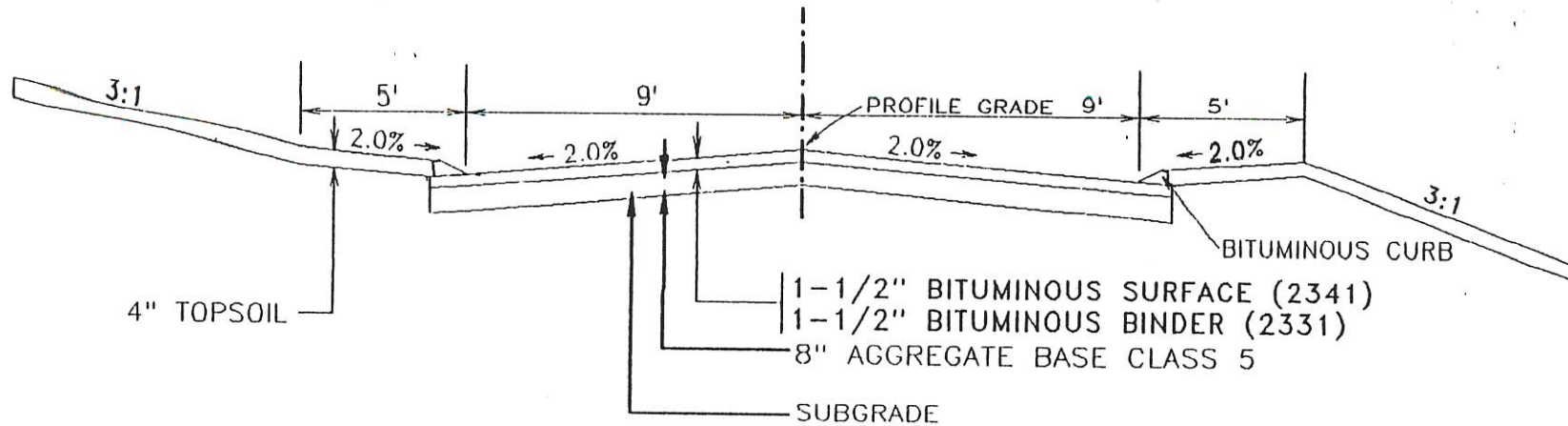


Sheet 2  
of  
3 Sheets

**NEWS ENGINEERING**  
1-800-446-5038

**CLARENCE MONASTERY**  
8251 DEMONTREVILLE TRAIL, LAKE ELMO, MN

TYPICAL SECTIONS  
(NO SCALE)

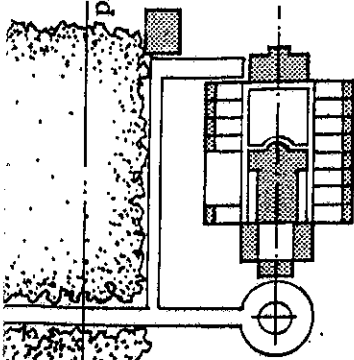


CONCRETE CURB BOX  
WITH NEENAH CASTING R-1690  
ELEV. T.C. = 94.25  
SPRUCE TREE (SAVE)

8' - 12" R.C.P. CLASS 4  
6' - 12" R.C. APRON CLASS 4  
WITHOUT RIP-RAP

Proposed Carmel of the Blessed Virgin Mary

property line



property line

# CARMEL OF THE BLESSED VIRGIN MARY

SITE PLAN



NORTH 0 100' 200' 400'



MS & R

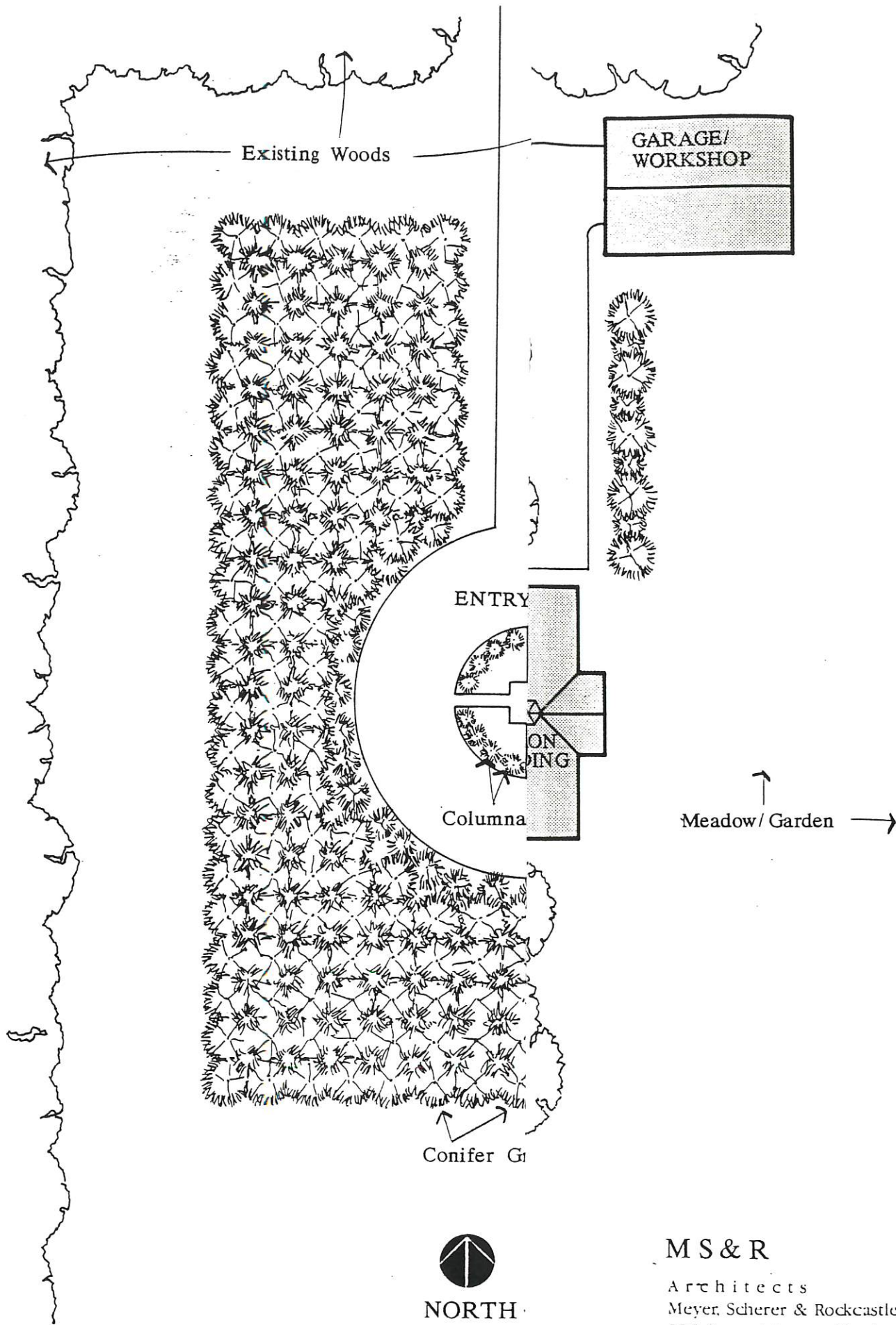
Architects

Meyer, Scherer & Rockcastle, Ltd.

325 Second Avenue North

Minneapolis, Minnesota 55401-1601

Demontreville Trail North



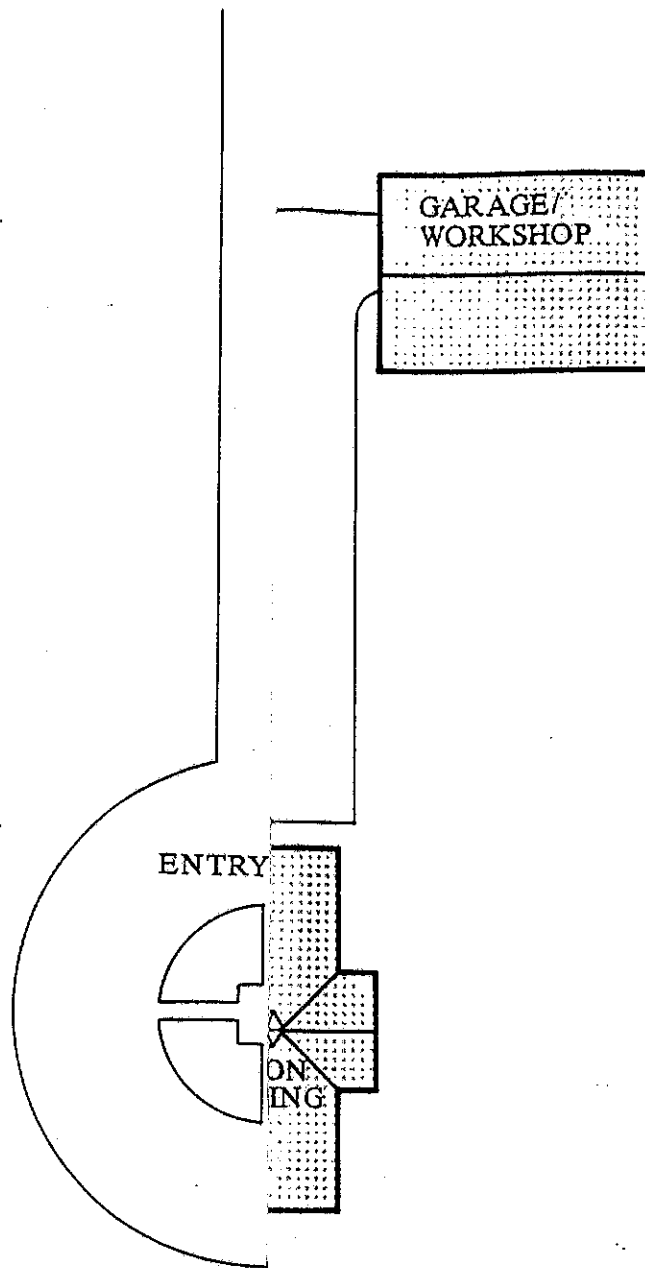
**M S & R**

Architects

Meyer, Scherer & Rockcastle, Ltd.

325 Second Avenue North

Minneapolis, Minnesota 55401-1601



MS & R

Architects  
Meyer, Scherer & Rockcastle, Ltd.  
325 Second Avenue North  
Minneapolis, Minnesota 55401-1601



REQUEST FOR PLANNING COMMISSION REVIEW

Meeting Date: July 22, 1991

AGENDA TOPIC: Building, Site & Plan Review: Kunz Oil

ITEM  
NO.

5.

The Kunz Oil Company is requesting through Dahl & Assoc. a building and site plan review for a temporary structure (approx 5 years) to be located on their property at the corner of Highway 5 and Washington County Road 15.

This is a required contamination cleanup project through MPCA for cleanup of contaminants due to leaky fuel tanks while being operated as a gas station.

Mr. Roger Akel of Dahl & Assoc. will be at the meeting to explain the process and answer any questions you may have.

Jim McNamara

# TKDA

ENGINEERS ARCHITECTS PLANNERS

TOLTZ, KING, DUVALL, ANDERSON  
AND ASSOCIATES, INCORPORATED

2500 AMERICAN NATIONAL BANK BUILDING  
SAINT PAUL, MINNESOTA 55101-1898  
612/292-4400  
FAX 612/292-0083

July 18, 1991

Planning and Zoning Commission  
Lake Elmo, Minnesota

Re: Site Plan Review  
Kunz Peoples Plus  
Gasoline Recovery System  
Lake Elmo, Minnesota  
Commission No. 9150-001

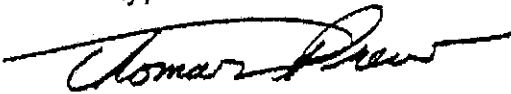
Dear Commission Members:

I have reviewed the plans for the recovery system; the following are my comments.

1. Contaminated soils which were stockpiled on site have been removed.
2. The applicant has received a MPCA permit for this recovery system.
3. No surface discharge of treated groundwater will occur. The process will dispose of water through drainfield type trenches on site.
4. The recovery system is expected to be in place about 5 years.

I recommend approval of this site plan.

Sincerely,



Thomas D. Prew, P.E.

TDP/mha



# Minnesota Pollution Control Agency

520 Lafayette Road, Saint Paul, Minnesota 55155-3898

Telephone (612) 296-6300



February 21, 1991

# COPY

Mr. Tom Manke  
Kunz Oil Company  
5200 Eden Circle  
Minneapolis, Minnesota 55436

Dear Mr. Manke:

RE: Corrective Action Design Approval  
Site: Peoples Plus/Lake Elmo K, 4201 Stillwater Boulevard, Lake Elmo  
Site ID#: LEAK00000947

The Minnesota Pollution Control Agency (MPCA) staff have reviewed the Petroleum Release Investigation and Corrective Action Report dated August 3, 1990, and the Corrective Action Design Supplemental Report dated October 3, 1990. Based on the information in these reports and previous reports on the site it appears that the extent and magnitude of soil and ground water have been adequately determined, and the potential impacts of the release have been identified.

The release has resulted in high levels of ground water contamination in a sand aquifer which has the potential to cross contaminate a lower sand aquifer used as a drinking water aquifer immediately downgradient of the site. Corrective action is necessary to remediate the contaminated ground water and prevent cross contamination. The site ground water cleanup goals are the Recommended Allowable Limits for Volatile Organic Compounds. In order to achieve these cleanup goals remediation of residual soil contamination is necessary. The Corrective Action Design proposes an effective method of achieving these goals. It is approved with the following comments and modifications.

1. Soil vents installed in the vicinity of the former pump islands should be installed to depths which will remediate the most heavily contaminated soils located above the silty clay, at depths of 15 to 25 feet. It is recommended that during soil vent installation adequate stratigraphic information be collected to tailor soil vent depth to accommodate the stratigraphic variation known to exist at the site.
2. The proposed soil vent system monitoring schedule (Table 5, report dated October 3, 1990) to evaluate system performance is approved. Additional monitoring will be necessary to evaluate air emissions from the soil vent system and the air strippers, as described in comment 3, below.

Mr. Tom Manke

Page 2

February 21, 1991

3. The enclosed MPCA "Air Emissions from Soil Vent Systems" and "Air Emissions from Air Strippers/Diffusers" guidance documents outline sampling, analysis, and control requirements for air and ground water effluent. The sampling program should be modified to fulfill these requirements. Ground water effluent sampling must also comply with the terms of the State Disposal System (SDS) permit, discussed in comment 4, below.
4. The recommendation to dispose of ground water effluent through infiltration is approved. SDS permit from the MPCA water quality division is required for infiltration systems. The SDS permit application process should be initiated as soon as possible. In our opinion, the length of the proposed trench (14,678 feet) may prove unworkable. We recommend that test pumping of the recovery wells be conducted to determine the actual pumping rates, and that the system design be reevaluated using this data. We understand that pumping tests have been scheduled for February, 1990. Staff hydrologist Melisa Pollak should be notified of proposed changes in the infiltration system design.
5. Monitoring of the lower sand aquifer is required. It is not safe to assume that ground water flow in the lower sand aquifer is in the same direction as flow in the upper sand aquifer, therefore three monitoring wells are required in the lower sand aquifer, rather than two as proposed in the report dated October 3, 1990. These wells should be installed within 120 days of receipt of this letter. Staff hydrologist Melisa Pollak should be notified of the proposed location and construction of the lower sand aquifer monitoring wells a minimum of 10 working days prior to their installation. After installation, these wells should be sampled quarterly and analyzed as described in the MPCA "Soil and Ground water analysis and Petroleum Release Sites" guidance document dated May 31, 1990.
6. The quarterly ground water monitoring program proposed in the report dated August 3, 1990, is approved. Modifications to the monitoring program or the monitoring well network may be necessary in the future based on the design adopted for the infiltration system.
7. When the soil venting, ground water pumpout and ground water infiltration systems are installed and operational, a report should be submitted which summarizes and documents corrective action system installation, the results of the activities described in comment 5, above, and results of all monitoring conducted up to that time. This report should also include geologic cross sections of the site, (using information from the soil borings, recovery well installations, and water well gamma logging), to illustrate the stratigraphic variations across the site, the relationship of the upper and lower sand aquifers, and the placement of the corrective actions. The schedule for future progress reporting will be based on the results of this report.

Mr. Tom Manke

Page 3

February 21, 1991

We expect, based on the available information, that completion of the approved corrective action will support a determination by the MPCA Commissioner that the release has been adequately addressed pursuant to Minn. Stat. § 115C.09, subd. 2(b)(1) (1990). However, if subsequently obtained information indicates that the approved corrective actions are inappropriate or inadequate, the MPCA may require additional work or modifications in the approved work.

In approving the plan, the MPCA does not assume any liability for the design or implementation of this remedy. You remain solely responsible for ensuring that this plan results in a successful cleanup and that its implementation does not result in any harm to public health or the environment. Moreover, the MPCA does not guarantee reimbursement of your costs from the Petroleum Tank Release Compensation Board (Petro Board). Application for reimbursement must be made to the Petro Board (612/297-4017). However, that decision is based on factors such as the adequacy of cleanup, compliance with notification laws and cooperativeness with the MPCA.

If you have any questions, please contact me at 643-3433.

Sincerely,



David A. Scheer  
Pollution Control Specialist, Senior  
Tanks and Spills Section  
Hazardous Waste Division

cc: David Trumm, Dahl & Associates, St. Paul

COPY

DAHL & ASSOCIATES, INC.  
Environmental Consultants, Contractors & Engineers

4390 McMENEMY ROAD  
SAINT PAUL, MINNESOTA 55127

PETROLEUM RELEASE INVESTIGATION  
AND CORRECTIVE ACTION DESIGN

KUNZ OIL CO./LAKE ELMO "K"  
4201 Stillwater Boulevard  
Lake Elmo, Minnesota 50356

MPCA ID: LEAK #00000947  
Dahl Report # MN745-001  
August 3, 1990

I hereby certify that this plan, specification, or report was prepared by  
me or under my direct supervision and that I am a duly Registered  
Professional Engineer under the Laws of the State of Minnesota.



P.E. 8-10-90

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Mark A. Johnson, P.E.  
Minnesota Registration No. 15407

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# CONTENTS

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## SECTIONS

1.0 INTRODUCTION .....	1
1.1 Purpose .....	1
1.2 Scope of Services .....	1
2.0 BACKGROUND INFORMATION .....	2
2.1 Site Description .....	2
2.2 Product Storage History .....	2
2.3 Product Release History .....	2
3.0 REMEDIAL INVESTIGATION RESULTS .....	3
3.1 Subsurface Geology .....	3
3.2 Hydrogeology .....	4
3.3 Contamination Impacts .....	5
3.3.1 Soil Impacts .....	5
3.3.2 Groundwater Impacts .....	6
3.4 Risk Assessment .....	6
3.4.1 Water Well Assessment .....	6
3.4.2 Vapor Risk Assessment .....	7
4.0 DISCUSSION .....	7
5.0 CONCLUSIONS .....	8
6.0 RECOMMENDATIONS .....	9
7.0 CORRECTIVE ACTIONS .....	9
7.1 Corrective Action Objectives .....	9
7.2 Corrective Action Alternatives .....	10
7.3 General Description of Corrective Actions .....	11
7.4 Component Description .....	12
7.5 Design Considerations .....	20
8.0 IMPLEMENTATION .....	22
8.1 Permits .....	22
8.2 Installation Timetable .....	23
8.3 System Start-up .....	24
8.4 Further Corrective Actions .....	24
8.5 Site Closure .....	25

## 1.0 INTRODUCTION

### 1.1 Purpose

Dahl & Associates, Inc. (DAHL) was retained by Kunz Oil Company to conduct a petroleum hydrocarbon release remedial investigation and to provide a corrective action design for the Lake Elmo "K" service station located at 4201 Stillwater Boulevard, Lake Elmo, Minnesota 50356 (Leak # 00000947).

### 1.2 Scope of Services

DAHL's scope of services was to:

- 1) Assess the results of previous investigations at the site by Warzyn Engineering, Inc.
- 2) Advance additional soil test borings in order to reasonably define the magnitude and horizontal and vertical extent of petroleum hydrocarbon contaminated soils resulting from the release.
- 3) Install six additional monitoring wells in order to obtain information on the uppermost groundwater flow dynamics, and to define the magnitude and extent of groundwater contamination.
- 4) Conduct a risk assessment for the purpose of identifying and investigating potential receptors and risks to human health and welfare resulting from the contamination present.
- 5) Outline a corrective action design which will address the phases of contamination and site impacts in methods acceptable to the Minnesota Pollution Control Agency (MPCA).

The test borings were advanced and the monitoring wells were installed between March 17 and June 27, 1990. The groundwater and soil contamination assessment and the human health and welfare risk assessment were conducted between March 17 and August 1, 1990.





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## 2.0 BACKGROUND INFORMATION

### 2.1 Site Description

The Lake Elmo "K" station is located at the southeast corner of the intersection of State Highway 14 and State Highway 5, east of Lake Elmo, Minnesota. This is primarily a residential and agricultural area. The site address is 4201 Stillwater Boulevard, Lake Elmo, Minnesota. The property description is the SW 1/4 of the NE 1/4 of the SE 1/4 of the SE 1/4 of Section 12, Township 29 North, Range 21 West, Washington County, Latitude 45°00'34" Longitude 92°51'20" (see Figure 1). The site consists of a convenience store, two covered pump islands, one open pump island, and four underground storage tanks (which have since been removed). See Figure 2 for a site map.

### 2.2 Product Storage History

Four steel underground storage tanks (UST's) previously existed at the site. The tanks consisted of: (1) a 4,000-gallon-capacity tank used for the storage of regular leaded gasoline, (2) a 10,000-gallon-capacity tank used for the storage of unleaded gasoline, (3) a 10,000-gallon-capacity tank used for the storage of diesel fuel, and (4) a 560-gallon-capacity tank used for the storage of waste oil. See Figure 2 for the locations of the former UST's.

The UST's used to store regular and unleaded gasoline were installed by Kunz Oil Company in December, 1961. The UST used to store diesel fuel was installed in July, 1982. All four UST's were taken out of service on March 15, 1989, and all four UST's were removed on December 13, 1989. No leak detectors or overspill protection devices were ever used. Inventory records for all four tanks are being compiled and will be submitted subsequent to this report. Product piping at the site is steel. The form "Excavation Report of Petroleum Release Sites" is included in Appendix B.

### 2.3 Product Release History

Prior to February 1, 1989, there were no reported releases of petroleum products at the site.

On December 15, 1988 Twin City Testing Corporation advanced four soil test borings around the storage tank basins and the product dispensing islands as part of a



prepurchase site assessment for Kunz Oil Company. Soil samples retrieved from the borings were tested for the presence of volatile organic vapors using a photo-ionization detector (PID). Petroleum hydrocarbons were detected in samples retrieved from a test boring advanced between the two pump islands north of the station building. The three other borings contained no PID-detectable contaminated soil. On February 1, 1989 the MPCA was notified that a release had been detected at the site.

On April 11 and 12, and June 9 and 12, 1989, Warzyn Engineering, Inc. advanced five soil borings and installed three monitoring wells at the site. Three of the five test borings contained PID-detectable contaminated soil (W-1, W-2, and W-5). Two of the three monitoring wells contained PID-detectable contaminated soil (MW-1 and MW-2). See Figure 2 for the test boring and monitoring well locations. Laboratory-analyzed groundwater from MW-1 and MW-2 contained benzene in concentrations of 35,300 and 6,790 parts-per-billion (ppb), respectively. Warzyn submitted a Petroleum Tank Release Investigation Report to the MPCA on September 13, 1989.

No other contaminants or sources are known or suspected in the area.

DAHL was retained to complete the remedial investigation and to recommend corrective actions, the results of which are presented in this report.

### 3.0 REMEDIAL INVESTIGATION RESULTS

#### 3.1 Subsurface Geology

Between April 6 and June 26, 1990, DAHL advanced test borings TB-1 through TB-9 (see Figure 2 for test boring locations).

The methodologies for soil test boring advancement, soil sampling and soil classification are presented in Appendix A. Drill logs and surveys of drilled locations are submitted in Appendix C.

Soil profiles have been interpolated from the soil test boring data. However, as with any testing procedure only a fraction of the entire soil profile is sampled. Variations in the sub-strata may exist. Therefore, general assumptions of the overall soil profile are made as interpreted from information obtained at each point drilled.



The western and northern parts of the site are overlain by bituminous asphalt. The first soil type encountered beneath the site was a fill material consisting of brown silty sand and gravel. The fill material generally extends one to three feet below the surface. The next layer encountered was a brown fine to medium sand with silt and fine to medium gravel. In the northern and eastern parts of the site this layer extends to 30 to 40 feet in depth, in the central part of the site it extends to 40 to 50 feet, and in the southern and western parts of the site it extends to at least 60 feet in depth. The next layer encountered was a brown fine sandy silt. This layer ranges in thickness from 7 to at least 14 feet in the northern and eastern parts of the site and thins toward the west and south. In the western and southern parts of the site this layer is only present as thin silt stringers. The third layer encountered was a well graded brown fine to medium sand with silt and fine gravel. This layer extends from the bottom of the silty sand in the northern and eastern parts of the site (47 to 54 feet in depth) to total boring depth (about 60 feet). In the western and southern parts of the site this layer extends from the silt stringers (about 47 to 55 feet depth) to total boring depth. This third layer is the water bearing unit at this site.

### 3.2 Hydrogeology

During test drilling, the water table of the uppermost unconfined aquifer was encountered at depths between 53 and 59 feet below the land surface. The total thickness of the aquifer is estimated to be 16 feet as based on well logs of water wells 560 feet and 2,880 feet east of the site.

Between March 17 and June 27, 1990 DAHL installed six monitoring wells (MW-4 through MW-9) into the uppermost unconfined aquifer. The purpose of the wells was to monitor the groundwater quality, and establish the dynamics of the uppermost aquifer underlying the site. MW-4, 5, 6, and 8 were placed on Kunz Oil property, at locations selected as to not impede normal station business operations. MW-7 was placed on Washington County property along the right-of-way of County Road 15, as per permit and agreement. MW-8 was placed on Minnesota Department of Transportation (MNDOT) property along the right-of-way of State Highway 5, as per permit and agreement. Copies of the Minnesota Department of Health (MDH) monitoring well permits, MNDOT and Washington County permits, and monitoring well agreements are included in Appendix E.



Monitoring well locations are illustrated in Figure 2. Table 3 lists a summary of each well's construction. Monitoring well soil logs, construction as-builts, and MDH Water Well Records are submitted in Appendix D.

Water table elevation data has been collected at the site on fourteen separate occasions. A summary of this data is included in Table 4. The groundwater elevation data indicate groundwater flow to the west-northwest. The gradient of the water table was found to average  $4.0 \times 10^{-2}$ . Figure 3 is a groundwater gradient map.

On August 8, 1990 a recovery rate test was conducted on MW-6 to determine the hydraulic conductivity of the water bearing unit. Data from the test was evaluated using the Bouwer Rice Methodology. See Appendix G for data reduction methodologies and see Appendix H for field data, calculations, and graphs.

The results of the recovery rate test indicate a hydraulic conductivity of approximately 287 gallons-per-day-per-square-foot (gpd/sq.ft).

### 3.3 Contamination Impacts

#### 3.3.1 Soil Impacts

Soil samples were analyzed for the presence of petroleum hydrocarbons using soil head space analysis with a PID in accordance with the MPCA's "Jar Headspace Analytical Screening Procedure" document dated May 31, 1990.

Soil samples were analyzed both in the field and at room temperature for the presence of petroleum hydrocarbon compounds. The results of the field analyses are recorded on the soil boring logs submitted in appendix B, and the results of the room temperature analyses are summarized in Table 1.

Selected soil samples were submitted for laboratory analysis for benzene, ethyl benzene, toluene and xylenes (BETX), and total hydrocarbons as gasoline (THG). The results are summarized in Table 2. Laboratory reports are included in Appendix C.



### 3.3.2 Groundwater Impacts

DAHL collected groundwater samples from monitoring wells MW-3, MW-4, and MW-6 on two occasions and from MW-1, MW-2, MW-7, MW-8, and MW-9 on one occasion. The water samples were submitted to a testing laboratory for analysis of volatile hydrocarbons, THG, methyl tertiary butyl ether (MTBE), and lead. The laboratory results are listed in Table 5 and the laboratory reports are submitted in Appendix D. On May 8, 1989 free product was encountered in MW-5 at a thickness of 0.27 feet. The maximum observed thickness of free product in MW-5 was 0.81 feet on June 29, 1989. On June 1, 1990 three piezometers (P-1, P-2, and P-3) were installed around MW-5 to determine the horizontal extent of the free product (see Figure 2). Free product thicknesses in MW-5 and the piezometers are listed in Table 4.

### 3.4 Risk Assessment

#### 3.4.1 Water Well Assessment

A water well search was conducted at the Minnesota Geological Survey to identify wells located within one mile of the site (well records are included in Appendix F). The data obtained from these records is summarized in Table 6.

One city water well was identified approximately one mile southwest of the site. This well is taking water from the Franconia Aquifer at a depth of 280 feet.

One water well, which is not currently in use, has been identified on the site (see Figure 2). Construction details of this well are not available at this time and will be submitted once they are obtained.

On December 13, 1989 a water sample was collected from a water well at the property 500 feet west (down-gradient) of the site building. The laboratory results are listed in Table 5 and the laboratory report is included in Appendix D. This well has an estimated total depth of approximately 120 feet.

A municipal water supply is not available at the site. Property owners up to one mile down-gradient of the site will be contacted in order to locate and document existing and abandoned water wells.



### 3.4.2 Vapor Risk Assessment

Through vapor risk assessment conducted at the site, no potential receptors to migrating petroleum hydrocarbon vapors have been found. Sewage at the site is disposed of into a septic system 30 feet east of the station building. The station building does not contain a basement and the nearest building to the site is a private residence about 500 feet west of the station building. The private residence is about 250 feet west of the inferred area of groundwater contamination (see Section 4.0 DISCUSSION), and, although a vapor survey has not been conducted at the residence, a laboratory-analyzed groundwater sample from the well contained no petroleum hydrocarbons.

## 4.0 DISCUSSION

Seven test borings were advanced, six monitoring wells were installed, and three piezometers were installed at the site. The test borings were advanced to determine the vertical and horizontal extent of soil contamination and to determine the site geology. The monitoring wells were installed to determine the hydraulic conductivity, groundwater gradient, and groundwater flow direction of the uppermost unconfined aquifer, and to determine the degree and the horizontal extent of groundwater contamination. The piezometers were installed to determine the vertical and horizontal extent of free product accumulation on the uppermost unconfined aquifer. Four UST's were removed from three tank basins on the site. A risk assessment documenting water wells within one mile of the site was conducted.

The site geology is comprised of sand, silt and gravel glacial drift to a depth of at least 155 feet overlying dolomitic bedrock of the Prairie du Chien Group. The glacial drift is predominantly a brown fine to medium sand with silt and fine to medium gravel extending to at least 60 feet (total depth of the borings). At the northern and eastern parts of the site, this unit contained a brown silt 7 to about 14 feet thick at depths of about 30 to 40 feet. This silt thins westward and southward grading into thin silt stringers.

The groundwater flow direction is to the west-northwest at a gradient of about  $4.0 \times 10^{-2}$  and the hydraulic conductivity is calculated to be 287 gallons-per-day-per-square-foot.



## 5.0 CONCLUSIONS

The locations and depths at which gasoline contamination was encountered at this site indicate that a gasoline release has occurred at or near the vicinity of the eastern-most dispensing island.

Through the release investigation, the following were identified: (1) an area of soil contaminated with gasoline, (2) free gasoline product accumulated on the uppermost unconfined aquifer's water table, and (3) dissolved petroleum hydrocarbons in the uppermost unconfined aquifer underlying a portion of the site.

The horizontal extent of soil contamination is depicted in Figure 4, based on PID readings and laboratory results of soil samples from test borings. The vertical extent of soil contamination ranges from 20 feet thick near the eastern-most dispensing island (W-1, W-2 and TB-4) to about 7 feet thick in the western part of the site at TB-7. In the southeastern portion of the site, the vertical thickness is about 15 feet (TB-5) and thins to 0 at MW-8. The vertical thickness in the southwestern part of the site is about 10 feet thick (MW-2).

Free product was encountered only in MW-5. Subsequent installations of piezometers around MW-5 indicated that the area of free product is isolated around that well. The inferred plume of free product is illustrated on Figure 5. The maximum observed thickness of free product was 0.81 feet in MW-5 on June 29, 1990. Product has been bailed from this well on a weekly basis since May 8, 1990.

Based on laboratory results of groundwater from the monitoring wells, an area of groundwater contamination has been inferred (see Figure 5). The Hydrogeologic Setting and Groundwater Contamination Characterization Petroleum Release Sites worksheet is included in Appendix D.

The risk from petroleum hydrocarbon vapor migration at this site is low. No sanitary sewer lines or municipal water lines are present within the area. Down-gradient groundwater receptors, however, are present near this site. The nearest down-gradient receptor is a water well 500 feet west of the site building at a residential home. This well is taking water from a depth of 120 feet from the Prairie du Chien Group aquifer. Groundwater from this well has been shown to be clean through laboratory analysis.



## 6.0 RECOMMENDATIONS

Based on the free product thicknesses, depth of the uppermost unconfined aquifer, and the hydraulic conductivity of the water bearing formation, it is the opinion of DAHL that the free product and the contaminated groundwater is recoverable.

Presented in the following sections is a corrective action design targeting free product and contaminated groundwater recovery.

## 7.0 CORRECTIVE ACTIONS

### 7.1 Corrective Action Objectives

The objectives of the corrective actions proposed within this report are to recover free product so that subsequent remediation activities are feasible, to control migration of contaminants during the recovery of free product, monitor effectiveness of the gradient control system, determine the effectiveness of a pump and treat system as a remediation option, and reduce contamination levels within the soil to acceptable levels. The reasons for proposing free product recovery include: a recoverable volume of free product exists; free product has already migrated from the point source; the presence of free product has a potential for further contamination of the groundwater, and the presence of free product significantly reduces the effectiveness or prevents the application of other remediation technology. The corrective actions proposed initially target the recovery of free product. Subsequent corrective actions address removal and treatment of contaminated groundwater from the uppermost aquifer and in-situ treatment of contaminated soil.

In the design of this corrective action design, computer models were used to evaluate raw data and calculate performance. As with any model, only a fraction of the variables which influence performance are known. Assumptions are therefore made to permit evaluation of designs and predict performance. Where assumptions have been made, this information has been stated. Every effort has been made to assure that assumptions are consistent with observations and are consistent with standards of care practiced by members of this profession, in this area, under similar time and budget constraints. Performance predictions reported in this document represent DAHL's professional opinion based upon the assumptions and conditions observed or encountered at specific





times, locations, and intervals.

In the design and implementation of any petroleum hydrocarbon removal method, it is important to note that no known technology or combination of cleanup techniques will restore the site to its original pre-spill condition. It is up to the MPCA therefore, to determine at what point the site is considered "clean," or, more realistically, where continued treatment costs can no longer be justified by the marginal return in environmental quality. Target remediation levels are to recover all free product and reduce groundwater and soil contamination to acceptable levels (see Table 5).

The recommendations and methods proposed in this report include treatment options which:

- 1) Utilize technology and methodologies acceptable to the MPCA and MDH;
- 2) Utilize technology recognized by industry standards;
- 3) Have demonstrated effectiveness under similar site conditions and constraints;
- 4) Addresses emergency recovery of free petroleum hydrocarbon contamination detected at this site; and
- 5) Addresses optimum treatment as a function of cost versus benefits.

## 7.2 Corrective Action Alternatives

The corrective action alternatives considered during the design of this corrective action plan included:

- 1) Bio-remediation: Bio-remediation has been considered for this site, however the presence of free product precludes the application of current bio-remediation technology. The application of bio-remediation will be reevaluated upon completion of free product recovery.
- 2) Excavation: Excavation, both total and general excavation, were considered for this site, however due to the presence of free product, depth to aquifer, volume of contaminated soil (in excess of MPCA guidelines), and volume of clean overburden, the application of excavation as a remediation activity was deemed to be inappropriate for this site.
- 3) Hydraulic Barrier Walls: The use of hydraulic barrier walls to confine the contaminant plume was considered. The contaminant plume has migrated



off-site and this method would require extensive off-site construction. The proposed free product recovery and gradient control system was deemed adequate to control further migration during the recovery of free product. The application was therefore deemed to be inappropriate.

- 4) **In-Situ Vitrification:** The use of in-situ vitrification was considered. The use of in-situ vitrification was determined inappropriate because: (1) free product is present at the site, (2) removal of underground metal would be required, (3) removal of site improvements (buildings) would be required, and (4) the construction of an off-gassing collector would be required.
- 5) **Soil Flushing:** The use of soil flushing was considered, however its application was deemed inappropriate because of the presence of free product.

Upon completion of free product recovery, the application of pump and treat, bio-remediation, and any new technologies should be reevaluated based upon the plume configuration and contaminant levels at that time. During recovery operations, monitoring will document the effectiveness of corrective actions and provide data for any additional corrective action recommendations and designs. Based upon the above considerations, the corrective action proposed within this report assume a two phase approach. The initial phase consisting of free product recovery, control of contaminant migration, and monitoring of contaminant levels. The second phase addresses remaining contamination by utilizing pump and treat technology for groundwater contamination.

### 7.3 General Description of Corrective Actions

For the first phase of corrective actions, a Free Product Recovery System (FPRS) with a Dissolved Petroleum Hydrocarbon Recovery System (DPHRS) is proposed. The proposed system includes the following primary components: three recovery wells; three groundwater depression pumps and one product skimming pump; on-site storage and containment of recovered product; a two stage water treatment system; a winterized equipment enclosure; and automatic system controls. Each of these components are described in additional detail below. A typical FPRS with gradient control (DPHRS) process flow diagram is included in Appendix I.

Hand bailing of free product from MW-5 has occurred at this site and will continue as a component of the FPRS.



The use of separate product recovery and groundwater depression pumps within the proposed remediation system will: establish a hydraulic gradient to each recovery well thereby promoting product migration to the recovery well; provide continuous product recovery down to a screen within the recovery well with recovery of essentially water-free product; and provide for the removal of dissolved petroleum hydrocarbons in the uppermost groundwater during free product recovery.

Upon completion of free product recovery, corrective actions are proposed to address the remaining contamination. The design of the recovery wells and groundwater treatment system have been designed for future adaptation to a pump and treat system. A soil venting system (SVS) will be proposed for removal of petroleum hydrocarbons retained within the soil. Utilization of pump and treat enhances the effectiveness of soil venting by lowering the capillary zone.

#### 7.4 Component Description

As described above, the proposed corrective actions consists of several primary components. The function and construction of components utilized for the groundwater system are addressed below.

- 1) Recovery Well DAHL proposes three recovery wells (RW-1 through RW-3).

Method of Construction: The recovery wells will be installed by a licensed water well contractor. The recovery wells will be advanced using the cable tool method of well construction. The cable tool method was selected based upon the following considerations: the casing is advanced during construction; the method is suitable for larger well diameters and is a relatively simple method; drilling muds typically are not required; and a minimum amount of water is introduced to the aquifer. The recovery wells will be constructed by advancing an eighteen inch diameter temporary casing to a depth of approximately eighteen feet below static water level. A twelve inch diameter recovery well will be constructed within the eighteen inch casing as it is retracted. The recovery wells will be constructed with a three foot long by twelve inch diameter solid casing (pump sump) connected to the screen bottom, to provide for the dewatering



pump. The well screen will be fifteen feet long by twelve inch diameter stainless steel. The screen slot opening will be specified to the soil formation as determined from grain size analysis of soil samples retrieved from the test drilling. The well screens will be placed to allow 5 feet of screen above static water level and 10 feet of screen below. The annular space below the top of screen, will be sand packed as specified by the soil grain size analysis; and the well completed by grouting in accordance with MDH water well construction codes. The well casing above the screen, will be twelve inch diameter water well casing, extending from the top of the well screen to an elevation at least one foot above the land surface. All joints will be welded. Construction details of the proposed recovery wells, are included in Appendix I. The proposed depths are summarized in Table 8.

Prior to advancing the recovery wells, a test boring will be advanced at the proposed location and to the proposed depth to confirm lithology is consistent thereby preventing inadvertent penetration into more permeable soil or advancing through a confining strata.

Location: The proposed locations of the recovery wells are shown on "Groundwater System Layout Map," Figure 6. The recovery well locations were based upon the following considerations: the inferred area of free product; direction of groundwater movement; site use; constraints imposed by the current site owner, and the hydraulic conductivity of the soil.

- 2) Well Head Protection The recovery well heads will be enclosed in twenty-four inch long by twenty-four inch wide by forty-eight inch high, painted, steel, well head enclosures. The well head enclosures will be provided with hinged and lockable covers. The well head enclosures will be protected with four, four inch diameter, schedule forty, steel pipe posts.
- 3) Pumps The recovery wells will be equipped with two pumps, one for groundwater depression and gradient control, the other for recovery of free product.



**Groundwater Depression and Gradient Control Pumps:** For groundwater depression submersible pumps will be utilized. The pump operations will be controlled with high water level pump start sensors and low water level pump stop sensors. The level control sensors and pump discharge rates are calibrated to maintain the desired water surface depression below static water level. The pump sensors working in conjunction with calibrated water discharge rates, provide assurance in maintaining a specified water surface drawdown, while safeguarding the pump motors from failure due to repeated cycling and preventing the water interface from reaching the water pump's intakes.

Factors influencing the selection of the groundwater pumps include; water withdrawal rate; depth of pumping; material compatibility; and design of the recovery well. The proposed groundwater pumps will be capable of delivering the required flow at system operating pressures and is compatible with gasoline. The recovery wells will be dewatered using Grundfos "Redi-Flo", stainless steel and Teflon submersible pumps. The water table drawdown and pump operations in the wells will be controlled by conductivity probes. The conductivity probes provide the first safeguard against accidental product discharge through the groundwater depression pumps. If the water table drops below the low probes or free product encounters the low probes, the water pumps will be shut down until the water table recharges to the elevation of the high probe. The probes will be calibrated to maintain the optimum drawdown for free product recovery as determined by pump tests, while controlling the dewatering to prevent excessive drawdown of product into the aquifer. The units manufactured for DAHL have been modified to include use of a power cord assembly, which the Minnesota Board of Electricity has accepted, by a variance, as in compliance with National Electric Code (NEC) Article 301-11.

**Free Product Recovery Pump:** The free product recovery pump consists of a buoy, reservoir, and pump. The buoy is designed to float on the surface of the water within the recovery well and has a vertical travel of approximately one foot. As product accumulates in the



recovery well it is removed by the product skimming buoy. The buoy is equipped with a filtering element which is both oleophilic (allowing liquid petroleum hydrocarbons to pass) and hydrophobic (restricting flow of water). Product entering the buoy flows by gravity to the reservoir. Product collecting in the reservoir, raises a float, which in turn activates or deactivates two level switches. Based upon the status of each switch, the controller starts or stops the product recovery pump. The reservoir is also equipped with a conductivity probe to detect the presence of water in the reservoir thereby minimizing pumping of water to the storage tank.

The recovery pump is located under the reservoir and is equipped with a twelve volt DC motor. The recovery pump is self priming and magnetically coupled to the motor. The recovery pump has a rated capacity of up to 720 gallons per day.

Although the manufacture literature shows a "complete system" only the "down well" portion is utilized. The unit manufactured for DAHL has been modified to include use of a power cord assembly, which the Minnesota Board of Electricity has accepted, by a variance, as in compliance with National Electric Code (NEC) Article 501-11. The manufacture's control unit does not comply with Minnesota Electrical Codes requiring Underwriter's Laboratory (U.L.) labeling of control panels. The DAHL control panel, therefore, has provisions for the control and operation of the Free Product Recovery Pump.

- 4) Groundwater Treatment Groundwater removed from the recovery wells will be routed through underground pipes to a two stage water treatment system consisting of a specific gravity separator, lift station, and two air strippers.

**Specific Gravity Separator:** The specific gravity separator removes free product droplets from water via differences in fluid densities; which provides a second safeguard against accidental product discharge through the water depression system. The separator design includes: an inlet distributor to provide distribution and reduce turbulence; an inspection and maintenance hatch; provisions for free



product removal; and tank full/product sensors, to safeguard against a tank overflow in the event the lift station pump fails to operate.

**Lift Station:** Pre-treated groundwater gravity flows from the separator to a contained lift station. The primary functions of the lift station are: to pump the pre-treated groundwater to secondary treatment (air stripper); equalize and control the water flow rate to the air stripper; and during low flow conditions, provide for batch treatment. The lift station is equipped with a reservoir, pump, flow control valves, totalizing flow meter, and water level sensors for lift station pump control. The pump motor and wiring are designed for use in a Class I - Division I location.

The lift station is contained to prevent overflowing in the event the discharge system backs up. Should the discharge system back up, water in the lift station will back up into the separator which will shutdown the system when the fluid volume of the separator reaches capacity.

**Air Stripper:** Secondary treatment of groundwater occurs in the air stripper. The air stripper consists of: a distribution manifold; packing tower shell; packing media; air blower; discharge stack; and safety controls. The distribution manifold utilizes spray nozzles to distribute the pre-treated groundwater over the packing media. The air stripper is equipped with an air flow sensor which shuts down the pumping operation should the air stripper blower become disabled, and a water level sensor to shut down the system should the air stripper sump overflow due to a discharge obstruction.

The air stripper removes dissolved volatile hydrocarbons from the water by inducing a counter current flow of air past the water cascading through packing media. The packing media breaks up the water into droplets, increasing the surface area of water exposed to the air flow for efficient volatilization. The air stripper will be interlocked with the lift station, to operate only as required. Subject to approval by the MPCA Division of Air Quality, the air from the



air stripper will be discharged above ground through an exhaust stack.

- 5) Product Storage Tank Product recovered by the product recovery pumps or removed from the separator will be stored on site in a 560 gallon, steel skid tank. The location of the enclosure and product storage tank will be coordinated with the current property owner, local authorities, and the Fire Marshal. The storage area will be provided with adequate secondary containment as specified by the Minnesota Fire Marshal Department. Secondary containment in the form of a masonry dike with all cells filled and reinforcement provided every other cell. The tank will be equipped with a tank full sensor (float switch) to safeguard against overfilling and the dike will be equipped with a dike level sensor. Disposal of recovered product will be at a licensed waste oil facility.
- 6) Controller Operation of systems will be managed by an electronic controller, located at the surface in a nonhazardous area. The controller receives signals from the product storage tank level sensors, separator level sensor, separator product sensor, lift station control sensors, groundwater depression pump control sensors, product recovery pump control sensors, blower air flow sensor, air stripper sump level sensor, and secondary storage level sensors.

Control logic within the control module, activates the recovery pumps when the following conditions are true:

- High level sensor not activated in product storage tank;
- Product sensor activated in recovery reservoir;
- Water sensor not activated in recovery reservoir;
- Secondary containment sensors not activated.

Control logic within the control module, activates the groundwater pumps when the following conditions are true:

- Liquid surface within the recovery wells has reached the pump's start sensors;
- Product sensor not activated in separator;
- High level sensor not activated in separator;
- Secondary storage sensors not activated.





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Control logic within the control module, activates the air stripper blower when the following conditions are true:

- Air stripper sump level sensor is not activated;
- Lift station control sensors activated.

Control logic within the control module, activates the lift station pump when the following conditions are true:

- Air stripper blower motor started (air stripper blower has a delay off sequence permitting treatment of "in process" water);
- Air stripper sump level sensor is not activated;
- Lift station control sensors activated.

The electronic controller has been programmed to provide process data consisting of run time and number of starts for the groundwater depressions pumps, free product recovery pumps, lift station pump, and air stripper blowers.

The controller has capacity for the future application of a soil vent system. Each motor is provided with a separate lockable circuit breaker as a lockable means of disconnect as required by NEC Article 430-102. The groundwater depression pump, free product recovery pump, lift station pump, and air stripper blower are capable of operating in either a "manual" or "automatic" mode.

Electronics within the control module are enclosed within a suitable enclosure for the environment. The exterior of the control module is posted "DANGER HIGH VOLTAGE". Sensor wiring is low level (intrinsically safe) control voltage in the recovery well, storage tank, separator, lift station, air stripper, and equipment enclosure. The control panel provided by DAHL has a U.L. label as required by the Minnesota Board of Electricity. The recovery system will be operated by a dedicated electric service.

- 7) Winterization To allow year-round operation of the recovery system, all piping will be installed underground to a sufficient depth to avoid freezing (eight feet within paved areas, four feet non-paved or snow cover protected



areas). If these depths cannot be achieved, then all piping will be heat traced, insulated, and buried to the obtainable depth. The equipment enclosure is furnished with electrical heat. The electrical heat and heat tracing cable are in conformity with electrical codes for use in Class I - Division I locations as require by NEC.

- 8) Equipment Enclosure The water treatment system will be protected by a fire proof, insulated enclosure, constructed of masonry. Secondary containment is provided by construction of the enclosure in the form of a masonry dike. The secondary containment will be provided with level sensors to shut down the system should water or product level approach 6 inches of the top of diking. Design of the equipment enclosure includes provisions for winterization, fire protection, lighting, and ventilation. Equipment within the enclosure has been selected for use within a Class I - Division I location. Access to the enclosure is provided by a locked, metal door. The exterior of the building and storage area are posted "DANGER, NO SMOKING, NO OPEN FLAMES, NO SPARKS". Additionally the exterior of the building is posted with the 24 hour emergency telephone number of DAHL and a location identification.
- 9) Operation The proposed design and operation of the FPRS and DPHRS have been selected to provide optimum performance. However, during free product recovery, the water table drawdown will be managed to maintained the optimum level for free product recovery and not for recovery of contaminated groundwater outside the down gradient edge of the free product plume. This operation is intended to minimize the depth at which free product will be drawn down into the soil and aquifer.

After free product has been significantly reduced, the operating parameters of the DPHRS will be managed to address a more aggressive recovery of dissolved petroleum hydrocarbons. The alterations in the FPRS parameters for operating the DPHRS are summarized in Table 9.

The system has been designed to provide continuous operation throughout the year. Additionally, the system has been designed to operate unattended and automatically, requiring minimum operator



interface and maintenance.

The time required to complete free product recovery activities is estimated to be approximately 1 year. Upon completion of free product recovery activities, should pump and treat still be deemed appropriate, the time required to reduce dissolved contaminant levels to target levels is estimated to require an additional 3 years.

- 10) Discharge Recommended discharge of treated groundwater, is to the ground surface, as no municipal sanitary sewer system is available at the site. Discharge directly to the land surface will require a National Pollution Discharge Elimination System permit.

#### 7.5 Design Considerations

The proposed groundwater system, as described above, was modeled based upon the parameters summarized in Table 9.

The variables, terminology, and assumptions used in the models and summarized in Table 9 are discussed below.

- 1) Hydraulic Conductivity The hydraulic conductivity has been determined based upon a recovery rate test conducted on August 7, 1990 on MW 5. Data obtained during the test was evaluated and interpreted following the Bouwer Rice method. (For additional explanation and formulas see "Hydraulic Conductivity Calculation" Appendix G.) Results of analysis are tabulated and presented graphically in Appendix H. The hydraulic conductivity of the aquifer was also determined based upon field observations and published data. During construction of the monitoring wells, the soil encountered during drilling was classified by the field geologist. Table 3-2 of "Basic Soils Engineering Second Edition" by B.K. Hough establishes typical values of the permeability coefficient (hydraulic conductivity) for silty sand and gravel as 0.0001 cm/sec (2.1 gallons per day per square foot) and for well graded, silty sand and gravel as 0.0004 cm/sec (8.4 gallons per day per square foot). The hydraulic conductivity as determined by the recovery rate tests, was therefore assumed to be



representative of the aquifer. The hydraulic conductivity of petroleum products was assumed to be the same as water. Petroleum products, especially gasoline, have a specific gravity less than water and have a lower viscosity. These factors were assumed to be compensating. A hydraulic conductivity of 287 gallons-per-day-per-square-foot was utilized for design.

- 2) Available Length of Screen Available length of screen is the length of screen penetrating the aquifer. Available length of screen has been calculated based upon design water elevations and bottom of screen elevation. The available length of screen influences performance of the recovery well and has been designed to provide optimum performance with anticipated fluctuations in the water table static elevation.
- 3) Depth of Aquifer Recovery well performance calculations are based upon the cross-sectional area of flow. Depth of aquifer is the vertical component of the cross-sectional area of flow. The initial depth of aquifer is assumed to be equal to the available length of screen. Subsequent values are calculated as described in Appendix G.
- 4) Water Withdrawal Rate The water withdrawal rate is the rate which the recovery well yields under steady state conditions and is different from pump rate. The water withdrawal rate has been calculated based upon Darcy's Law. Factors include the hydraulic conductivity, depth of aquifer, required distance of influence, and hydraulic gradient required to control contaminant migration. For additional explanation and formulas see "Performance Calculations - Drawdown and Gradient of a Recovery Well" Appendix G.
- 5) Drawdown The steady state drawdown of the recovery well has been calculated based upon Darcy's Law. Factors include the hydraulic conductivity, depth of aquifer, and withdrawal rate. For additional explanation and formulas see "Performance Calculations - Drawdown and Gradient of a Recovery Well" Appendix G. The results of calculations are tabulated and presented graphically in Appendix H. Drawdown within the recovery well during free product recovery is controlled to minimize drawdown of contaminants into the aquifer.



- 6) Hydraulic Gradient The steady state hydraulic gradient has been calculated based upon Darcy's Law. Factors include the hydraulic conductivity, depth of aquifer, distance from the recovery well, and withdrawal rate. For additional explanation and formulas see "Performance Calculations - Drawdown and Gradient of a Recovery Well" Appendix G. The results of calculations are presented graphically in Appendix H.
- 7) Radius of Influence The radius of influence was assumed to be the distance from the recovery well where the calculated gradient to the recovery well (assuming no site gradient) was equal to or greater than the nominal site gradient. This interpretation assumes that vector addition of site gradient and well gradient equals zero at the radius of influence.
- 8) Area of Influence The area of influence was assumed to include all area within the calculated cone of depression having a hydraulic gradient limited by the site gradient.

### 8.0 IMPLEMENTATION

Upon MPCA approval of this Corrective Action Design, including design, engineering, locations, and construction details; a work plan outlining the installation timetable, labor, material, and equipment requirements will be coordinated with Kunz Oil Company. All MPCA and client provisions for system design and implementation will be observed.

#### 8.1 Permits

DAHL or its subcontractors will obtain permits and schedule inspections required to install and operate the proposed corrective actions. These consist of;

- Local building permit.
- Recovery well permit from MDH.
- Monitoring well permit from MDH.
- Utility locate (Gopher One Call).
- Electrical inspections Minnesota Board of Electricity.
- "Request for Air Quality Impact Analysis of Remedial Action" from MPCA Air Quality Division.



- Water Appropriation permit from DNR.
- National Pollution Discharge Elimination System (NPDES) permit.

### 8.2 Installation Timetable

To expedite the installation of the free product recovery system, a work plan outlining the installation timetable, labor, material, and equipment requirements will be coordinated with the client during MPCA review of this corrective action design. All MPCA provisions for system design and implementation will be observed.

Upon approval of this CAD by the MPCA and other regulating authorities, DAHL will commence fabrication of the recovery system components and schedule installation of the recovery system.

The anticipated installation schedule is as follows:

#### First Week

- Manufacturing of water treatment equipment.
- Staging of recovery equipment.
- Submission of applications for applicable permits (zoning, utility, construction, NPDES, MDH, State Fire Marshal Department)

#### Second Week (Pending receipt of applicable permits and approvals)

- Installation of recovery wells.
- Installation of underground piping and components.
- Installation of underground electrical conduits.
- Construction of equipment enclosures.
- Construction of secondary containment.

#### Third Week

- Installation of water treatment equipment.
- Installation of recovered product storage tank.
- Installation of Rotron blower system.
- Installation of enclosure accessories.
- Install temporary controller and start-up of product recovery pump.



- Recovery well pump test.
- Treated groundwater effluent quality test.
- Equipment calibration.
- Electrical wiring.

Pending Completion/Delivery Date of Control Panel

- Installation of groundwater pumps.
- Installation of permanent control panel.
- Electrical inspection.

Pending Electrical Final Inspection and Operating Permits

- System start-up.

### 8.3 System Start-up

At the earliest opportunity during the system installation, the groundwater depression system will be started and operated long enough to conduct pump and equipment tests, and to obtain representative samples from pre-separation, post-separation, air stripper effluent, and air stripper discharge stack.

The test data will be used for equipment calibration, and the samples analyzed for parameters required by the NPDES permit. All sample analysis will be rushed so that the application for the NPDES permit can be completed.

Upon completion of installation, final inspections by code enforcement authorities, and issuance of operational permits, the system will be started and operated in accordance with any permit provisions. Since the free product level has been reduced through bailing, upon startup of the recovery system, recovery will commence in an all fluids mode until it is determined that free product is present. The system will be operated continually until a satisfactory reduction of petroleum hydrocarbons is achieved or until monitoring indicates continued operation will be of marginal effectiveness, pending approval by MPCA.

### 8.4 Further Corrective Actions

As stated above the anticipated duration of time required to complete free product recovery activities is estimated to require 2 years and the time required to complete



remediation of groundwater and reduction of soil contaminant levels to 10 ppm PID, is an additional 3 years. During operation of the groundwater recovery system, a soil venting system (SVS) will be proposed for removal of petroleum hydrocarbons retained within the soil. Utilization of pump and treat enhances the effectiveness of soil venting by lowering the capillary zone.

### 8.5 Site Closure

Upon completion of the above corrective actions and any future recommendations, a request will be made to the MPCA for site closure. Soil samples, directed by the MPCA, will be obtained and analyzed for THG. Upon approval of the closure request, the monitoring wells and recovery wells will be abandoned in accordance with the prevailing MDH Water Well Codes, equipment removed and disposed of in accordance with all applicable regulations, below grade components abandoned in place by grouting of all pipes, and the equipment enclosure demolished. Prior approval for site closure will be obtained from the MPCA.

## 9.0 MONITORING

Upon completion of each phase of installation, the recovery system will be started and run long enough to collect representative samples of the water treatment system. Pre-treatment, mid-treatment, and post-treatment samples will be collected. Sample analysis parameters will be benzene, ethyl benzene, toluene, xylenes (BETX), and total hydrocarbons as gasoline (THG), including additional parameters recommended by involved regulatory agencies. A Dräger sample from the air stripper exhaust will be obtained and analyzed for THG.

When acceptable discharge standards have been achieved, the system will be started. The pumps and level sensors will be calibrated to ensure flow for optimum drawdown with minimum pump cycling.

Initially, the system will be inspected daily during the first week of each phase of operation, to assure proper system operation and to make required adjustments to the system. After the first week, site inspections will be reduced to monthly.

System maintenance will include removal of recovered product from the storage tank,





removal of free product from the specific gravity separator, adjustments to product skimming mechanisms, inspection of equipment for malfunctions, and preventative maintenance of the system.

Proposed initial sampling includes sampling of the specific gravity separator influent, specific gravity separator effluent, and air stripper effluent. The proposed monitoring program for the water treatment system consists of quarterly sampling of the specific gravity separator influent, specific gravity separator effluent, and air stripper effluent. Future sampling will be modified as required by the MPCA regulations and permit guidelines. Sample analysis parameter will be THG and BETX unless otherwise directed or specified by the MPCA. A Dräger sample from the air stripper exhaust will be obtained quarterly and analyzed for and THG.

The proposed groundwater monitoring program consists of quarterly sampling of groundwater at the monitoring wells. The samples will be analyzed for BETX and any other parameters required by the regulating agencies.

## 10.0 COSTS

Installation costs are estimated to be \$                      which includes:

- \* three recovery wells
- \* three groundwater depression pumps
- \* one hundred feet of underground, insulated, and heat traced piping
- \* one on-site, recovered product storage tank
- \* one specific gravity separator
- \* four lift stations
- \* one effluent pump
- \* four air stripping tower
- \* one winterized equipment enclosure (10 x 30 ft.)
- \* one automatic, system controller
- \* electrical wiring
- \* labor to install the above equipment
- \* start-up

Annual operating costs, excluding utilities, are estimated to be \$                      per year, which



includes normal maintenance, monitoring, management, and reporting.

Based upon a minimum of 4 years of operation, the costs of remediation are estimated to be \_\_\_\_\_, excluding utilities.

The above costs are based upon current material and labor costs and assume that no unforeseen circumstances are encountered. This estimate also assumes that no additional requirements or restrictions will be imposed by the current or future property owner, MPCA, or other regulatory entity.

#### 11.0 REPORTING

Upon completion of system installation and initiation of system operation, an installation report will be submitted.

Throughout corrective actions, quarterly status reports and annual project reports will be submitted to the client and the MPCA. All reports will be formatted to include the information outlined in the MPCA guidelines.



The recommendations and methodologies contained in this report represent our professional opinions and are based on accepted analytical practices and documented industry standards. Services performed on this project have been conducted in a manner consistent with standards of care practiced by members of this profession in this area, under similar time and budget restraints. Beyond this, no warranty is expressed or implied.

This report was prepared by:

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8/10/90

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8-10-90

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