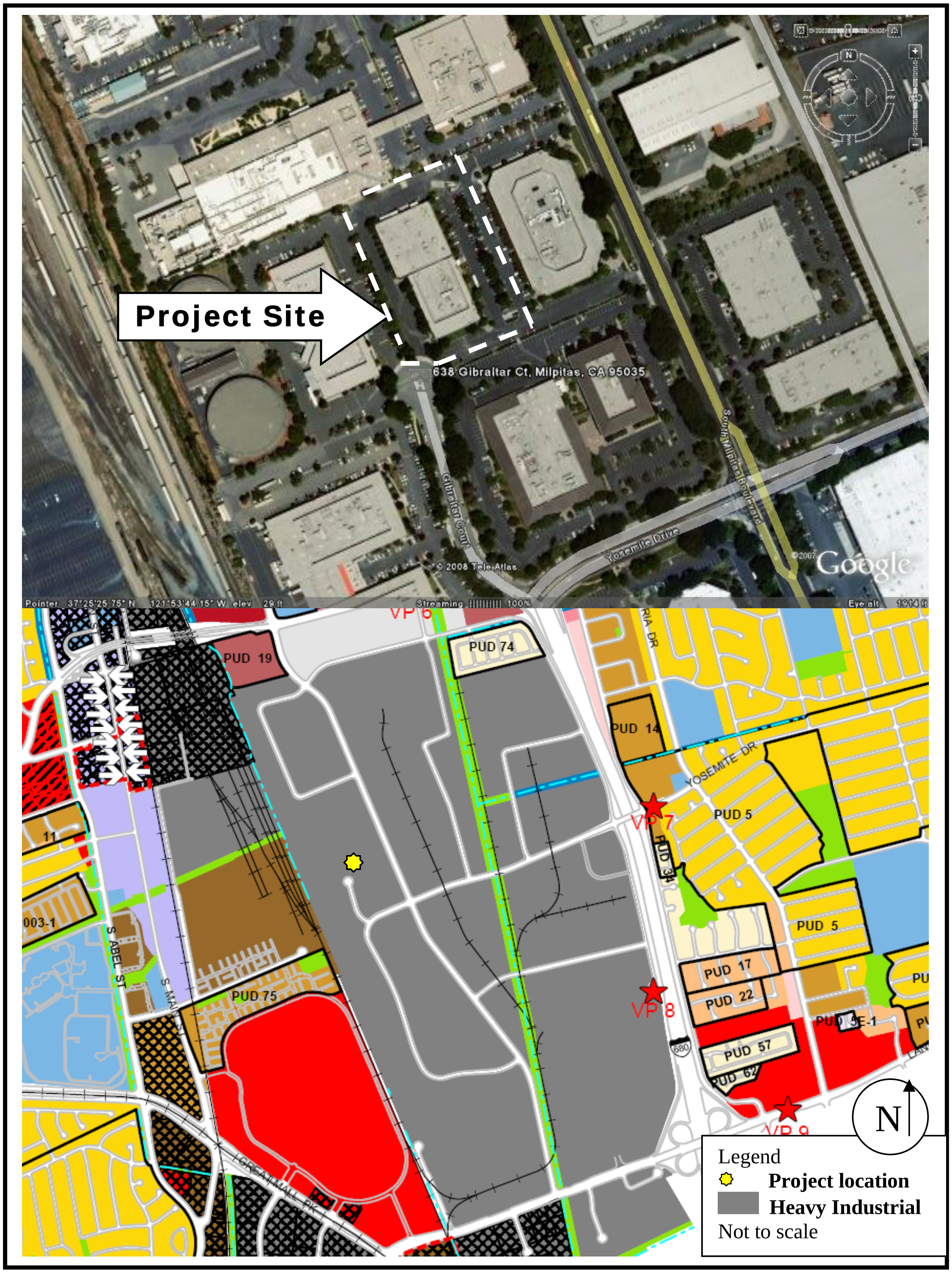
AGENDA ITEM: 6

MILPITAS PLANNING COMMISSION
AGENDA REPORT

PUBLIC HEARING Meeting Date: June 11, 2008

APPLICATION:	**Conditional Use Permit No. UP07-0001, Crosspoint Church of Silicon Valley**
APPLICATION SUMMARY:	A request to locate a church facility within a 38,837 square foot industrial building zoned Heavy Industrial (M2).
LOCATION:	638 Gibraltar Ct. (APN: 86-24-030)
APPLICANT:	Pastor Andy Ching, 680 E Calaveras Boulevard, Milpitas, CA 95035
OWNER:	Crosspoint Chinese Church of Silicon Valley, 680 E Calaveras Boulevard, Milpitas, CA 95035
RECOMMENDATION:	**Staff recommends that the Planning Commission:** **1. Close the public hearing; and** **2. Adopt Resolution No. 08-022 denying the conditional use permit.**
PROJECT DATA: General Plan/ Zoning Designation:	Manufacturing & Warehousing / Heavy Industrial (M2)
Site Area:	2.47 acres
CEQA Determination:	None
PLANNER:	Tiffany Kunsman, Junior. Planner
PJ:	2508
ATTACHMENTS:	A. Site Plans B. Resolution No. 08-022 for denial C. Risk Assessment D. Gas Plum Maps E. Public comments

LOCATION MAP



BACKGROUND

On November 7, 2007, Pastor Andy Ching of Crosspoint Chinese Church of Silicon Valley submitted an application to locate a new church facility at 638 Gibraltar Court. Crosspoint Chinese Church of Silicon Valley is currently located at 680 East Calaveras Boulevard in Milpitas. The project site on Gibraltar Court is a 2.47 acre parcel, consisting of a 38,837 square foot building built in 1984. The subject property is zoned Heavy Industrial (M2) and abutting properties are also zoned Heavy Industrial (M2). A vicinity map of the subject site location is included on the previous page. The application includes a youth center, Sunday school classes, and a daycare facility. According to Section 31.03-4.1 within the Municipal Code, churches are a conditionally permitted use in the Heavy Industrial (M2) Zoning District with the approval of the Planning Commission.

PROJECT DESCRIPTION

The proposal includes one main assembly/worship room at approximately 4,171 square feet with 420 fixed seats, three alternate assembly/worship rooms (one for youth) ranging from 1,110 square feet to 2,803 square feet with an average of 90 fixed seats, a community center, youth center, four Sunday school classrooms teaching children ranging from three to 10 years of age, and a 728 square foot child center, 6,783 square foot gymnasium, seven offices and ten meeting rooms. *(See Site Plan)*

The proposed schedule of activities is as follows:

Schedule of Activities

DAY	TIME	ACTIVITY/ EVENT
Monday – Friday	9:00 A.M. – 5:00 P.M.	Office work, sports, and gatherings
Friday	7:00 P.M. – 11:00 P.M.	Small group meetings
Saturday	9:00 A.M. – 5:00 P.M.	Training, TV production, sports, weddings, and gatherings
Sunday	9:30 A.M. – 10:35 A.M.	Adult worship, children program
	11:00 A.M. – 12:05 P. M. (Peak service time)	Adult worship, Youth Worship, Children Programs
	2:30 P.M. – 4:30 P.M.	Family interactive program, Youth leadership program, choir practice, Baptismal Service, Sports

Parking

The project site has 156 parking spaces. Because the church offers a variety of services and activities at differing times it is not anticipated that the facility would operate at full capacity (e.g. there is no day or time that every room within the church will be fully occupied concurrently) resulting in a fluctuating parking demand throughout the week. Parking requirements for churches are usually based on the peak activity/event that generates the highest parking demand rather then the maximum amount of parking required if the building were at full capacity. It is anticipated that the maximum peak activity/event time occurs on Sundays between 11:00 A.M. and 12:05 P.M. During this time the facility requires 142 parking spaces. *(See chart on following page)*

Sunday; 11:00 A.M. – 12:05 P.M.	***Parking ratio***	***Parking***
Main Assembly/Worship room Religious facility, Section 53.23-5 (5)	420 seats 1 space per every 5 seats	84 spaces
Assembly/Worship room #2 Religious facility, Section 53.23-5 (5)	74 seats 1 space per every 5 seats	15 spaces
Assembly/Worship room #3 Religious facility, Section 53.23-5 (5)	90 seats 1 space per every 5 seats	18 spaces
Assembly/Worship room #4 with Youth Center Religious facility, Section 53.23-5 (5)	99 sets 1 space per every 5 seats	20
Sunday School (daycare school) Section 53.23-2 (9)	4 classrooms 1 space per every classroom	4 spaces
Child Center (childcare facilities) Section 53.23-23-6 (2)	1 classroom 1 space per every 1.5 employees 2 adults to watch children	1 space
	Total Required	**142**

As shown in the chart above, the project proposal meets the required amount of parking with a surplus of 14 parking spaces.

Risk Assessment

The applicant provided a Risk Assessment Report *(Attachment C)* for 638 Gibraltar Court, prepared by ENVIRON International Corporation, as part of the application submittal. The Risk Assessment identifies three facilities that store and uses toxic gases and that upon an accidental release could impact the project site. The three facilities are: Linear Technology Corporation, 275 South Hillview Drive (located 0.7 miles away from proposed site), Nanogram Corporation, 165 Topaz Street (0.5 miles from proposed site), and Magic technologies, 463 South Milpitas Boulevard (0.3 miles from proposed site). *(See Attachment D)*

Facilities with Toxic Gas (June 2008)		
Linear Technology 275 S. Hillview Drive	Magic Technologies 463 S Milpitas	Nanogram 165 Topaz
Chemical Gas Used by Businesses		
Ammonia	Ammonia	Ammonia, amhydrous
Boron Trifluoride	Boron Trichloride	Diborane
Chlorine	Carbon Monoxide	Phosphine
5% Diborane	Chlorine-250	
Hydrogen Bromide	Hydrogen Bromide	
Hydrogen Chloride		
15% Phosphine		
Tungsten Hexafluoride		

To assess the potential effects of these chemicals, the National Institute of Occupational Health and Safety (NIOSH) has established an evaluation criteria known as the "Immediately Dangerous to Life and Health" (IDLH) level. The IDLH is considered a maximum concentration above which only a highly reliable breathing apparatus providing maximum worker protection was permitted. In determining IDLH values, the ability of a worker to escape without loss of life or irreversible health effects was considered along with severe eye or respiratory irritation. As a safety margin, IDLH values were based on the effects that might occur as a consequence of a 30-minute exposure of a healthy adult. It can be assumed that the health risks are increased when applied to children and the elderly.

ENVIRON conducted Potential Consequence of Off-Site Release analysis for the three facilities. Out of the three facilities, ENVIRON identified Linear Technology Corporation located at 275 South Hillview Drive and Magic Technologies located at 463 S Milpitas Boulevard as facilities of potential concern. Worst case scenario modeling revealed that the project site would be exposed to at least 1/10 of the IDLH for the toxic gases used at these facilities upon an instantaneous accidental release to the outdoors *(See 4-3, Risk Assessment & Attachment C).).* The Environmental Protection Agency has established 1/10 IDLH has a maximum safe exposure level for the general public. ENVIRON recommended a series of measure to notify the occupants of the church and provide a level of protection in the event of an accidental release. These measures are consistent with the requirements that have been placed on other quasi-public uses in the City and include chemical monitoring systems, ventilation shutoff systems, and signage, and preparation of an Emergency Action Plan.

ADOPTED PLANS AND ORDINANCES CONSISTENCY

The City of Milpitas has over the years conditionally allowed non-industrial serving quasi-public uses in industrial zoning districts when it was evident that the specific location of the use was not detrimental to industrial business in the vicinity. Several industrial districts within the City have experienced a transition into more of an office or community serving type of district. Two examples of this are the Industrial Park zones located between Los Coches Street and East Calaveras Boulevard (currently the location of the applicant's church) and along California Circle. This transition started when non-industrial serving quasi-public uses began locating within these districts.

The location on Gibraltar Drive proposed with this application is an industrial area that has not experience this same transition. Gibraltar Drive is the central street within the Town Center Business Park which is a key manufacturing area with the City's central Heavy Industrial zoning district. The Town Center Business Park is home to significant employers such as Lifescan, Adaptec, and Seagate. Based on the evidence in other parts of the City, once non-industrial serving quasi public uses are established in an industrial area that area begins to transform into an office/community serving district. Perpetuating these changes does not strengthen or sustain our industrial areas. Significant industrial districts in the City should be maintained for purely industrial uses. The Town Center Business Park is one of those areas given that it is a key district that serves a critical role as an employment center and home to major business that contribute to the local economy.

General Plan
The table below outlines the project's consistency with applicable General Plan Guiding Principles and Implementing Policies.

General Plan Consistency

Principles/Policy	Consistency Finding
2.a-G-1 Maintain a land use program that balances Milpitas' regional and local roles by providing for a highly amenable community environment and a thriving regional industrial center.	Inconsistent
2.a-I-5 Maintain policies that promote a strong economy which provides economic opportunities for all Milpitas residents within existing environmental, social fiscal and land use constraints	Inconsistent
2.a-I-6 Endeavor to maintain a balanced economic base that can resist downturns in any one economic sector.	Inconsistent
2.a-I-7 Provide opportunities to expand employment, participate in partnerships with local business to facilitate communication, and promote business retention.	Inconsistent

Zoning Ordinance
The proposed project is located in the Heavy Industrial (M2) zoning district and is a conditionally permitted use requiring Planning Commission Approval (Milpitas Municipal Code Chapter 10, Section 31.03-4.1). Per Chapter 10, Section 57.03-5 of the Milpitas Municipal, Conditional Use Permits May be granted by the Planning Commission if all of the following findings are made, based on the evidence in the public record:

(a) The proposed use, at the proposed location will not be detrimental or injurious to property or improvements in the vicinity nor the public health, safety, and general welfare;

(b) The proposed use is consistent with the Milpitas General Plan; and

(c) The proposed use is consistent with the Milpitas Zoning Ordinance.

Planning staff has concluded that the addition of a non-industrial quasi public use such as a church within the Town Center Business Park would be detrimental to the investments in property and improvements in the vicinity by starting a transition of the area away from its key purpose as a key manufacturing and employment center. Each finding above can be basis of denying a use permit since all the findings are necessary for approval. Staff is suggesting that none of the above findings can be made because the proposed project at the proposed location will be detrimental to property, is inconsistent with the General Plan, and is therefore inconsistent with the Zoning Ordinance.

It should be noted that Kaiser operates a medical clinic on South Milpitas Boulevard adjacent to the project site. Services currently provided at this location include OB/GYN and eye-care. Medical and dental offices, clinics and laboratories when found necessary to serve and appropriate to the industrial area are permitted uses (no conditional use permit required) in the Heavy Industrial zoning district pursuant to Sections 10-31.02-1 and 10-30.02 of the zoning ordinance. Therefore, the adjacent Kaiser medical clinic would not be considered a non-industrial serving quasi-public use.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not require environmental assessments for projects that a public agency disapproves (Section 15270 of the CEQA Guidelines). The primary purpose of this exemption is to allow an initial screening of a project by the public agency without going through the time and expense of preparing the necessary CEQA documents. An environmental assessment was not prepared for this project to for that reason. The applicant was given the opportunity to postpone the hearing to allow time to prepare the document but chose not to. If the Planning Commission chooses to approve the project, than staff will prepare the necessary CEQA document in time for the July 9, 2008 Commission meeting.

PUBLIC COMMENT/OUTREACH

Staff publicly noticed the application in accordance with City and State law. As of the time of writing this report, there have been two comments from the public in support of the project. *(See attachment E)*

CONCLUSION

Staff is recommending denial of this conditional use permit because it is inconsistent with General Plan Implementation Principals and Policies *2.a-G-1, 2.a-I-5, 2.a-I-6, and 2.a-I-7* and Section 57.03-5 of the Zoning Ordinance. The project would be detrimental to a key business park by initiating a transition of the area away from its key purpose as manufacturing center. This transition would lead to reduced industrial business retention and employment opportunities in the vicinity as has occurred in two other industrial districts within the City.

RECOMMENDATION

STAFF RECOMMENDS THAT the Planning Commission Deny CONDITIONAL USE PERMIT NO. UP07-0001, Crosspoint Church, subject to the attached Resolution.

ALTERNATIVES; IMPLICATIONS OF ALTERNATIVES

1. The Planning Commission can concur with staff and deny Conditional Use Permit No. UP07-0001: A request to locate a church within a 38,837 square foot building. Zoned Heavy Industrial (M2).

   This action would result in applicant not being able to move their existing church at 680 East Calaveras Boulevard to the proposed location at 683 Gibraltar Court. The applicant may appeal the decision to the City Council.

2. The Planning Commission can continue the public hearing to July 9, 2008 and direct staff to return with the necessary CEQA document and resolution to approve the project.

   This action would result in the applicant being able to operate their church at 683 Gibraltar Court under specific conditions approved the Planning Commission on July 9, 2008.

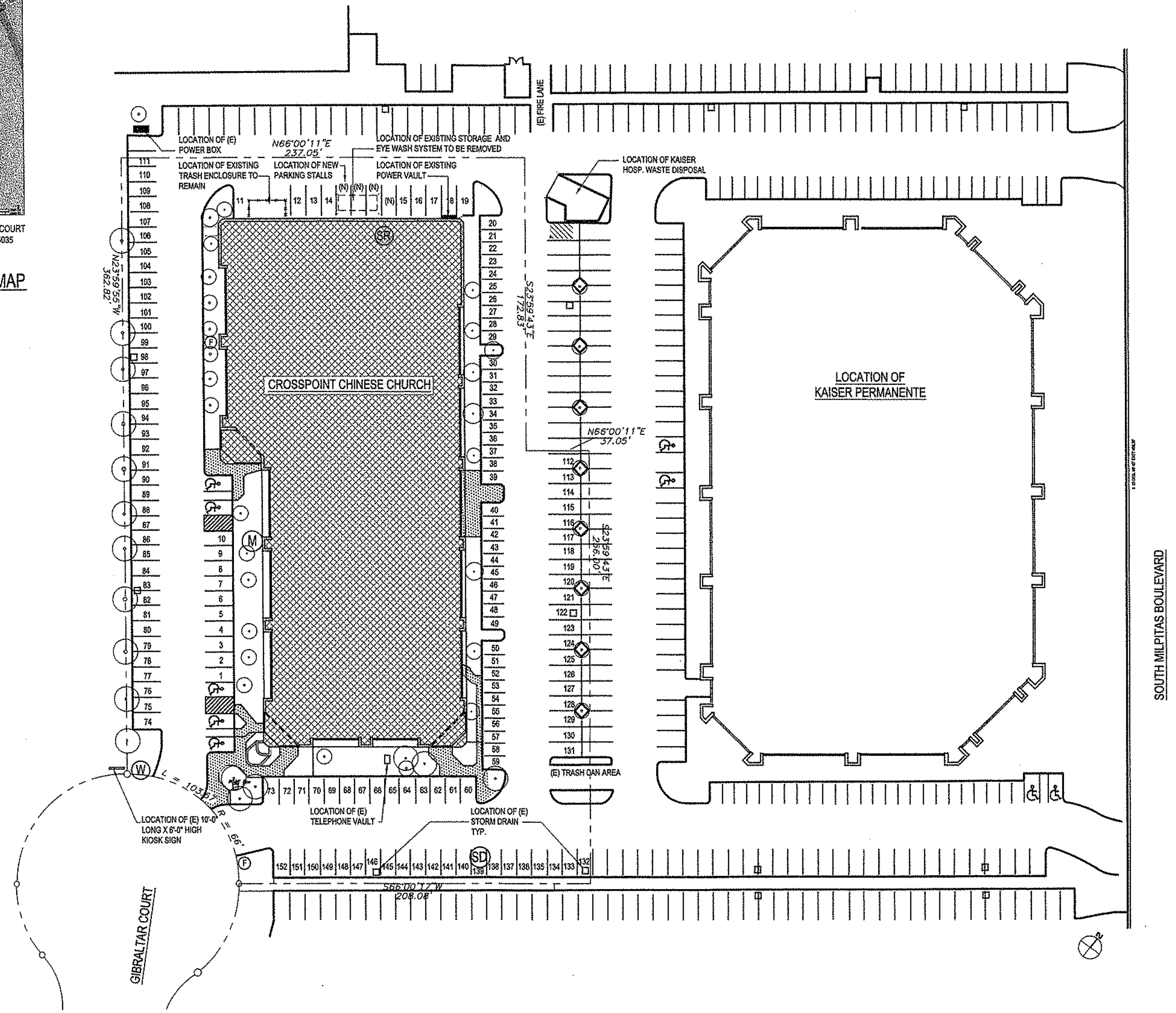
VICINITY MAP

LEGEND:

- LOCATION OF EXISTING BUILDING SITE
- LOCATION OF EXISTING WALKWAY
- LOCATION OF EXISTING TREES, SPECIES NOT DETERMINED AT THIS TIME
- (F) LOCATION OF EXISTING FIRE HYDRANT
- LOCATION OF EXISTING STORM DRAIN INLETS
- (SR) LOCATION OF EXISTING SPRINKLER RISER
- (W) LOCATION OF EXISTING WATER MAIN
- (SD) LOCATION OF EXISTING STORM DRAIN MAN HOLE
- (M) LOCATION OF EXISTING GA METER

EXISTING PARKING SPACE:

EXISTING PARKING SPACES:	152 SPACES
ADJACENT HANDICAP SPACE:	5 SPACES
NEW PARKING SPACES	4 SPACES
TOTAL PARKING SPACES:	161 SPACES



EXISTING SITE PLAN (1)
1/32" = 1'-0"

CROSSPOINT CHINESE CHURCH

CONSULTANTS

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CROSSPOINT CHINESE CHURCH

PROJECT ADDRESS:
638 GIBRALTAR COURT
MILPITAS, CA 95035

OWNER
CROSSPOINT CHINESE CHURCH
680 EAST CALAVERAS BLVD.

408-586-8688

MARK	DATE	DESCRIPTION
	09-16-07	OWNER'S PRELIM. APPROVAL
	10-01-07	COMMITTEE APPROVAL
	10-31-07	CUP APPROVAL
	04-16-08	PUBLIC HEARING
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PROJECT NO:	2007011
CAD DWG FILE:	SC-0 SITE PLAN.DWG
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SITE PLAN

SC-0

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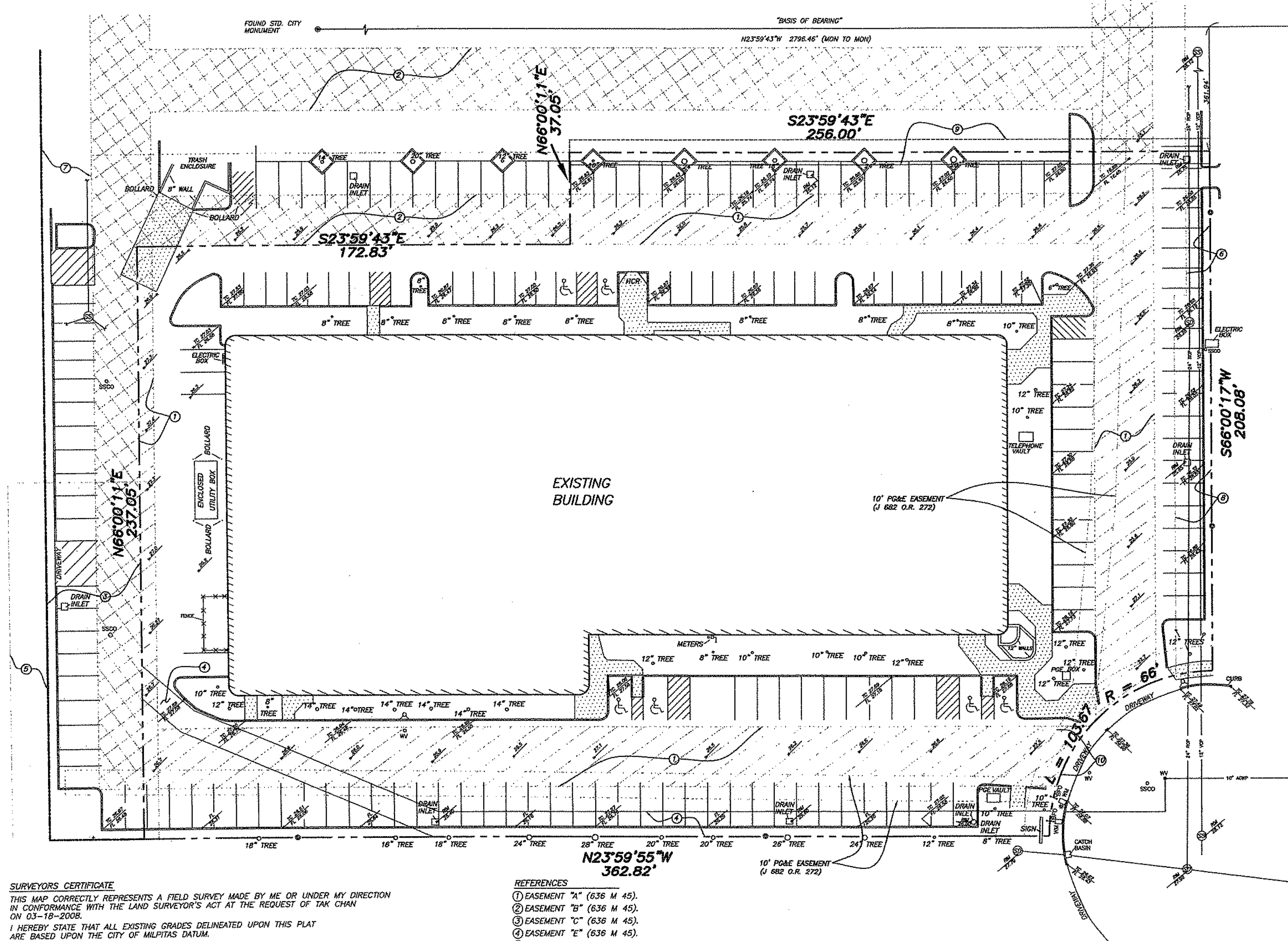


LEGEND

TC	TOP OF CURB
FL	FLOW LINE
BW	BACK OF WALK
————	PROPERTY LINE
BFP	BACK FLOW PREVENTOR
EP	EDGE OF PAVEMENT
WM	WATER METER
WV	WATER VALVE
SSCO	SANITARY SEWER CLEAN OUT
(symbol)	FIRE HYDRANT
(SS)	SANITARY SEWER MAN HOLE
(SD)	STORM DRAIN MANHOLD
(symbol)	ST. LITE/24" CONCRETE BASE
HCR	HANDICAP RAMP

BASIS OF BEARING:
MONUMENT LINE OF MILPITAS BLVD TAKEN AS S23°59'43"E

BENCHMARK:
BRASS DISK IN MONUMENT WELL @ INTERSECTION, SOUTH MILPITAS BLVD AND YOSMITE DRIVE. ELEV. = 28.94

SURVEYORS CERTIFICATE

THIS MAP CORRECTLY REPRESENTS A FIELD SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE LAND SURVEYOR'S ACT AT THE REQUEST OF TAK CHAN ON 03-18-2008.

I HEREBY STATE THAT ALL EXISTING GRADES DELINEATED UPON THIS PLAT ARE BASED UPON THE CITY OF MILPITAS DATUM.

I FURTHER STATE THAT THE PARCEL DELINEATED UPON THIS SURVEY IS THE SAME AS THAT SHOWN ON THE CURRENT COUNTY ASSESSMENT ROLL AS A UNIT.

I FURTHER STATE THAT IN ACCORDANCE WITH THE PROFESSIONAL LAND SURVEYOR'S ACT THE PERFORMANCE OF THIS SURVEY DOES NOT REQUIRE A RECORD OF SURVEY.

(signature) 04/08/08
EKUNDAYO SOWUNMI, P.E. — DATE
LICENSE EXPIRES 12/31/2009

REFERENCES

1. EASEMENT "A" (636 M 45).
2. EASEMENT "B" (636 M 45).
3. EASEMENT "C" (636 M 45).
4. EASEMENT "E" (636 M 45).
5. 15' P.S.U.E. (503 M 48).
6. 10' P.S.U.E. (520 M 30 & 31).
7. P.U.E. (593 M 48/49).
8. 15' P.S.U.E. (501 M 30 & 31).
9. 10' DRAINAGE EASEMENT "F" (636 M 45).
10. 10' P.S.U.E. (503 M 48 & 49).

ACKLAND
INTERNATIONAL, INC.
333 Hegenberger Road, Suite 304
Oakland, CA 94621
510.633.1797 (tel)
510.633.2431 (fax)

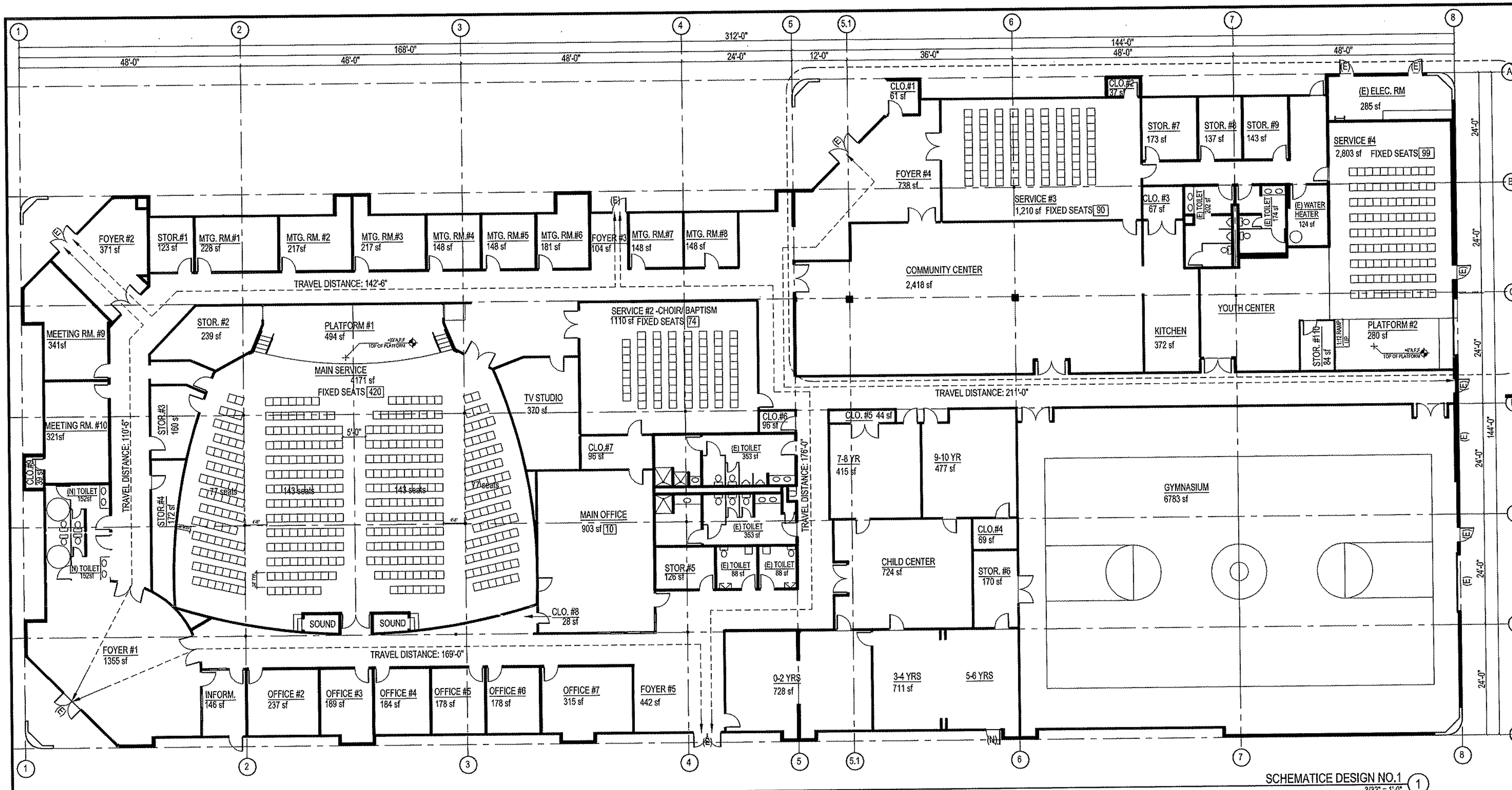
Boundary And Topographic Survey
Of

APN # 086-42-030

PARCEL 2, AS SHOWN ON THAT CERTAIN PARCEL MAP RECORDED MAY 14, 1992 IN BOOK 636 OF MAPS AT PAGES 44 AND 45, SANTA CLARA COUNTY RECORDS

Milpitas — Santa Clara County — California

Date: 4-7-2008 — Scale: 1"=20'



OCCUPANCY LOAD CALCULATION

ROOM NAME	OCCUPANCY CLASSIFICATION	SIZE (SQ. FT.)	OCCUPANCY LOAD FACTOR	OCCUPANCY LOAD	NUMBER OF EXIT REQ. BY CODE	NUMBER OF EXIT ACTUAL LAYOUT	ROOM NAME	OCCUPANCY CLASSIFICATION	SIZE (SQ. FT.)	OCCUPANCY LOAD FACTOR	OCCUPANCY LOAD	NUMBER OF EXIT REQ. BY CODE	NUMBER OF EXIT ACTUAL LAYOUT
MAIN SERVICE	A-3 W/ FIXED SEATING	4147	ACTUAL NO. SEATS	420	2	3	OFFICE #6	A-3 BUSINESS	178	100	2	1	1
SERVICE #2	A-3 W/ FIXED SEATING	1126	ACTUAL NO. SEATS	74	2	2	OFFICE #7	A-3 BUSINESS	315	100	4	1	1
SERVICE #3-CHOIR BAPT	A-3 W/ FIXED SEATING	1210	ACTUAL NO. SEATS	90	2	2	MEETING #1	A-3 UNCONCENTRATED	228	15	16	1	1
SERVICE #4	A-3 W/ FIXED SEATING	2,803	ACTUAL NO. SEATS	99	2	3	MEETING #2	A-3 UNCONCENTRATED	217	15	15	1	1
							MEETING #3	A-3 UNCONCENTRATED	217	15	15	1	1
PLATFORM #1	A-3 UNCONCENTRATED	494	15 NET	33	1	3	MEETING #4	A-3 UNCONCENTRATED	148	15	10	1	1
PLATFORM #2	A-3 UNCONCENTRATED	280	15 NET	19	1	3	MEETING #5	A-3 UNCONCENTRATED	148	15	10	1	1
CHILD CENTER	A-3 DAYCARE	724	35	21	1	1	MEETING #6	A-3 UNCONCENTRATED	181	15	13	1	1
0-2 YEAR	A-3 DAYCARE	728	35	21	1	2	MEETING #7	A-3 UNCONCENTRATED	148	15	10	1	1
3-6 YEARS	A-3 DAYCARE	718	35	21	1	2	MEETING #8	A-3 UNCONCENTRATED	148	15	10	1	1
7-8 YEARS	A-3 DAYCARE	415	35	12	1	2	MEETING #9	A-3 UNCONCENTRATED	341	15	23	1	1
9-10 YEARS	A-3 DAYCARE	477	35	13	1	2	MEETING #10	A-3 UNCONCENTRATED	321	15	22	1	1
GYMNASIUM	A-3 EXERCISE	6783	50	135	2	3	STORAGE #1	A-3 STORAGE	123	300	1	1	1
COM. CENTER	A-3 UNCONCENTRATED	2418	15 NET	161	2	3	STORAGE #2	A-3 STORAGE	239	300	1	1	1
TV STUDIO	A-3 VOCATIONAL	370	50	8	1	1	STORAGE #3	A-3 STORAGE	160	300	1	1	1
INFO. RM	A-3 BUSINESS	148	100	2	1	1	STORAGE #4	A-3 STORAGE	172	300	1	1	1
MAIN OFFICE #1	A-3 BUSINESS	903	100	10	1	1	STORAGE #5	A-3 STORAGE	126	300	1	1	1
OFFICE #2	A-3 BUSINESS	237	100	3	1	1	STORAGE #6	A-3 STORAGE	168	300	1	1	1
OFFICE #3	A-3 BUSINESS	169	100	2	1	1	STORAGE #7	A-3 STORAGE	173	300	1	1	1
OFFICE #4	A-3 BUSINESS	184	100	2	1	1	STORAGE #8	A-3 STORAGE	137	300	1	1	1
OFFICE #5	A-3 BUSINESS	178	100	2	1	1	STORAGE #9	A-3 STORAGE	143	300	1	1	1
							STORAGE #10	A-3 STORAGE	84	300	1	1	1

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CROSSPOINT CHINESE CHURCH

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MARK	DATE	DESCRIPTION
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	10-01-07	COMMITTEE APPROVAL
	10-31-07	CUP APPROVAL
	04-16-08	PUBLIC HEARING
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PROJECT NO: 2007011
CAD DWG FILE: SC-1 SCHEMATIC DESIGN NO. 1.DWG
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CHK'D BY: SHY
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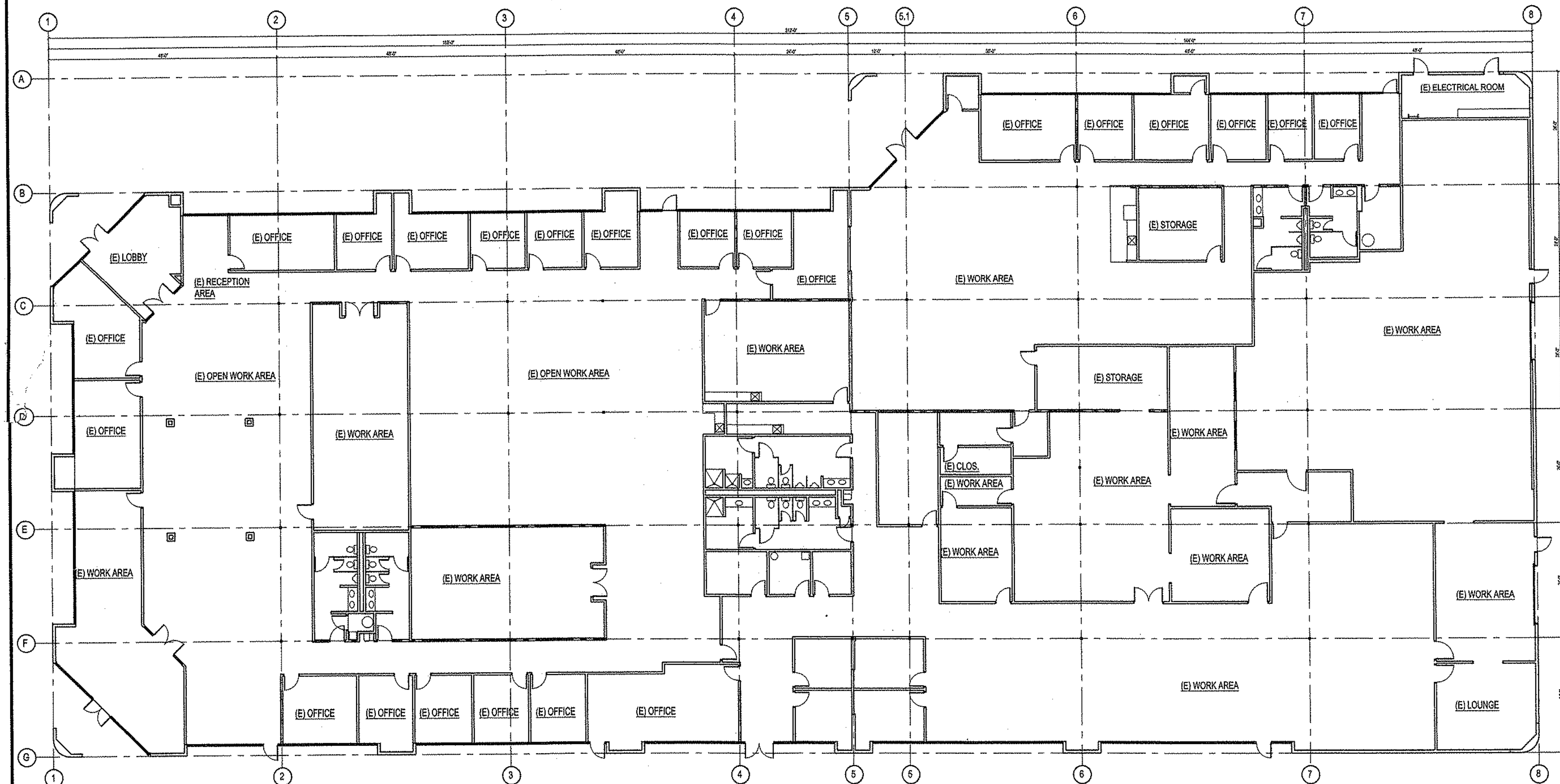
SHEET TITLE

SCHEMATIC DESIGN NO. 1

SHEET SC-1 OF



EXISTING FLOOR PLAN 1
3/32" = 1'-0"

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PROJECT ADDRESS:

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MILPITAS, CA 95035

OWNER
CROSSPOINT CHINESE CHURCH
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408-586-9698

MARK	DATE	DESCRIPTION
	09-18-07	OWNER'S PRELIM. APPROVAL
	10-01-07	COMMITTEE APPROVAL
	10-31-07	CUP APPROVAL
	03-05-08	CITY MEETING
	03-12-08	CUP RESUBMITTAL
	—	—

PROJECT NO:	2007011
CAD DWG FILE:	SC-E EXISTING FLOOR PLAN.DWG
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EXISTING FLOOR PLAN

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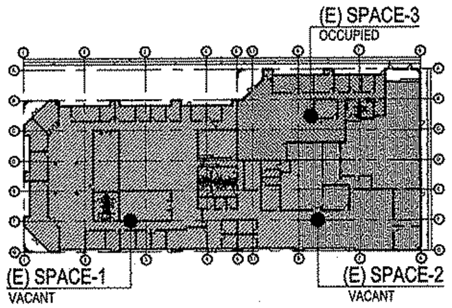
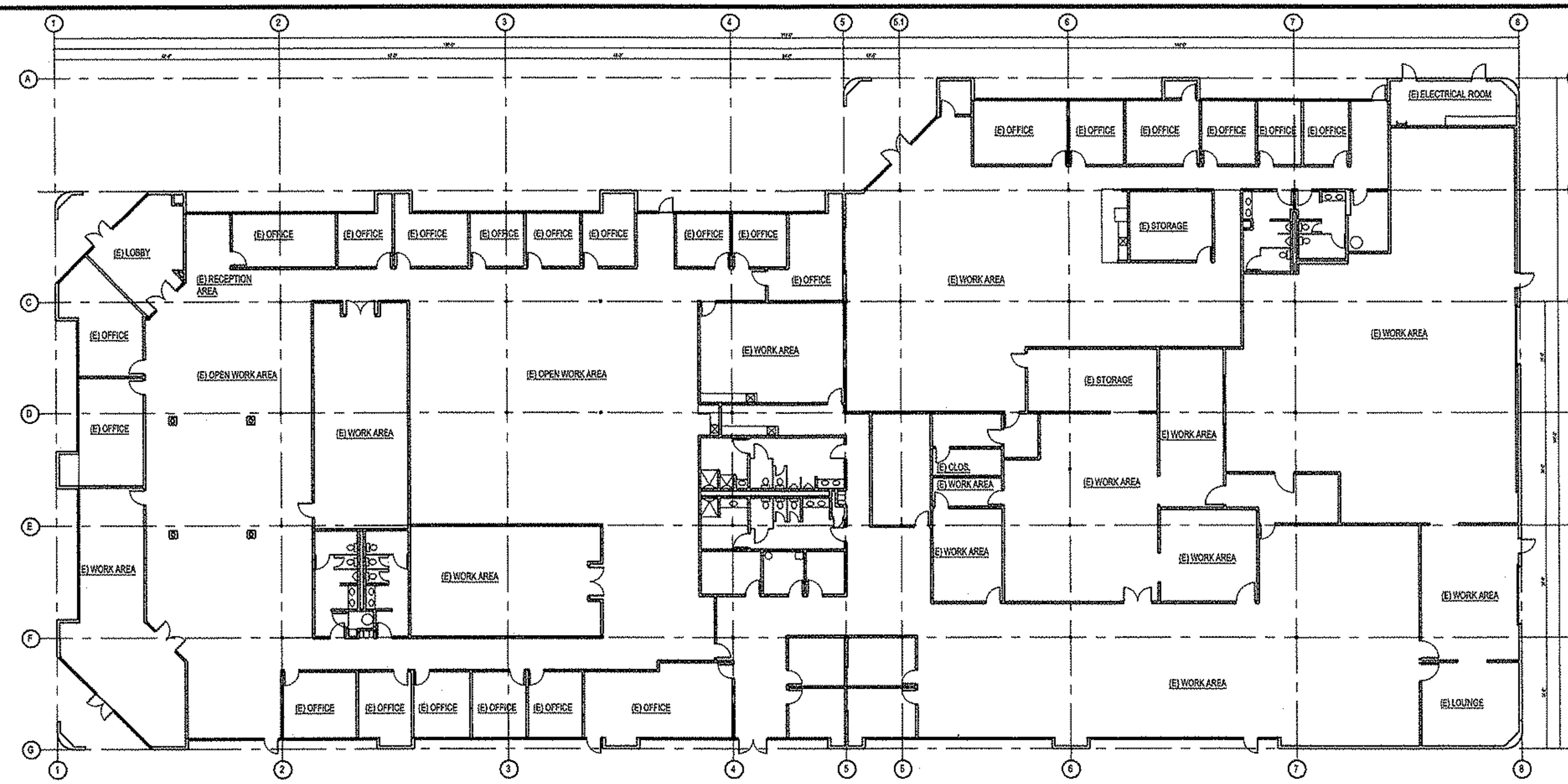
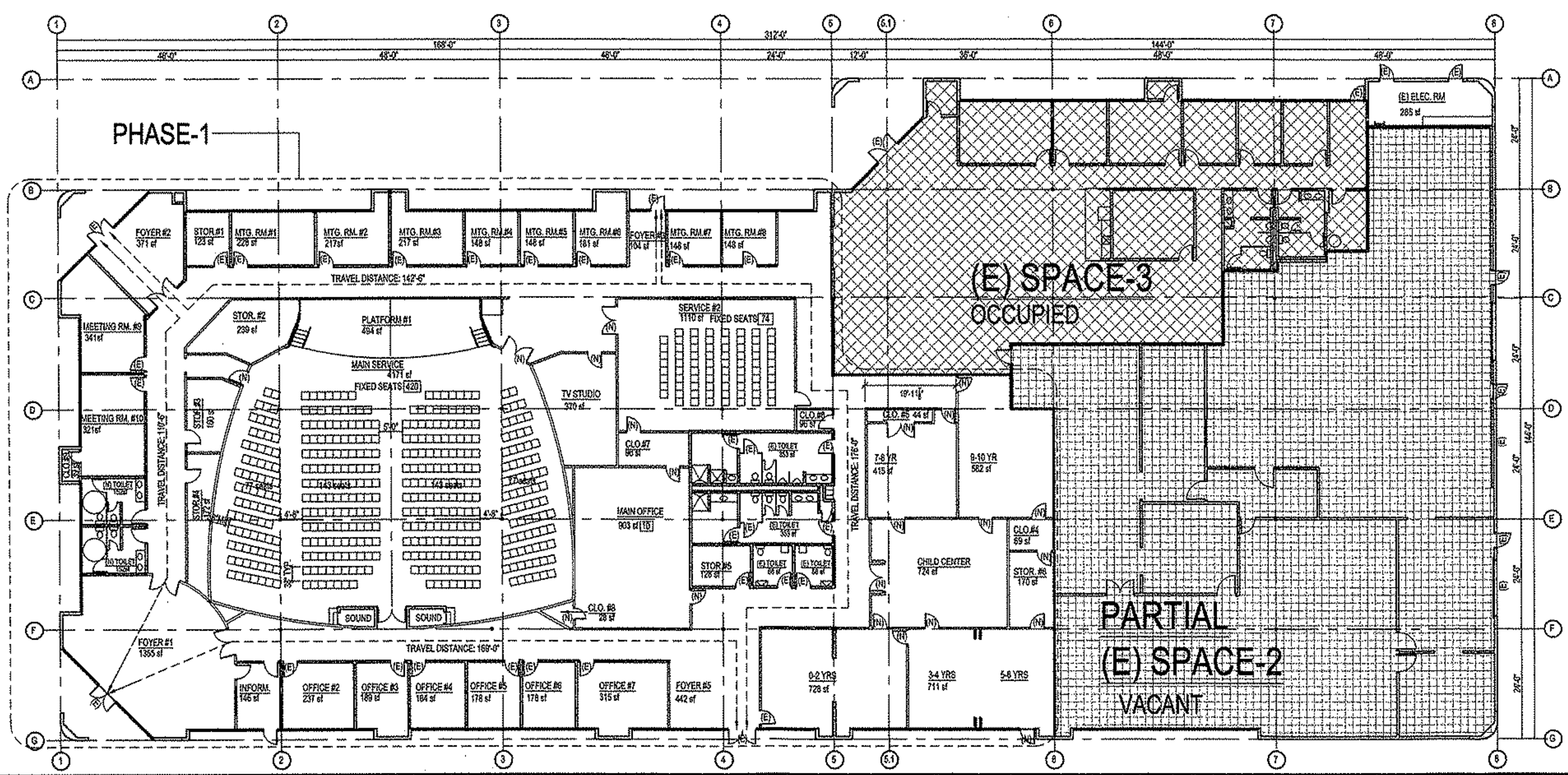


REFERENCE PLAN
N.T.S.



EXISTING FACILITY PLAN (2)
1/16" = 1'-0"



PHASING PLAN NO.1 (1)
1/16" = 1'-0"

LEGEND:

[21]	OCCUPANT LOAD OF THE ROOM
	(E) WALL TO REMAIN
	(N) WALL
	(E) DOOR TO REMAIN
	(N) DOOR

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CROSSPOINT CHINESE CHURCH

PROJECT ADDRESS:

638 GIBRALTAR COURT

OWNER

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680 EAST CALAVERAS BLVD.

408-586-9698

MARK	DATE	DESCRIPTION
	09-16-07	OWNER'S PRELIM. APPROVAL
	10-01-07	COMMITTEE APPROVAL
	10-31-07	CUP APPROVAL
	03-05-08	CITY MEETING
	03-12-08	CUP RESUBMITTAL
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PROJECT NO:	2007011
CAD DWG FILE:	PH-1 PHASING PLAN NO.1.DWG
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PHASING PLAN NO.1

PH-1

SHEET . OF .

RESOLUTION NO. 08-022

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF MILPITAS, CALIFORNIA, DENYING CONDITIONAL USE PERMIT NO. UP07-0001, CROSSPOINT CHURCH, TO LOCATE A CHURCH WITHIN A 38,837 SQUARE FOOT BUILDING LOCATED AT 638 GIBRALTER COURT.

WHEREAS, on November 7, 2008, an application was submitted by Pastor Andy Ching, 680 E Calaveras Boulevard, Milpitas, CA 95035, to locate a quasi-public facility within a 38,837 square foot building. The property is located within the Heavy Industrial (M2) Zoning District (APN: 086-42-030); and

WHEREAS, The California Environmental Quality Act (CEQA) does not require environmental assessments for projects that a public agency disapproves; and

WHEREAS, on June 11, 2008, the Planning Commission held a duly noticed public hearing on the subject application and considered the applicable sections of the zoning code and all such other related evidence presented by City staff, the applicant, and other interested parties.

NOW THEREFORE, the Planning Commission of the City of Milpitas hereby finds, determines and resolves as follows:

Section 1: The recitals set forth above are true and correct and incorporated herein by reference.

Section 2: The project is exempt from environmental review pursuant to Section 15270 of the CEQA Guidelines.

Section 3: The General Plan designates this site as Manufacturing and Warehousing. The proposed use is inconsistent with the General Plan Principal Guidelines and Implementation Policies *2.a-G-1, 2.a-I-5, 2.a-I-6, and 2.a-I-7* because the use is not compatible with or conducive to the surrounding industrial uses and will potentially lead to reduced business retention, employment opportunities, and economic development. The location of the proposed use may also inhibit the development and maintenance of a balanced and stable mix of industrial, warehousing and manufacturing uses in the area.

Section 4: The findings necessary to approve a conditional use permit can not be made as demonstrated below:

a) The proposed use, at the proposed location, will be detrimental or injurious to property or improvements in the vicinity by starting a transition of the area away from its key purpose as a key manufacturing and employment center.
b) The proposed use is inconsistent with the Milpitas General Plan by potentially leading to reduced business retention and employment opportunities.

c) The proposed use is inconsistent with the Milpitas Zoning Ordinance because the necessary findings in Section 57.03-5 of the Zoning Ordinance can not be made

Any one of the factors above can be a basis of denial.

Section 5: The Planning Commission of the City of Milpitas Denies Conditional Use Permit UP07-0001, Crosspoint Church, subject to the above Findings.

DENIED at a regular meeting of the Planning Commission of the City of Milpitas on June 11, 2008.

____
Chair

TO WIT:

I HEREBY CERTIFY that the following resolution was denyed at a regular meeting of the Planning Commission of the City of Milpitas on June 11, 2008, and carried by the following roll call vote:

COMMISSIONER	**AYES**	**NOES**	**OTHER**
Cliff Williams			
Gunawan Ali-Santosa			
Lawrence Ciardella			
Alexander Galang			
Sudhir Mandal			
Gurdev Sandhu			
Noella Tabladillo			
Aslam Ali			

RISK ASSESSMENT REPORT

PROPOSED CROSSPOINT CHINESE CHURCH
628-658 GIBRALTAR COURT
MILPITAS, CALIFORNIA

Prepared for:

Crosspoint Chinese Church of Silicon Valley

Milpitas, California

Prepared by:

ENVIRON International Corporation

Emeryville, California

September 12, 2007

03-18804A

Prepared by:

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REGISTERED PROFESSIONAL ENGINEER
THOMAS MICHAEL KEINATH
CH 6275
EXP. 6/30/07
CHEMICAL
STATE OF CALIFORNIA

Michael Keinath, P.E. (California Chemical Engineer No. 6275)
Senior Associate

Estelle Shiroma, D.Env.
Senior Manager

Norm Ozaki, Ph.D.
Principal

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ACRONYMS

CalARP	California Accidental Release Prevention
CalEPA	California Environmental Protection Agency
IDLH	Immediately Dangerous to Life or Health
HMCD	County of Santa Clara Department of Environmental Health – Hazardous Materials Compliance Division
HMBP	Hazardous Materials Business Plan
R&D	Research and Development
RMP	Risk Management Plan
TEP	Toxic Endpoint
TGO	City of Milpitas Toxic Gas Ordinance
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank

EXECUTIVE SUMMARY

The Crosspoint Chinese Church of Silicon Valley (CCC) is interested in purchasing the properties identified as 628-658 Gibraltar Court, Milpitas, Santa Clara County, California (the "Site" or the "proposed CCC Site"). Because the proposed CCC Site is located in an industrial zone, as part of it's review of a Conditional Use Permit the City of Milpitas is requiring a Risk Assessment "...to evaluate the potential health and safety risks to individuals from the exposure to hazardous material which may occur at the proposed site." On behalf of the CCC, ENVIRON International Corporation (ENVIRON) has prepared this report to address the risk assessment requirement imposed by the City of Milpitas. The focus of this report is on neighboring businesses that may store chemicals that could have off-site consequences if catastrophically released. This includes chemicals that are acutely toxic, exist in a form that readily allows off-site transport after release and are used/stored in sufficient quantities that a release could adversely impact individuals who may be at the proposed CCC location.

First, ENVIRON used information collected as part of risk assessments prepared by ENVIRON for other facilities nearby the proposed CCC Site and identified facilities of potential concern in the vicinity of the proposed CCC. The facilities of potential concern were identified by conducting a number of tasks including conducting a visual reconnaissance of the Site vicinity, identifying land use in the Site vicinity, identifying facilities that have had historical hazardous material releases, identifying facilities that have submitted Risk Management Plans (RMPs) under the Federal RMP or California Accidental Release Prevention (CalARP) Programs, and identifying facilities in the Site vicinity that have submitted Hazardous Material Business Plans (HMBPs) that indicate large or medium chemical use, as characterized by the City of Milpitas, including use of toxic gases under the City of Milpitas Toxic Gas Ordinance (TGO). Based on the findings of these tasks, ENVIRON identified several facilities of potential concern.

Second, as part of risk assessments prepared by ENVIRON for other facilities nearby the proposed CCC Site, ENVIRON conducted file reviews of the facilities identified as facilities of potential concern at the Milpitas Fire Department and the County of Santa Clara Department of Environmental Health – Hazardous Materials Compliance Division (HMCD). Based on information gathered during the file reviews (e.g., type and quantity of hazardous materials stored, and number and significance of historical releases, if any) and discussions with the Milpitas Fire Department, the Milpitas Fire Department requested that ENVIRON evaluate three of the facilities (Magic Technologies, Nanogram Corporation, and Linear Technology Corporation) which store toxic chemicals to determine if they could have off-site consequences if catastrophically released. Magic Technologies (0.3 miles to the north-northeast of the proposed CCC Site), Nanogram Corporation (0.5 miles to the north-northwest of the proposed CCC Site), and Linear Technology Corporation (0.7 miles north-northeast of the proposed CCC Site) are semiconductor manufacturers that use various toxic gases (e.g., anhydrous ammonia, arsine, boron trichloride, chlorine, carbon monoxide, diborane, hydrogen bromide, hydrogen chloride, phosphine, and tungsten hexafluoride) in their operations.

Third, ENVIRON evaluated the potential risk posed by toxic chemical storage at these three facilities. Based on determinations by the Milpitas Fire Department, ENVIRON evaluated worst-case toxic chemical release scenarios, as defined under RMP, for certain toxic chemicals at these facilities. Based on this evaluation, ENVIRON concluded that a catastrophic release of boron trichloride from Magic Technologies facility could have off-site consequences at IDLH concentrations that could affect individuals at the proposed CCC Site. ENVIRON further concluded that it is unlikely that a catastrophic release of the other toxic chemicals evaluated from the three facilities would have off-site consequences at the IDLH concentrations that would affect individuals at the proposed CCC Site.

ENVIRON understands that the Milpitas Fire Department also requests distances to either the TEP or 1/10 IDLH for the toxic gases evaluated. Based on worst-case release scenarios, the distance to either the TEP or 1/10 IDLH encompasses the proposed CCC Site for the following toxic gases at the three facilities: hydrogen bromide from the Linear Technology Corporation facility; phosphine from Nanogram Corporation facility; and chlorine and boron trichloride from Magic Technologies facility.

Based on these results, ENVIRON believes an emergency and protective action plan would aid the Crosspoint Chinese Church in developing mitigation measures for catastrophic off-site consequences from Linear Technology Corporation, Nanogram Corporation, and Magic Technologies. As an emergency and protective action plan is to be tailored to individual buildings and coordinated with local planners and emergency response systems, the development of this plan requires coordination between the Crosspoint Chinese Church, Linear Technology Corporation, Nanogram Corporation, and Magic Technologies, the Milpitas Fire Department, and the Milpitas Planning Department.

1.0 INTRODUCTION

The Crosspoint Chinese Church of Silicon Valley (CCC) is currently leasing the building located at 680 E. Calaveras Boulevard, Milpitas, California. The CCC is interested in purchasing the properties identified as 628-658 Gibraltar Court (the "Site" or the "proposed CCC Site"), located 0.7 miles from their current location. The location of the Site is shown on Figure 1.

Because the proposed CCC Site is located in an industrial zone, as part of its review of a Conditional Use Permit the City of Milpitas is requiring a Risk Assessment "...to evaluate the potential health and safety risks to individuals from the exposure to hazardous material which may occur at the proposed site." On behalf of the CCC, ENVIRON International Corporation (ENVIRON) has prepared this report to address the risk assessment requirement imposed by the City of Milpitas. The focus of this report is on neighboring businesses that may store chemicals that could have off-site consequences if catastrophically released. This includes chemicals that are acutely toxic, exist in a form that readily allows off-site transport after release and are used/stored in sufficient quantities that a release could adversely impact individuals at the proposed CCC Site.

Subsequent to this Introduction (Chapter 1.0), this report is divided into five sections as follows: Description of Proposed Project (Chapter 2.0); Identification of Facilities of Potential Concern (Chapter 3.0); Evaluation of Potential for Adverse Impacts (Chapter 4.0); Conclusions and Mitigation Measures (Chapter 5.0); and Limitations (Chapter 6.0).

2.0 DESCRIPTION OF PROPOSED PROJECT

The CCC is interested in purchasing the properties identified as 628-658 Gibraltar Court, Milpitas, California for the purposes of relocating to expand services and activities offered by the CCC. The Site is located at the junction of Yosemite Drive and Gibraltar Drive, one block west of S. Milpitas Boulevard, in a commercial/industrial setting (Figure 1). According to the City of Milpitas Planning Department, the assessor's parcel number (APN) for the subject property is 86 42 030. The property is located in Zone M-2, a designation for heavy industrial activities.

The building on the property is located on an area of approximately 2.47 acres with a concrete tilt-up construction, and a roof covered with tar and gravel. The building is partitioned into three suites that share a total square footage of 38,837, each with its own mailing address. Crosspoint Chinese Church intends to occupy Suite 2 (658 Gibraltar Ct.) that consists of 15,601 square feet. This Suite was previously occupied by Serve Gate; business activities at Serve Gate included sales and marketing of computer security. Suite 1 (628 Gibraltar Ct.) consists of 16,684 square feet and is currently occupied by HDC Operations on a 5-year lease. Business activities at HDC include assembling and shipping of medical devices. Suite 3 (638 Gibraltar Ct.) consists of 6,552 square feet and is currently occupied by Digital Radio Express on a 3-year lease. Prior to Digital Radio Express, lriver America occupied Suite 3; business activities at lriver America were the marketing of MP3 Players.

The total number of parking spaces is 196, of which four are designated for handicap parking. The building is surrounded by mature landscaping that includes annuals, shrubs and small trees.

2.1 Proposed and Current CCC Activities:

- Provide wedding services
- Production of cultural and educational TV programming
- Meditation, stress management and occupation workshops/seminars
- Provide conference facility for the community and businesses
- Parent/child interactive programs, exercise and recreational classes
- Sunday worship service, Bible studies for adults, youth and college students
- Offer refreshments, food prepared off-site will be served before or after activities

Based on the type of proposed and current CCC activities, it is anticipated that sensitive receptors (i.e., children, elderly, and handicapped) will be present at the Site.

2.2 Hours of Operation:

While the Church is open during the week, the bulk of the visits to the Church are expected to be during off-peak hours – after work hours on weekdays and on weekends. The occupancy rate at the Church will be consistent with City of Milpitas requirements.

Office hours:

Tuesday-Friday (9 am – 5 pm)

Activity hours: (Based on the various activity they may start and end within the confines of the listed times stated below.)

Weekend:	9 am – 11 pm
Weekday evening:	7 pm – 11 pm

2.3 Building Improvements:

Upon occupying the building, CCC plans to commence building renovations; this is expected to be completed in 3 phases. Phase 1 will consist of tenant improvements to Suite 2 with no changes to the exterior of the building with the exception of signage. CCC intends to eventually occupy the entire building as each of the leases come to an end. Phases 2 and 3 will consist of modifying the leased suites to CCC's proposed design.

3.0 IDENTIFICATION OF FACILITIES OF POTENTIAL CONCERN

3.1 Introduction

The focus of this report is on neighboring businesses that may store chemicals that could have off-site consequences if catastrophically released. ENVIRON has recently conducted several other risk assessments (RAs) and updates to those RAs for facilities in the immediate vicinity of the Site that have been approved by the City of Milpitas and the Milpitas Fire Department (MFD) and this assessment is consistent with the methodologies used and results from those RAs.[1] As part of those RAs, ENVIRON identified facilities that store toxic gases in sufficient quantities to potentially impact adjacent properties and evaluated the impact distances of a potential emergency release of those toxic gases. ENVIRON contacted Captain Clare Owens, the Hazardous Materials Inspector with the MFD, to inquire if the City of Milpitas would allow ENVIRON to use results developed from those analyses and apply them to the RA for the CCC Site. Captain Owens indicated that approach would be acceptable provided ENVIRON conduct a drive-by site investigation to identify businesses adjacent to the Site.[2] ENVIRON provided that list to the MFD, which Captain Owens reviewed to identify any additional facilities that would require evaluation. No additional facilities requiring evaluation were identified by Captain Owens.[3]

3.2 Site Vicinity Reconnaisance

At the request of Captain Owens of the MFD, on August 6, 2007, ENVIRON conducted a drive-by visual reconnaissance of the Site vicinity to identify neighboring businesses (including addresses and company names) within 1,000 foot radius. ENVIRON cannot guarantee that every business within the 1,000 foot radius was identified; however, it is anticipated that large business locations and the majority of small business locations were identified. The reconnaissance was conducted by foot and car from public walkways, parking lots, and public thoroughfares. ENVIRON personnel did not enter any buildings, cross private property, or conduct any interviews with occupants of the properties located in the vicinity of the Site. To the extent possible, the name and address of each business were identified. Figure 2 identifies the location and identification of the businesses located within a 1,000 foot radius of the proposed CCC location and Table 1 identifies the name, address,

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[1] In December 2004, ENVIRON prepared a Revised Risk Assessment Report for the proposed India Community Center at 525/535 Los Coches Street, Milpitas, California, a community center approximately 0.5-miles from the proposed CCC Site. In March 2007, ENVIRON submitted an Update to the Revised Risk Assessment Report which was approved by the Milpitas Fire Department on March 6, 2007. In October 2004, SOMA Corporation (SOMA) developed a RA report for the Santa Clara Christian Assembly (SCCA) facility at 211-215 Topaz Street, Milpitas, California, a church approximately 0.3 miles from the CCC Site. This RA was updated by ENVIRON on May 18, 2007.
[2] Personal communication between Clare Owen, Milpitas Fire Department Hazardous Materials Environmental Services and Michael Keinath, ENVIRON, July 2007.
[3] E-mail from Clare Owen, Milpitas Fire Department Hazardous Materials Environmental Services to Michael Keinath, ENVIRON, dated August 10, 2007.

and type of businesses located within an approximately 1,000 foot radius of the proposed CCC location.

3.3 Site Location and Land Use in Site Vicinity

Based on the results of the Site vicinity reconnaissance, the proposed CCC Site is located within a mixed-use commercial/industrial area and near to residential areas. ENVIRON identified small businesses, medical offices, municipal buildings, a railroad terminal, a park, a church, and other commercial, retail, industrial and residential land uses within 1,000 feet of the proposed CCC location. In general, industrial land use is located to the north of the Site and generally includes several semiconductor manufacturing/research and development (R&D) facilities, including Magic Technologies, Headway Technologies, and Seagate Technology. In general, electronic manufacturers, including Solectron, Adaptec, and SEM are located south of the Site. Small businesses, medical offices, and several retailers surround the Site and a railroad terminal is located west of the Site. Calaveras Boulevard (Highway 237), which is a major thoroughfare in Milpitas, is located a few blocks north of the Site. Commercial establishments (primarily located in the Milpitas Town Center Shopping Center), restaurants, small businesses, a hotel, and the City of Milpitas municipal buildings, including the Milpitas City Hall, Milpitas Fire Department, Milpitas Community Center, and the Milpitas Community Library are located along Calaveras Boulevard within 0.75-mile north of the Site. In addition, a new single-family residential area with a playground covering approximately 14 acres is located within 0.3-mile southeast of the Site.

Several interstates, highways, and railroad right-of-ways run within two miles of the Site, including Highway 237 (approximately 0.6 miles north), I-680 (approximately 0.7 miles east), I-880 (approximately 1.1 miles west), and the Union Pacific Railroad right-of-ways (approximately 0.2 miles west). Hazardous materials can be transported on major highways and railroads, and releases of hazardous materials from vehicles and railcars can occur. The potential for release of toxic chemicals from vehicles or railcars traveling along roadways or railroads was not assessed in this report.

3.4 Review of Files at Milpitas Fire Department

The Milpitas Fire Department (Hazardous Materials and Environmental Services Unit) is the lead agency for facilities in Milpitas concerning USTs, ASTs, Hazardous Materials Business Plans (HMBPs)/Emergency Response Plans, and the Uniform Fire Code, which has incorporated the City of Milpitas Toxic Gas Ordinance (TGO). In 1990, the City of Milpitas adopted the TGO (Milpitas Municipal Code, Title V-Chapter 300). The intent of the TGO was to protect the public from acute exposure due to accidental releases of toxic gases and to supplement the Hazardous Materials Storage Ordinance by identifying and requiring safety controls for toxic gases. In general, the TGO regulates the safe storage, use and handling of toxic gases. Through amendments to the 2001

California Fire Code, the Milpitas Fire Code now provides the controls previously found in the TGO.

As part of recent, previous risk assessment updates, based on recommendations from the Milpitas Fire Department Hazardous Materials Environmental Services (HMES), ENVIRON conducted a review of Milpitas Fire Department files for six identified facilities that store hazardous materials, including toxic gases, near the CCC Site. The following six facilities in Milpitas were identified by HMES:[4]

1. Sipex Corporation, 233 Hillview Dr.
2. Headway Technologies, 678 S. Hillview Dr.
3. JDS Uniphase, 345 Los Coches St.
4. Linear Technology Corporation, 275 S. Hillview Dr.
5. Nanogram Corporation, 165 Topaz St.
6. Magic Technologies, 463 S. Milpitas Blvd.

On November 1, 2004 and February 1, 2007, ENVIRON conducted file reviews for these six facilities at the Milpitas Fire Department. Based on the file reviews conducted at the Milpitas Fire Department, ENVIRON concluded that there are six facilities (Sipex Corporation, JDS Uniphase, Headway Technologies, Linear Technology Corporation, Nanogram Corporation, and Magic Technologies) located in the Site vicinity that store toxic gases (e.g., anhydrous ammonia, arsine, boron trichloride, chlorine, diborane, hydrogen bromide, hydrogen chloride, phosphine, and tungsten hexafluoride). All six of these facilities conduct semiconductor manufacturing operations.

In general, ENVIRON reviewed the current Hazardous Materials Business Plan, annual Hazardous Materials Inspection Reports, and incident reports (if present) in each facility's file. During the file reviews, ENVIRON focused on the type and quantity of toxic gases stored at each facility, as well as any history of hazardous material incidents at these facilities. For each of the six facilities identified by the HMES, the following information is summarized below:

- A brief summary of the analysis of that facility in the RA, if applicable,
- The toxic gas present at the facility and quantity of that gas in the largest container,
- Recommendation of HMES as to what toxic gases to model[5], and
- Where applicable, results of modeling off-site impacts from a catastrophic release. As described in the RA, ENVIRON modeled distances to the air concentration Immediately Dangerous to Life and Health (IDLH), 1/10 IDLH, and the United States Environmental Protection Agency (USEPA) Risk Management Plan (RMP)/CalARP toxic endpoint (TEP).

[4] E-mail from Clare Owen, Milpitas Fire Department Hazardous Materials Environmental Services to Estelle Shiroma, ENVIRON, dated March 6, 2007.
[5] Voicemail from Clare Owen, Milpitas Fire Department Hazardous Materials Environmental Services to Michael Keinath, ENVIRON, on February 16, 2007.

An evaluation of Sipex Corporation, Headway Technologies, and JDS Uniphase were not required for the following reasons:

1. **Sipex Corporation, 233 N. Hillview Dr. (0.7 miles from proposed CCC Site)**

   This facility was evaluated in a previous RA but off-site impacts analysis was not requested by HMES. Since this facility will close shortly, HMES did not request further evaluation for this RA.[6]

2. **Headway Technologies, 678 S. Hillview Dr. (0.3 miles from proposed CCC Site)**

   This facility was evaluated in a previous RA but off-site impacts analysis was not requested by HMES. Since ENVIRON's previous updated RA report for another facility in the area (the India Community Center), Headway Technologies reduced the largest container amount for boron trichloride from 250 cu ft to 125 cu ft (37.9 lbs) and for chlorine from 250 cu ft to 205 cu ft (38 lbs). Since the quantities have all decreased, HMES did not request further evaluation for this update.[7] Table 2 lists toxic chemicals stored at this facility.

3. **JDS Uniphase, 345 Los Coches St. (0.5 miles from proposed CCC Site)**

   This facility was evaluated in a previous RA but off-site impacts analysis was not requested by HMES. Based on the Milpitas Fire Department's review, off-site consequence analysis for the toxic gases stored at the JDS Uniphase facility was not warranted for this RA.[8] Table 3 lists toxic chemicals stored at this facility.

For facilities requiring off-site analysis (Linear Technology Corporation, Nanogram Corporation, and Magic Technologies) Tables 4, 5, and 6 list the types of toxic gases stored and the amount of each toxic gas stored in the largest container for the remaining three facilities, respectively. In addition, the tables show the CalARP threshold for each toxic gas and the ratio of CalARP threshold to the amount stored in the largest container for each toxic gas. In most cases, storage of toxic gases at these three facilities is well below CalARP threshold quantities, where a CalARP threshold exists.

3.5 Summary of Findings

Based on the type and quantity of certain toxic gases stored at Linear Technology Corporation, Nanogram Corporation, and Magic Technologies and their location in the immediate vicinity (all within 0.7-mile) of the proposed CCC Site, the Milpitas Fire Department[9] requested off-site consequence analysis for a catastrophic release of four toxic gases stored at Magic Technologies (anhydrous ammonia, chlorine, boron trichloride and carbon monoxide), three toxic gases stored at

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[6] E-mail from Clare Owen, Milpitas Fire Department Hazardous Materials Environmental Services to Michael Keinath, ENVIRON, dated August 10, 2007.
[7] Ibid.
[8] Ibid.
[9] Ibid.

Nanogram Corporation (phosphine, boron trichloride, and anhydrous ammonia) and hydrogen bromide stored at Linear Technology Corporation. As described in Chapter 4.0 (Potential for Adverse Impacts), ENVIRON evaluated the distance to the IDLH and either the TEP or 1/10 the IDLH using a worst-case release scenario of the above listed toxic gases from the Linear Technology Corporation, Nanogram Corporation, and Magic Technologies facilities. The potential for adverse impacts from these three facilities are provided in Chapter 4.0.

4.0 EVALUATION OF POTENTIAL FOR ADVERSE IMPACTS

4.1 Methodology for Assessing Potential for Adverse Impacts

ENVIRON performed off-site consequence analyses for worst-case accidental releases for certain toxic gases stored at Linear Technology Corporation, Nanogram Corporation, and Magic Technologies following USEPA guidelines established for toxic and flammable substances for the RMP.[10] Select pages of USEPA's RMP guidance are attached as Appendix A.[11]

ENVIRON's consequence analysis focused on a worst-case release scenario (i.e., a catastrophic, instantaneous release) under the meteorological and topographical conditions as recommended by USEPA's RMP guidance. For the worst-case release scenarios, ENVIRON assumed that all of the toxic gas in the single largest container at the facility was released to the outdoors in ten minutes as per USEPA guidelines. USEPA's RMP guidance and CalARP regulations have defined the worst-case release scenario as the release of the largest quantity of a regulated substance from a single vessel or process line failure that results in the greatest distance to an endpoint under conservative meteorological conditions.[12] For worst-case release scenario analysis under RMP/CalARP, the possible causes of the worst-case release or the probability that such a release might take place are not considered; the release is simply assumed to occur. Worst-case release scenarios represent the failure modes that would result in the worst possible off-site consequences, however unlikely, and not more likely smaller releases that would potentially result in smaller impacts.

For the evaluation of impacts from accidental releases, ENVIRON understands that the Milpitas Planning Department requires the distance to the IDLH for planning purposes. ENVIRON further understands that the Milpitas Fire Department would also like to see distances to either the RMP/CalARP TEP or 1/10 the IDLH. To evaluate the distance to various toxic endpoints (i.e., IDLH, TEP, and/or 1/10 IDLH) if the facilities evaluated had a catastrophic release of a toxic gas, ENVIRON used lookup tables prepared by the USEPA for their RMP Program.[13] Specifically, ENVIRON used Reference Table 5 on page 5-8 (*Dense Gas Distances to Toxic Endpoint, 10-minute Release, Rural Conditions, F Stability, Wind Speed 1.5 Meters per Second*). In addition, USEPA prepared chemical-specific lookup tables for certain chemicals including anhydrous ammonia and chlorine. Therefore, ENVIRON used Reference Table 9 on page 5-12 (*Distances to Toxic Endpoint for Anhydrous Ammonia Liquefied Under Pressure, F Stability, Wind Speed 1.5*

[10] USEPA. 1999. *Risk Management Program Guidance for Offsite Consequence Analysis*. EPA 550-B-99-009. April.

[11] The complete document can be found at the following web address: http://yosemite.epa.gov/oswer/ceppoweb.nsf/vwResourcesByFilename/oca-all.PDF/$File/oca-all.PDF

[12] Ibid.

[13] Ibid.

Meters per Second), and Reference Table 11 on page 5-14 (*Distances to Toxic Endpoint for Chlorine, F Stability, Wind Speed 1.5 Meters per Second*) for anhydrous ammonia and chlorine. The distances calculated in these lookup tables assume the following: the terrain in the vicinity of the facility is generally flat and unobstructed (i.e., rural conditions); the wind speed is 1.5 meters per second (3.4 miles per hour); the stability class is F, and the air temperature is 77 degrees Fahrenheit. As a conservative assumption, ENVIRON modeled the releases as dense gases, which is appropriate for chemicals that are liquefied under pressure. These reference tables are included in Appendix A.

Reference Table 5 allows the user to lookup the distance to various toxic endpoints at various release rates for dense gas releases. According to USEPA RMP guidance (page 4-4), if the endpoint of the substance is halfway between two values on the table, one chooses the value on the table that is smaller; otherwise, the closest value is chosen. Similarly, if the release rate is halfway between two values on the table, one chooses the release rate that is larger; otherwise, the closest value is chosen. When choosing the distances to the various endpoints, ENVIRON followed this guidance. Further, the smallest release rate available on the table is one pound per minute (1 lb/min). Given that some of the release rates were much less than 1 lb/min, ENVIRON extrapolated the distances assuming that the distance was linear between release rates of 0 and 1 lb/min.

Reference Tables 9 and 11 allows the user to lookup the distance to the TEP at various release rates for anhydrous ammonia liquefied under pressure and chlorine, respectively. Because ENVIRON was interested in distances to other endpoints (e.g., the IDLH), ENVIRON calculated a normalized dispersion factor (TEP/Release Rate) for the reported distances in Reference Table 9 and 11 and calculated new release rates corresponding to the same distances for the endpoints of interest. The calculation tables showing the distance to the IDLH and 1/10 the IDLH for anhydrous ammonia and chlorine are provided as Appendix B.

The following sections describe, in further detail, the evaluation of a worst-case release scenario of certain toxic gases from Linear Technology Corporation, Nanogram Corporation, and Magic Technologies in Milpitas, California.

4.2 Potential Consequence of Off-Site Release

Based on decreasing distance from the CCC, the results are as follows:

1. **Linear Technology Corporation, 275 S. Hillview Dr. (0.7 miles from proposed CCC Site)**

   The Linear Technology Corporation facility located at 275 S. Hillview Drive was identified as a facility of potential concern. Based on the type and quantity of certain toxic gases stored at Linear Technology Corporation (see Table 4) and its location in the immediate vicinity (approximately 0.7-miles to the north-northeast) of the proposed CCC Site, the Milpitas Fire Department requested off-site consequence analysis for a catastrophic release of hydrogen bromide stored at Linear Technology. Table 7 shows the distances to the various toxic endpoints for a catastrophic release of the hydrogen bromide evaluated for the Linear Technology Corporation facility. As shown in Table 7, the distance to the IDLH for hydrogen bromide is 0.3 miles. Therefore, under the worst-case scenario for the amount of hydrogen bromide in the single largest vessel, the proposed CCC Site is not located within the distance to the IDLH.

However, the proposed CCC Site is within the distance to the 1/10 IDLH. Given that the proposed CCC Site is located within the distance to the 1/10 IDLH, ENVIRON believes that a catastrophic release of hydrogen bromide from the Linear Technology Corporation facility could have off-site consequences that would affect the proposed CCC Site for Milpitas Planning Department purposes. ENVIRON believes an emergency and protective action plan would aid the proposed CCC in developing mitigation measures for catastrophic off-site consequences of hydrogen bromide from Linear Technology Corporation. These mitigation measures are discussed in Chapter 5.0 (Conclusions and Mitigation Measures). A TEP does not exist for hydrogen bromide and thus was not evaluated.

2. **Nanogram Corporation, 165 Topaz St. (0.5 miles from proposed CCC Site)**

Milpitas Fire Department records indicate that this facility stores the following chemicals, with the quantity stored in the largest container shown (see Table 5): anhydrous ammonia (15 lbs), boron trichloride (2.2 lbs), phosphine (2.2 lbs), and silane (1.7 lbs). As shown in Table 7, the distances to the IDLH for the three toxic gases evaluated (phosphine, boron trichloride, and anhydrous ammonia) are 0.2, 0.1, and 0.1 mile, respectively. Nanogram Corporation is located approximately 0.5 miles to the north-northwest of the proposed CCC Site. Therefore, under the worst-case scenario for the amount of these three toxic gases in the single largest vessel, the proposed CCC Site is not located within the distance to the IDLH. HMES did not request an off-site impact analysis for silane.

Under the worst-case scenario the distance which encompasses the TEP for the amount of phosphine in the single largest vessel is 0.8 miles, which also encompasses the distance from Nanogram to the proposed CCC Site. The quantities of anhydrous ammonia and boron trichloride stored at this facility are approximately 33- and 220-times less than the CalARP threshold quantity, respectively. Under the worst-case scenario for the amount of these three toxic gases in the single largest vessel, the proposed CCC Site is not located within the distance to the 1/10 IDLH.

3. **Magic Technologies, 463 S. Milpitas Blvd. (0.3 miles from proposed CCC Site)**

The Magic Technologies facility located at 463 S. Milpitas Blvd. was identified as a facility of potential concern. Based on the type and quantity of certain toxic gases stored at Magic Technologies (as shown in Table 6) and its location in the immediate vicinity (approximately

0.3-mile to the north-northeast) of the proposed CCC Site, the Milpitas Fire Department requested off-site consequence analysis for a catastrophic release of four toxic gases. Table 7 shows the distances to the various toxic endpoints for a catastrophic release of the four toxic gases evaluated for the Magic Technologies facility. As shown in Table 7, the distances to the IDLH for four of the toxic gases (chlorine, anhydrous ammonia, boron trichloride, and carbon monoxide) are 0.3, <0.1, 0.4, and <0.1 mile, respectively. Magic Technologies is located approximately 0.3 miles to the north-northeast of the proposed CCC Site. Therefore, under the worst-case scenario for the amount of boron trichloride in the single largest vessel, the proposed CCC Site is located within the distance to the IDLH.

Further, the amount of boron trichloride is also within the distance to the TEP and 1/10 IDLH. The distances to the TEP and 1/10 IDLH for chlorine at the Magic Technologies facility is 0.5 and 0.8 miles, respectively (as shown in Table 7). Therefore, under the worst-case scenario for the amount of chlorine stored in the single largest vessel, the proposed CCC Site is located within the distances to the TEP and 1/10 IDLH. Thus, it is possible that a catastrophic release of chlorine or boron trichloride from the Magic Technologies facility could have off-site consequences that would affect the proposed CCC Site. Based on these results, ENVIRON believes an emergency and protective action plan would aid the proposed CCC in developing mitigation measures for catastrophic off-site consequences of chlorine or boron trichloride from Magic Technologies. These mitigation measures are discussed in Chapter 5.0 (Conclusions and Mitigation Measures).

5.0 CONCLUSIONS AND MITIGATION MEASURES

ENVIRON, in conjunction with the Milpitas Fire Department, identified three facilities in the vicinity of the proposed Crosspoint Chinese Church Site that store chemicals that could have off-site consequences if catastrophically released. The three facilities and the toxic chemicals stored in quantities of concern are summarized below:

- Linear Technology Corporation (275 S. Hillview Drive) – hydrogen bromide
- Nanogram Corporation (165 Topaz Street) – anhydrous ammonia, boron trichloride, and phosphine
- Magic Technologies (463 S. Milpitas Blvd.) – anhydrous ammonia, boron trichloride, carbon monoxide and chlorine.

ENVIRON evaluated the potential risk posed by these chemicals at these three facilities by evaluating worst-case release scenarios as defined under RMP. For the evaluation of impacts from accidental releases, ENVIRON understands that the Milpitas Planning Department requires the distance to the IDLH for planning purposes. Following the methodology outlined in Chapter 4.0, our off-site consequence analysis showed that it is unlikely that a worst-case release (i.e., a catastrophic, instantaneous release) of the chemicals evaluated from these three facilities would have off-site consequences that would affect individuals at the IDLH at the proposed CCC Site, with the following exception:

- ENVIRON's analysis of the worst-case release scenario for boron trichloride at the Magic Technologies facility results in an impact radius of 0.4-miles to the IDLH, as shown in Table 7. Magic Technologies is located approximately 0.3 miles to the north-northeast of the proposed CCC Site.

ENVIRON understands that the Milpitas Fire Department also requests distances to either the TEP or 1/10 the IDLH for the toxic gases evaluated. Table 7 shows the distances to both the TEP (if established) and 1/10 IDLH for each of the toxic gases evaluated. Based on worst-case release scenarios, the distance to either the TEP and/or 1/10 IDLH encompasses the proposed CCC Site for the following toxic gases at the three facilities: hydrogen bromide at Linear Technology Corporation; phosphine at Nanogram Corporation; and chlorine and boron trichloride at Magic Technologies.

Note that in worst-case release scenario analysis under RMP/CalARP, the possible causes of the worst-case release or the probability that such a release might take place are not considered; the release is simply assumed to occur. Worst-case release scenarios represent the failure modes that would result in the worst possible off-site consequences, however unlikely, and not more likely smaller releases that would potentially result in smaller impacts.

Based on the worst-case scenario results, ENVIRON believes an emergency and protective action plan would aid the proposed Crosspoint Chinese Church in developing mitigation measures for catastrophic off-site consequences from Linear Technology Corporation, Nanogram Corporation, and Magic Technologies. The U.S. Army Corps of Engineers has developed a draft guideline document entitled "Protecting Buildings and Their Occupants from Airborne Hazards" that can provide the CCC with good background information on the development of a protective action plan.[14] Specifically, Chapter 6 of this guideline discusses protective actions for perceptible hazards and includes discussion of the applicability, advantages, and disadvantages of evacuation, sheltering in-place, use of ventilation system and smoke purge fans, and use of protective masks. As discussed in this guideline, the effectiveness of protective action requires a protective action plan specific to each building, as well as training and familiarization for building occupants. Chapter 7 of this guideline discusses the four steps of developing a protective action plan, which includes the following:

- conducting a building survey to determine practical protective actions for the specific building;
- writing procedures for implementing emergency and protective action plans;
- designating and training protective action coordinators; and
- training of those who reside in the building on the steps to be taken during an emergency or implementation of protective actions.

As an emergency and protective action plan is to be tailored to individual buildings and coordinated with local planners and emergency response systems, the development of these plans require coordination between the Crosspoint Chinese Church, Linear Technology Corporation, Nanogram Corporation, Magic Technologies, the Milpitas Fire Department, and the Milpitas Planning Department. The plan should also address the applicability of the suite of mitigation measures recommended by the Milpitas Fire Department in their risk assessment guidelines, as not all mitigation measures may be appropriate for the proposed CCC site.

[14] U.S. Army Corps of Engineers (USACE). 2001. *Protecting Buildings and Their Occupants from Airborne Hazards*, Draft. Engineering and Construction Division. Washington, DC. October.

6.0 LIMITATIONS

This report has been prepared exclusively for use by the Crosspoint Chinese Church for submission to the City of Milpitas and may not be relied upon by any other person or entity without ENVIRON's express written permission. The conclusions presented in this report represent ENVIRON's professional judgment based upon the information available to us and conditions existing as of the date of this report, and are correct to the best of ENVIRON's knowledge as of the date of this report. Future conditions (e.g., new industrial uses) may differ from those described herein and this report is not intended for use in future evaluations of risks to the Site. In performing its assignment, ENVIRON relied upon publicly available information, including information submitted by facilities to the HMCD and the Milpitas Fire Department. Accordingly, the conclusions in this report are valid only to the extent that the information provided to ENVIRON was accurate and complete. In particular, ENVIRON accepted the Milpitas Fire Department's classification of whether sites were large, medium or small chemical users, and did not independently review the classifications. Further, ENVIRON accepted the Milpitas Fire Department's selection of chemicals of concern. ENVIRON does not make any warranties or representations, whether expressed or implied, regarding the accuracy of such information, and shall not be held accountable or responsible in the event that any such inaccuracies are present.

ENVIRON's scope of work for this assignment was limited to identifying neighboring businesses that may store chemicals that could have off-site consequences if catastrophically released. The proposed Crosspoint Chinese Church is located in close proximity to Highway 237 (approximately 0.6 miles north), I-680 (approximately 0.7 miles east) and I-880 (approximately 1.1 miles west), and is located approximately 0.2 miles east of the Union Pacific Railroad right-of-way, consisting of multiple tracks. The scope of work for this report did not include evaluation of potential risks from trucks accidents or railcar derailments involving releases of hazardous materials. Further, because the proposed Crosspoint Chinese Church Site is located within the greater Bay Area, which is urban and industrialized, the proposed Crosspoint Chinese Church faces the same potential risks and hazards as any other business in an industrial/urban area. This report is intended, consistent with normal standards of practice and care, to assist the client in identifying the risks of known current conditions within the Site vicinity.

TABLES

TABLE 1

Businesses Currently Operating Within a 1000-foot Radius to 628-658 Gibraltar Court
As Identified through a Drive-by Site Visit Conducted by ENVIRON on August 6, 2007

Address	Business	Map ID[1]
658 Gibraltar Court	Vacant, formerly Servgate	1
628 Gibraltar Court	HDC Corporation	1
638 Gibraltar Court	Digital Radio Express	1
637 Gibraltar Court	Solectron (Building 1)	2
Not Available	City of Milpitas Reservoirs and Pumps	3
677 Gibraltar Court	Solectron (Building 2)	4
727 Gibraltar Drive	Solectron (Building 3)	5
777 Gibraltar Drive	Solectron (Building 4)	6
847 Gibraltar Drive	Solectron (Headquarters)	7
691 South Milpitas Boulevard	Adaptec (Building 7)	8
691 South Milpitas Boulevard	Café ConneXtion (Adaptec)	8
500 Yosemite Drive (Suite 100)	Newsoft	9
500 Yosemite Drive (Suite 108)	Virident Systems	9
500 Yosemite Drive	Adaptec (Building 4)	9
673 Gibraltar Drive	Adaptec (Building 1)	11
637 Gibraltar Drive	Adaptec (Building 1)	10
673 Gibraltar Drive	Andy Autosport	11
673 Gibraltar Drive	Broadlink	11
746 South Milpitas Boulevard	Flextronics	12
876 South Milpitas Boulevard	BTM B.T. Mancini Co., Inc.	12
595 Yosemite Drive	SEM (Streamline Electronics Manufacturing, Inc.)	13
591 Yosemite Drive	Magnum Semiconductor	13
740 South Milpitas Boulevard	Alcatel Network Systems	14
720 South Milpitas Boulevard	Alcatel - Lucent	14
666 South Milpitas Boulevard	TUBE Service Co.	15
562 South Milpitas Boulevard	GDM, Electronic and Medical	16
568 South Milpitas Boulevard	T2Global	16
556 South Milpitas Boulevard	Jaton (Audio/Video Store)	16
463 South Milpitas Boulevard	Magic Technologies	17
461 South Milpitas Boulevard	Global Star	18
461 South Milpitas Boulevard	BitBlitz Communications	18
372 Turquoise Street	Tru$tPrice	20
374 Turquoise Street	Xecom	20
334 Turquoise Street	Barkley Square (Dog Services)	21
330 Turquoise Street	Northern Die Cutting, Inc.	21
304 Turquoise Street	Glide/Write; Division of Marbury Tech., Inc.	22
235 South Milpitas Boulevard	Edgies Billiards	24
311 Turquoise Street	Seagate	23
Not Available	Union Pacific Railroad Terminal	29
456 South Milpitas Boulevard	Parikh	19
462 South Milpitas Boulevard	PacTec	19
468 South Milpitas Boulevard	Action Computer Toner Supply	19
474 South Milpitas Boulevard	Complete Workplace (Office Furnishings)	19
497 Hillview	Headway Technologies	27
755 Yosemite Drive	Bottomley Distributors	26
611 South Milpitas Boulevard	Kaiser Permanente	28
673 South Milpitas Boulevard	Azalea networks	28
215 Topaz Street	Christ Assembly Church	25
Not Available	Residential (North and South of Curtis Avenue)	31
Not Available	City of Milpitas Park	30

Notes:
1. Refers to accompanying map (Figure 2) with locations of businesses identified.

TABLE 2

Toxic Gas Storage at Headway Technologies
497 S. Hillview Drive, Milpitas, CA

Toxic Chemical	Largest Container[1] (in units reported)	Amount of Toxic Chemical in Largest Container[2] (lbs)	CalARP Threshold Quantity (lbs)	Ratio of CalARP Threshold: Largest Container
Anhydrous Ammonia (100%)	NR	--	500	--
Boron Trichloride (100%)	125 cu ft	37.9	500	13.2
Chlorine (100%)	205 cu ft	38	100	2.6
Fluorine (1%) in Neon/Krypton	250 cu ft	0.2	500	2,500

[1] Obtained from Headway Technologies' Hazardous Material Inventory Statement on file at the Milpitas Fire Department.

[2] If the largest container was reported as a volume (e.g., cu ft), the conversion to pounds was estimated based on specific volume of gas (cu ft/lb) at standard temperature and pressure (STP). If the toxic chemical is a percentage by weight of the total container (e.g., 5% Diborane in Nitrogen), then the amount of toxic chemical in the largest container was adjusted to represent only the amount of the toxic chemical in the container.

NR = not reported, but identified as being stored at Headway Technologies on inspection reports.

TABLE 3
JDS Uniphase
345 Los Coches Street, Milpitas, CA

Toxic Chemical	Largest Container[1] (in units reported)	Amount of Toxic Chemical in Largest Container[2] (lbs)	CalARP Threshold Quantity (lbs)	Ratio of CalARP Threshold: Largest Container
Diborane (5 %) in Nitrogen	240 cu ft	0.9	500	575.4
Phosphine (5%) in Nitrogen	235 cu ft	0.9	500	582
Silane (100%)	22 cu ft	1.8	NE	--

[1] Obtained from JDS Uniphase's Hazardous Material Inventory Statement on file at the Milpitas Fire Department.

[2] If the largest container was reported as a volume (e.g., cu ft), the conversion to pounds was estimated based on specific volume of gas (cu ft/lb) at standard temperature and pressure (STP). If the toxic chemical is a percentage by weight of the total container (e.g., 5% Diborane in Nitrogen), then the amount of toxic chemical in the largest container was adjusted to represent only the amount of the toxic chemical in the container.

NE = not established.

TABLE 4
Toxic Gas Storage at Linear Technology Corporation
275 S. Hillview Drive, Milpitas, CA

Toxic Chemical	Largest Container[1] (in units reported)	Amount of Toxic Chemical in Largest Container[2] (lbs)	CalARP Threshold Quantity (lbs)	Ratio of CalARP Threshold: Largest Container
Anhydrous Ammonia (100%)	1130 cu ft	49.8	500	10
Arsine (< 0.01%) in Hydrogen	0.00001 lbs	0.00001	100	10,000,000
Arsine (100%)	1.32 lbs	1.32	100	76
Boron Trichloride (100%)	16.5 cu ft	5.0	500	100
Boron Trifluoride (100%)	28.5 cu ft	5.0	500	100
Chlorine (100%)	540 cu ft	100	100	1
Diborane (<1%) in Hydrogen	1.5 lbs	1.5	100	67
Diborane (5%) in Nitrogen	0.89 lbs	0.89	100	112
Dichlorosilane (100%)	192.5 cu ft	50.3	NE	--
Hydrogen Bromide (100%)	329 cu ft	68.5	NE	--
Hydrogen Chloride (100%) (gas)	540 cu ft	50.9	500	10
Nitrogen Trifluoride	208 cu ft	18.2	NE	--
Phosphine (1%) in Hydrogen	0.21 lbs	0.21	500	2,381
Phosphine (100%)	27 cu ft	2.4	500	208
Phosphine (15%) in Nitrogen	4.5 lbs	4.5	500	111
Phosphine (5%) in Nitrogen	1.5 lbs	1.5	500	333
Phosphorous Oxychloride (liquid)	0.3 gallons	4.2	500	119
Trichlorosilane	285 cu ft	229.8	NE	--
Tungsten Hexafluoride (100%)	55 cu ft	44.4	NE	--

[1] Obtained from Linear Technology Corporation's Hazardous Material Inventory Statement on file at the Milpitas Fire Department.

[2] If the largest container was reported as a volume (e.g., cu ft), the conversion to pounds was estimated based on specific volume of gas (cu ft/lb) at standard temperature and pressure (STP). If the toxic chemical is a percentage by weight of the total container (e.g., 5% Diborane in Nitrogen), then the amount of toxic chemical in the largest container was adjusted to represent only the amount of the toxic chemical in the container.

NE = not established.

TABLE 5
Toxic Gas Storage at Nanogram Corporation
165 Topaz Street, Milpitas, CA

Toxic Chemical	Largest Container[1] (in units reported)	Amount of Toxic Chemical in Largest Container[2] (lbs)	CalARP Threshold Quantity (lbs)	Ratio of CalARP Threshold: Largest Container
Anhydrous Ammonia (100%)	15 lbs	15.0	500	33.3
Boron Trichloride (100%)	7.2 cu ft	2.2	500	229.2
Phosphine (100%)	25 cu ft	2.2	500	228
Silane (100%)	20 cu ft	1.7	NE	--

[1] Obtained from Nanogram's Hazardous Material Inventory Statement on file at the Milpitas Fire Department.

[2] If the largest container was reported as a volume (e.g., cu ft), the conversion to pounds was estimated based on specif volume of gas (cu ft/lb) at standard temperature and pressure (STP). If the toxic chemical is a percentage by weight of the total container (e.g., 5% Diborane in Nitrogen), then the amount of toxic chemical in the largest container was adjusted to represent only the amount of the toxic chemical in the container.

NE = not established.

TABLE 6
Magic Technologies
463 South Milpitas Boulevard, Milpitas, CA

Toxic Chemical	Largest Container[1] (in units reported)	Amount of Toxic Chemical in Largest Container[2] (lbs)	CalARP Threshold Quantity (lbs)	Ratio of CalARP Threshold: Largest Container
Anhydrous Ammonia (100%)	250 cu ft	11.0	500	45
Boron Trichloride (100%)	100 lbs	100.0	500	5
Carbon Monoxide (100%)	250 cu ft	43.9	NE	--
Chlorine (100%)	250 cu ft	46.3	100	2
Fluorine (1%) in Neon/Krypton	250 cu ft	0.2	500	2,364
Hexafluorobutadiene (100%)	250 cu ft	201.6	NE	--
Silane (100%)	50 cu ft	4.1	NE	--

[1] Obtained from Magic Technologies' Hazardous Material Inventory Statement on file at the Milpitas Fire Department.

[2] If the largest container was reported as a volume (e.g., cu ft), the conversion to pounds was estimated based on specific volume of gas (cu ft/lb) at standard temperature and pressure (STP). If the toxic chemical is a percentage by weight of the total container (e.g., 5% Diborane in Nitrogen), then the amount of toxic chemical in the largest container was adjusted to represent only the amount of the toxic chemical in the container.

NE = not established.

TABLE 7
Distances to the IDLH, TEP, & 1/10 IDLH for Worst-Case Catastrophic Release Scenario of Toxic Gases of Concern[1] Stored in the Vicinity of the Crosspoint Chinese Church (CCC) Site

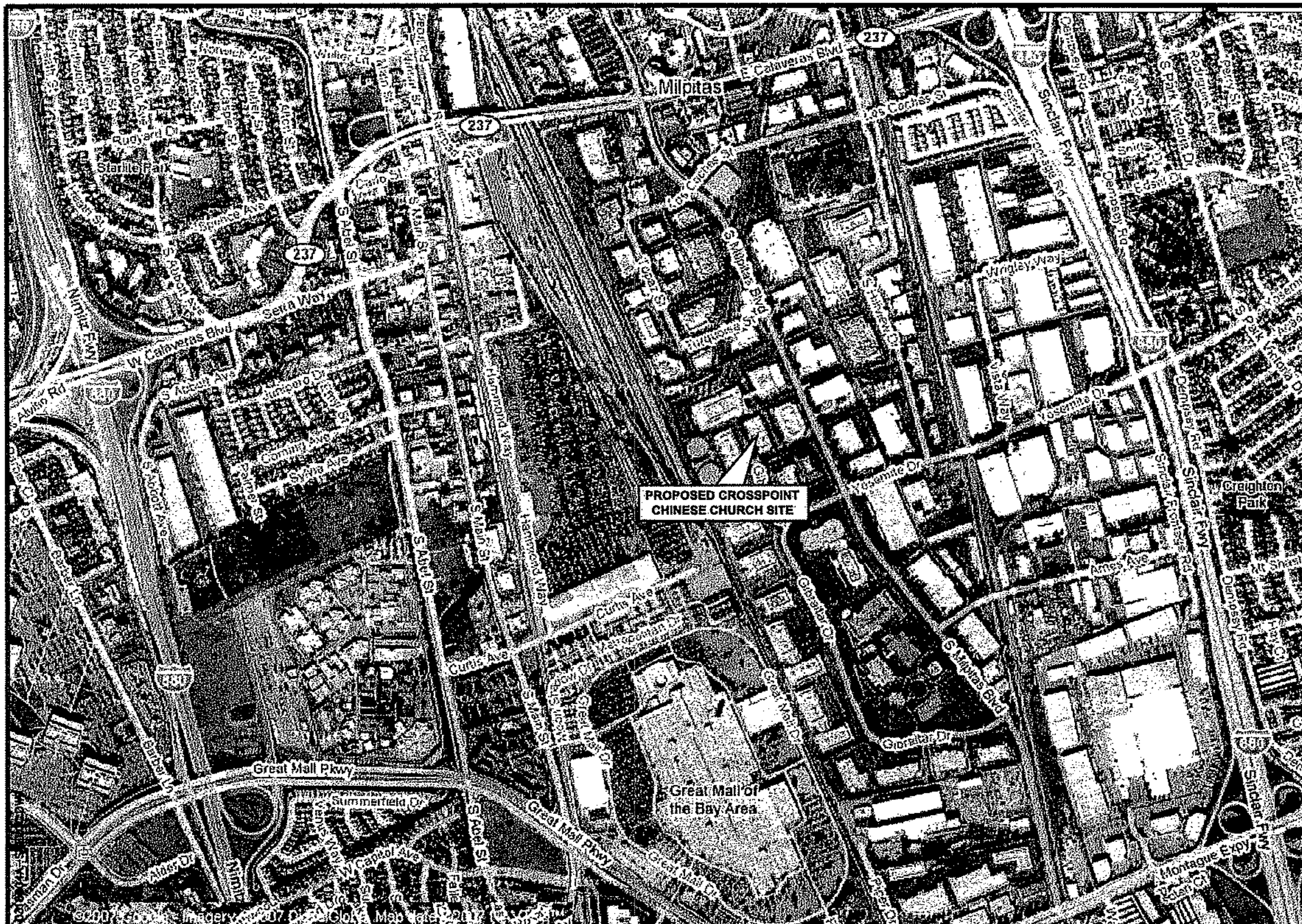
Facility	Approximate Distance and Direction from CCC Site[2]	Chemical	Amount of Toxic Chemical in Largest Container (lbs)	Release Rate (lbs/min)[3]	IDLH (mg/L)	TEP (mg/L)	1/10 IDLH (mg/L)	Distance to IDLH [4,5] (miles)	Distance to TEP (miles)	Distance to 1/10 IDLH (miles)
Linear Technology Corporation 275 S. Hillview Drive	0.7 miles to the NNE	Hydrogen Bromide	68.5	6.85	0.099	NE	0.0099	0.3	--	**1.0**
Nanogram Corporation 165 Topaz Street	0.5 miles to the NNW	Phosphine	2.2	0.22	0.069	0.0035	0.0069	0.2	**0.8**	0.5
		Boron Trichloride	2.2	0.22	0.120	0.0096	0.0120	0.1	0.5	0.5
		Anhydrous Ammonia [6,7]	15	1.5	0.209	0.14	0.0209	0.1	0.1	0.2
Magic Technologies 463 S. Milpitas Blvd.	0.3 miles to the NNE	Chlorine [6]	46.3	4.63	0.029	0.0087	0.0029	0.3	**0.5**	**0.8**
		Anhydrous Ammonia [6,7]	11	1.1	0.209	0.14	0.0209	<0.1	0.1	0.1
		Boron Trichloride	100	10	0.120	0.0096	0.0120	**0.4**	**1.4**	**1.4**
		Carbon Monoxide	43.9	4.39	1.372	NE	0.1372	<0.1	--	0.3

Notes:
Distance to toxic endpoints based on USEPA 1999.
BOLD indicates that the distance to the toxic endpoint is greater than the distance to the proposed CCC site.

[1] Chosen in conjunction with the Milpitas Fire Department.
[2] Distance based on approximate center of properties.
[3] Assumes worst-case catastrophic release in which all of the toxic chemical is released from the largest container in 10 minutes.
[4] Assumes rural landscape.
[5] ENVIRON understands that the planning department only requires the distance to the IDLH for planning purposes and decisions.
We further understand that the Fire Department would also like to see distances to either the RMP/CalARP toxic endpoint (TEP) or 1/10 the IDLH for Fire Department planning purposes.
[6] Distances for anhydrous ammonia and chlorine based on chemical-specific dispersion models provided in USEPA 1999.
[7] Assumes anhydrous ammonia is liquefied under pressure.
NE = not established

Reference:
USEPA. 1999. *Risk Management Program Guidance for Offsite Consequence Analysis* . Office of Solid Waste and Emergency Response. EPA 550-B-99-009. April 1999.

FIGURES



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Proposed Site Location - Crosspoint Chinese Church
628-658 Gibraltar Court
Milpitas, California

Figure
1

Drafter: RS | Date: 8/29/07 | Contract Number: 03-18804A | Approved: | Revised:

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Facilities Within 1000-foot Radius of Proposed Crosspoint Chinese Church Site
628-658 Gibraltar Court
Milpitas, California

Figure **2**

Drafter: RS	Date: 8/24/07	Contract Number: 03–18804A	Approved:	Revised:

APPENDIX A

USEPA's Risk Management Program (RMP) Guidance for Offsite Consequence Analysis, April 1999 (Selected Pages and Tables)

United States
Environmental Protection
Agency

Office of Solid Waste
and Emergency Response
(5104)

EPA 550-B-99-009
April 1999
www.epa.gov/ceppo/

EPA
CEPPO

RISK MANAGEMENT PROGRAM GUIDANCE FOR OFFSITE CONSEQUENCE ANALYSIS

RMP SERIES

Chemical Emergency Preparedness and Prevention Office

Printed on recycled paper

This document provides guidance to the owner or operator of processes covered by the Chemical Accident Prevention Program rule in the analysis of offsite consequences of accidental releases of substances regulated under section 112(r) of the Clean Air Act. This document does not substitute for EPA's regulations, nor is it a regulation itself. Thus, it cannot impose legally binding requirements on EPA, States, or the regulated community, and may not apply to a particular situation based upon the circumstances. This guidance does not constitute final agency action, and EPA may change it in the future, as appropriate.

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1 INTRODUCTION

1.1 Purpose of this Guidance

This document provides guidance on how to conduct the offsite consequence analyses for Risk Management Programs required under the Clean Air Act (CAA). Section 112(r)(7) of the CAA directed the U. S. Environmental Protection Agency (EPA) to issue regulations requiring facilities with large quantities of very hazardous chemicals to prepare and implement programs to prevent the accidental release of those chemicals and to mitigate the consequences of any releases that do occur. EPA issued that rule,"Chemical Accident Prevention Provisions" on June 20, 1996. The rule is codified at part 68 of Title 40 of the Code of Federal Regulations (CFR). If you handle, manufacture, use, or store any of the toxic or flammable substances listed in 40 CFR 68.130 above the specified threshold quantities in a process, you are required to develop and implement a risk management program under part 68 of 40 CFR. The rule applies to a wide variety of facilities that handle, manufacture, store, or use toxic substances, including chlorine and ammonia, and highly flammable substances, such as propane. If you are not sure whether you are subject to the rule, you should review the rule and Chapters 1 and 2 of EPA's *General Guidance for Risk Management Programs (40 CFR part 68),* available from EPA at http://www.epa.gov/ceppo/.

If you are subject to the rule, you are required to conduct an offsite consequence analysis to provide information to the state, local, and federal governments and the public about the potential consequences of an accidental chemical release. The offsite consequence analysis consists of two elements:

- A worst-case release scenario, and
- Alternative release scenarios.

To simplify the analysis and ensure comparability, EPA has defined the worst-case scenario as the release of the largest quantity of a regulated substance from a single vessel or process line failure that results in the greatest distance to an endpoint. In broad terms, the distance to the endpoint is the distance a toxic vapor cloud, heat from a fire, or blast waves from an explosion will travel before dissipating to the point that serious injuries from short-term exposures will no longer occur. Endpoints for regulated substances are specified in 40 CFR 68.22(a) and Appendix A of part 68 and are presented in Appendices B and C of this guidance.

Alternative release scenarios are scenarios that are more likely to occur than the worst-case scenario and that will reach an endpoint offsite, unless no such scenario exists. Within these two parameters, you have flexibility to choose alternative release scenarios that are appropriate for your site. The rule, in 40 CFR 68.28 (b)(2), and the *General Guidance for Risk Management Programs (40 CFR part 68)*, Chapter 4, provide examples of alternative release scenarios that you should consider when conducting the offsite consequence analysis.

RMP*Comp™

To assist those using this guidance, the National Oceanic and Atmospheric Administration (NOAA) and EPA have developed a software program, RMP*Comp™, that performs the calculations described in this document. This software can be downloaded from the EPA/CEPPO Internet website at http://www.epa.gov/ceppo/ds-epds.htm#comp.

This guidance document provides a simple methodology for conducting offsite consequence analyses. You may use simple equations to estimate release rates and reference tables to determine distances to the endpoint of concern. This guidance provides generic reference tables of distances, applicable to most of the regulated toxic substances, and chemical-specific tables for ammonia, chlorine, and sulfur dioxide. This guidance also provides reference tables of distances for consequences of fires and explosions of flammable substances. In some cases, the rule allows users of this document to adopt generic assumptions rather than the site-specific data required if another model is employed (see Exhibit 1).

The methodology and reference tables of distances presented here are optional. You are not required to use this guidance. You may use publicly available or proprietary air dispersion models to do your offsite consequence analysis, subject to certain conditions. If you choose to use models instead of this guidance, you should review the rule and Chapter 4 of the *General Guidance for Risk Management Programs*, which outline required conditions for use of models. In selected example analyses, this document presents the results of some models to provide a basis for comparison. It also indicates certain conditions of a release that may warrant more sophisticated modeling than is represented here. However, this guidance does not discuss the procedures to follow when using models; if you choose to use models, you should consult the appropriate references or instructions for those models.

This guidance provides distances to endpoints for toxic substances that range from 0.1 miles to 25 miles. Other models may not project distances this far (and some may project even longer distances). One commonly used model, ALOHA, has an artificial distance cutoff of 6 miles (i.e., any scenario which would result in an endpoint distance beyond 6 miles is reported as "greater than 6 miles"). Although you may use ALOHA if it is appropriate for the substance and scenario, you should consider choosing a different model if the scenario would normally result in an endpoint distance significantly greater than 6 miles. Otherwise, you should be prepared to explain the difference between your results and those in this guidance or other commonly used models. Also, you should be aware that the RMP*Submit system accepts only numerical entries (i.e., it will not accept a "greater than" distance). If you do enter a distance in RMP*Submit that is the result of a particular model's maximum distance cutoff (including the maximum distance cutoff in this guidance), you can explain this in the executive summary of your RMP.

Exhibit 1
Required Parameters for Modeling (40 CFR 68.22)

WORST CASE	ALTERNATIVE SCENARIO
Endpoints (§68.22(a))	
Endpoints for toxic substances are specified in part 68 Appendix A.	Endpoints for toxic substances are specified in part 68 Appendix A.
For flammable substances, endpoint is overpressure of 1 pound per square inch (psi) for vapor cloud explosions.	For flammable substances, endpoint is: ✦Overpressure of 1 psi for vapor cloud explosions, or ✦Radiant heat level of 5 kilowatts per square meter (kW/m^2) for 40 seconds for heat from fires (or equivalent dose), or ✦Lower flammability limit (LFL) as specified in NFPA documents or other generally recognized sources.
Wind speed/stability (§68.22(b))	
This guidance assumes 1.5 meters per second and F stability. For other models, use wind speed of 1.5 meters per second and F stability class unless you can demonstrate that local meteorological data applicable to the site show a higher minimum wind speed or less stable atmosphere at all times during the previous three years. If you can so demonstrate, these minimums may be used for site-specific modeling.	This guidance assumes wind speed of 3 meters per second and D stability. For other models, you must use typical meteorological conditions for your site.
Ambient temperature/humidity (§68.22(c))	
This guidance assumes 25°C (77°F) and 50 percent humidity. For other models for toxic substances, you must use the highest daily maximum temperature and average humidity for the site during the past three years.	This guidance assumes 25°C and 50 percent humidity. For other models, you may use average temperature/humidity data gathered at the site or at a local meteorological station.
Height of release (§68.22(d))	
For toxic substances, you must assume a ground level release.	This guidance assumes a ground-level release. For other models, release height may be determined by the release scenario.
Surface roughness (§68.22(e))	
Use urban (obstructed terrain) or rural (flat terrain) topography, as appropriate.	Use urban (obstructed terrain) or rural (flat terrain) topography, as appropriate.
Dense or neutrally buoyant gases (§68.22(f))	
Tables or models used for dispersion of regulated toxic substances must appropriately account for gas density. If you use this guidance, see Tables 1-4 for neutrally buoyant gases and Tables 5-8 for dense gases, or Tables 9-12 for specific chemicals.	Tables or models used for dispersion must appropriately account for gas density. If you use this guidance, see Tables 14-17 for neutrally buoyant gases and Tables 18-21 for dense gases, or Tables 22-25 for specific chemicals.
Temperature of released substance (§68.22(g))	
You must consider liquids (other than gases liquefied by refrigeration) to be released at the highest daily maximum temperature, from data for the previous three years, or at process temperature, whichever is higher. Assume gases liquefied by refrigeration at atmospheric pressure to be released at their boiling points. This guidance provides factors for estimation of release rates at 25°C or the boiling point of the released substance, and also provides temperature correction factors.	Substances may be considered to be released at a process or ambient temperature that is appropriate for the scenario. This guidance provides factors for estimation of release rates at 25 °C or the boiling point of the released substance, and also provides temperature correction factors.

1.2 This Guidance Compared to Other Models

Results obtained using the methods in this document are expected to be conservative (i.e., they will generally, but not always, overestimate the distance to endpoints). The chemical-specific reference tables in this guidance provide less conservative results than the generic reference tables, because the chemical-specific tables were derived using more realistic assumptions and considering more factors.

Complex models that can account for many site-specific factors may give less conservative estimates of offsite consequences than the simple methods in this guidance. This is particularly true for alternative scenarios, for which EPA has not specified many assumptions. However, complex models may be expensive and require considerable expertise to use; this guidance is designed to be simple and straightforward. You will need to consider these tradeoffs in deciding how to carry out your required consequence analyses. Appendix A provides information on references for some other methods of analysis; these references do not include all models that you may use for these analyses. You will find that modeling results will sometimes vary considerably from model to model.

1.3 Number of Scenarios to Analyze

The number and type of analyses you must perform depend on the "Program" level of each of your processes. The rule defines three Program levels. Processes are eligible for Program 1 if, among other criteria, there are no public receptors within the distance to the endpoint for the worst-case scenario. Because no public receptors would be affected by the worst-case release, no further modeling is required for these processes. For processes subject to Program 2 or Program 3, both worst-case release scenarios and alternative release scenarios are required. To determine the Program level of your processes, consult 40 CFR 68.10(b), (c), and (d), or Chapter 2 of EPA's *General Guidance for Risk Management Programs (40 CFR part 68).*

Once you have determined the Program level of your processes, you are required to conduct the following offsite consequence analyses:

- One worst-case release scenario for each Program 1 process;
- One worst-case release scenario to represent all regulated toxic substances in Program 2 and Program 3 processes;
- One worst-case release scenario to represent all regulated flammable substances in Program 2 and Program 3 processes;
- One alternative release scenario for each regulated toxic substance in Program 2 and Program 3 processes; and
- One alternative release scenario to represent all regulated flammable substances in Program 2 and Program 3 processes.

NOTE: You may need to analyze additional worst-case scenarios if release scenarios for regulated flammable or toxic substances from other covered processes at your facility would affect different public receptors. For example, worst-case release scenarios for storage tanks at opposite ends of your facility may potentially reach different areas where people could be affected. In that case, you will have to conduct analyses of and report on both releases.

GUIDANCE FOR INDUSTRY-SPECIFIC RISK MANAGEMENT PROGRAMS

EPA developed guidance for industry-specific risk management programs for the following industries:

- Propane storage facilities
- Chemical distributors
- Waste water treatment plants
- Warehouses
- Ammonia refrigeration
- Small propane retailers & users

The industry-specific guidances are available from EPA at http://www.epa.gov/ceppo/.

Industry-specific guidances developed by EPA take the place of this guidance document and the *General Guidance for Risk Management Programs* for the industries addressed. If an industry-specific program exists for your process(es), you should use it as your basic guidance because it will provide more information that is specific to your process, including dispersion modeling.

1.4 Modeling Issues

The consequences of an accidental chemical release depend on the conditions of the release and the conditions at the site at the time of the release. This guidance provides reference tables of distances, based on results of modeling, for estimation of worst-case and alternative scenario consequence distances. Worst-case consequence distances obtained using these tables are not intended to be precise predictions of the exact distances that might be reached in the event of an actual accidental release. For this guidance, worst-case distances are based on modeling results assuming the combination of worst-case conditions required by the rule. This combination of conditions occurs rarely and is unlikely to persist for very long. To derive the alternative scenario distances, less conservative assumptions were used for modeling; these assumptions were chosen to represent more likely conditions than the worst-case assumptions. Nevertheless, in an actual accidental release, the conditions may be very different. Users of this guidance should remember that the results derived from the methods presented here are rough estimates of potential consequence distances. Other models may give different results; the same model also may give different results if different assumptions about release conditions and/or site conditions are used.

The reference tables of distances in this guidance provide results to a maximum distance of 25 miles. EPA recognizes that modeling results at such large distances are highly uncertain. Almost no experimental data or data from accidents are available at such large distances to compare to modeling results. Most data are reported for distances well under 10 miles. Modeling uncertainties are likely to increase as distances increase because conditions (e.g., atmospheric stability, wind speed, surface roughness) are not likely to remain constant over large distances. Thus, at large distances (e.g., greater than about 6 to 10 miles), the modeling results should be viewed as very coarse estimates of consequence distances. EPA believes, however, that the results, even at large distances, can provide useful information for comparison purposes. For example, Local Emergency Planning Committees (LEPCs) and other local agencies can use relative differences in distance to aid in establishing chemical accident prevention and preparedness priorities among facilities in a community. Since worst-case scenario distances are based on modeling conditions that are unlikely to occur, and since modeling of any scenario that results in large distances is very uncertain, EPA strongly urges communities and industry not to rely on the results of worst-case modeling or any modeling that results in very large toxic endpoint distances in emergency planning and response activities. Results of alternative scenario models are apt to provide a more reasonable basis for planning and response.

1.5 Steps for Performing the Analysis

This Chapter presents the steps you should follow in using this guidance to carry out an offsite consequence analysis. Before carrying out one or more worst-case and/or alternative release analyses, you will need to obtain several pieces of information about the regulated substances you have, the area surrounding your site, and typical meteorological conditions:

- Determine whether each regulated substance is toxic or flammable, as indicated in the rule or Appendices B and C of this guidance.

- For the worst-case analysis, determine the quantity of each substance held in the largest single vessel or pipe.

- Collect information about any passive or active (alternative scenarios only) release mitigation measures that are in place for each substance.

- For toxic substances, determine whether the substance is stored as a gas, as a liquid, as a gas liquefied by refrigeration, or as a gas liquefied under pressure. For alternative scenarios involving a vapor cloud fire, you may also need this information for flammable substances.

- For toxic liquids, determine the highest daily maximum temperature of the liquid, based on data for the previous three years, or process temperature, whichever is higher.

- For toxic substances, determine whether the substance behaves as a dense or neutrally buoyant gas or vapor (see Appendix B, Exhibits B-1 and B-2). For alternative scenarios involving a vapor cloud fire, you will also need this information for flammable substances (see Appendix C, Exhibits C-2 and C-3).

- For toxic substances, determine whether the topography (surface roughness) of your site is either urban or rural as thse terms are defined by the rule (see 40 CFR 68.22(e)). For alternative scenarios involving a vapor cloud fire, you will also need this information for flammable substances.

After you have gathered the above information, you will need to take three steps (except for flammable worst-case releases):

(1) Select a scenario;

(2) Determine the release or volatilization rate; and
(3) Determine the distance to the endpoint.

For flammable worst-case scenarios, only steps one and three are needed. Sections 1.5.1 through 1.5.6 outline the procedures to perform the analyses. In addition to basic procedures, these sections provide references to sections of this guidance where you will find detailed instructions on carrying out the applicable portion of the analysis. Sections 1.5.1 through 1.5.3 below provide basic steps to analyze worst-case scenarios for toxic gases, toxic liquids, and flammable substances. Sections 1.5.4 through 1.5.6 provide basic steps for alternative scenario analysis. Appendix E of this document provides worksheets that may help you to perform the analyses.

1.5.1 Worst-Case Analysis for Toxic Gases

To conduct worst-case analyses for toxic gases, including toxic gases liquefied by pressurization (see Appendix E, Worksheet 1, for a worksheet that can be used in carrying out this analysis):

Step 1: Determine worst-case scenario. Identify the toxic gas, quantity, and worst-case release scenario, as defined by the rule (Chapter 2).

Step 2: Determine release rate. Estimate the release rate for the toxic gas, using the parameters required by the rule. This guidance provides methods for estimating the release rate for:

- Unmitigated releases (Section 3.1.1).
- Releases with passive mitigation (Section 3.1.2).

Step 3: Determine distance to endpoint. Estimate the worst-case consequence distance based on the release rate and toxic endpoint (defined by the rule) (Chapter 4). This guidance provides reference tables of distances (Reference Tables 1-12). Select the appropriate reference table based on the density of the released substance, the topography of your site, and the duration of the release (always 10 minutes for gas releases). Estimate distance to the endpoint from the appropriate table.

1.5.2 Worst-Case Analysis for Toxic Liquids

To conduct worst-case analyses for toxic substances that are liquids at ambient conditions or for toxic gases that are liquefied by refrigeration alone (see Appendix E, Worksheet 2, for a worksheet for this analysis):

Step 1: Determine worst-case scenario. Identify the toxic liquid, quantity, and worst-case release scenario, as defined by the rule (Chapter 2). To estimate the quantity of liquid released from piping, see Section 3.2.1.

Step 2: Determine release rate. Estimate the volatilization rate for the toxic liquid and the duration of the release, using the parameters required by the rule. This guidance provides methods for estimating the pool evaporation rate for:

- Gases liquefied by refrigeration alone (Sections 3.1.3 and 3.2.3).
- Unmitigated releases (Section 3.2.2).
- Releases with passive mitigation (Section 3.2.3).
- Releases at ambient or elevated temperature (Sections 3.2.2, 3.2.3, and 3.2.5).
- Releases of mixtures of toxic liquids (Section 3.2.4).
- Releases of common water solutions of regulated substances and of oleum (Section 3.3).

Step 3: Determine distance to endpoint. Estimate the worst-case consequence distance based on the release rate and toxic endpoint (defined by the rule) (Chapter 4). This guidance provides reference tables of distances (Reference Tables 1-12). Select the appropriate reference table based on the density of the released substance, the topography of your site, and the duration of the release. Estimate distance to the endpoint from the appropriate table.

1.5.3 Worst-Case Analysis for Flammable Substances

To conduct worst-case analyses for all regulated flammable substances (i.e., gases and liquids) (see Appendix E, Worksheet 3, for a worksheet for this analysis):

Step 1: Determine worst-case scenario. Identify the appropriate flammable substance, quantity, and worst-case scenario, as defined by the rule (Chapter 2).

Step 2: Determine distance to endpoint. Estimate the distance to the required overpressure endpoint of 1 psi for a vapor cloud explosion of the flammable substance, using the assumptions required by the rule (Chapter 5). This guidance provides a reference table of distances (Reference Table 13) for worst-case vapor cloud explosions. Estimate the distance to the endpoint from the quantity released and the table.

1.5.4 Alternative Scenario Analysis for Toxic Gases

To conduct alternative release scenario analyses for toxic gases, including toxic gases liquefied by pressurization (see Appendix E, Worksheet 4, for a worksheet for this analysis):

Step 1: Select alternative scenario. Choose an appropriate alternative release scenario for the toxic gas. This scenario should have the potential for offsite impacts unless no such scenario exists. (Chapter 6).

Step 2: Determine release rate. Estimate the release rate and duration of the release of the toxic gas, based on your scenario and site-specific conditions. This guidance provides methods for:

- Unmitigated releases (Section 7.1.1).
- Releases with active or passive mitigation (Section 7.1.2).

Step 3: Determine distance to endpoint. Estimate the alternative scenario distance based on the release rate and toxic endpoint (Chapter 8). This guidance provides reference tables of distances (Reference Tables 14-25) for alternative scenarios for toxic substances. Select the appropriate reference table based on the density of the released substance, the topography of your site, and the duration of the release. Estimate distance to the endpoint from the appropriate table.

1.5.5 Alternative Scenario Analysis for Toxic Liquids

To conduct alternative release scenario analyses for toxic substances that are liquids at ambient conditions or for toxic gases that are liquefied by refrigeration alone (see Appendix E, Worksheet 5, for a worksheet for this analysis):

Step 1: Select alternative scenario. Choose an appropriate alternative release scenario and release quantity for the toxic liquid. This scenario should have the potential for offsite impacts (Chapter 6), unless no such scenario exists.

Step 2: Determine release rate. Estimate the release rate and duration of the release of the toxic liquid, based on your scenario and site-specific conditions. This guidance provides methods to estimate the liquid release rate and quantity of liquid released for:

- Unmitigated liquid releases (Section 7.2.1).
- Mitigated liquid releases (Section 7.2.2).

The released liquid is assumed to form a pool. This guidance provides methods to estimate the pool evaporation rate and release duration for:

- Unmitigated releases (Section 7.2.3).
- Releases with passive or active mitigation (Section 7.2.3).
- Releases at ambient or elevated temperature (Sections 7.2.3).
- Releases of common water solutions of regulated substances and of oleum (Section 7.2.4).

Step 3: Determine distance to endpoint. Estimate the alternative scenario distance based on the release rate and toxic endpoint (Chapter 8). This guidance provides reference tables of distances (Reference Tables 14-25) for alternative scenarios for toxic substances. Select the appropriate reference table based on the density of the released substance, the topography of your site, and the duration of the release. Estimate distance to the endpoint from the appropriate table.

1.5.6 Alternative Scenario Analysis for Flammable Substances

To conduct alternative release scenario analyses for all regulated flammable substances (i.e., gases and liquids) (see Appendix E, Worksheet 6, for a worksheet for this analysis):

Step 1: Select alternative scenario. Identify the flammable substance, and choose the quantity and type of event for the alternative scenario consequence analysis (Chapter 6).

Step 2: Determine release rate. Estimate the release rate to air of the flammable gas or liquid, if the scenario involves a vapor cloud fire (Section 9.1 for flammable gases, Section 9.2 for flammable liquids).

Step 3: Determine distance to endpoint. Estimate the distance to the appropriate endpoint (defined by the rule). This guidance provides methods for:

- Vapor cloud fires (Section 10.1 and Reference Tables 26-29); select the appropriate reference table based on the density of the released substance and the topography of your site, and estimate distance to the endpoint from the appropriate table.

- Pool fires (Section 10.2); estimate distance from the equation and chemical-specific factors provided.

- BLEVEs (Section 10.3 and Reference Table 30); estimate distance from the quantity of flammable substance and the table.

- Vapor cloud explosions (Section 10.4 and Reference Table 13); estimate quantity in the cloud from the equation and chemical-specific factors provided, and estimate distance from the quantity, the table, and a factor provided for alternative scenarios.

1.6 Additional Sources of Information

EPA's risk management program requirements may be found at 40 CFR part 68. The relevant sections were published in the *Federal Register* on January 31, 1994 (59 FR 4478) and June 20, 1996 (61 FR 31667). Final rules amending the list of substances and thresholds were published on August 25, 1997 (62 FR 45130) and January 6, 1998 (63 FR 640). A consolidated copy of these regulations is available in Appendix F.

EPA is working with industry and local, state, and federal government agencies to assist sources in complying with these requirements. For more information, refer to the *General Guidance for Risk Management Programs* Appendix E (Technical Assistance). Appendices C and D of the *General Guidance* also provide points of contact for EPA and Occupational Safety and Health Administration (OSHA) at the state and federal levels for your questions. Your LEPC also can be a valuable resource.

Finally, if you have access to the Internet, EPA has made copies of the rules, fact sheets, and other related materials available at the home page of EPA's Chemical Emergency Preparedness and Prevention Office (http://www.epa.gov/ceppo/). Please check the site regularly, as additional materials are posted when they become available. If you do not have access to the Internet, you can call EPA's hotline at (800) 424-9346.

2 DETERMINING WORST-CASE SCENARIOS

<u>In Chapter 2</u>

- 2.1 EPA's definition of a worst-case scenario.
- 2.2 How to determine the quantity released.
- 2.3 How to identify the appropriate worst-case scenario.

2.1 Definition of Worst-Case Scenario

A worst-case release is defined as:

- The release of the largest quantity of a regulated substance from a vessel or process line failure, and
- The release that results in the greatest distance to the endpoint for the regulated toxic or flammable substance.

You may take administrative controls into account when determining the largest quantity. Administrative controls are written procedures that limit the quantity of a substance that can be stored or processed in a vessel or pipe at any one time or, alternatively, procedures that allow the vessel or pipe to occasionally store larger than usual quantities (e.g., during shutdown or turnaround). Endpoints for regulated substances are specified in the rule (40 CFR 68.22(a), and Appendix A to part 68 for toxic substances). For the worst-case analysis, you do not need to consider the possible causes of the worst-case release or the probability that such a release might occur; the release is simply assumed to take place. You must assume all releases take place at ground level for the worst-case analysis.

This guidance assumes meteorological conditions for the worst-case scenario of atmospheric stability class F (stable atmosphere) and wind speed 1.5 meters per second (3.4 miles per hour). Ambient air temperature for this guidance is 25 °C (77 °F). If you use this guidance, you may assume this ambient temperature for the worst case, even if the maximum temperature at your site in the last three years is higher.

The rule provides two choices for topography, urban and rural. EPA (40 CFR 68.22(e)) has defined urban as many obstacles in the immediate area, where obstacles include buildings or trees. Rural, by EPA's definition, means there are no buildings in the immediate area, and the terrain is generally flat and unobstructed. Thus, if your site is located in an area with few buildings or other obstructions (e.g., hills, trees), you should assume open (rural) conditions. If your site is in an area with many obstructions, even if it is in a remote location that would not usually be considered urban, you should assume urban conditions.

Toxic Gases

Toxic gases include all regulated toxic substances that are gases at ambient temperature (25 °C, 77 °F), with the exception of gases liquefied by refrigeration under atmospheric pressure and released into diked areas. For the worst-case consequence analysis, you must assume that a gaseous release of the total quantity occurs in 10 minutes. You may take passive mitigation measures (e.g., enclosure) into account in the analysis of the worst-case scenario.

Gases liquefied by refrigeration alone and released into diked areas may be modeled as liquids at their boiling points and assumed to be released from a pool by evaporation (40 CFR 68.25(c)(2)). Gases liquefied by refrigeration alone that would form a pool one centimeter or less in depth upon release must be modeled as gases. (Modeling indicates that pools one centimeter or less deep formed by gases liquefied by refrigeration would completely evaporate in 10 minutes or less, giving a release rate that is equal to or greater than the worst-case release rate for a gaseous release. In this case, therefore, it is appropriate to treat these substances as gases for the worst-case analysis.)

Endpoints for consequence analysis for regulated toxic substances are specified in the rule (40 CFR part 68, Appendix A). Exhibit B-1 of Appendix B lists the endpoint for each toxic gas. These endpoints are used for air dispersion modeling to estimate the consequence distance.

Toxic Liquids

For toxic liquids, you must assume that the total quantity in a vessel is spilled. This guidance assumes the spill takes place onto a flat, non-absorbing surface. For toxic liquids carried in pipelines, the quantity that might be released from the pipeline is assumed to form a pool. You may take passive mitigation systems (e.g., dikes) into account in consequence analysis. The total quantity spilled is assumed to spread instantaneously to a depth of one centimeter (0.033 foot or 0.39 inch) in an undiked area or to cover a diked area instantaneously. The temperature of the released liquid must be the highest daily maximum temperature occurring in the past three years or the temperature of the substance in the vessel, whichever is higher (40 CFR 68.25(d)(2)). The release rate to air is estimated as the rate of evaporation from the pool. If liquids at your site might be spilled onto a surface that could rapidly absorb the spilled liquid (e.g., porous soil), the methods presented in this guidance may greatly overestimate the consequences of a release. Consider using another method in such a case.

Exhibit B-2 of Appendix B presents the endpoint for air dispersion modeling for each regulated toxic liquid (the endpoints are specified in 40 CFR part 68, Appendix A).

Flammable Substances

For all regulated flammable substances, you must assume that the worst-case release results in a vapor cloud containing the total quantity of the substance that could be released from a vessel or pipeline. For the worst-case consequence analysis, you must assume the vapor cloud detonates. If you use a TNT-equivalent method for your analysis, you must assume a 10 percent yield factor.

The rule specifies the endpoint for the consequence analysis of a vapor cloud explosion of a regulated flammable substance as an overpressure of 1 pound per square inch (psi). This endpoint was chosen as the threshold for potential serious injuries to people as a result of property damage caused by an explosion (e.g., injuries from flying glass from shattered windows or falling debris from damaged houses). (See Appendix D, Section D.5 for additional information on this endpoint.)

Effect of Required Assumptions

The assumptions required for the worst-case analysis are intended to provide conservative worst-case consequence distances, rather than accurate predictions of the potential consequences of a release; that is, in most cases your results will overestimate the effects of a release. In certain cases, actual conditions could be even more severe than these worst-case assumptions (e.g., very high process temperature, high process pressure, or unusual weather conditions, such as temperature inversions); in such cases, your results might underestimate the effects. However, the required assumptions generally are expected to give conservative results.

2.2 Determination of Quantity for the Worst-Case Scenario

EPA has defined a worst-case release as the release of the largest quantity of a regulated substance from a vessel or process line failure that results in the greatest distance to a specified endpoint. For substances in vessels, you must assume release of the largest amount in a single vessel. For substances in pipes, you must assume release of the largest amount in a pipe. The largest quantity should be determined taking into account administrative controls rather than absolute capacity of the vessel or pipe. Administrative controls are written procedures that limit the quantity of a substance that can be stored or processed in a vessel or pipe at any one time, or, alternatively, occasionally allow a vessel or pipe to store larger than usual quantities (e.g., during turnaround).

2.3 Selecting Worst-Case Scenarios

Under part 68, a worst-case release scenario analysis must be completed for all covered processes, regardless of program level. The number of worst-case scenarios you must analyze depends on several factors. You need to consider only the hazard (toxicity or flammability) for which a substance is regulated (i.e., even if a regulated toxic substance is also flammable, you only need to consider toxicity in your analysis; even if a regulated flammable substance is also toxic, you only need to consider flammability).

For every Program 1 process, you must report the worst-case scenario with the greatest distance to an endpoint. If a Program 1 process has more than one regulated substance held above its threshold, you must determine which substance produces the greatest distance to its endpoint and report on that substance. If a Program 1 process has both regulated toxics and flammables above their thresholds, you still report only the one scenario that produces the greatest distance to the endpoint. The process is eligible for Program 1 if there are no public receptors within the distance to an endpoint of the worst-case scenario for the process and the other Program 1 criteria are met. For Program 2 or Program 3 processes, you must analyze and report on one worst-case analysis representing all toxic regulated substances present above the threshold quantity and one worst-case analysis representing all flammable regulated substances present above the threshold quantity. You may need to submit an additional worst-case analysis if a worst-case release from elsewhere at the source would potentially affect public receptors different from those affected by the initial worst-case scenario(s).

If you have more than one regulated substance in a class, the substance chosen for the consequence analysis for each hazard for Program 2 and 3 processes should be the substance that has the potential to cause the greatest offsite consequences. Choosing the toxic regulated substance that might lead to the greatest offsite consequences may require a screening analysis of the toxic regulated substances on site, because the potential consequences are dependent on a number of factors, including quantity, toxicity, and volatility.

Location (distance to the fenceline) and conditions of processing or storage (e.g., a high temperature process) also should be considered. In selecting the worst-case scenario, you may want to consider the following points:

- Toxic gases with low toxic endpoints are likely to give the greatest distances to the endpoint for a given release quantity; a toxic gas would be a likely choice for the worst-case analysis required for Program 2 and 3 processes (processes containing toxic gases are unlikely to be eligible for Program 1).
- Volatile, highly toxic liquids (i.e., liquids with high ambient vapor pressure and low toxic endpoints) also are likely to give large distances to the endpoint (processes containing this type of substance are unlikely to be eligible for Program 1).
- Toxic liquids with relatively low volatility (low vapor pressure) and low toxicity (large toxic endpoint) in ambient temperature processes may give fairly small distances to the endpoint; you probably would not choose such substances for the worst-case analysis for Program 2 or 3 if you have other regulated toxics, but you may want to consider carrying out a worst-case analysis to demonstrate potential Program 1 eligibility.

For flammable substances, you must consider the consequences of a vapor cloud explosion in the analysis. The severity of the consequences of a vapor cloud explosion depends on the quantity of the released substance in the vapor cloud, its heat of combustion, and other factors that are assumed to be the same for all flammable substances. In most cases, the analysis probably should be based on the regulated flammable substance present in the greatest quantity; however, a substance with a high heat of combustion may have a greater potential offsite impact than a larger quantity of a substance with a lower heat of combustion. In some cases, a regulated flammable substance that is close to the fenceline might have a greater potential offsite impact than a larger quantity farther from the fenceline.

You are likely to estimate smaller worst-case distances for flammable substances than for similar quantities of most toxic substances. Because the distance to the endpoint may be relatively small, you may find it worthwhile to carry out a worst-case analysis for each process containing flammable substances to demonstrate potential eligibility for Program 1, unless there are public receptors close to the process.

4 ESTIMATION OF WORST-CASE DISTANCE TO TOXIC ENDPOINT

<u>In Chapter 4</u>

- Reference tables of distances for worst-case releases, including:
  - -- Generic reference tables (Exhibit 2), and
  - -- Chemical-specific reference tables (Exhibit 3).
- Considerations include:
  - -- Gas density (neutrally buoyant or dense),
  - -- Duration of release (10 minutes or 60 minutes),
  - -- Topography (rural or urban).

This guidance provides reference tables giving worst-case distances for neutrally buoyant gases and vapors and for dense gases and vapors for both rural (open) and urban (obstructed) areas. This chapter describes these reference tables and gives instructions to help you choose the appropriate table to estimate consequence distances for the worst-case analysis.

Neutrally buoyant gases and vapors have approximately the same density as air, and dense gases and vapors are heavier than air. Neutrally buoyant and dense gases are dispersed in different ways when they are released; therefore, modeling was carried out to develop separate reference tables. These generic reference tables can be used to estimate distances using the specified toxic endpoint for each substance and the estimated release rate to air. In addition to the generic tables, chemical-specific reference tables are provided for ammonia, chlorine, and sulfur dioxide. These chemical-specific tables were developed based on modeling carried out for industry-specific guidance documents. All the tables were developed assuming a wind speed of 1.5 meters per second (3.4 miles per hour) and F stability. To use the reference tables, you need the worst-case release rates estimated as described in the previous sections. For liquid pool evaporation, you also need the duration of the release. In addition, to use the generic tables, you will need to determine the appropriate toxic endpoint and whether the gas or vapor is neutrally buoyant or dense, using the exhibits in Appendix B. You may interpolate between entries in the reference tables.

Generic reference tables are provided for both 10-minute releases and 60-minute releases. You should use the tables for 10-minute releases if the duration of your release is 10 minutes or less; use the tables for 60-minute releases if the duration of your release is more than 10 minutes. For the worst-case analysis, all releases of toxic gases are assumed to last for 10 minutes. You need to consider the estimated duration of the release (from Equation 3-5) for evaporation of pools of toxic liquids. For evaporation of water solutions of toxic liquids or of oleum, you should always use the tables for 10-minute releases.

The generic reference tables of distances (Reference Tables 1-8), which should be used for substances other than ammonia, chlorine, and sulfur dioxide, are found at the end of Chapter 5. The generic tables and the conditions for which each table are applicable are described in Exhibit 2. Chemical-specific reference tables of distances (Reference Tables 9-12) follow the generic reference tables at the end of Chapter 5. Each of these chemical-specific tables includes distances for both rural and urban topography. These tables are described in Exhibit 3.

Remember that these reference tables provide only rough estimates, not accurate predictions, of the distances that might be reached under worst-case conditions. In particular, although the distances in the tables are as great as 25 miles, you should bear in mind that the larger distances (more than six to ten miles) are very uncertain.

To use the reference tables of distances, follow these steps:

For Regulated Toxic Substances Other than Ammonia, Chlorine, and Sulfur Dioxide

- Find the toxic endpoint for the substance in Appendix B (Exhibit B-1 for toxic gases or Exhibit B-2 for toxic liquids).

- Determine whether the table for neutrally buoyant or dense gases and vapors is appropriate from Appendix B (Exhibit B-1 for toxic gases or Exhibit B-2 for toxic liquids). A toxic gas that is lighter than air may behave as a dense gas upon release if it is liquefied under pressure, because the released gas may be mixed with liquid droplets, or if it is cold. Consider the state of the released gas when you decide which table is appropriate.

- Determine whether the table for rural or urban conditions is appropriate.

  -- Use the rural table if your site is in an open area with few obstructions.

  -- Use the urban table if your site is in an urban or obstructed area. The urban tables are appropriate if there are many obstructions in the area, even if it is in a remote location, not in a city.

- Determine whether the 10-minute table or the 60-minute table is appropriate.

  -- Always use the 10-minute table for worst-case releases of toxic gases.

  -- Always use the 10-minute table for worst-case releases of common water solutions and oleum from evaporating pools, for both ambient and elevated temperatures.

  -- If you estimated the release duration for an evaporating toxic liquid pool to be 10 minutes or less, use the 10-minute table.

  -- If you estimated the release duration for an evaporating toxic liquid pool to be more than 10 minutes, use the 60-minute table.

Exhibit 2
Generic Reference Tables of Distances for Worst-case Scenarios

Applicable Conditions			Reference Table Number
Gas or Vapor Density	**Topography**	**Release Duration (minutes)**	
Neutrally buoyant	Rural	10	1
		60	2
	Urban	10	3
		60	4
Dense	Rural	10	5
		60	6
	Urban	10	7
		60	8

Exhibit 3
Chemical-Specific Reference Tables of Distances for Worst-case Scenarios

Substance	Applicable Conditions			Reference Table Number
	Gas or Vapor Density	**Topography**	**Release Duration (minutes)**	
Anhydrous ammonia liquefied under pressure	Dense	Rural, Urban	10	9
Non-liquefied ammonia, ammonia liquefied by refrigeration, or aqueous ammonia	Neutrally buoyant	Rural, Urban	10	10
Chlorine	Dense	Rural, Urban	10	11
Sulfur dioxide (anhydrous)	Dense	Rural, Urban	10	12

Neutrally Buoyant Gases or Vapors

- If Exhibit B-1 or B-2 indicates the gas or vapor should be considered neutrally buoyant, and other factors would not cause the gas or vapor to behave as a dense gas, divide the estimated release rate (pounds per minute) by the toxic endpoint (milligrams per liter).

- Find the range of release rate/toxic endpoint values that includes your calculated release rate/toxic endpoint in the first column of the appropriate table (Reference Table 1, 2, 3, or 4), then find the corresponding distance to the right (see Example 13 below).

Dense Gases or Vapors

- If Exhibit B-1 or B-2 or consideration of other relevant factors indicates the substance should be considered a dense gas or vapor (heavier than air), find the distance in the appropriate table (Reference Table 5, 6, 7, or 8) as follows;

  -- Find the toxic endpoint closest to that of the substance by reading across the top of the table. If the endpoint of the substance is halfway between two values on the table, choose the value on the table that is smaller (to the left). Otherwise, choose the closest value to the right or the left.

  -- Find the release rate closest to the release rate estimated for the substance at the left of the table. If the calculated release rate is halfway between two values on the table, choose the release rate that is larger (farther down on the table). Otherwise, choose the closest value (up or down on the table).

  -- Read across from the release rate and down from the endpoint to find the distance corresponding to the toxic endpoint and release rate for your substance.

For Ammonia, Chlorine, or Sulfur Dioxide

- Find the appropriate chemical-specific table for your substance (see the descriptions of Reference Tables 9-12 in Exhibit 3).

  -- If you have ammonia liquefied by refrigeration alone, you may use Reference Table 10, even if the duration of the release is greater than 10 minutes.

  -- If you have chlorine or sulfur dioxide liquefied by refrigeration alone, you may use the chemical-specific reference tables, even if the duration of the release is greater than 10 minutes.

- Determine whether rural or urban topography is applicable to your site.

  -- Use the rural column in the reference table if your site is in an open area with few obstructions.

-- Use the urban column if your site is in an urban or obstructed area. The urban column is appropriate if there are many obstructions in the area, even if it is in a remote location, not in a city.

- Estimate the consequence distance as follows:

-- In the left-hand column of the table, find the release rate closest to your calculated release rate.

-- Read the corresponding distance from the appropriate column (urban or rural) to the right.

The development of Reference Tables 1-8 is discussed in Appendix D, Sections D.4.1 and D.4.2. The development of Reference Tables 9-12 is discussed in industry-specific risk management program guidance documents and a backup information document that are cited in Section D.4.3. If you think the results of the method presented here overstate the potential consequences of a worst-case release at your site, you may choose to use other methods or models that take additional site-specific factors into account.

Examples 14 and 15 below include the results of modeling using two other models, the Areal Locations of Hazardous Atmospheres (ALOHA) and the World Bank Hazards Analysis (WHAZAN) systems. These additional results are provided for comparison with the results of the methods presented in this guidance. The same modeling parameters were used as in the modeling carried out for development of the reference tables of distances. Appendix D, Section D.4.5, provides information on the modeling carried out with ALOHA and WHAZAN.

Example 13. Gas Release (Diborane)

In Example 1, you estimated a release rate for diborane gas of 250 pounds per minute. From Exhibit B-1, the toxic endpoint for diborane is 0.0011 mg/L, and the appropriate reference table for diborane is a neutrally buoyant gas table. Your facility and the surrounding area have many buildings, pieces of equipment, and other obstructions; therefore, you assume urban conditions. The appropriate reference table is Reference Table 3, for a 10-minute release of a neutrally buoyant gas in an urban area.

The release rate divided by toxic endpoint for this example is 250/0.0011 = 230,000.

From Reference Table 3, release rate divided by toxic endpoint falls between 221,000 and 264,000, corresponding to about 8.1 miles.

Example 14. Gas Release (Ethylene Oxide)

You have a tank containing 10,000 pounds of ethylene oxide, which is a gas under ambient conditions. Assuming the total quantity in the tank is released over a 10-minute period, the release rate (QR) from Equation 3-1 is:

QR = 10,000 pounds/10 minutes = 1,000 pounds per minute

From Exhibit B-1, the toxic endpoint for ethylene oxide is 0.09 mg/L, and the appropriate reference table is the dense gas table. Your facility is in an open, rural area with few obstructions; therefore, you use the table for rural areas.

Using Reference Table 5 for 10-minute releases of dense gases in rural areas, the toxic endpoint of 0.09 mg/L is closer to 0.1 than 0.075 mg/L. For a release rate of 1,000 pounds per minute, the distance to 0.1 mg/L is 3.6 miles.

Additional Modeling for Comparison

The ALOHA model gave a distance of 2.2 miles to the endpoint, using the same assumptions.

The WHAZAN model gave a distance of 2.7 miles to the endpoint, using the same assumptions and the dense cloud dispersion model.

Example 15. Liquid Evaporation from Pool (Acrylonitrile)

You estimated an evaporation rate of 307 pounds per minute for acrylonitrile from a pool formed by the release of 20,000 pounds into an undiked area (Example 4). You estimated the time for evaporation of the pool as 65 minutes. From Exhibit B-2, the toxic endpoint for acrylonitrile is 0.076 mg/L, and the appropriate reference table for a worst-case release of acrylonitrile is the dense gas table. Your facility is in an urban area. You use Reference Table 8 for 60-minute releases of dense gases in urban areas.

From Reference Table 8, the toxic endpoint closest to 0.076 mg/L is 0.075 mg/L, and the closest release rate to 307 pounds per minute is 250 pounds per minute. Using these values, the table gives a worst-case consequence distance of 2.9 miles.

Additional Modeling for Comparison

The ALOHA model gave a distance of 1.3 miles to the endpoint for a release rate of 307 pounds per minute, using the same assumptions.

The WHAZAN model gave a distance of 1.0 mile to the endpoint for a release rate of 307 pounds per minute, using the same assumptions and the dense cloud dispersion model.

Reference Table 5
Dense Gas Distances to Toxic Endpoint
10-minute Release, Rural Conditions, F Stability, Wind Speed 1.5 Meters per Second

Release Rate (lbs/min)	Toxic Endpoint (mg/L) 0.0004	0.0007	0.001	0.002	0.0035	0.005	0.0075	0.01	0.02	0.035	0.05	0.075	0.1	0.25	0.5	0.75
	Distance (Miles)															
1	2.2	1.7	1.5	1.1	0.8	0.7	0.5	0.5	0.3	0.2	0.2	0.2	0.1	0.1	#	#
2	3.0	2.4	2.1	1.5	1.1	0.9	0.7	0.7	0.4	0.3	0.3	0.2	0.2	0.1	<0.1	<0.1
5	4.8	3.7	3.0	2.2	1.7	1.5	1.2	1.0	0.7	0.5	0.4	0.3	0.3	0.2	0.1	0.1
10	6.8	5.0	4.2	3.0	2.4	2.1	1.7	1.4	1.0	0.7	0.6	0.5	0.4	0.2	0.2	0.1
30	11	8.7	6.8	5.2	3.9	3.4	2.8	2.4	1.7	1.3	1.1	0.9	0.7	0.4	0.3	0.2
50	14	11	9.3	6.8	5.0	4.2	3.5	3.0	2.2	1.7	1.4	1.1	0.9	0.6	0.4	0.3
100	19	15	12	8.7	6.8	5.8	4.8	4.2	2.9	2.2	1.9	1.6	1.3	0.8	0.5	0.4
150	24	18	15	11	8.1	6.8	5.7	5.0	3.6	2.7	2.3	1.9	1.6	0.9	0.6	0.5
250	>25	22	19	14	11	8.7	7.4	6.2	4.5	3.4	2.8	2.3	2.0	1.2	0.8	0.6
500	*	>25	>25	19	14	12	9.9	8.7	6.2	4.7	3.8	3.1	2.7	1.6	1.1	0.9
750	*	*	*	23	17	15	12	11	7.4	5.5	4.5	3.7	3.2	1.9	1.3	1.0
1,000	*	*	*	>25	20	17	14	12	8.1	6.2	5.2	4.2	3.6	2.2	1.4	1.1
1,500	*	*	*	*	24	20	16	14	9.9	7.4	6.2	5.0	4.3	2.5	1.7	1.3
2,000	*	*	*	*	>25	23	19	16	11	8.7	6.8	5.6	4.8	2.9	1.9	1.5
2,500	*	*	*	*	*	>25	20	18	12	9.3	8.1	6.2	5.3	3.2	2.1	1.6
3,000	*	*	*	*	*	*	23	20	14	9.9	8.7	6.8	5.6	3.4	2.2	1.7
4,000	*	*	*	*	*	*	>25	22	16	11	9.3	7.4	6.2	3.8	2.5	2.0
5,000	*	*	*	*	*	*	*	25	17	13	11	8.7	6.8	4.2	2.7	2.1
7,500	*	*	*	*	*	*	*	>25	20	15	12	9.9	8.7	4.9	3.2	2.5
10,000	*	*	*	*	*	*	*	*	24	17	14	11	9.3	5.5	3.6	2.8
15,000	*	*	*	*	*	*	*	*	>25	20	17	13	11	6.2	4.2	3.2
20,000	*	*	*	*	*	*	*	*	*	23	19	15	12	7.4	4.7	3.7
50,000	*	*	*	*	*	*	*	*	*	>25	>25	21	18	10	6.6	5.0
75,000	*	*	*	*	*	*	*	*	*	*	*	>25	21	12	7.6	5.8
100,000	*	*	*	*	*	*	*	*	*	*	*	*	24	13	8.5	6.4
150,000	*	*	*	*	*	*	*	*	*	*	*	*	>25	15	9.8	7.4
200,000	*	*	*	*	*	*	*	*	*	*	*	*	*	17	11	8.2

* > 25 miles (report distance as 25 miles)

\# <0.1 mile (report distance as 0.1 mile)

Reference Table 9
Distances to Toxic Endpoint for Anhydrous Ammonia Liquefied Under Pressure
F Stability, Wind Speed 1.5 Meters per Second

Release Rate (lbs/min)	Distance to Endpoint (miles)	
	Rural	Urban
1	0.1	<0.1*
2	0.1	0.1
5	0.1	0.1
10	0.2	0.1
15	0.2	0.2
20	0.3	0.2
30	0.3	0.2
40	0.4	0.3
50	0.4	0.3
60	0.5	0.3
70	0.5	0.3
80	0.5	0.4
90	0.6	0.4
100	0.6	0.4
150	0.7	0.5
200	0.8	0.6
250	0.9	0.6
300	1.0	0.7
400	1.2	0.8
500	1.3	0.9
600	1.4	0.9
700	1.5	1.0
750	1.6	1.0
800	1.6	1.1
900	1.7	1.2

*Report distance as 0.1 mile

Release Rate (lbs/min)	Distance to Endpoint (miles)	
	Rural	Urban
1,000	1.8	1.2
1,500	2.2	1.5
2,000	2.6	1.7
2,500	2.9	1.9
3,000	3.1	2.0
4,000	3.6	2.3
5,000	4.0	2.6
6,000	4.4	2.8
7,000	4.7	3.1
7,500	4.9	3.2
8,000	5.1	3.3
9,000	5.4	3.4
10,000	5.6	3.6
15,000	6.9	4.4
20,000	8.0	5.0
25,000	8.9	5.6
30,000	9.7	6.1
40,000	11	7.0
50,000	12	7.8
75,000	15	9.5
100,000	18	10
150,000	22	13
200,000	**	15
250,000	**	17
750,000	**	**

** More than 25 miles (report distance as 25 miles)

Reference Table 11
Distances to Toxic Endpoint for Chlorine
F Stability, Wind Speed 1.5 Meters per Second

Release Rate (lbs/min)	Distance to Endpoint (miles)	
	Rural	Urban
1	0.2	0.1
2	0.3	0.1
5	0.5	0.2
10	0.7	0.3
15	0.8	0.4
20	1.0	0.4
30	1.2	0.5
40	1.4	0.6
50	1.5	0.6
60	1.7	0.7
70	1.8	0.8
80	1.9	0.8
90	2.0	0.9
100	2.2	0.9
150	2.6	1.2
200	3.0	1.3
250	3.4	1.5
300	3.7	1.6
400	4.2	1.9
500	4.7	2.1
600	5.2	2.3
700	5.6	2.5
750	5.8	2.6
800	5.9	2.7
900	6.3	2.9
1,000	6.6	3.0
1,500	8.1	3.8
2,000	9.3	4.4
2,500	10	4.9
3,000	11	5.4
4,000	13	6.2
5,000	14	7.0
6,000	16	7.6
7,000	17	8.3
7,500	18	8.6
8,000	18	8.9
9,000	19	9.4
10,000	20	9.9
15,000	25	12
20,000	*	14
25,000	*	16
30,000	*	18
40,000	*	20
50,000	*	*

* More than 25 miles (report distance as 25 miles)

APPENDIX A

REFERENCES FOR CONSEQUENCE ANALYSIS METHODS

APPENDIX A REFERENCES FOR CONSEQUENCE ANALYSIS METHODS

Exhibit A-1 lists references that may provide useful information for modeling or calculation methods that could be used in the offsite consequence analyses. This exhibit is not intended to be a complete listing of references that may be used in the consequence analysis; any appropriate model or method may be used.

Exhibit A-1
Selected References for Information on Consequence Analysis Methods

Center for Process Safety of the American Institute of Chemical Engineers (AIChE). *Guidelines for Evaluating the Characteristics of Vapor Cloud Explosions, Flash Fires, and BLEVEs*. New York: AIChE, 1994.

Center for Process Safety of the American Institute of Chemical Engineers (AIChE). *Guidelines for Use of Vapor Cloud Dispersion Models*, Second Ed. New York: AIChE, 1996.

Center for Process Safety of the American Institute of Chemical Engineers (AIChE). *International Conference and Workshop on Modeling and Mitigating the Consequences of Accidental Releases of Hazardous Materials*, September 26-29, 1995. New York: AIChE, 1995.

Federal Emergency Management Agency, U.S. Department of Transportation, U.S. Environmental Protection Agency. *Handbook of Chemical Hazard Analysis Procedures*. 1989.

Madsen, Warren W. and Robert C. Wagner. "An Accurate Methodology for Modeling the Characteristics of Explosion Effects." *Process Safety Progress*, 13 (July 1994), 171-175.

Mercx, W.P.M., D.M. Johnson, and J. Puttock. "Validation of Scaling Techniques for Experimental Vapor Cloud Explosion Investigations." *Process Safety Progress*, 14 (April 1995), 120.

Mercx, W.P.M., R.M.M. van Wees, and G. Opschoor. "Current Research at TNO on Vapor Cloud Explosion Modelling." *Process Safety Progress*, 12 (October 1993), 222.

Prugh, Richard W. "Quantitative Evaluation of Fireball Hazards." *Process Safety Progress*, 13 (April 1994), 83-91.

Scheuermann, Klaus P. "Studies About the Influence of Turbulence on the Course of Explosions." *Process Safety Progress*, 13 (October 1994), 219.

TNO Bureau for Industrial Safety, Netherlands Organization for Applied Scientific Research. *Methods for the Calculation of the Physical Effects*. The Hague, the Netherlands: Committee for the Prevention of Disasters, 1997.

TNO Bureau for Industrial Safety, Netherlands Organization for Applied Scientific Research. *Methods for the Calculation of the Physical Effects of the Escape of Dangerous Material (Liquids and Gases)*. Voorburg, the Netherlands: TNO (Commissioned by Directorate-General of Labour), 1980.

TNO Bureau for Industrial Safety, Netherlands Organization for Applied Scientific Research. *Methods for the Calculation of the Physical Effects Resulting from Releases of Hazardous Materials*. Rijswijk, the Netherlands: TNO (Commissioned by Directorate-General of Labour), 1992.

TNO Bureau for Industrial Safety, Netherlands Organization for Applied Scientific Research. *Methods for the Determination of Possible Damage to People and Objects Resulting from Releases of*

Hazardous Materials. Rijswijk, the Netherlands: TNO (Commissioned by Directorate-General of Labour), 1992.

Touma, Jawad S., et al. "Performance Evaluation of Dense Gas Dispersion Models." *Journal of Applied Meteorology*, 34 (March 1995), 603-615.

U.S. Environmental Protection Agency, Federal Emergency Management Agency, U.S. Department of Transportation. *Technical Guidance for Hazards Analysis, Emergency Planning for Extremely Hazardous Substances*. December 1987.

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. *Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants*. EPA-450/4-88-009. September 1988.

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. *Guidance on the Application of Refined Dispersion Models for Hazardous/Toxic Air Release*. EPA-454/R-93-002. May 1993.

U.S. Environmental Protection Agency, Office of Pollution Prevention and Toxic Substances. *Flammable Gases and Liquids and Their Hazards*. EPA 744-R-94-002. February 1994.

APPENDIX B

TOXIC SUBSTANCES

APPENDIX B TOXIC SUBSTANCES

B.1 Data for Toxic Substances

The exhibits in this section of Appendix B provide the data needed to carry out the calculations for regulated toxic substances using the methods presented in the text of this guidance. Exhibit B-1 presents data for toxic gases, Exhibit B-2 presents data for toxic liquids, and Exhibit B-3 presents data for several toxic substances commonly found in water solution and for oleum. Exhibit B-4 provides temperature correction factors that can be used to correct the release rates estimated for pool evaporation of toxic liquids that are released at temperatures between 25 °C to 50 °C.

The derivation of the factors presented in Exhibits B-1 - B-4 is discussed in Appendix D. The data used to develop the factors in Exhibits B-1 and B-2 are primarily from Design Institute for Physical Property Data (DIPPR), American Institute of Chemical Engineers, *Physical and Thermodynamic Properties of Pure Chemicals, Data Compilation*. Other sources, including the National Library of Medicine's Hazardous Substances Databank (HSDB) and the *Kirk-Othmer Encyclopedia of Chemical Technology,* were used for Exhibits B-1 and B-2 if data were not available from the DIPPR compilation. The factors in Exhibit B-3 were developed using data primarily from *Perry's Chemical Engineers' Handbook* and the *Kirk-Othmer Encyclopedia of Chemical Technology*. The temperature correction factors in Exhibit B-4 were developed using vapor pressure data derived from the vapor pressure coefficients in the DIPPR compilation.

Exhibit B-1
Data for Toxic Gases

CAS Number	Chemical Name	Molecular Weight	Ratio of Specific Heats	Toxic Endpoint[a]			Liquid Factor Boiling (LFB)	Density Factor (DF) (Boiling)	Gas Factor (GF)[k]	Vapor Pressure @25 °C (psia)	Reference Table[b]
				mg/L	ppm	Basis					
7664-41-7	Ammonia (anhydrous)[c]	17.03	1.31	0.14	200	ERPG-2	0.073	0.71	14	145	Buoyant[d]
7784-42-1	Arsine	77.95	1.28	0.0019	0.6	EHS-LOC (IDLH)	0.23	0.30	30	239	Dense
10294-34-5	Boron trichloride	117.17	1.15	0.010	2	EHS-LOC (Tox[e])	0.22	0.36	36	22.7	Dense
7637-07-2	Boron trifluoride	67.81	1.20	0.028	10	EHS-LOC (IDLH)	0.25	0.31	28	f	Dense
7782-50-5	Chlorine	70.91	1.32	0.0087	3	ERPG-2	0.19	0.31	29	113	Dense
10049-04-4	Chlorine dioxide	67.45	1.25	0.0028	1	EHS-LOC equivalent (IDLH)[g]	0.15	0.30	28	24.3	Dense
506-77-4	Cyanogen chloride	61.47	1.22	0.030	12	EHS-LOC equivalent (Tox)[h]	0.14	0.41	26	23.7	Dense
19287-45-7	Diborane	27.67	1.17	0.0011	1	ERPG-2	0.13	1.13	17	f	Buoyant[d]
75-21-8	Ethylene oxide	44.05	1.21	0.090	50	ERPG-2	0.12	0.55	22	25.4	Dense
7782-41-4	Fluorine	38.00	1.36	0.0039	2.5	EHS-LOC (IDLH)	0.35	0.32	22	f	Dense
50-00-0	Formaldehyde (anhydrous)[c]	30.03	1.31	0.012	10	ERPG-2	0.10	0.59	19	75.2	Dense
74-90-8	Hydrocyanic acid	27.03	1.30	0.011	10	ERPG-2	0.079	0.72	18	14.8	Buoyant[d]
7647-01-0	Hydrogen chloride (anhydrous)[c]	36.46	1.40	0.030	20	ERPG-2	0.15	0.41	21	684	Dense
7664-39-3	Hydrogen fluoride (anhydrous)[c]	20.01	1.40	0.016	20	ERPG-2	0.066	0.51	16	17.7	Buoyant[i]
7783-07-5	Hydrogen selenide	80.98	1.32	0.00066	0.2	EHS-LOC (IDLH)	0.21	0.25	31	151	Dense
7783-06-4	Hydrogen sulfide	34.08	1.32	0.042	30	ERPG-2	0.13	0.51	20	302	Dense
74-87-3	Methyl chloride	50.49	1.26	0.82	400	ERPG-2	0.14	0.48	24	83.2	Dense
74-93-1	Methyl mercaptan	48.11	1.20	0.049	25	ERPG-2	0.12	0.55	23	29.2	Dense
10102-43-9	Nitric oxide	30.01	1.38	0.031	25	EHS-LOC (TLV[j])	0.21	0.38	19	f	Dense
75-44-5	Phosgene	98.92	1.17	0.00081	0.2	ERPG-2	0.20	0.35	33	27.4	Dense

Exhibit B-1 (continued)

CAS Number	Chemical Name	Molecular Weight	Ratio of Specific Heats	Toxic Endpoint[a]			Liquid Factor Boiling (LFB)	Density Factor (DF) (Boiling)	Gas Factor (GF)[k]	Vapor Pressure @25 °C (psia)	Reference Table[b]
				mg/L	ppm	Basis					
7803-51-2	Phosphine	34.00	1.29	0.0035	2.5	ERPG-2	0.15	0.66	20	567	Dense
7446-09-5	Sulfur dioxide (anhydrous)	64.07	1.26	0.0078	3	ERPG-2	0.16	0.33	27	58.0	Dense
7783-60-0	Sulfur tetrafluoride	108.06	1.30	0.0092	2	EHS-LOC (Tox[c])	0.25	0.25 (at -73 °C)	36	293	Dense

Notes:

[a] Toxic endpoints are specified in Appendix A to 40 CFR part 68 in units of mg/L. To convert from units of mg/L to mg/m^3, multiply by 1,000. To convert mg/L to ppm, use the following equation:

$$Endpoint_{ppm} = \frac{Endpoint_{mg/L} \times 1{,}000 \times 24.5}{Molecular\ Weight}$$

[b] "Buoyant" in the Reference Table column refers to the tables for neutrally buoyant gases and vapors; "Dense" refers to the tables for dense gases and vapors. See Appendix D, Section D.4.4, for more information on the choice of reference tables.
[c] See Exhibit B-3 of this appendix for data on water solutions.
[d] Gases that are lighter than air may behave as dense gases upon release if liquefied under pressure or cold; consider the conditions of release when choosing the appropriate table.
[e] LOC is based on the IDLH-equivalent level estimated from toxicity data.
[f] Cannot be liquefied at 25 °C.
[g] Not an EHS; LOC-equivalent value was estimated from one-tenth of the IDLH.
[h] Not an EHS; LOC-equivalent value was estimated from one-tenth of the IDLH-equivalent level estimated from toxicity data.
[i] Hydrogen fluoride is lighter than air, but may behave as a dense gas upon release under some circumstances (e.g., release under pressure, high concentration in the released cloud) because of hydrogen bonding; consider the conditions of release when choosing the appropriate table.
[j] LOC based on Threshold Limit Value (TLV) - Time-weighted average (TWA) developed by the American Conference of Governmental Industrial Hygienists (ACGIH).
[k] Use GF for gas leaks under choked (maximum) flow conditions.

Exhibit B-2
Data for Toxic Liquids

CAS Number	Chemical Name	Molecular Weight	Vapor Pressure at 25 °C (mm Hg)	Toxic Endpoint[a]			Liquid Factors		Density Factor (DF)	Liquid Leak Factor (LLF)[l]	Reference Table[b]	
				mg/L	ppm	Basis	Ambient (LFA)	Boiling (LFB)			Worst Case	Alternative Case
107-02-8	Acrolein	56.06	274	0.0011	0.5	ERPG-2	0.047	0.12	0.58	40	Dense	Dense
107-13-1	Acrylonitrile	53.06	108	0.076	35	ERPG-2	0.018	0.11	0.61	39	Dense	Dense
814-68-6	Acrylyl chloride	90.51	110	0.00090	0.2	EHS-LOC (Tox[c])	0.026	0.15	0.44	54	Dense	Dense
107-18-6	Allyl alcohol	58.08	26.1	0.036	15	EHS-LOC (IDLH)	0.0046	0.11	0.58	41	Dense	Buoyant[d]
107-11-9	Allylamine	57.10	242	0.0032	1	EHS-LOC (Tox[c])	0.042	0.12	0.64	36	Dense	Dense
7784-34-1	Arsenous trichloride	181.28	10	0.01	1	EHS-LOC (Tox[c])	0.0037	0.21	0.23	100	Dense	Buoyant[d]
353-42-4	Boron trifluoride compound with methyl ether (1:1)	113.89	11	0.023	5	EHS-LOC (Tox[c])	0.0030	0.16	0.49	48	Dense	Buoyant[d]
7726-95-6	Bromine	159.81	212	0.0065	1	ERPG-2	0.073	0.23	0.16	150	Dense	Dense
75-15-0	Carbon disulfide	76.14	359	0.16	50	ERPG-2	0.075	0.15	0.39	60	Dense	Dense
67-66-3	Chloroform	119.38	196	0.49	100	EHS-LOC (IDLH)	0.055	0.19	0.33	71	Dense	Dense
542-88-1	Chloromethyl ether	114.96	29.4	0.00025	0.05	EHS-LOC (Tox[c])	0.0080	0.17	0.37	63	Dense	Dense
107-30-2	Chloromethyl methyl ether	80.51	199	0.0018	0.6	EHS-LOC (Tox[c])	0.043	0.15	0.46	51	Dense	Dense
4170-30-3	Crotonaldehyde	70.09	33.1	0.029	10	ERPG-2	0.0066	0.12	0.58	41	Dense	Buoyant[d]
123-73-9	Crotonaldehyde, (E)-	70.09	33.1	0.029	10	ERPG-2	0.0066	0.12	0.58	41	Dense	Buoyant[d]
108-91-8	Cyclohexylamine	99.18	10.1	0.16	39	EHS-LOC (Tox[c])	0.0025	0.14	0.56	41	Dense	Buoyant[d]
75-78-5	Dimethyldichlorosilane	129.06	141	0.026	5	ERPG-2	0.042	0.20	0.46	51	Dense	Dense
57-14-7	1,1-Dimethylhydrazine	60.10	157	0.012	5	EHS-LOC (IDLH)	0.028	0.12	0.62	38	Dense	Dense
106-89-8	Epichlorohydrin	92.53	17.0	0.076	20	ERPG-2	0.0040	0.14	0.42	57	Dense	Buoyant[d]
107-15-3	Ethylenediamine	60.10	12.2	0.49	200	EHS-LOC (IDLH)	0.0022	0.13	0.54	43	Dense	Buoyant[d]
151-56-4	Ethyleneimine	43.07	211	0.018	10	EHS-LOC (IDLH)	0.030	0.10	0.58	40	Dense	Dense
110-00-9	Furan	68.08	600	0.0012	0.4	EHS-LOC (Tox[c])	0.12	0.14	0.52	45	Dense	Dense
302-01-2	Hydrazine	32.05	14.4	0.011	8	EHS-LOC (IDLH)	0.0017	0.069	0.48	48	Buoyant[d]	Buoyant[d]

Exhibit B-2 (continued)

CAS Number	Chemical Name	Molecular Weight	Vapor Pressure at 25 °C (mm Hg)	Toxic Endpoint[a]			Liquid Factors		Density Factor (DF)	Liquid Leak Factor (LLF)[f]	Reference Table[b]	
				mg/L	ppm	Basis	Ambient (LFA)	Boiling (LFB)			Worst Case	Alternative Case
13463-40-6	Iron, pentacarbonyl-	195.90	40	0.00044	0.05	EHS-LOC (Tox[c])	0.016	0.24	0.33	70	Dense	Dense
78-82-0	Isobutyronitrile	69.11	32.7	0.14	50	ERPG-2	0.0064	0.12	0.63	37	Dense	Buoyant[d]
108-23-6	Isopropyl chloroformate	122.55	28	0.10	20	EHS-LOC (Tox[c])	0.0080	0.17	0.45	52	Dense	Dense
126-98-7	Methacrylonitrile	67.09	71.2	0.0027	1	EHS-LOC (TLV[e])	0.014	0.12	0.61	38	Dense	Dense
79-22-1	Methyl chloroformate	94.50	108	0.0019	0.5	EHS-LOC (Tox[c])	0.026	0.16	0.40	58	Dense	Dense
60-34-4	Methyl hydrazine	46.07	49.6	0.0094	5	EHS-LOC (IDLH)	0.0074	0.094	0.56	42	Dense	Buoyant[d]
624-83-9	Methyl isocyanate	57.05	457	0.0012	0.5	ERPG-2	0.079	0.13	0.52	45	Dense	Dense
556-64-9	Methyl thiocyanate	73.12	10	0.085	29	EHS-LOC (Tox[c])	0.0020	0.11	0.45	51	Dense	Buoyant[d]
75-79-6	Methyltrichlorosilane	149.48	173	0.018	3	ERPG-2	0.057	0.22	0.38	61	Dense	Dense
13463-39-3	Nickel carbonyl	170.73	400	0.00067	0.1	EHS-LOC (Tox[c])	0.14	0.26	0.37	63	Dense	Dense
7697-37-2	Nitric acid (100%)[f]	63.01	63.0	0.026	10	EHS-LOC (Tox[c])	0.012	0.12	0.32	73	Dense	Dense
79-21-0	Peracetic acid	76.05	13.9	0.0045	1.5	EHS-LOC (Tox[c])	0.0029	0.12	0.40	58	Dense	Buoyant[d]
594-42-3	Perchloromethylmercaptan	185.87	6	0.0076	1	EHS-LOC (IDLH)	0.0023	0.20	0.29	81	Dense	Buoyant[d]
10025-87-3	Phosphorus oxychloride	153.33	35.8	0.0030	0.5	EHS-LOC (Tox[c])	0.012	0.20	0.29	80	Dense	Dense
7719-12-2	Phosphorus trichloride	137.33	120	0.028	5	EHS-LOC (IDLH)	0.037	0.20	0.31	75	Dense	Dense
110-89-4	Piperidine	85.15	32.1	0.022	6	EHS-LOC (Tox[c])	0.0072	0.13	0.57	41	Dense	Buoyant[d]
107-12-0	Propionitrile	55.08	47.3	0.0037	1.6	EHS-LOC (Tox[c])	0.0080	0.10	0.63	37	Dense	Buoyant[d]
109-61-5	Propyl chloroformate	122.56	20.0	0.010	2	EHS-LOC (Tox[c])	0.0058	0.17	0.45	52	Dense	Buoyant[d]
75-55-8	Propyleneimine	57.10	187	0.12	50	EHS-LOC (IDLH)	0.032	0.12	0.61	39	Dense	Dense
75-56-9	Propylene oxide	58.08	533	0.59	250	ERPG-2	0.093	0.13	0.59	40	Dense	Dense
7446-11-9	Sulfur trioxide	80.06	263	0.010	3	ERPG-2	0.057	0.15	0.26	91	Dense	Dense
75-74-1	Tetramethyllead	267.33	22.5	0.0040	0.4	EHS-LOC (IDLH)	0.011	0.29	0.24	96	Dense	Dense
509-14-8	Tetranitromethane	196.04	11.4	0.0040	0.5	EHS-LOC (IDLH)	0.0045	0.22	0.30	78	Dense	Buoyant[d]

Exhibit B-2 (continued)

CAS Number	Chemical Name	Molecular Weight	Vapor Pressure at 25 °C (mm Hg)	Toxic Endpoint[a]			Liquid Factors		Density Factor (DF)	Liquid Leak Factor (LLF)[i]	Reference Table[b]	
				mg/L	ppm	Basis	Ambient (LFA)	Boiling (LFB)			Worst Case	Alternative Case
7550-45-0	Titanium tetrachloride	189.69	12.4	0.020	2.6	ERPG-2	0.0048	0.21	0.28	82	Dense	Buoyant[d]
584-84-9	Toluene 2,4-diisocyanate	174.16	0.017	0.0070	1	EHS-LOC (IDLH)	0.000006	0.16	0.40	59	Buoyant[d]	Buoyant[d]
91-08-7	Toluene 2,6-diisocyanate	174.16	0.05	0.0070	1	EHS-LOC (IDLH[g])	0.000018	0.16	0.40	59	Buoyant[d]	Buoyant[d]
26471-62-5	Toluene diisocyanate (unspecified isomer)	174.16	0.017	0.0070	1	EHS-LOC equivalent (IDLH[h])	0.000006	0.16	0.40	59	Buoyant[d]	Buoyant[d]
75-77-4	Trimethylchlorosilane	108.64	231	0.050	11	EHS-LOC (Tox[c])	0.061	0.18	0.57	41	Dense	Dense
108-05-4	Vinyl acetate monomer	86.09	113	0.26	75	ERPG-2	0.026	0.15	0.53	45	Dense	Dense

Notes:

[a] Toxic endpoints are specified in the Appendix A to 40 CFR part 68 in units of mg/L. To convert from units of mg/L to mg/m^3, multiply by 1,000. To convert mg/L to ppm, use the following equation:

$$Endpoint_{ppm} = \frac{Endpoint_{mg/L} \times 1{,}000 \times 24.5}{Molecular\ Weight}$$

[b] "Buoyant" in the Reference Table column refers to the tables for neutrally buoyant gases and vapors; "Dense" refers to the tables for dense gases and vapors. See Appendix D, Section D.4.4, for more information on the choice of reference tables.

[c] LOC is based on IDLH-equivalent level estimated from toxicity data.

[d] Use dense gas table if substance is at an elevated temperature.

[e] LOC based on Threshold Limit Value (TLV) - Time-weighted average (TWA) developed by the American Conference of Governmental Industrial Hygienists (ACGIH).

[f] See Exhibit B-3 of this appendix for data on water solutions.

[g] LOC for this isomer is based on IDLH for toluene 2,4-diisocyanate.

[h] Not an EHS; LOC-equivalent value is based on IDLH for toluene 2,4-diisocyanate.

[i] Use the LLF only for leaks from tanks at atmospheric pressure.

APPENDIX B

Calculation Tables Showing the Distances to the IDLH and 1/10 the IDLH for Anhydrous Ammonia and Chlorine

Calculated Release Rates Using a Disperson Factor for the IDLH and 1/10 the IDLH for Release of Anbydrous Ammonia

TEP (X_1) (mg/L)	0.14
IDLH (X_2) (mg/L)	0.21
1/10 IDLH (X_3) (mg/L)	0.02

Distance (D) (miles)[1]	Release Rate for TEP (Q_1) (lbs/min)[1]	Dispersion Factor (X_1/Q_1) [(mg/L)/(lbs/min)]	Release Rate for IDLH (Q_2) $Q_2 = X_2/(X_1/Q_1)$ (lbs/min)	Release Rate for 1/10 IDLH (Q_3) $Q_3 = X_3/(X_1/Q_1)$ (lbs/min)
0.1	1	0.1390	1.5	0.2
0.1	2	0.0695	3.0	0.3
0.1	5	0.0278	7.5	0.8
0.2	10	0.0139	15	1.5
0.2	15	0.0093	23	2.3
0.3	20	0.0070	30	3.0
0.3	30	0.0046	45	4.5
0.4	40	0.0035	60	6.0
0.4	50	0.0028	75	7.5
0.5	60	0.0023	90	9.0
0.5	70	0.0020	105	11
0.5	80	0.0017	120	12
0.6	90	0.0015	135	14
0.6	100	0.0014	150	15
0.7	150	0.0009	225	23
0.8	200	0.0007	300	30
0.9	250	0.0006	375	38
1.0	300	0.0005	450	45
1.2	400	0.0003	600	60
1.3	500	0.0003	750	75
1.4	600	0.0002	900	90
1.5	700	0.0002	1050	105
1.6	750	0.0002	1125	113
1.6	800	0.0002	1200	120
1.7	900	0.0002	1350	135
1.8	1000	0.0001	1500	150
2.2	1500	0.0001	2250	225
2.6	2000	0.0001	3000	300
2.9	2500	0.0001	3750	375
3.1	3000	0.00005	4500	450
3.6	4000	0.00003	6000	600
4.0	5000	0.00003	7500	750
4.4	6000	0.00002	9000	900
4.7	7000	0.00002	10500	1050
4.9	7500	0.00002	11250	1125
5.1	8000	0.00002	12000	1200
5.4	9000	0.00002	13500	1350
5.6	10000	0.00001	15000	1500
6.9	15000	0.00001	22500	2250
8.0	20000	0.00001	30000	3000
8.9	25000	0.00001	37500	3750
9.7	30000	0.000005	45000	4500
11	40000	0.000003	60000	6000
12	50000	0.000003	75000	7500
15	75000	0.000002	112500	11250
18	100000	0.000001	150000	15000
22	150000	0.000001	225000	22500

Notes:

[1] Distance and Release Rate for TEP obtained from Reference Table 9, USEPA 1999.

Reference:

USEPA. 1999. *Risk Management Program Guidance for Offsite Consequence Analysis*. Office of Solid Waste and Emergency Response. EPA 550-B-99-009. April 1999.

Calculated Release Rates Using a Disperson Factor for the IDLH and 1/10 the IDLH for Release of Chlorine

TEP (X_1) (mg/L)	0.009
IDLH (X_2) (mg/L)	0.029
1/10 IDLH (X_3) (mg/L)	0.003

Distance (D) (miles)[1]	Release Rate for TEP (Q_1) (lbs/min)[1]	Dispersion Factor (X_1/Q_1) [(mg/L)/(lbs/min)]	Release Rate for IDLH (Q_2) $Q_2 = X_2/(X_1/Q_1)$ (lbs/min)	Release Rate for 1/10 IDLH (Q_2) $Q_3 = X_3/(X_1/Q_1)$ (lbs/min)
0.2	1	0.00868	3.3	0.3
0.3	2	0.00434	6.7	0.7
0.5	5	0.00174	17	1.7
0.7	10	0.00087	33	3.3
0.8	15	0.00058	50	5.0
1.0	20	0.00043	67	6.7
1.2	30	0.00029	100	10
1.4	40	0.00022	133	13
1.5	50	0.00017	167	17
1.7	60	0.00014	200	20
1.8	70	0.00012	233	23
1.9	80	0.00011	267	27
2.0	90	0.00010	300	30
2.2	100	0.00009	333	33
2.6	150	0.00006	500	50
3.0	200	0.00004	667	67
3.4	250	0.00003	833	83
3.7	300	0.00003	1000	100
4.2	400	0.00002	1333	133
4.7	500	0.00002	1667	167
5.2	600	0.00001	2000	200
5.6	700	0.00001	2333	233

Notes:

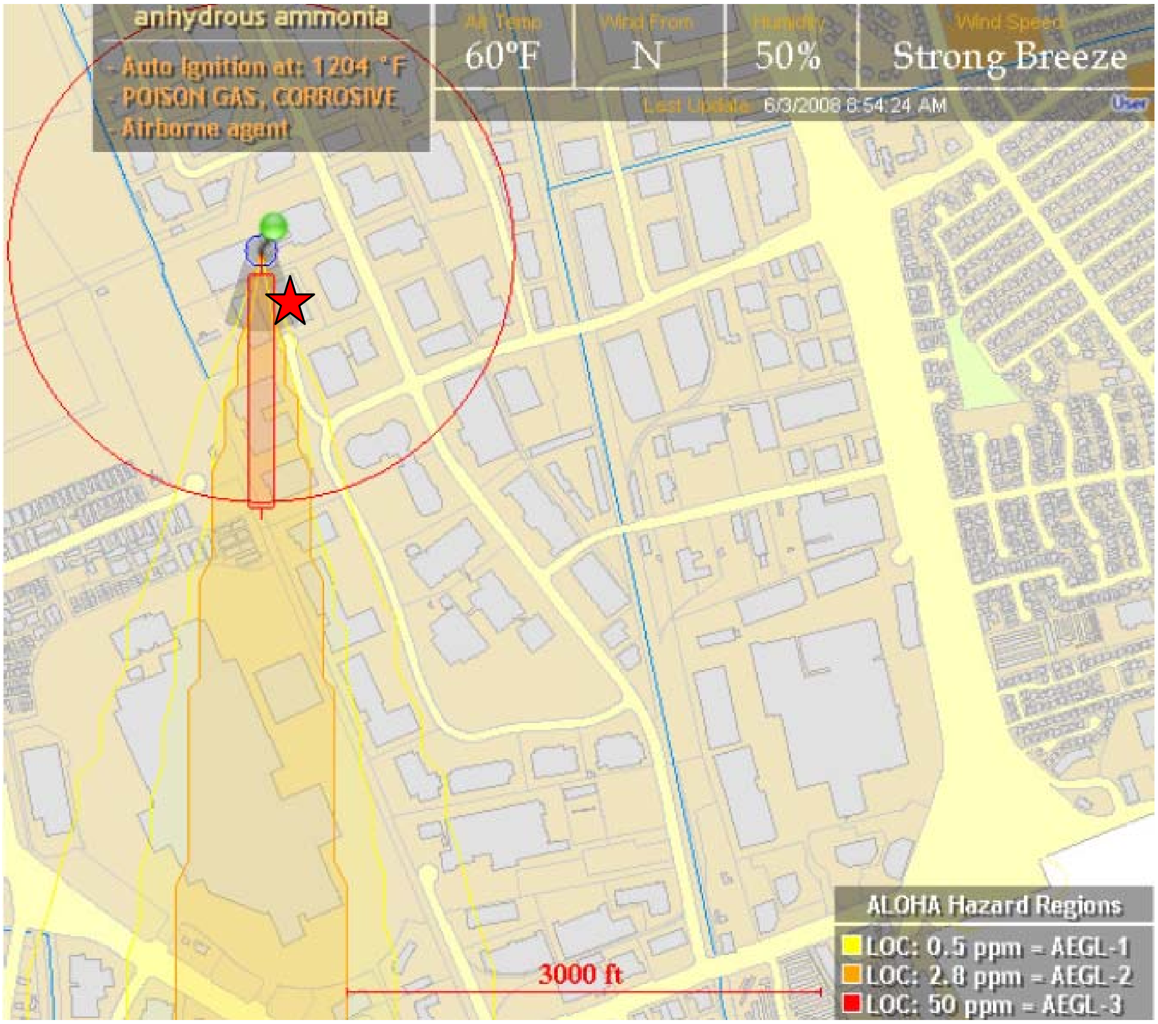
[1] Distance and Release Rate for TEP obtained from Reference Table 11, USEPA 1999.

Reference:

USEPA. 1999. *Risk Management Program Guidance for Offsite Consequence Analysis* . Office of Solid Waste and Emergency Response. EPA 550-B-99-009. April 1999.

FIGURE 1

100% ANHYDROUS AMMONIA IN 500 LBS
GAS PLUM AS PREDICTED BY *ALOHA MODEL
Magic Technologies, 463 S. Milpitas Blvd.
(0.3 miles from proposed project site)



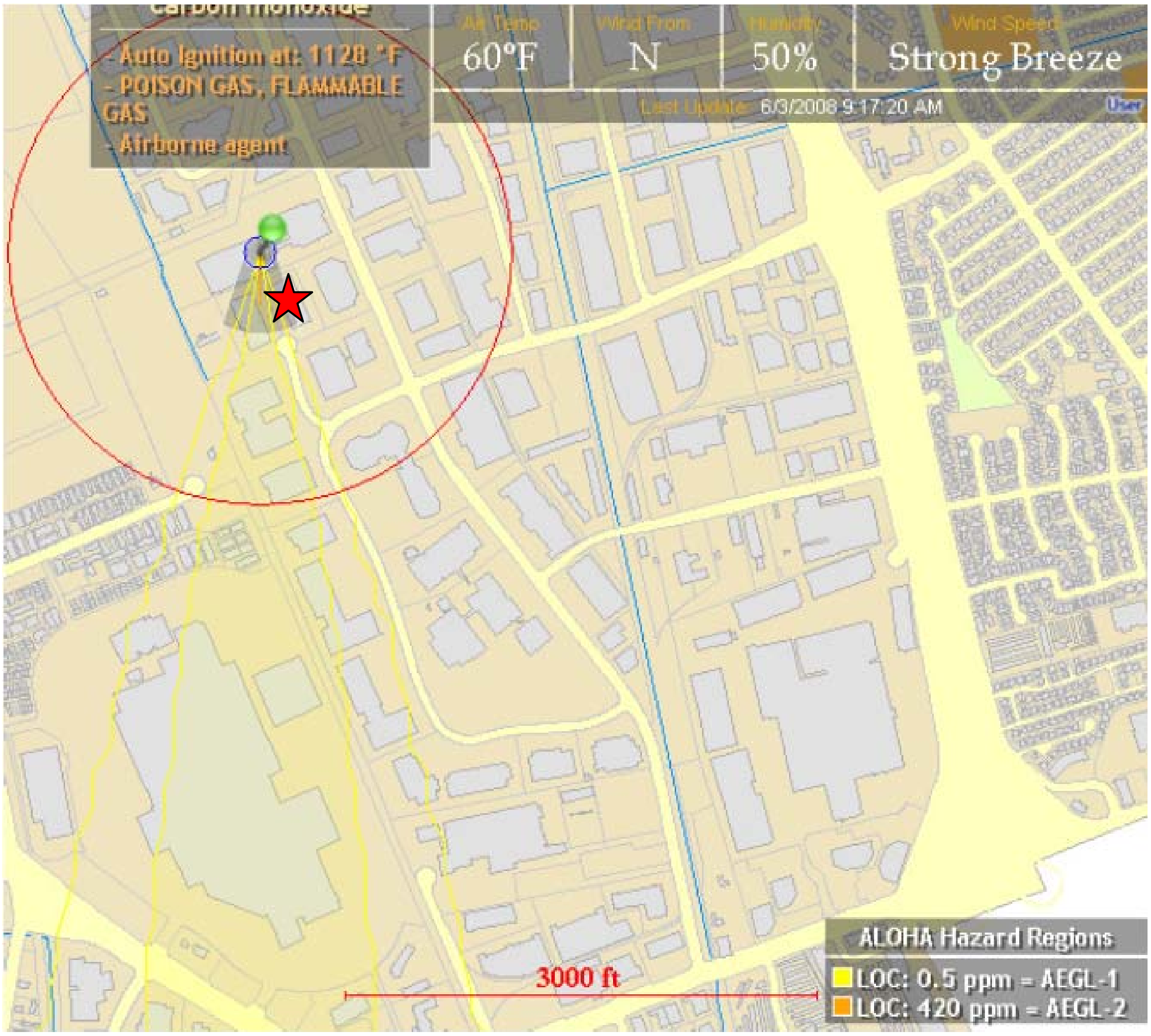
LEGEND

Facility using Hazardous Materials
Proposed location for Crosspoint Church
AEGL - 1
AGEL - 2
AGEL - 3

* ALOHA: Areal Location of Hazardous Atmospheres. Uses information provided by First Response along with physical property data to predict how a hazardous gas cloud might disperse in the atmosphere after a chemical release. ALOHA identifies the area of concern relative to the point of release where the chemical concentration is then graphically displayed on a street map.
* AGEL : Acute Exposure Guideline Levels *(See figure 9 for description of each level)*

FIGURE 2

100% CARBON MONOXIDE IN NE LBS
GAS PLUM AS PREDICTED BY ALOHA MODEL
Magic Technologies, 463 S. Milpitas Blvd.
(0.3 miles from proposed project site)



LEGEND

Facility using Hazardous Materials

Proposed location for Crosspoint Church

AEGL - 1

AGEL - 2

* ALOHA: Areal Location of Hazardous Atmospheres. Uses information provided by First Response along with physical property data to predict how a hazardous gas cloud might disperse in the atmosphere after a chemical release. ALOHA identifies the area of concern relative to the point of release where the chemical concentration is then graphically displayed on a street map.

* AGEL : Acute Exposure Guideline Levels *(See figure 9 for description of each level)*

FIGURE 3

100% CHLORINE IN 100 LBS
GAS PLUM AS PREDICTED BY ALOHA MODEL
Magic Technologies, 463 S. Milpitas Blvd.
(0.3 miles from proposed project site)

LEGEND

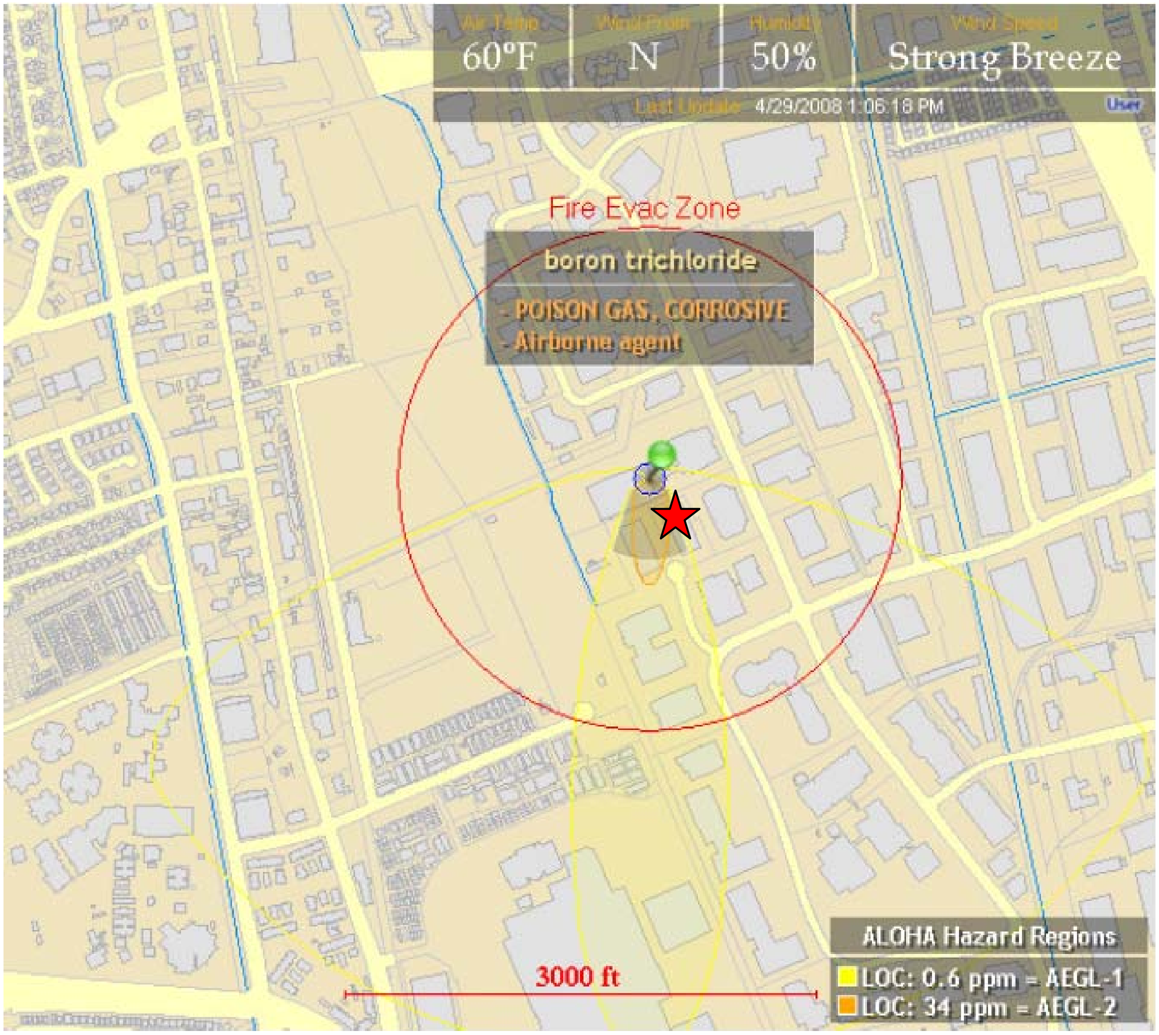
Facility using Hazardous Materials
Proposed location for Crosspoint Church

AEGL - 1
AGEL - 2
AGEL - 3

* ALOHA: Areal Location of Hazardous Atmospheres. Uses information provided by First Response along with physical property data to predict how a hazardous gas cloud might disperse in the atmosphere after a chemical release. ALOHA identifies the area of concern relative to the point of release where the chemical concentration is then graphically displayed on a street map.
* AGEL : Acute Exposure Guideline Levels *(See figure 9 for description of each level)*

FIGURE 4

100% BORON TRICHLORIDE IN 500 LBS
GAS PLUM AS PREDICTED BY ALOHA MODEL
Magic Technologies, 463 S. Milpitas Blvd.
(0.3 miles from proposed project site)



LEGEND

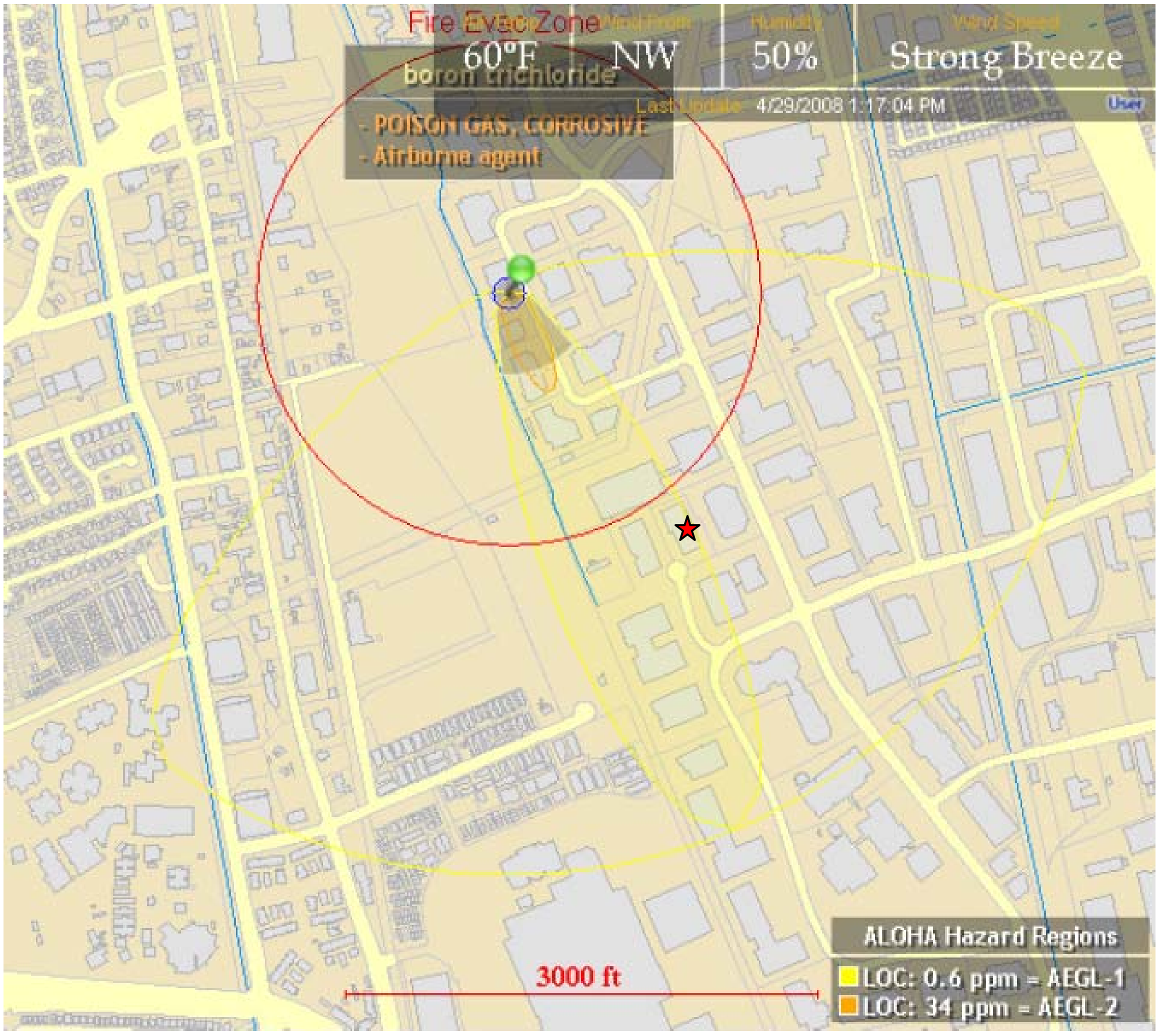
Facility using Hazardous Materials
Proposed location for Crosspoint Church

AEGL - 1
AGEL - 2

* ALOHA: Areal Location of Hazardous Atmospheres. Uses information provided by First Response along with physical property data to predict how a hazardous gas cloud might disperse in the atmosphere after a chemical release. ALOHA identifies the area of concern relative to the point of release where the chemical concentration is then graphically displayed on a street map.
* AGEL : Acute Exposure Guideline Levels *(See figure 9 for description of each level)*

FIGURE 5

100% BORON TRICHLORIDE IN 500 LBS
GAS PLUM AS PREDICTED BY ALOHA MODEL
Nanogram Corporation, 165 Topaz St.
(0.5 miles from proposed project site)



LEGEND

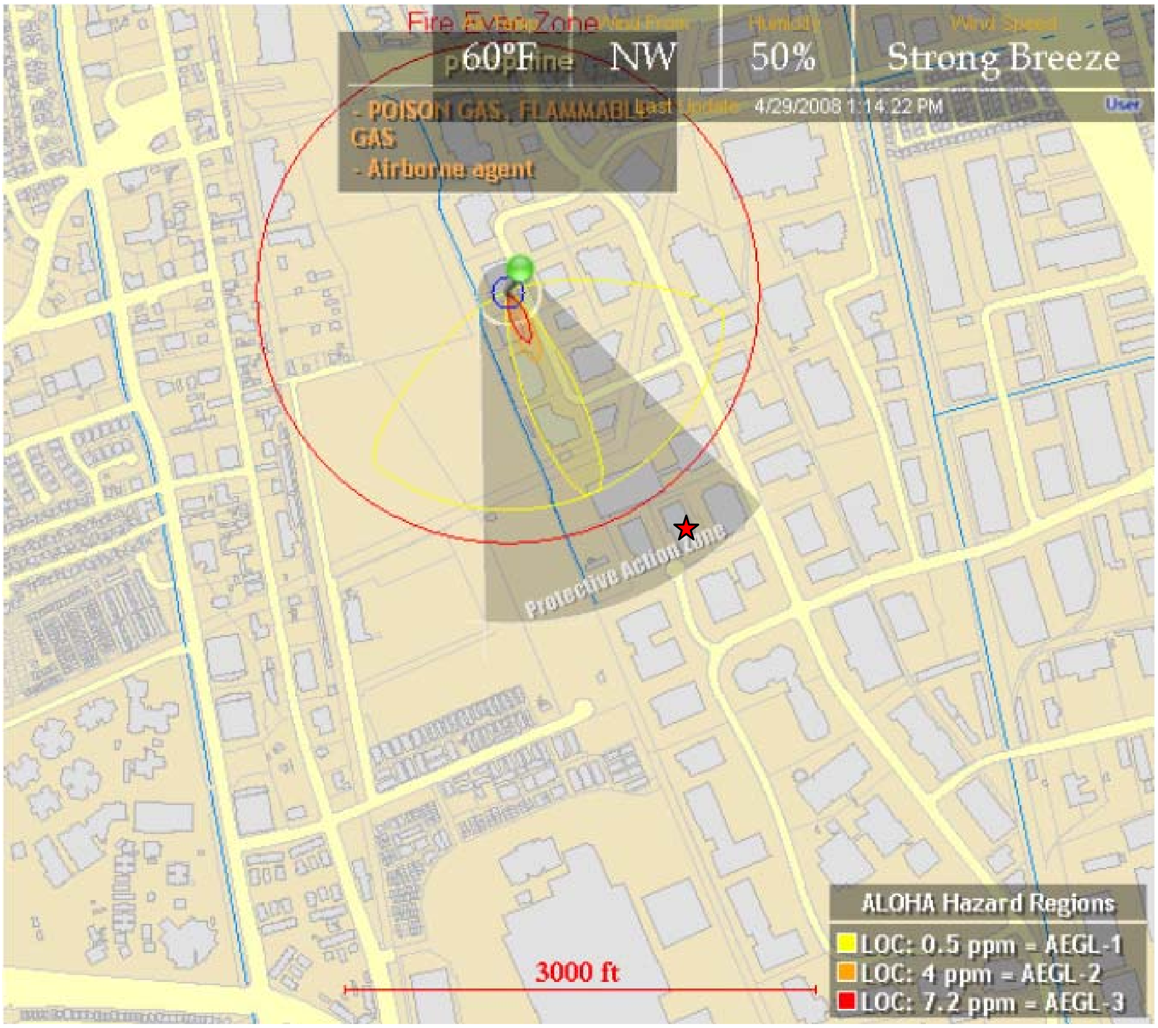
Facility using Hazardous Materials
Proposed location for Crosspoint Church

AEGL - 1
AGEL - 2

* ALOHA: Areal Location of Hazardous Atmospheres. Uses information provided by First Response along with physical property data to predict how a hazardous gas cloud might disperse in the atmosphere after a chemical release. ALOHA identifies the area of concern relative to the point of release where the chemical concentration is then graphically displayed on a street map.
* AGEL : Acute Exposure Guideline Levels *(See figure 9 for description of each level)*

FIGURE 6

100% PHOSPHINE IN 500 LBS
GAS PLUM AS PREDICTED BY ALOHA MODEL
Nanogram Corporation, 165 Topaz St.
(0.5 miles from proposed project site)



LEGEND

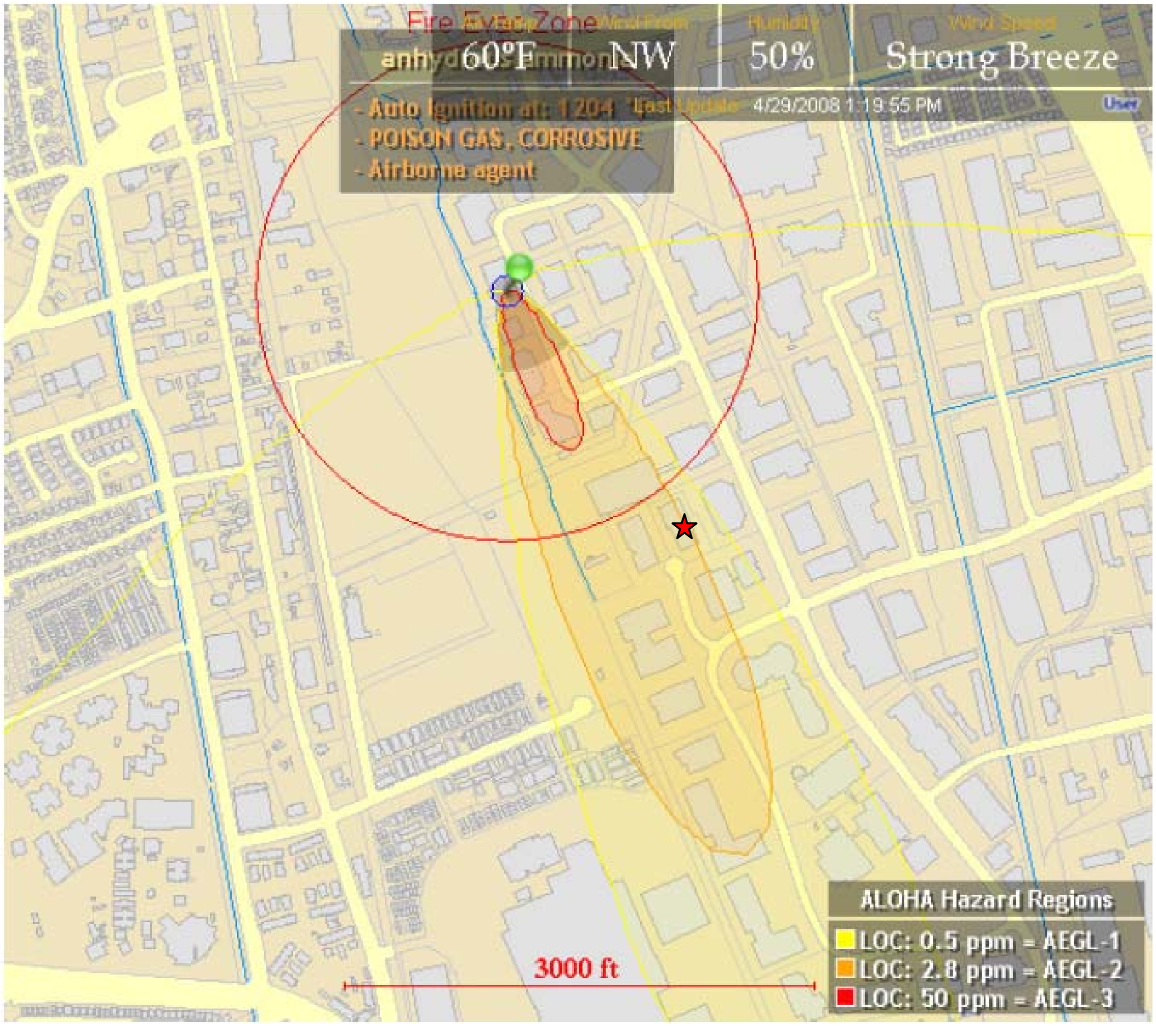
Facility using Hazardous Materials
Proposed location for Crosspoint Church

AEGL - 1
AGEL - 2
AGEL - 3

* ALOHA: Areal Location of Hazardous Atmospheres. Uses information provided by First Response along with physical property data to predict how a hazardous gas cloud might disperse in the atmosphere after a chemical release. ALOHA identifies the area of concern relative to the point of release where the chemical concentration is then graphically displayed on a street map.
* AGEL : Acute Exposure Guideline Levels *(See figure 9 for description of each level)*

FIGURE 7

100% ANHYDROUS AMMONIA IN 500 LBS
GAS PLUM AS PREDICTED BY ALOHA MODEL
Nanogram Corporation, 165 Topaz St.
(0.5 miles from proposed project site)



LEGEND

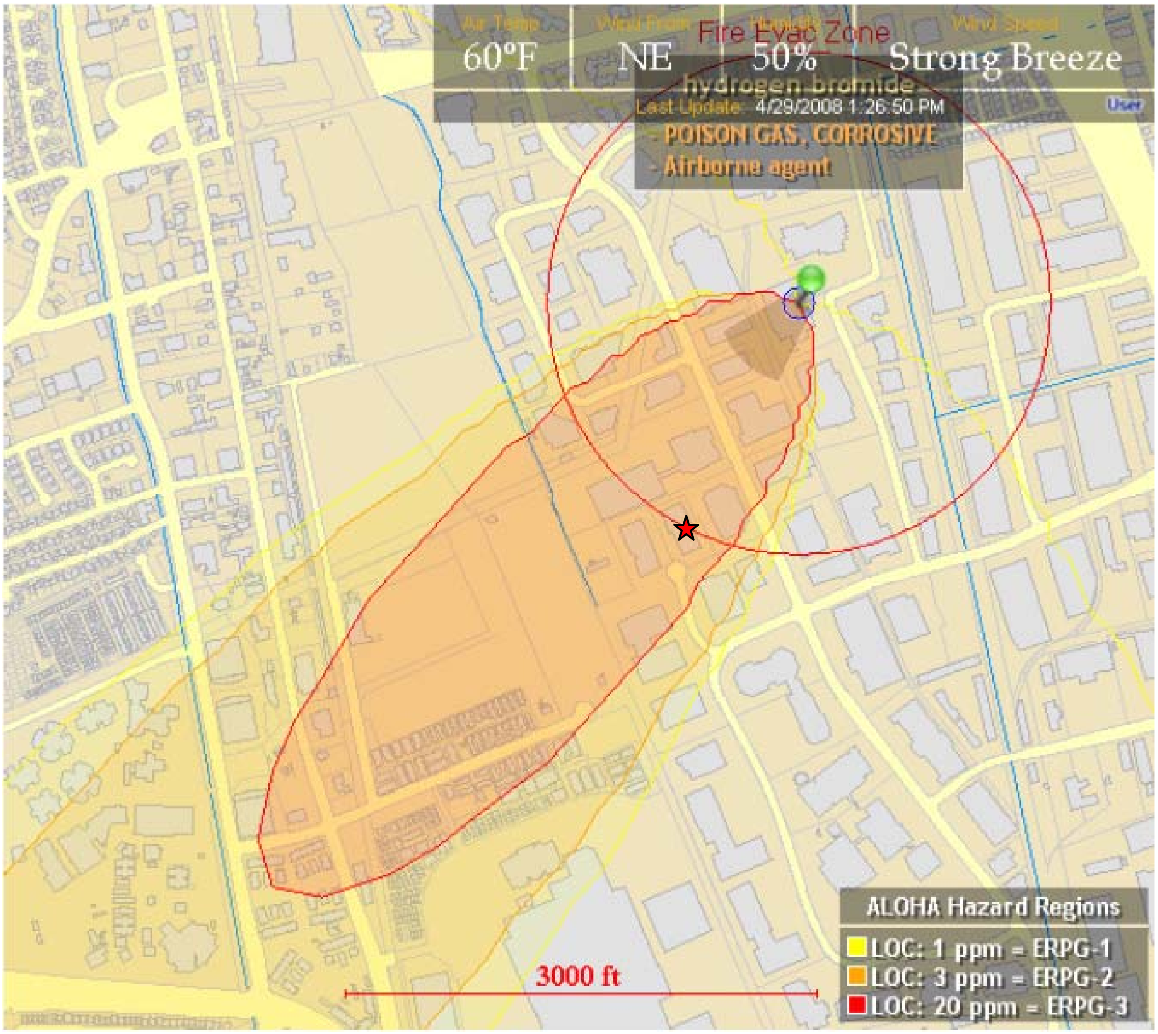
Facility using Hazardous Materials
Proposed location for Crosspoint Church

AEGL - 1
AGEL - 2
AGEL - 3

* ALOHA: Areal Location of Hazardous Atmospheres. Uses information provided by First Response along with physical property data to predict how a hazardous gas cloud might disperse in the atmosphere after a chemical release. ALOHA identifies the area of concern relative to the point of release where the chemical concentration is then graphically displayed on a street map.
* AGEL : Acute Exposure Guideline Levels *(See figure 9 for description of each level)*

FIGURE 8

100% HYDROGEN BROMIDE IN NE LBS
GAS PLUM AS PREDICTED BY ALOHA MODEL
Linear Technology, 275 S Hillview Drive.
(0.7 miles from proposed project site)



LEGEND

Facility using Hazardous Materials
Proposed location for Crosspoint Church

AEGL - 1
AGEL - 2
AGEL - 3

* ALOHA: Areal Location of Hazardous Atmospheres. Uses information provided by First Response along with physical property data to predict how a hazardous gas cloud might disperse in the atmosphere after a chemical release. ALOHA identifies the area of concern relative to the point of release where the chemical concentration is then graphically displayed on a street map.
* AGEL : Acute Exposure Guideline Levels *(See figure 9 for description of each level)*

FIGURE 9

ACUTE EXPOSURE GUIDELINE LEVELS

AEGL – 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL – 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL – 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Acute Exposure Guideline Levels (AEGLS) are under development by the National Research Council's Committee on Toxicology. The committee developed detailed guidelines for developing uniform, meaningful emergency response standards for the general public.

* ALOHA: Areal Location of Hazardous Atmospheres. Uses information provided by First Response along with physical property data to predict how a hazardous gas cloud might disperse in the atmosphere after a chemical release. ALOHA identifies the area of concern relative to the point of release where the chemical concentration is then graphically displayed on a street map.
* AGEL : Acute Exposure Guideline Levels *(See figure 9 for description of each level)*

Milpitas City Planning Commission
City Hall, Milpitas, CA 95035

Dear Commissioners:

My name is Anita Lau and I am a Milpitas resident living at 1217 Park Heights Dr., Milpitas, CA 95035.

I would like to urge the Planning Commission to grant Crosspoint Chinese Church of Silicon Valley a conditional use permit so that they could move from its current location at 680 E. Calaveras Blvd. to 658 Gibraltar Court. They have been here for 8 years serving the Chinese people and the City of Milpitas at large. Granting the church the conditional use permit would enhance their ability to serve the hard working people in our community.

5-19-2008
Date:

14 Neptune Ct.
San Ramon CA 94583

May 17, 2008

Milpitas City Planning Commission
City Hall
455 East Calaveras Blvd.
Milpitas CA 95035

Dear Friends,

I am writing this letter to urge you to approve the conditional use permit application of Crosspoint Chinese Church.

I am a former City Planning Commissioner from 1961-68, a former council member from 68-76, Mayor from 1974-76, a former teacher and administrator in Milpitas for 48 years. I was also an active member and deacon of Park Victoria Baptist Church and was Superintendent of Milpitas Christian Schools for several years.

I could not make it to the meeting tonight due to conflicting commitments, but I express strong support for the use permit application of Crosspoint Chinese Church. It is my observation and experience that churches like Crosspoint play a vital roll in the welfare of our community. And the City of Milpitas has a history of support for churches and has profited from the ministry of these churches toward making Milpitas the ideal community it is. I believe that support should continue, particularly in the approval of the current application by Crosspoint Chinese Church.

Other speakers will speak to the amelioration of any perceived problems, and I urge the commission's approval subject to any necessary conditions.

The approval will enable Crosspoint Chinese Church to continue its vital ministry to keep Milpitas the ideal community it has become.

Sincerely,

Joseph W. House

Joseph W. House

KAISER PERMANENTE®

Kaiser Permanente Medical Offices

Ravita Saluja, M.D.
Physician-in-Charge

Noël G. Wilson, R.N.
Assistant Medical Group Administrator

Milpitas City Planning Commission
City Hall
Milpitas, CA 95035

Dear Commissioners:

My name is Noël Wilson and I am currently working in Milpitas for Kaiser Permanente as an Assistant Medical Group Administrator.

I would like to urge the Planning Commission to grant Crosspoint Chinese Church of Silicon Valley a conditional use permit so that they can move from their current location at 680 E. Calaveras Blvd. to 658 Gibraltar Court. They have been here for 8 years serving the Chinese community and the City of Milpitas at large.

As a healthcare organization we provide for the physical health needs of the community and our churches in the community provide for the spiritual needs. I would be delighted to have Crosspoint Chinese Church as our neighbor on Gibraltar Court.

Sincerely,

Noël Wilson

Noël Wilson, R.N.
Assistant Medical Group Administrator

770 East Calaveras Boulevard
Milpitas, California 95035-5462

Milpitas City Planning Commission
City Hall, Milpitas, CA 95035

Dear Commissioners:

My name is Wai Ling Lau and I am a Milpitas resident living at 1217 Park Heights Dr., Milpitas, CA 95035.

I would like to urge the Planning Commission to grant Crosspoint Chinese Church of Silicon Valley a conditional use permit so that they could move from its current location at 680 E. Calaveras Blvd. to 658 Gibraltar Court. They have been here for 8 years serving the Chinese people and the City of Milpitas at large. Granting the church the conditional use permit would enhance their ability to serve the hard working people in our community.

5-19-2008

Date: