



## **ARROWHEAD UNION HIGH SCHOOL DISTRICT**

# **FACILITY AND ENROLLMENT PROJECTION REPORT**

**May 28, 2009**



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FACILITY & ENROLLMENT REPORT**

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SECTION ONE  
**EXECUTIVE SUMMARY**

# **ARROWHEAD UNION HIGH SCHOOL DISTRICT FACILITY AND ENROLLMENT PROJECTION REPORT**

## **Executive Summary**

This report is prepared by Eppstein Uhen Architects to provide an objective analysis of the present and emerging conditions affecting long range planning for effective use and development of the Arrowhead Union High School District Site and Facilities. The report consists of three topical sections, all integral to preparing for and addressing the issues over time with a proactive master plan for action. Those sections are as follows.

- District Ultimate Enrollment Projection
- Facilities Assessment
- Emerging Trends in Education

The Ultimate Enrollment Projection piece summarizes the potential household and enrollment growth in the constituent communities of the Arrowhead Union HS District area in Waukesha County Wisconsin. The goal of this effort is to provide a reasonable estimate of the ultimate enrollment growth potential within the district boundaries. EUA has gathered information from and/or met with representatives of each of the municipalities within the District boundaries that have existing households and/or developable land that contribute to the present and/or future enrollment of students. Information was also obtained from the Arrowhead Union High School District, published census data as well as municipal land use plans and maps, information from the Southeastern Wisconsin Regional Planning Commission, the Wisconsin Department of Administration, and other sources as listed in the Land Use/Enrollment section of this report.

The Facilities Assessment piece documents current building utilization and adequacy of the physical plants to support the district's mission for curriculum delivery and student achievement. The information presented in this report was gathered through on-site inspections of each building, interviews with building Principals, District Administrators and Facilities Staff. Addressing student capacity is always an urgent priority in facility development, however providing the optimum combination of adaptable and appropriate spaces to educate is foremost in making sure the jobs of teaching and learning are done to their maximum potential. The Educational Adequacy Assessment for each facility reviews the actual program activity use of the buildings to how the available accommodations and physical space support the requirements of each activity, and how adaptable those facilities are to changing requirements in program and curriculum delivery. The Building Inspection Report for the site and both school buildings review core facility elements and systems, assessing each element as being in Good, Fair, or Poor condition relative to accepted industry standards. Included in this report is an analysis of existing building and site capacities for future expansion and/or development opportunities.

Emerging trends in education as a measurable facility planning and design component that has been tracked as new technologies and approaches to teaching and learning are being used throughout the country. Where in the past theories on educational delivery and student learning have been proposed but seldom acted on, the rapid advance and implementation of technology has made it possible to use active classrooms as learning labs; experimenting with new ideas and methods while educating, proving successful and unsuccessful methods in short time through advancing technology. All the while improving and expanding the educational experience in the process. Buildings need to be planned for and adapt to the requirements of new technology and the way new spaces will need to be created to support a new and changing way of teaching and learning.

The findings presented in this report will provide the Arrowhead Union High School District up-to-date tangible information to assess its existing site and building conditions relative to providing optimal learning environments for successful curriculum delivery. It will serve as a reference to the District and its constituents in making informed decisions for effective planning to support community development and advance the School District Mission for educating current and future generations of students.

Thank you for the opportunity to participate in this endeavor. If you have any questions or concerns regarding this summary, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Gary G. Woodward". The signature is fluid and cursive, with a large, sweeping flourish at the end.

Eppstein Uhen Architects, Inc.  
Gary G. Woodward, NCARB  
Senior Project Architect

SECTION TWO

**DISTRICT ULTIMATE ENROLLMENT PROJECTION**

Land Use Analysis

Enrollment Projection Summary

## LAND USE ANALYSIS – ENROLLMENT PROJECTION

In order to provide a basis for determining long-term capacity needs for the Arrowhead Union High School District, Eppstein Uhen Architects conducted research and land-use analysis to determine the potential ultimate enrollment for the Arrowhead Union High School District.

The following sources of information were utilized in our analysis:

- Arrowhead Union High School District Boundary Map and Enrollment Data
- Wisconsin Department of Public Instruction (WI-DPI)
  - Additional enrollment information from WDPI website
- US Census data (2000)
- Southeastern Wisconsin Regional Planning Commission (SEWRPC)
  - Regional Land Use Plan for Southeastern Wisconsin: 2035
  - Additional demographic, household and population information from SEWRPC Demographic Representatives
- Wisconsin Department of Administration (WI-DoA), Demographic Service Center
  - Wisconsin Population 2035: A Report on Projected State, County Populations and Households for the Period 2000-2035 and Municipal Populations 2000-2030 (October 2008)
  - Additional demographic, household and population information from Department of Administration website and Demographic Representatives
- Waukesha County
  - Waukesha County Comprehensive Development Plan, 2035
  - GIS website (for parcel and land-use acreage information)
  - Additional demographic, household and population information from Waukesha County Demographic Representatives

Valuable assistance and land-use maps were also obtained through correspondence with municipal representatives

- City of Delafield: City Planner
- City of Pewaukee: City Planner
- Town of Delafield: Town Planner
- Town of Lisbon: Town Planner
- Town of Merton: Town Planner
- Town of Oconomowoc: Town Planner
- Village of Chenequa: Village Administrator
- Village of Hartland: Village Administrator
- Village of Merton: Village Planner and Village Administrator
- Village of Nashotah: Village Clerk
- Village of Sussex: Assistant Village Administrator

### **Land Use / Enrollment Process Summary:**

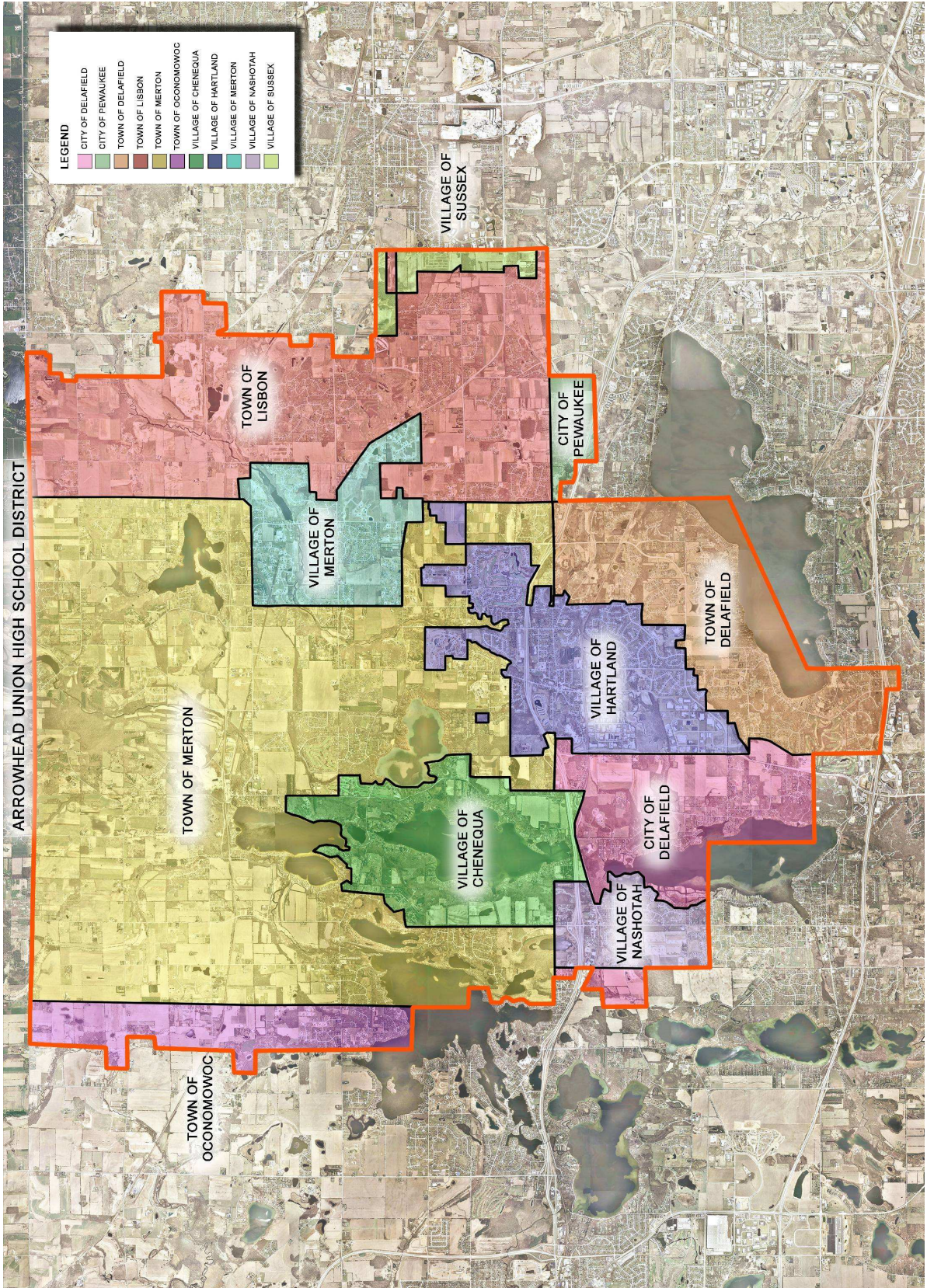
As indicated in the Executive Summary of this report, the district is fed by multiple municipalities. A map showing the municipalities serving the Arrowhead Union High School District is shown in Figure 1 on page 2, overlaid with the district boundary. Note that only those portions of each municipality within the Arrowhead Union High School District Boundary are shown.

In order to determine an estimate of the ultimate projected enrollment growth for the Arrowhead Union High School District, a multi-step process was implemented. The process is summarized below.

#### **1. Determine the land-use plan in effect for each municipality which feeds the Arrowhead Union High School District.**

It was determined that many of the municipalities serving the district used a different land-use plan for their communities. Therefore, it was not possible to analyze the district as a whole utilizing the same criteria.

# LAND USE ANALYSIS – ENROLLMENT PROJECTION



**Figure 1: Arrowhead Union High School District Overlaid with Municipal Boundaries**  
 DISTRICT ULTIMATE ENROLLMENT PROJECTION

## LAND USE ANALYSIS – ENROLLMENT PROJECTION

### 2. Determine future land use and housing growth potential in the Arrowhead Union High School District Boundaries for each municipality.

Existing and planned land-use information was gathered for each municipality within the district for all areas which are either currently developed under a residential use, or could be developed as a residential use in the future under that municipality's current land-use plan. For each municipality, only those areas within the Arrowhead Union High School District were analyzed.

The maximum potential house growth for a municipality was then obtained by adding the potential remaining household sites in currently developed residential areas, to the potential number of households possible in the undeveloped areas.

#### Areas currently developed or platted for residential use:

For those areas in a municipality already developed or platted, municipal representatives assisted in determining the number of residential parcels remaining to be built.

#### Areas which have potential for residential development:

This represents the "buildable" area within the district. The majority of the areas which have potential for residential growth in the district are currently designated in the referenced land use plans as Residential, Rural Residential, and Other Agricultural Land. Each municipality uses similar designation for this type of land.

The type of land use and the number of acres/parcel allowed within the developable areas differ according to each municipality. The Town of Merton and Lisbon and Village of Chenequa land-use plans are relatively conservative and allow for approximately 5 acres per parcel within the Rural Residential developable area. The Town of Oconomowoc land use plan currently is the most conservative and allows approximately 35 acres per parcel within the Agricultural developable area. The remaining municipalities have only a limited area of potential residential growth and allow as little as 1/3 acre per parcel in developable areas.

The total amount of buildable area within the Arrowhead Union High School District is considerable. The definitive factors for residential development are determined by the various densities permitted by constituent municipalities, along with a significant acreage of lakes, rivers and creeks, wetlands, environmental corridors and protected agricultural land - all which have a large effect on the total amount of households that might be counted for census in the district. This is reflected in the number of potential households shown in the table in step 4 of this process.

The number of acres per household/parcel in developable areas was determined in two ways. In some of the municipalities, the number of acres per parcel were given by the municipal representatives as net acres/parcel, and assumed that roads and other features would be included in the acres/parcel. In that case, the number of parcels for a developable area was determined by dividing the number of acres by the net acres/parcel. In other municipalities, the number of acres per parcel was based on gross acres per parcel. In this case, the number of acres is multiplied by a "usability factor" to determine the net acres available. This factor used in this report was 85% based on planning staff input and confirmed by municipalities.<sup>1</sup> The resulting number of acres was then divided by the planned number of acres per parcel for that municipality.

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<sup>1</sup> Eppstein Uhen Architects planning staff recommendations  
DISTRICT ULTIMATE ENROLLMENT PROJECTION

## LAND USE ANALYSIS – ENROLLMENT PROJECTION

### 3. Determine number of 9<sup>th</sup> through 12<sup>th</sup> Grade children per household in the Arrowhead Union High School District.

Two primary sources were used to determine an approximate number of children per household (9<sup>th</sup> through 12<sup>th</sup> Grade) for use in determining ultimate enrollment growth. Historical information regarding the number of households in each community is available. However, due to the fact that only portions of the municipalities serving the Arrowhead Union High School District are contained within the district boundary, this information could not be used directly. Therefore, household data available for Waukesha County, and current household information for the school district were used to determine the number of children per household.

#### **Waukesha County Household / High School Age Population per Household Projections**

Source: Wisconsin Department of Administration, Demographic Services Center, May 2008.

The following table of information shows the number of children ages 15-19 per household as projected by the Wisconsin Department of Administration Demographic Services Center in May, 2008. Note that the age range selected was the closest range available to the school age range of 14-18.

Year	Number of households	Number of children ages 15-19	Number of high school age children / household
2000	135,229	25,361	0.19
2005	143,485	28,090	0.20
2010	150,802	27,429	0.18
2015	158,529	27,309	0.17
2020	165,520	26,881	0.16
2025	171,774	27,253	0.16
2030	176,772	28,426	0.16
2035	180,553	29,372	0.16

#### **Historic Arrowhead Union High School District School Enrollment / Number of Households**

Source: SEWRPC (number of households), and AUHS (Enrollment Information)

Household calculations within the Arrowhead Union High School District were provided by SEWRPC. Historical enrollment information was obtained from the Arrowhead Union High School District.

Year	Number of households (SEWRPC)	Enrollment (AUHS)	Number of high school age children / household
2000	10,100	1,917	.19
2005	10,800	2,346	.22

The numbers above correspond closely to Waukesha County in 2000 and 2005.

## LAND USE ANALYSIS – ENROLLMENT PROJECTION

### **Current Arrowhead Union High School District School Enrollment / Number of Current Households**

Source: Waukesha County (number of households), and AUHS (Enrollment Information)

Waukesha County was able to provide an approximate number of households currently serving the Arrowhead Union High School District. This information was determined by obtaining the current number of residential parcels with improvements (over \$30,000) that are assigned to the district (as recorded by the county). Historical enrollment information was obtained from the Arrowhead Union High School District.

Year	Number of households (Waukesha County)	2008-2009 Enrollment (AUHS)	Number of high school age children / household
2009	10,888	2,235	.21

It can be seen that the number of children per household in the Arrowhead Union High School District is slightly higher in 2009 than that projected for the county in 2010. This difference may be attributable to variations in demographics within Waukesha County as a whole versus that within the district. Differences are also likely due in part to open enrollment, as well as students in the district attending private, parochial and charter choice schools.

The number of children per household projected for Waukesha County starting in the year 2020 levels off at approximately .16 high school age children per household. Based on the correlation of the multiple data sources above, it can be expected that the Arrowhead Union High School District would experience slightly higher levels of children per household than Waukesha County. **Therefore in projecting ultimate district enrollment numbers, .19 high school aged children per household was used.**

### **Condo/Multi-Family Short-term Growth in Arrowhead Union High School District**

There are a number of short-term condo developments noted by the municipalities within Arrowhead Union High School District. The percentage of high school aged children in condo developments is lower than in single family households. Therefore, a separate number of students per household have been broken out for this short-term development designation.

### **Number of High School Age Children per Condo/Multi-Family Household in Arrowhead Union High School District**

Source: SEWRPC

Southeastern Wisconsin Regional Planning Commission provided information obtained regarding high school aged children per multi-family households in Waukesha County based on 2000 U.S. Census information. As the Census information does not break out Condo households specifically this report utilizes the number of students per multi-family households to include condo households. The number of high school students per household in multi-family units both owner occupied and renter occupied was averaged. The following table of information shows the number of children ages 15-19 per household as provided by the 2000 U.S. Census information. Note that the age range selected was the closest range available to the school age range of 14-18.

Grade Level	Number of high school age children in Arrowhead Union High School District/ Household
9-12 (Ages 15-19)	.03

## LAND USE ANALYSIS – ENROLLMENT PROJECTION

### 4. Determine additional 9<sup>th</sup> through 12<sup>th</sup> Grade children expected based on children per household for the Arrowhead Union High School District.

Based on the anticipated housing growth determined in previous Step 2, Eppstein Uhen Architects worked to determine the potential near term growth as well as ultimate potential enrollment growth.

To provide the district with useful information in the short and long term, enrollment growth potential was determined for two scenarios:

- a. Short-term Household Growth - between now and the year 2019
  - i. The number of households expected in this category was determined based on the number of parcels in existing or platted developments within the district that municipalities have indicated approval or likely approval. Additional developments have been identified by the municipalities as preliminary, or conceptual. These developments have not been platted or approved, but have some expectation of proceeding at some time in the next several years. While the time expected for this growth to occur is unknown, this report assumes that these areas will be built-out within the next five to ten years for graphical representation.
- b. Short-term Condo Growth - between now and the year 2019
  - i. The number of households expected in this category was determined in the same fashion as explained in the household growth above. While the time expected for this growth to occur is unknown, this report assumes that these areas will be built-out within the next five to ten years for graphical representation.
- c. Long-term Growth
  - i. The number of households expected beyond five to ten years is more difficult to predict, and therefore should be monitored periodically. Long-term growth is based on the land use analysis described in Step 2.
- d. Ultimate Growth
  - i. The total household growth (ultimate) includes both the short and long term household growth. Note Short-term Condo growth is broken down independently in the following tables to allow for a separate analysis of high school aged children per household.

Municipality	Short Term Condo Growth (now to 2019)	Short Term Household Growth (now to 2019)	Long-Term Household Growth (beyond 2019)	Total Household Growth - Ultimate
Delafield, City of	0	17	80	97
Pewaukee, City of	0	0	17	17
Delafield, Town of	22	19	107	148
Lisbon, Town of	0	185	869	1054
Merton, Town of	0	163	1194	1357
Oconomowoc, Town of	0	7	16	23
Chenequa, Village of	0	0	86	86
Hartland, Village of	96	105	62	263
Merton, Village of	0	96	370	466
Nashotah, Village of	0	7	112	119
Sussex, Village of	72	0	250	322
<b>TOTAL</b>	<b>190</b>	<b>599</b>	<b>3163</b>	<b>3952</b>

## LAND USE ANALYSIS – ENROLLMENT PROJECTION

### **Short-term Household/Enrollment Growth – Now through approximately 2019**

Using the projected increase in households shown in the table on the previous page, the following chart summarizes the short-term enrollment growth expected.

Projected short-term increase in households	Number of high school-age children per household	Expected Enrollment Increase
599	.17 (Based on Waukesha County)	102
599	.20 (Based on SEWRPC)	120
599	.21 (Based on District)	126
599	.19 (Selected)	114

### **Short-term Condo/Enrollment Growth– Now through approximately 2019**

Using the projected increase in households shown in the table on the previous page, the following chart summarizes the short-term condo enrollment growth expected.

Projected short-term increase in households	Number of high school-age children per household	Expected Enrollment Increase
190	.03 (Based on SEWRPC)	6

### **Long-term Household/Enrollment Growth**

Using the projected increase in households shown in the table on the previous page, the following chart summarizes the long-term enrollment growth expected.

Projected short-term increase in households	Number of high school-age children per household	Expected Enrollment Increase
3163	.17 (Based on Waukesha County)	538
3163	.20 (Based on SEWRPC)	633
3163	.21 (Based on District)	665
3163	.19 (Selected)	601

### **Ultimate Household/Enrollment Growth**

Similarly the ultimate enrollment growth is summarized using the ultimate household growth projection information on the previous page including the condo growth as broken out in the tables above.

Projected increase in households (Now to ultimate build-out)	Number of high school-age children per household	Expected Ultimate Enrollment Increase
3952	Based on WI-DoA	646
3952	Based on SEWRPC	759
3952	Based on District	797
3952	Selected	721

# LAND USE ANALYSIS – ENROLLMENT PROJECTION

## ULTIMATE DISTRICT ENROLLMENT PROJECTION

It is evident that the actual enrollment growth in the future is not entirely predictable. If the household growth rate continued at its current pace, based on the average number of children per household, and assuming development of currently platted residential units, there could be an increase in approximately 120 students in short-term growth. Household growth beyond that generated by short-term growth will be dependent on the rate of development of the currently undeveloped land designated for possible residential development.

Note that the projections below illustrate projections based on current information obtained from each municipality at the time this report was written. Completion and adoption of many of the municipality land-use plans is currently in progress. Most municipalities will adopt their draft land-use plan by the end of 2009. Ultimate household projections will require future updating if significant changes are made to current municipality land use plans in the future.

The current enrollment in Arrowhead Union High School (as of the 2008-2009 school year) was 2,235 students.<sup>2</sup>

Given the expected short-term growth above, the projected enrollment would increase by 120 students to 2,355 students.

If all developable land was built out under current land use plans, the enrollment of the district would increase by 721 students to 2,956. However, it should be noted that this growth will occur over an extended period of time.

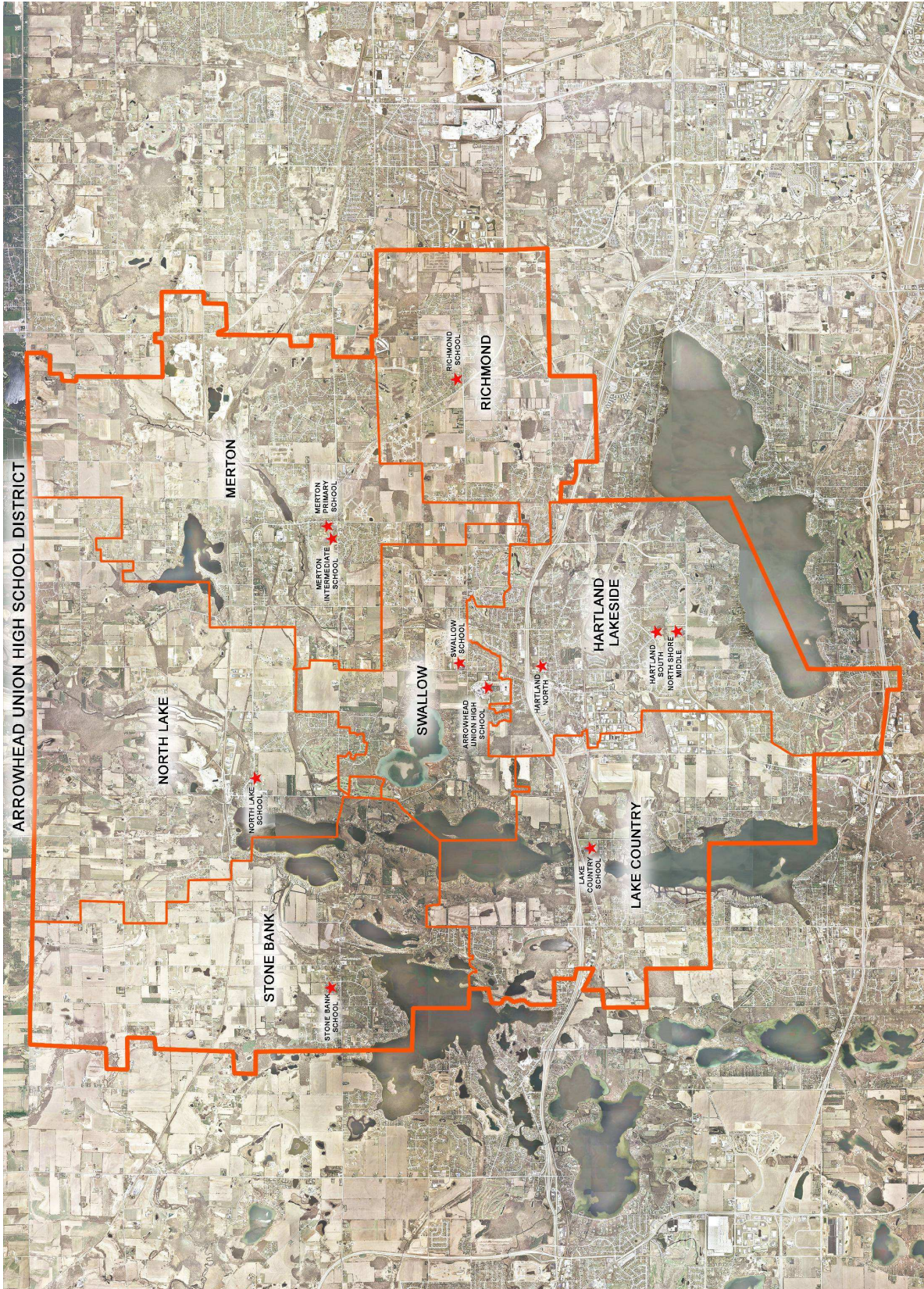
The following pages contain images illustrating the distribution of developable land throughout the Arrowhead Union High School District and graphs showing historical and projected enrollment growth in the district.

- a. **Figure 2: AUHSD Attendance Boundaries and Existing School Locations** (pg. 9)  
This image illustrates the school attendance boundaries and existing school locations within the district boundary.
- b. **Figure 3: Projected Household Growth within AUHSD, including Municipal Boundaries** (pg. 10)  
This image illustrates the relationship of projected growth to the municipal boundaries within the district boundary.
- c. **Figure 4: Projected Household Growth within AUHSD, including Attendance Boundaries** (pg. 11)  
This image illustrates the relationship of projected growth to the attendance boundaries within the district boundary.
- d. **Figure 5: AUHSD Enrollment History and Projections: 2000-2060** (pg. 12)  
This graph shows recent enrollment history for the Arrowhead Union High School District. It also contains projected ultimate enrollment information. **Note that the year 2060 is an arbitrary number, used for graphical purposes.** The time at which the ultimate enrollment is reached will be dependent on actual growth rates and any potential changes to land use plans.

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<sup>2</sup> Arrowhead Union High School District Enrollment Data, 2009  
DISTRICT ULTIMATE ENROLLMENT PROJECTION

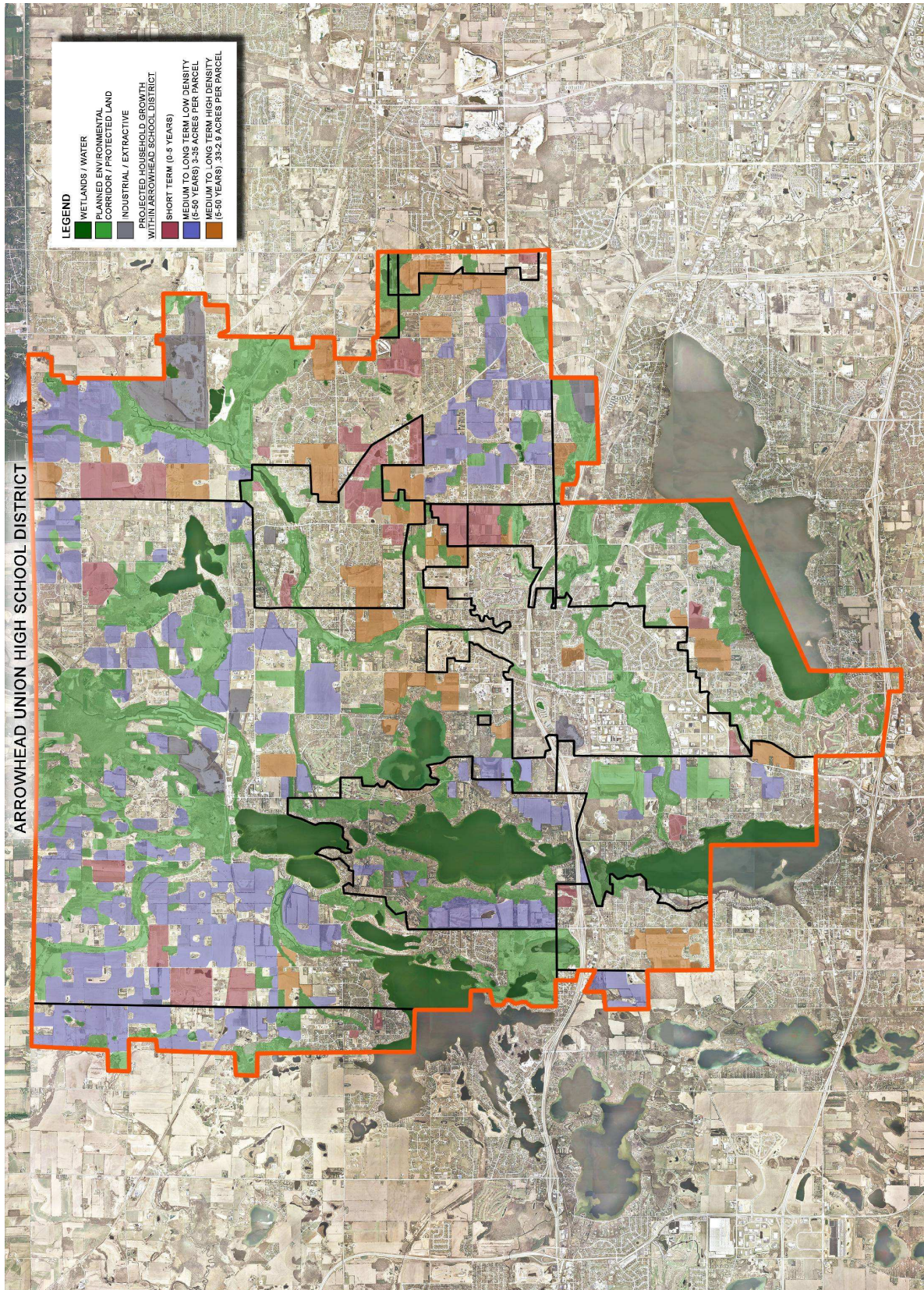
# LAND USE ANALYSIS – ENROLLMENT PROJECTION



**Figure 2: AUHSD Attendance Boundaries and Existing School Locations**

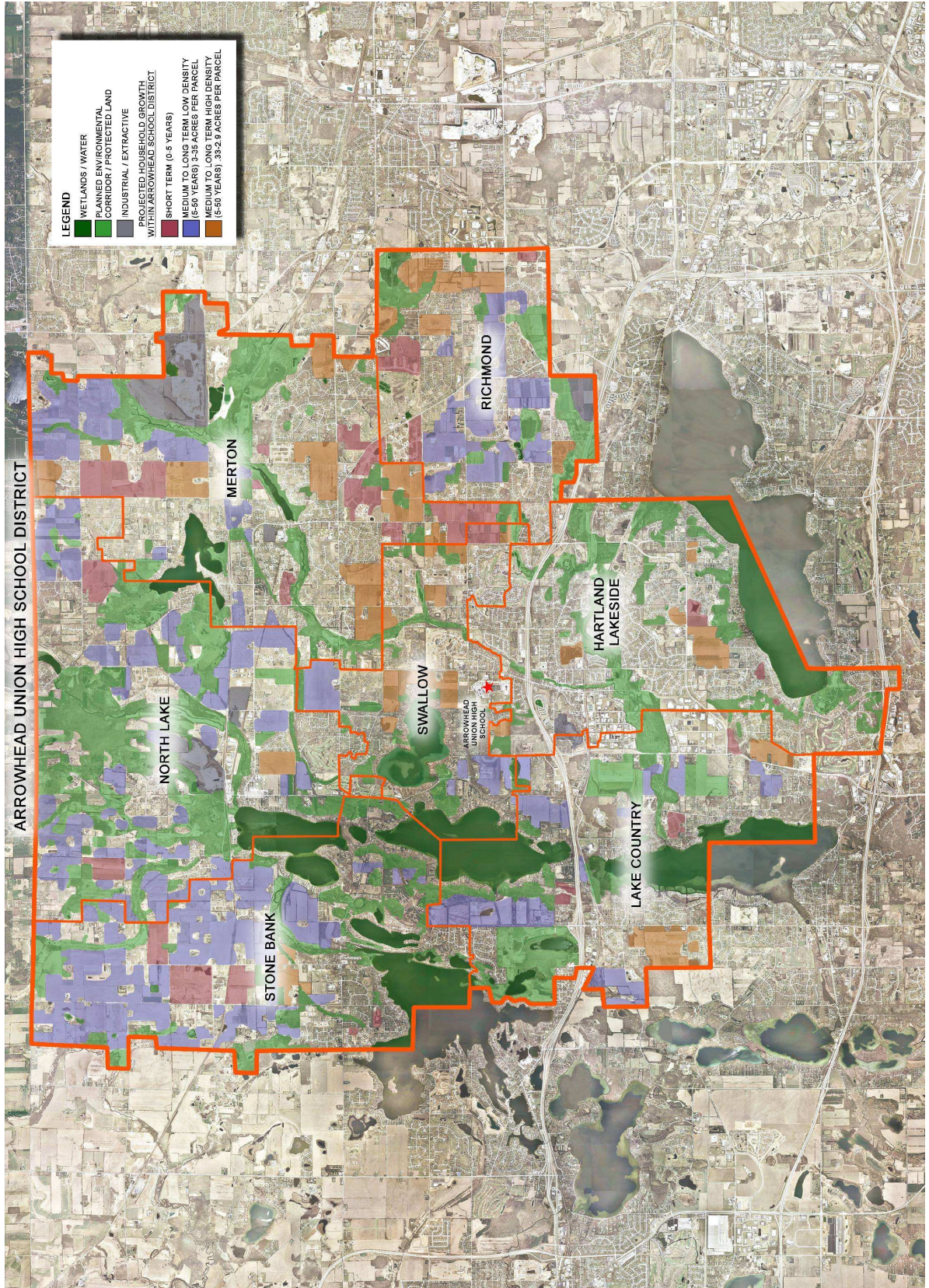
DISTRICT ULTIMATE ENROLLMENT PROJECTION

# LAND USE ANALYSIS – ENROLLMENT PROJECTION



**Figure 3: Projected Household Growth within AUHSD, including Municipal Boundaries**  
DISTRICT ULTIMATE ENROLLMENT PROJECTION

# LAND USE ANALYSIS – ENROLLMENT PROJECTION



**Figure 4: Projected Household Growth within AUHSD, including Attendance Boundaries**  
 DISTRICT ULTIMATE ENROLLMENT PROJECTION

# LAND USE ANALYSIS – ENROLLMENT PROJECTION

## Arrowhead High School District Enrollment History and Projections

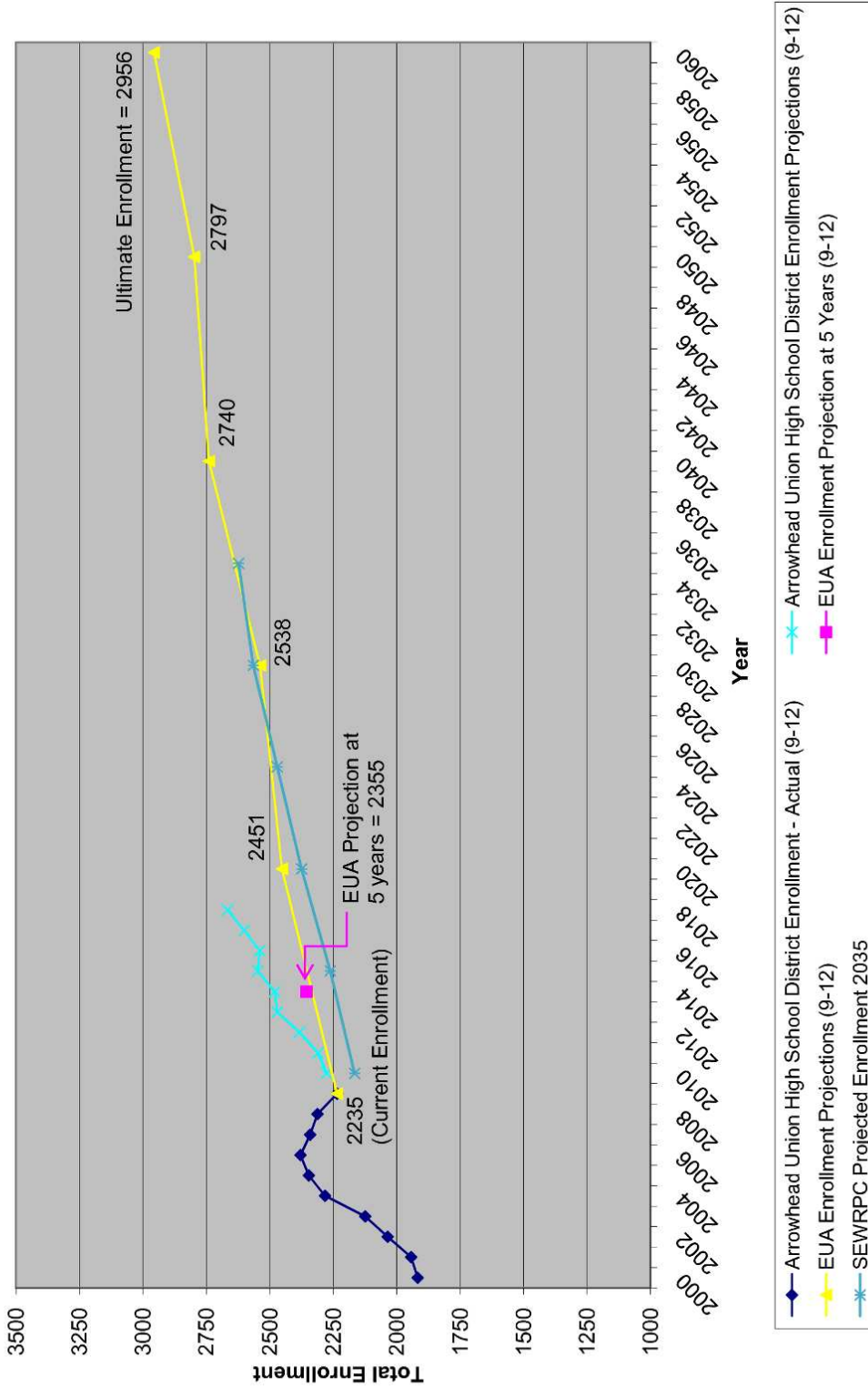


Figure 5: AUHSD Enrollment History and Projections: 2000-2060

DISTRICT ULTIMATE ENROLLMENT PROJECTION

SECTION THREE

**FACILITIES USE ASSESSMENT**

Building Utilization Analysis

Building Enrollment Capacity Analysis

Summary

# **BUILDING UTILIZATION & ENROLLMENT CAPACITY OF EXISTING BUILDINGS**

## **Introduction**

In 2008 EUA prepared a report for the Arrowhead Union High School to evaluate the existing facility utilization and capacities of the North and South Campus buildings. That information has been included in this report to provide a complete picture of all the present issues affecting the operation, use and capacities of the campus buildings and site. The building utilization and capacity data places the building condition and educational adequacy information into relative context for comparative analysis while exploring options to address the potential affect the enrollment projection information may have on district facilities in the future.

For this report, the building enrollment numbers have been updated to the Third Friday 2009 count, however the information used for the building utilization charts remains the same from the 2008 report. Though the enrollment numbers have changed slightly from 2008 to 2009, the daily building schedules, courses offered, and building use patterns remained the same with only negligible variance. The utilization study analyzes each buildings daily program schedule and classroom occupancy levels, then categorizes and measures the findings against current accepted standards for educational facility design and management and guidelines for educational program delivery.

## **Methodology**

Two methods were used to evaluate the utilization efficiency and enrollment capacities of the North and South Campus buildings.

1. Building capacity based on utilization: Determine the average capacity for a classroom and compare it to the number of periods occupied for use during the scheduled day.
2. Building square footage: Take the existing building overall square footage and divide it by the recommended square footage per student, as described on the next and following pages.

Application of these methods in evaluating the utilization efficiency and enrollment capacities of the North and South Campus buildings indicate high building use approaching the upper limits of recommended effective occupant levels. With the evident utilization patterns presented, it is recommended that consideration be given to undertake a master plan initiative; to explore and address potential variables that enrollment trends affect program demand and student number increases might present to future facility operation. As the data indicates, there is presently a small margin of flexibility left in the program schedule and available building space to meet unforeseen changes to the program or student needs in the short term future. In planning for the long term future, it is advisable to examine the options available to adapt and flex the existing District assets in the buildings and site to meet the challenges that may come as the constituent community develops and grows.

## **Method 1 – Building Utilization Analysis**

It is important to note that a high school building is not typically planned to operate at a maximum capacity of 100% utilization of all rooms. 80% is the optimum at the high school level, which allows for space and time to accommodate teacher preparation, scheduling conflicts, and meeting with students for special assistance. This utilization percentage represents utilizing a room at least 8 periods of a 10 period day. The following table summarizes room utilization by building, program area, and frequency of use as recorded by the attached North and South Campus Building Utilization Analysis spreadsheets.

## Current Capacity Analysis

*Based on Average Number Students per Classroom @ 80% Utilization*

Number of Instructional Use Rooms	Instructional Program Area	Average Number of Students per Room	Number of Program Rooms used 80%+ per day
North Campus - 35 South Campus - 32	Basic Classrooms	North Campus - 23 South Campus - 24	North Campus - 17 South Campus - 14
North Campus - 10 South Campus - 8	Science	North Campus - 22 South Campus - 24	North Campus - 5 South Campus - 1
North Campus - 6.5 South Campus - 5	Art & Music	North Campus - A23, M24 South Campus - A24, M58	North Campus - 1 South Campus - 2
North Campus - 5.5 South Campus - 5	Tech Ed. & F.A.C.E	North Campus - 22 South Campus - 22	North Campus - 4 South Campus - 3
North Campus - 2 South Campus - 2	Special Education	North Campus - 2 South Campus - 10	North Campus - 0 South Campus - 2
North Campus - 1 South Campus - 1	Physical Education	North Campus - 60 South Campus - 48	North Campus - 1 South Campus - 1
North Campus - 1 South Campus - 4	Computer Labs	North Campus - 23 South Campus - 13	North Campus - 0 South Campus - 1
North Campus - 2 South Campus - 1	Study Halls	North Campus - 66 South Campus - 130	North Campus - 2 South Campus - 1

The attached North and South Campus Building Utilization Analysis spreadsheets provide information on each classroom during the scheduled 10 period day. It should be noted that same program area classrooms are not all of similar size, even though they may have the same number of students scheduled. Space equity in classroom size for similar programs can differ as much as 20% between rooms in older and newer areas of the buildings. Consequently a room that has 24 students in a larger room functions more efficiently than a smaller room with the same number of students. Establishing an acceptable average number for each program area is subjective given the range of classroom sizes utilized to make the daily schedule work.

The spreadsheets document a fairly consistent pattern of use between the North and South Campus buildings. Averaging the A&B day schedules, the greatest intensity of room utilization focuses on the same six periods of the daily schedule.

- North Campus Building – 80% or greater room utilization 6 periods out of 10.
- South Campus Building – 80% or greater room utilization 3 periods out of 10.

The North Campus Building has 2 periods experiencing greater than 70% total room utilization, and the South Campus Building has 5 periods experiencing greater than 70% total room utilization. The rooms in both buildings utilized for instructional purposes for 80% or more of each scheduled day approach 50% of the total number of classrooms in all program areas. This coupled with the number of periods that have 80% or more total building utilization presents a small margin of building capacity available in both buildings to address potential changes in enrollment trends both in program demand and increases student numbers.





## Method 2 – Building Size Analysis

Building size is another factor that can be used when determining the maximum enrollment of a building. The chart below analyzes the building size and the potential for enrollment of the building based on a recommended square footage per student. Information on existing versus recommended site size is also included.

The following information comes from the Department of Public Instruction, the Wisconsin Association of School Boards tracking of new schools built in Wisconsin over the last 5 –10 years, and the Council of Educational Facility Planners International. The recommended ranges for school building square footages per student are based on an average of the contributing data from these organizations.

- *Elementary School:* 100 – 120 sq.ft. per student (average of 110 sq.ft.)
- *Middle School:* 120 – 140 sq.ft per student (average of 130 sq.ft.)
- **High School:** 170 – 220 sq.ft. per student (average of 195 sq.ft.)

\*The higher end range of square foot per student number reflects facilities with more auxiliary spaces provided such as an Auditorium, Pool, and Special Education specific rooms. The lower range square foot per student number reflects facilities providing few auxiliary spaces.

Typical school site area recommendations:

- *Elementary School:* Sites should be a minimum of 10 acres plus an additional one acre for each 100 students.
- *Middle School:* Sites should be a minimum of 20 acres plus an additional one acre for each 100 students.
- **High School:** Sites should be a minimum of 30 acres plus an additional acre for each 100 students.

In order to distinguish adequate from inadequate conditions in an existing school site and building, the information presented above is applied to the facility using the following table. The recommended site size listed is based on current enrollment numbers factored into the site recommendations listed above. The maximum enrollment is based on the existing building sq.ft. divided by the average sq.ft. per student. These comparisons can then be used as an indicator to compare how the schools and sites compare to National and State recommendations. The student enrollment count is from the Third Friday September 2009 Report.

### Building Enrollment Analysis

School	Existing site size	Recommended site size based on current enrollment	Existing facility size (South Campus building excluding District Office)	Current Building Enrollment	Maximum Capacity based on recommended average building sq. ft. per student*	Max. Enrollment Capacity Difference Students/ %
<b>South Campus</b>			209,831 sf.	1,119	1,076	43/ 104%
<b>North Campus</b>			272,854 sf.	1,116	1,241	(125)/90%
<b>TOTALS</b>	<b>117 acres</b>	<b>53 acres</b>	<b>482,685 sf.</b>	<b>2,235 Students</b>	<b>2,317 Students</b>	<b>96% Average</b>

*\* The data assumes that the buildings are of typical efficiency. Efficiency is measured by building circulation, number of floor levels, and the building layout. Building features to be considered in the assessment are the presence/absence of auxiliary spaces such as auditoriums, pools, common spaces, food service areas, administrative office suites, and multi-purpose spaces. These items have an impact on how the average square foot per student number is applied. The North Campus building was assessed at the higher range of 220 s.f. per student due to the presence of multiple gyms, auditorium, and pool in that facility. The South Campus building was assessed at the averaged 195 s.f. per student given the updated facilities provided. Due to program offerings, there is daily migration of students from the South Campus building to the North Campus building, increasing the periodic utilization and occupancy load of the North Campus building on a regular basis.*

With the adjustment to enrollment in the 2008-2009 year numbers, there was a reduction in the 11-12 grade population at the North Campus Building from the prior year of 86 students. The 9-10 grade population at the South Campus building increased slightly from the prior year by 9 students, and as use/curriculum needs dictate there's a 9-10 grade population migrates to North Campus for classes and activities throughout the day. Though there has been a dip in enrollment this past year, the shared use of the North Campus building by all grades has had little effect on the findings of the previous year's enrollment and utilization analysis.

## **Summary**

The two methods presented for evaluating the utilization efficiency and enrollment capacities of the North and South Campus buildings continue to indicate high building use approaching the upper limits of recommended effective occupant levels, even through a period of slight enrollment decline. The South Campus building enrollment is above its recommended maximum capacity for space, most notable in the crowding of corridors during passing time between classes and use of older, smaller classrooms. As the data indicates, there is presently a small margin of flexibility left in the program schedule and available building space to meet unforeseen changes to the program or student needs in the short term future. In planning for the long term future, it is advisable to examine the options available to adapt and flex the existing District assets in the buildings and site to meet the challenges that may come as the constituent community develops and grows.

SECTION FOUR

**FACILITIES CONDITION ASSESSMENT**

Educational Adequacy Assessments

Building Inspection Reports

Building Energy Use

## **EDUCATIONAL ADEQUACY ASSESSMENTS**

### **Introduction**

In evaluating school building performance, the Educational Adequacy Assessment process reviews the actual program activities use of the building to how the available accommodations and physical space support the requirements of each activity. It should be noted that the North and South Campus buildings, regardless of their physical assets or limitations, both meet the curricular objectives of the District's educational programs. However, much of that is due to administrators and teachers using creative class scheduling and making optimal use of available space, which can affect the quantity of quality instructional time delivered during the school day.

## EDUCATIONAL ADEQUACY ASSESSMENT

**School:** Arrowhead High School – South Campus

**Date of Assessment:** April 21, 2009

**Enrollment:** 1,119 students (10/2009)

**Evaluator:** Gary Woodward/EUA  
Gregg Wiczorek, Principal/AHS South Campus

	MEETS NEED	COMMENTS
<b>1. Site</b>		
<b>General</b>		
a. Enough usable acreage to meet educational needs	YES	1. Vilter Property is a plus for future expansion possibilities.
b. Large enough for future expansion	YES	
c. Play fields, appropriate to age group	YES	
<b>Safety</b>		
a. Separation of car, school bus, and service traffic	NO	1. Traffic plan doesn't adequately meet the volume of traffic and space to deal with needs.
b. Separation of vehicular and pedestrian traffic	NO	1. Heavy car traffic at peak volume times of the day is a problem for students having to cross lanes of traffic traveling to and from the building.
c. Play fields are separate from streets and parking areas	YES	
d. Direct access to play fields without crossing vehicular traffic	YES/NO	
e. Additional Comments		

	MEETS NEED	COMMENTS
<b>2. Lobbies, Corridors &amp; Commons Spaces</b>		
a. Secure Entrance	NO	1. Electronic locks are scheduled to be installed. Entrance is unofficially monitored by sign-in table and visually from the office.
a. Entrances and exits permit efficient and safe traffic flow	YES	
b. Commons areas for student socialization	YES/NO	1. Commons areas exist but are not used because they are not connected to the most used corridors on route to primary classroom areas. 2. Students chose to congregate & socialize along where they are traveling, creating congestion in the narrowest corridors.
c. Size of lobbies/commons spaces supports numbers gathering	YES/NO	1. South Entrance Commons is not used much due to lack of furnishings and being remote from the highest volume of student traffic and main activity areas.
d. Size of corridors	NO	1. Corridors in the original sections of the building are narrow and highly congested with students during passing periods.
e. Additional Comments		1. Corridors would be easier to use and alleviate congestion if there were more open areas to add width to the spaces. 2. Stairways at the two-story section are very congested at the end of the day, particularly at the lower level corridor junction area where they all empty into.

	MEETS NEED	COMMENTS
<b>3. General Building Considerations</b>		
a. Opportunity for student display	YES	
b. Student Storage	YES	
c. Teacher Storage	YES	
d. Room darkening capabilities	YES	
f. Technology	YES/NO	<ol style="list-style-type: none"> <li>1. Wireless capabilities need to be improved and expanded.</li> <li>2. Good integration of Smartboards where possible.</li> </ol>
g. Additional Comments		<ol style="list-style-type: none"> <li>1. Expansion of wireless technology is one of the biggest concerns at the South Campus building.</li> <li>2. Need more segregated and secure storage areas for activities and extra curriculars.</li> </ol>

	MEETS NEED	COMMENTS
<b>4. Administration / Student Services</b>		
a. Adjacent to main entry	YES	
b. Accessible from all areas of building	YES	
c. Reception area sized to accommodate users	YES	
d. Functional adjacencies among offices	YES	
e. Office sizes support activities	YES	1. As enrollment increases, there will be a need for another office for a Dean of Students position.
f. Health room/clinic appropriate for age level	YES	
g. Workroom/ copy area accommodates equipment/storage	YES	
h. Mailboxes	YES	1. As enrollment increases, more mailboxes will be needed for additional staff, requiring additional space.
i. Appropriate furnishings to support activities	YES	
j. Counselors Area	YES	
k. Additional Comments	YES	

	MEETS NEED	COMMENTS
<b>5. Educational Areas</b>		
<b>5A. General Classrooms</b>		
a. Size of space	YES/NO	1. Classrooms located in the original/older sections of the building (Rooms 314-316) are small and don't adequately serve the larger class sections approaching 28 students.
b. Meets current educational program delivery system	YES	

c. Space permits change in educational program	YES/NO	1. Classrooms located in the original/older sections of the building (Rooms 314-316) are too small to accommodate much flexibility.
d. Additional Comments		
<b>5B. Special Education</b>		
a. Location within building	YES	
b. Size of space	YES/NO	1. For L.D., space is great. EBD will be moved to Room 316 next year. Severe Autism is in 317 and it doesn't serve the program well.
c. Meets current educational program delivery system	YES/NO	1. Spaces and locations are fluid and piecemeal in assignment and equipment. The rooms must be right-sized to match the curriculum and needs for each program and student population.
d. Space permits change in educational program	NO	1. The lack of permanence to room locations and other existing challenges to the areas assigned the program prohibit meaningful adjustments to the space to meet changes in educational program.
e. Additional Comments		1. Special education issues are one of the biggest concerns for the South Campus building.
<b>5C. Music Area</b>		
a. Location within building	YES	
b. Size of space	YES	
c. Meets current educational program delivery system	YES	
d. Space permits change in educational program	YES	
e. Instrument Storage	YES	
f. General storage	YES	
g. Additional Comments		1. Riser storage must be improved.
<b>5D. Science Rooms</b>		
a. Location within building	YES	

b. Size of space	YES	
c. Meets current educational program delivery system	YES	
d. Science Storage	YES	
e. Additional Comments		
<b>5E. Art</b>		
a. Location	YES	
b. Size of space	YES/NO	1. Two rooms are well sized, one (Room S805) is too small.
c. Meets current educational program delivery system	YES/NO	1. Two rooms function well, one (Room S805) does not.
d. Space permits change in educational program	YES/NO	1. Two rooms are well sized and flexible, one (Room S805) is too small to flex to changes.
e. Water access within room	YES	
f. Kiln	YES	
g. Ability to provide natural lighting	YES/NO	1. Room S807 has windows; Rooms S805 and S803 do not.
h. Additional Comments		
<b>5F. Tech Ed</b>		
a. Location	YES	
b. Size of space	YES	
c. Meets current educational program delivery system	YES	
d. Space permits change in educational program	YES	
e. Storage	YES	
a. Additional Comments		
<b>5G. FACE</b>		
a. Location	YES	

b. Size of space	YES	
c. Meets current educational program delivery system	YES	
d. Space permits change in educational program	YES/NO	1. Existing folding wall is inadequate (noise, flimsy). Needs to be replaced with a better system.
e. Storage	YES	
f. Additional Comments		
<b>5H. Business</b>		
a. Location	YES	
b. Size of space	YES/NO	1. Number (5 rooms) and size of rooms is inadequate for the number of students served. Two (2) computer labs are very tight.
c. Meets current educational program delivery system	YES	
d. Space permits change in educational program	NO	1. Inflexible due to small size.
e. Additional Comments		
<b>5I. Physical Education</b>		
a. Location	YES	
b. Size of teaching space	YES	
c. Size of locker areas	YES	
d. Meets current educational program delivery system	YES	
e. Space permits change in educational program	YES/NO	1. Weight room size and layout is inadequate. Also access to the space is bad.
f. Storage	YES/NO	1. Storage area for PE and athletic equipment is too small. Additional storage is found in remote spaces and sometimes out in corridors (mats).
g. Additional Comments		
<b>5J. Athletic Department</b>		
a. Location		<i>*Located @ North Campus Building</i>

b. Size of space		
c. Size of locker areas		
d. Storage		
e. Additional Comments		
<b>5K. Multi-purpose classroom</b>		
a. Location	YES	
b. Size of Space	YES	
c. Meets current educational program delivery system	YES	
d. Space permits change in educational program	YES	
f. Additional Comments		1. A room large enough to hold grade level presentations and assemblies at one time would be beneficial. It wouldn't need to be in the South Campus Building, but a larger North Campus Auditorium would do.

	MEETS NEED	COMMENTS
<b>6. Media Center</b>		
a. Location	YES	
b. Size of Space	YES	
c. Meets current educational program delivery system	YES	
d. Space permits change in educational program	YES	
e. Accessible for community use	YES	
f. Additional Comments		1. Carpet needs replacement.

	MEETS NEED	COMMENTS
<b>7A. Teacher Areas - Work Areas</b>		
a. Location	YES	
b. Appropriate equipment for area	YES	
c. Appropriate furnishings to support activities	YES	
d. Room sizes support activities and number of persons utilizing	YES	
e. Additional Comments		1. As enrollment increases, there will be a space crunch to provide more teacher work spaces in the existing space.
<b>7B. Teacher Areas - Lounge</b>		
a. Location	YES	
b. Appropriate equipment for area	YES	
c. Appropriate furnishings to support activities	YES	
d. Room sizes support activities and number of persons utilizing	YES	
e. Additional Comments		1. Area not used much by staff.

	MEETS NEED	COMMENTS
<b>8. Student Dining/Multipurpose Room</b>		
a. Location within building	YES	
b. Capacity of facility	YES	1. Adequate for now, but will be tight if enrollment exceeds 1,200.
c. Flexibility	YES	
d. Appropriate furnishings to support activities	YES	
e. Accessible for Community Use	YES	
<b>9. Food Preparation / Serving</b>		
a. Kitchen & support spaces adequate for food prep	YES	
b. Logical traffic patterns	YES	
c. Serving area convenient to cafeteria entry & kitchen	YES	
d. Delivery location convenient for deliveries	YES	
e. Additional Information		

## EDUCATIONAL ADEQUACY ASSESSMENT

**School:** Arrowhead High School – North Campus

**Date of Assessment:** April 21, 2009

**Enrollment:** 1,116 students (10/2009)

**Evaluator:** Gary Woodward / EUA  
Bonnie Laugerman, Ed. D. Principal/ AHS North Campus

	MEETS NEED	COMMENTS
<b>1. Site</b>		
<b>General</b>		
a. Enough usable acreage to meet educational needs	YES	
b. Large enough for future expansion	YES	
c. Play fields, appropriate to age group	YES	
<b>Safety</b>		
a. Separation of car, school bus, and service traffic	YES	
b. Separation of vehicular and pedestrian traffic	YES/NO	1. Student pedestrian traffic between the Mullet Center, North Campus, and the Tennis Courts should be improved. Safe travel is difficult through vehicular traffic on drives and through the parking lot, especially during winter when the snow is piled high along the roads and parking lot edges.
c. Play fields are separate from streets and parking areas	YES	
d. Direct access to play fields without crossing vehicular traffic	YES/NO	1. Tennis, football, baseball, field hockey no. All others yes.
e. Additional Comments		1. If the Vilter property is developed for athletic fields it would alleviate space needs on main campus, but a safe solution for students crossing Hwy K must be studied. 2. The development of the new west side road access could adversely impact campus traffic volume and safety for pedestrians.

	MEETS NEED	COMMENTS
<b>2. Lobbies, Corridors &amp; Commons Spaces</b>		
a. Secure Entrance	YES/NO	1. Locked doors are identified during the day. 2. Main entrance is unlocked but informally supervised by the office and a sign-in station in the corridor.
a. Entrances and exits permit efficient and safe traffic flow	YES	
b. Commons areas for student socialization	YES	
c. Size of lobbies/commons spaces supports numbers gathering	YES	
d. Size of corridors	YES	
e. Additional Comments		1. If the long-range plan is not to create additional building program area to the west end of the building, it would be advantageous to create a more formal controlled entrance feature at the present location of Door 17. The volume of activity and adjacency of the west parking lot makes this a prime location for building access. Having a secure and supervised entrance with an extended roof overhang would provide a convenient point of welcome and control to the west side of the building.

	MEETS NEED	COMMENTS
<b>3. General Building Considerations</b>		
a. Opportunity for student display	YES	1. Art display cases aren't used much. There could be more display cases and boards incorporated in the academic areas to expand opportunities for the display of all kinds of student work.
b. Student Storage	YES	1. Getting close to full capacity using available corridor lockers without having students share.
c. Teacher Storage	YES	
d. Room darkening capabilities	YES	
f. Technology		1. Wireless capabilities need to be improved and expanded to increase intra/internet access and use. 2. Wireless network capability would allow for the integrated use of laptop computers in curriculum.
g. Additional Comments		1. Interactive student-driven/student owned initiatives in curriculum and learning will mean less time for teachers lecturing in front of a class and more time facilitating hand-on learning directly with students. 2. Technology will enable project- based team learning opportunities and advance exploring beyond the classroom via the internet to expansive resources.

	MEETS NEED	COMMENTS
<b>4. Administration / Student Services</b>		
a. Adjacent to main entry	YES	
b. Accessible from all areas of building	YES	
c. Reception area sized to accommodate users	YES	
d. Functional adjacencies among offices	YES	
e. Office sizes support activities	YES	
f. Health room/clinic appropriate for age level	YES	1. Could use one additional cot in the room.
g. Workroom/ copy area accommodates equipment/storage	YES	
h. Mailboxes	YES	1. As enrollment increases, more mailboxes will be needed for additional staff, requiring additional space.
i. Appropriate furnishings to support activities	YES	
j. Counselors Area	YES	
k. Additional Comments		1. Need more storage for receiving and holding deliveries securely before they can be distributed.

	MEETS NEED	COMMENTS
<b>5. Educational Areas</b>		
<b>5A. General Classrooms</b>		
a. Size of space	YES/NO	1. Foreign Language classrooms located in the original/older sections of the building are small and don't adequately serve the larger class sections approaching 28 students.

b. Meets current educational program delivery system	YES/NO	1. Smaller classrooms are difficult for presentations and small group arrangements.
c. Space permits change in educational program	YES/NO	1. Small classroom sizes are limiting and don't allow for flexibility.
d. Additional Comments		
<b>5B. Special Education</b>		
a. Location within building	YES/NO	1. ED classroom is OK where it is but should be closer to the office. 2. CMC is adequate. 3. Severe special needs can not be accommodated in the North Campus building.
b. Size of space	YES	
c. Meets current educational program delivery system	YES/NO	1. OK for present needs. Should be more integrated in mainstream for future programs.
d. Space permits change in educational program	YES	1. Direction of the program will determine future needs.
e. Additional Comments		1. The future enrollment pressures may require there to be a single special needs center on campus for all grades (developmental levels) Based at South Campus?
<b>5C. Music Area</b>		
a. Location within building	YES	
b. Size of space	YES	
c. Meets current educational program delivery system	YES	
d. Space permits change in educational program	YES	
e. Instrument Storage	YES	
f. General storage	YES	
g. Additional Comments		
<b>5D. Science Rooms</b>		
a. Location within building	YES	1. AP Biology room not large enough for the program. The greenhouse is not adequately used.

b. Size of space	YES	
c. Meets current educational program delivery system	YES	
d. Science Storage	YES	
e. Additional Comments		
<b>5E. Art</b>		
a. Location	YES	
b. Size of space	YES	1. Very large
c. Meets current educational program delivery system	YES	
d. Space permits change in educational program	YES	
e. Water access within room	YES	
f. Kiln	YES	
g. Ability to provide natural lighting	YES	
h. Additional Comments		1. Digital Media lab could expand into one of the adjacent art lab spaces.
<b>5F. Tech Ed</b>		
a. Location	YES	
b. Size of space	YES	
c. Meets current educational program delivery system	YES	
d. Space permits change in educational program	YES	
e. Storage	YES	
a. Additional Comments		1. Improve ventilation for woodshop. 2. Update Metals/Jewelry area. 3. Tech Ed program is very strong with no indication of enrollment decrease.

<b>5G. FACE</b>		
a. Location	YES	
b. Size of space	YES/NO	1. Foods Lab is smaller than it should be for program flexibility. 2. There isn't adequate space for a Working with Children curriculum.
c. Meets current educational program delivery system	YES/NO	1. Present area has no room for program expansion to support broader curriculum offerings. 2. Space needs to be designed and equipped to support allied health profession and childcare exploratories.
d. Space permits change in educational program	NO	1. Only one (1) lab and one (1) classroom available for use.
e. Storage	YES	1. Adequate for present needs.
f. Additional Comments		
<b>5H. Business</b>		
a. Location	YES	1. Adequate for current programming. Three (3) labs, three (3) classrooms.
b. Size of space	YES/NO	1. Accounting lab is too small for student enrollment of sections served.
c. Meets current educational program delivery system	YES	
d. Space permits change in educational program	YES	
e. Additional Comments		1. Will be affected by growth in enrollment. There's no additional space to expand to if numbers demand additional sections of classes.
<b>5I. Physical Education</b>		
a. Location	YES	
b. Size of teaching space	YES	
c. Size of locker areas	YES	
d. Meets current educational program delivery system	YES	
e. Space permits change in educational program	YES	

f. Storage	YES/NO	<ol style="list-style-type: none"> <li>1. West gym needs more storage (storage area would expand if field house is built).</li> <li>2. East gym is a hodge-podge of scattered rooms not all adjacent the gym activity areas.</li> </ol>
g. Additional Comments		<ol style="list-style-type: none"> <li>1. Weight room needs upgrades and expansion.</li> <li>2. There is a need for a fitness center to serve PE and student staff wellness.</li> <li>3. Teaching stations are adequate.</li> <li>4. PE and activity scheduling very complex.</li> </ol>
<b>5J. Athletic Department</b>		
a. Location	YES	
b. Size of space	YES	
c. Size of locker areas	YES/NO	<ol style="list-style-type: none"> <li>1. Athletic programs sometime conflict with PE program needs.</li> </ol>
d. Storage	YES	
e. Additional Comments		<ol style="list-style-type: none"> <li>1. Teachers workroom is used as a department conference room.</li> </ol>
<b>5K. Multi-purpose classroom</b>		
a. Location	YES	<ol style="list-style-type: none"> <li>1. Study hall locations are good and very accessible.</li> </ol>
b. Size of Space	YES	
c. Meets current educational program delivery system	YES/NO	
d. Space permits change in educational program	YES/NO	
f. Additional Comments		<ol style="list-style-type: none"> <li>1. There needs to be a large room that can be scheduled and used for large groups, student presentation work, and staff presentation work (50-100 person capacity).</li> </ol>

	MEETS NEED	COMMENTS
<b>6. Media Center</b>		
a. Location	YES	
b. Size of Space	YES	
c. Meets current educational program delivery system	YES	
d. Space permits change in educational program	YES	
e. Accessible for community use	YES/NO	1. Not normally scheduled or offered for use except for occasional meetings.
f. Additional Comments		

	MEETS NEED	COMMENTS
<b>7A. Teacher Areas - Work Areas</b>		
a. Location	YES	
b. Appropriate equipment for area	YES	
c. Appropriate furnishings to support activities	YES	
d. Room sizes support activities and number of persons utilizing	YES	
e. Additional Comments		
<b>7B. Teacher Areas - Lounge</b>		
a. Location	YES	
b. Appropriate equipment for area	YES	
c. Appropriate furnishings to support activities	YES	
d. Room sizes support activities and number of persons utilizing	YES	
e. Additional Comments		

	MEETS NEED	COMMENTS
<b>8. Student Dining/Multipurpose Room</b>		
a. Location within building	YES	
b. Capacity of facility	YES	1. Space for current capacity is adequate. Will be pressed for efficient space if enrollment increases much beyond present levels.
c. Flexibility	YES	
d. Appropriate furnishings to support activities	YES	
e. Accessible for Community Use	YES	
<b>9. Food Preparation / Serving</b>		
a. Kitchen & support spaces adequate for food prep	YES	1. Space for current production capacity needs is adequate. Will be pressed for more space if enrollment increases demand on food service production.
b. Logical traffic patterns	YES	
c. Serving area convenient to cafeteria entry & kitchen	YES	
d. Delivery location convenient for deliveries	YES	
e. Additional Information		

	MEETS NEED	COMMENTS
<b>10. Auditorium</b>		
a. Location	YES	
b. Size of Space	NO	1. Too small. House capacity for seating should be at least 800 to accommodate grade level assemblies, presentations, shows, concerts, and any other large scale event of interest to the school and public.
c. Lobby	YES/NO	1. Would like the lobby to be dedicated to the auditorium, and have the ability to segregate it (security) from other building areas after hours.
d. Dressing rooms	YES/NO	1. Not well used. Used as storage.
e. Storage	NO	1. Scene shop too small. Safety is an issue for working on scenery and props. 2. Costume/prop storage is inadequate.
f. Additional Comments		1. Upgrade sound system to meet advanced use needs for productions and concerts. 2. Upgrade theatrical lighting for more advanced use during productions. 3. A performance venue with a fully equipped fly space would greatly enhance fine arts productions and learning opportunities.

	MEETS NEED	COMMENTS
<b>11. Pool</b>		
a. Location	YES	
b. Size of Space	YES/NO	1. Adequate for P.E. classes and swimming lessons. Too small for events and large meets.
c. Lobby	NO	1. Door 10 Lobby should be improved for use.
d. Size of locker areas	YES	
e. Storage	YES	
f. Additional Comments		1. A field house/pool lobby concept should be considered for development, similar to Waukesha West HS for efficient use and facility control. 2. Expansion of pool should be considered to better serve all events and community activities that are scheduled for the facility.

## Summary

The findings of this Educational Adequacy Assessment will provide the Arrowhead High School District School District up-to-date tangible information to assess its existing site and building conditions, to better plan for providing optimal learning environments for successful curriculum delivery. At both campuses, academic areas were determined to adequately serve the students and teachers in curriculum delivery. Only the smallest classrooms in the original building sections were assessed as being inadequate.

The primary concern at both buildings was the lack of existing classroom space available to address future enrollment increases and new or expanded programs. Along with that was the desire to create a wireless network to expand technology beyond the classroom setting, enabling a more flexible educational setting to initiate 21<sup>st</sup> Century Learner initiatives. Flexible learning areas within the building are something hoped to be achieved to begin taking advantage of the wireless technology. Such spaces could be out in the open off of corridor or commons areas, and be flexible in use for scheduling and activities. However the ability to have small group project work areas separate from the general classrooms is limited by available space in both buildings.

At North and South Campus, the need for large group areas was strongly indicated for grade level assemblies, presentations, and performances. These spaces would also be used for district staff meetings and training opportunities, as well as being available for co-curricular organizations and community use. Along with the large group area conversation came the recommendation for a larger auditorium at North Campus, both in seating capacity, performance, technology, and support areas. The success of the fine arts programs at Arrowhead has put pressure on the existing facility with larger and higher levels of technical production. Having a venue that can enhance the experience of the audience and elevate the level of the performers is as much a part of the educational experience as it is of the final event. A state-of-the-art facility of the appropriate quality and size that matches the academic core programs and level of talent

Another concern was the lack of adequate central storage space for departments, PE & athletics, and other activities. Planning and expenditure for non-instructional areas such as storage is difficult in the public sector to justify, however it is needed, and as the need increases space is taken wherever available often competing with instructional space needs. Having well planned, segregated and secure storage areas increases operational efficiencies, protects District assets, and establishes boundaries within the building between non-instructional and instructional space use.

Site circulation has become a concern with the enrollment growth since the last major building expansion and increased vehicular traffic due to a high volume of student drivers and on-site activities. With any future development, an emphasis on safety and separation of pedestrian and vehicular traffic must be at the forefront of any consideration for changes or additions to the existing site layout.

## ARROWHEAD UNION HIGH SCHOOL DISTRICT BUILDING INSPECTION REPORT

Building Name: Arrowhead High School – South Campus      Address: 700 North Avenue, Hartland WI 53029

Contact Person: Kevin Lipscomb

Telephone: (262) 369-3611 ext. 4109

Inspector: Gary Woodward – EUA (Architectural)

Date: March 13, 2009

Bert Fredericksen – FEI (HVAC)

Pete Bartnik – Meurmann Engineering (Structural)

Curt Krupp – Meurmann Engineering (Electrical)

Dan Friedrich – Meurmann Engineering (Plumbing)

Tom Perez / Mike Froehlich - Kapur & Associates (Site)

Maintenance Plan: Yes  No

Re-inspection Date: \_\_\_\_\_

Building Data		Use Data	
Total Building Area	209,831 s.f.	Grades Housed	10 & 11
Total Site Area	117.00 acres	Current Enrollment	1,119
Year Built	1955	No. of teaching stations	58
Additions	1957, 1962, 1994, 2000		
Portable Classrooms			
No. of Floors	1- Primary 2 - Partial		

**The assessment of site and building systems identifies the condition of categorized elements observed during inspection, grading for relative fitness by the following criteria for expected service.**

**Good:** The reviewed element has been observed to have the following characteristics.

- Is between the beginning and middle of its expected service life.
- Meets optimum functional and / or performance requirements.
- Requires routine maintenance or minor repair.
- Less than 25% of the element is in substandard condition or has failed.

**Fair:** The reviewed element has been observed to have the following characteristics.

- Is between the middle and end of its expected service life.
- Meets minimum acceptable functional and / or performance requirements.
- Requires attention to repair beyond routine maintenance.
- 25 - 50% of the element is in substandard condition or has failed.

**Poor:** The reviewed element has been observed to have the following characteristics.

- Is at or has passed the end of its expected service life.
- Fails to meet functional and / or performance requirements.
- Requires excessive and constant attention, and major corrective repair.

More than 50 percent of the element is in substandard condition or has failed.

**A: ROOF INSPECTION REPORT**

**\*AVAILABLE THROUGH AUHSD FACILITIES DEPARTMENT\***

**B: EXTERIOR WALLS AND OPENINGS**

TYPES OF EXTERIOR WALLS:

Brick X Block \_\_\_ Wood X Steel \_\_\_ Aluminum X Concrete X Window X Other \_\_\_

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1B. Brick/block deterioration	X			Some isolated areas of minor spalling.
2B. Mortar deterioration	X			Isolated minor areas requiring tuckpointing.
3B. Expansion/control joints	X			
4B. Masonry cracks	X			
5B. Signs of water penetration	X			
6B. Lintels/headers/sills deteriorating	X			
7B. Frames rusted/rotting	X			
8B. Exterior Doors	X			
9B. Windows	X			
Comments:				

**C: STRUCTURAL REPORT**

TYPE OF STRUCTURAL SYSTEM:

Reinforced Concrete X Steel X Wood Frame \_\_\_ Masonry X Other \_\_\_

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1C. Columns	X			
2C. Beams and Framing	X			
3C. Roof deck and support	X			
4C. Bearing walls	X			
5C. Non-bearing	X			
6C.. Foundation walls	X			
7C. Basement slabs	X			
8C. Indoor pool ceilings	X			
Comments:				

## D: HVAC INSPECTION REPORT

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1D. Boilers	X			Boilers are less than 15 years old, have been well maintained and are in very good condition.
2D. Circulating pumps	X			Pumps are variable flow using VFD's.
3D. Piping systems & insulation	X			Piping and associated insulation is in good condition.
4D. Rooftop Units		X		Some of the rooftop units are nearing their expected service life.
5D. Air handling units	X			While relatively old, the indoor air handling units have been well maintained and are in very good condition.
6D. Filters	X			Filters are routinely maintained.
7D. Temperature controls			X	The existing DDC system is no longer supported by the manufacturer and can no longer be expanded.
8D. Humidity control		X		There are known humidity issues in the north classrooms.
<p>Comments:</p> <p>1D. The boilers are sized to accommodate this building only and therefore are not capable of accommodating a large addition or expansion of the building.</p> <p>4D. The rooftop units that were installed in 1994 are now 15 years old and nearing the end of their expected service life. Plans should be made for their replacement over the next 5 years. Units installed in 2000 are still relatively new and will not need replacement for another 10 years or more.</p> <p>5D. It was mentioned that the building occasionally falls under a negative pressure. If the negative pressure is small there is no adverse effect. However, if the negative pressure becomes large there would be energy and comfort control issues. We recommend monitoring the building pressure. If the negative pressure exceeds -.05" water column then a rebalancing of the air systems would be warranted. Nothing in our walk-thru led us to believe that the pressure even approached this level.</p> <p>7D. The temperature controls date back to 1994 and are a system that is no longer supported by the manufacturer. Without manufacturer support future parts availability is not guaranteed making repairs difficult and expensive. Additionally, the District maintenance staff has been very proactive in implementing innovative control strategies to minimize energy use. The control system is now out of memory and can no longer be expanded to accommodate even greater innovation. The best short and long term solution is to obtain competitive bids for the replacement of the existing control system with a new system offering all of the latest advancements in digital control technology.</p> <p>8D. It was reported that the humidity level in six classrooms along the north exposure become so high in the summer that moisture has developed in the carpeting. To alleviate this there has been a humidistat installed with the intention that the gas heating available in the rooftop unit will be used as a reheat source to assist in driving the humidity level down. If this does not work then we recommend that the boilers be fired to allow the heating coils in the vav boxes to serve the reheat needs.</p>				

**E: PLUMBING INSPECTION**

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1E. Restroom Facilities	X			Throughout building
2E. Circulating Pumps		X		Water heater room by boiler room
3E. Water Heaters	X			Water heater room by boiler room
4E. Backflow Protection	X			Boiler room
5E. Sprinkler System				N/A
6E. Gas Piping	X			Boiler room
7E. Roof Drainage		X		Throughout building above and below floor slab
8E. Sanitary Waste System				Throughout building below floor slab
9E. Water Service	X			Receiving room

Comments:

1E. The existing restroom facility plumbing fixtures are in good condition. There are ADA compatible plumbing fixtures throughout the building.

2E. The existing circulating pumps appear to be in good condition. The existing girl's locker room area is not getting sufficient hot water. The existing circulating system should be reviewed for pipe routing and then be balanced.

3E. The domestic hot water system consists of six (6) sealed combustion gas fired water heaters and one (1) sealed combustion gas fired booster heater for the kitchen. The hot water system does have capacity for expansion. However, depending on the location of any additions, it may be more cost effective to add a new water heater to the additions.

7E. The existing roof drainage system appears to be at capacity. Any additions would require a new storm sewer be extended into the additions.

8E. The existing sanitary sewers below the floor have capacity for some expansion. However, depending on the location of any additions, a new sanitary sewer would need to be extended into the additions.

9E. The existing 4" water service to the building does have capacity for expansion. However, depending on the location of any additions, it may be more cost effective to extend a new water service into the additions.

## F: ELECTRICAL INSPECTION

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1F. Main electric service & equipment South Campus 1994	x			New service installed in 1994. Good condition. Has room for future expansion. 277/480 V 1200A
2F. Main electric service & equipment South Campus 1950			x	Fusible switches with distribution original construction. No room for future expansion. 120/208 V 1600A
3F. Secondary distribution equipment	x	x		IF new additions are planned new panels will be required. Varying ages of panels are present. We do not recommend extending or reusing any secondary distribution panels for additions.
4F. Emergency generator	x			Installed as part of the 1994 building project. One distribution branch feeds both EM and non EM loads. The generator appears to have room for small additions.
5F. Interior lighting controls		x		Existing lighting is controlled with a PCI low voltage system.
6F. Fire alarm system	x			Installed in 2000.
7F. Clock system	x			New recently installed Primex GPS system
8F. Intercom system		X		Existing intercom can be extended in its present state.
9F. Telephone/data/television cabling	X			Appears to be serving occupants as required. The systems are expandable
10F. Wide area network		x	x	Owner indicated existing fiber WAN is failing and plans to install new are being reviewed.

**Comments:**

1F. This facility contains 2 separate electric services. This service installed in 1994 is full but has capacity for minor future additions. Modifications to the switchgear will be required if additions are required to this service. Owner indicated Ground fault issues. A coordination study may be required.

2F. The original service also has no space for future additions and is original to the building. The switchgear has exceeded its useful life, we recommend replacement if additions are planned to this service.

4F. Consider installation of emergency generator and automatic transfer switch to power exit lights and egress lighting. Consider installation of second automatic transfer switch to power non-life safety loads, such as boiler and pumps, data server equipment, and phone system to preserve equipment and electronic information.

5F. Consider installing occupancy sensors in all enclosed spaces for automatic shut-off of lighting. Where light fixtures are replaced or remodeling occurs, provide dual level lighting and separate controls for area adjacent to windows for additional energy savings. Also consider replacing light controls with standard low voltage GE "off the shelf" relays and interface to the energy management system. We do not recommend expanding this system.

6F. The system was installed new in approximately 2000. The system has capacity for future expansion. If any building additions are planned, coordination with the fire department will be required to determine if the facility will need additional detection. Possible additions to the existing system may be to add additional strobes and horns to provide proper coverage per code requirements. Owner indicated monitoring services and annunciators are being added.

7F. Clock extension is possible as the district recently installed a wireless Primex system.

8F. Intercom and IP phones are connect to allow Paging through entire facility.

10F. Depending on building expansion or future addition, locations may require providing new WAN fiber.

### G: INTERIOR REPORT

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1G. Smoke enclosure self closing doors	X			
2G. Exit doors-operable hardware	X			
3G. General condition of ceilings	X	X		Low ceilings in older classroom areas showing signs of minor abuse.
4G. General condition of corridor floors	X	X		Some isolated areas of VCT floor cracking.
5G. Handrails at stairs and ramps		X		Not in compliance with current ADA requirements.
6G. General condition of floors	X	X	X	Carpet in library is original and showing effects of considerable use. Classrooms have some isolated areas of VCT floor cracking.
7G. General condition of stairs		X		Stair covering material is showing effects of considerable use.
8G. Fire extinguisher inspection tags	X			
9G. Adequate classroom lighting	X			
10G. Bleachers	X			
11G. Gym flooring	X			
Comments:				

### H: SPECIALTY AREA REPORT

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1H. General condition of Kitchen		X		Flooring is in need of updating. Limited prep and dishwashing area.
2H. Kitchen Equipment	X			
3H. Cafeteria Equipment	X			
4H. General condition of Pool				
5H. Pool Heater				
6H.. Other				
Comments: 2H. Food preparation equipment of various ages and condition. Serving equipment in the cafeteria is new.				

**I: SECURITY**

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1I. Security Systems				
2I. Entrance Supervision			X	Main entrance to the building has a hall monitor.
3I. Entrance Control			X	Main entrance to the building has a hall monitor.
Comments: 1. There is no remote control electronic door lock or monitoring system in place. 2. Security cameras are throughout the building and exterior for security monitoring.				

**J: GROUNDS REPORT – NORTH & SOUTH CAMPUS AREAS**

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS (Refer to corresponding photos)
	GOOD	FAIR	POOR	
1J. Parking Lot – General Notes		X		South Campus parking lots appear to have sufficient capacity, though north lots are at capacity and may require expansion. Traffic flow throughout the campus appears inefficient and confusing; during our inspection one vehicle drove across a sidewalk path to gain access to a parking lot area. Considerable snow removal damage exists throughout the campus
2J. Parking Lot & Pathway Pavement		X		The parking lot pavement appears to be in good repair. Some striping is faded. The parking lot south of the soccer fields is gravel with considerable erosion and the asphalt connector path is deteriorating, as well as the asphalt along the west edge of the soccer field. Considerable settling is occurring around the light pole bases of the north parking lot.
3J. Curb and Gutter			X	Pavement edges, parking lot islands, and turf areas are deteriorating throughout the campus possibly due to a lack of curb and gutter.
4J. Bollards		X		The addition of Bollards near maintenance garage entries and along select walking paths may protect buildings and prevent vehicles from traveling along undesired paths.
5J. Handicap Signage and Ramp			X	The east parking lot of the north campus is missing the Accessible parking signs in front of the stalls. The south campus drop off zone does not have an ADA accessible ramp.

6J. Parking Lot Erosion			X	Major erosion is occurring in drainage areas near the parking lots in several areas of the campus. These include the culverts ends at the east & southeast entrance to the east parking lot of north campus, as well as the southwest corner of the lot itself.
7J. Sidewalks		X		No sidewalk exists along the east side of campus, nor does one connect the ice arena with the school buildings. The sidewalk at the Northwest corner of the south lot of north campus is deteriorating. A low spot exists by the service entry of the north campus.
8J. Fencing		X		Fencing along the east edge of the east parking lot at the south building requires repair and maintenance. The east fence of the south infiltration basin has been damaged by snow removal procedures and requires maintenance and repair. The gate to the main field requires maintenance; the wheel supporting the gate has sunk into the asphalt.
9J. Athletic Fields		X		Concrete slab in Southeast corner of ball fields has settled. Infield of Southwest ball field contains standing water. Backstop in SW corner of large ball field requires maintenance and repair. Northwest ball field contains excessive weed growth, standing water, exposed fence post footings, and the back stop requires maintenance and repair. Erosion is occurring in the swale and grass area leading from the parking lot to the north athletic fields. Track/Football field complex contains standing water at northwest corner.
10J. South Building Internal Courtyard		X		Door landings are 16"x16" pavers that have settled or heaved, causing the doors to rub against the ground while opening. Water from southwest corner does not appear to affectively drain to field inlet. Excessive moss growth is apparent. Field inlet appears to be filled with debris and clogged. Trees have been improperly pruned and maintained within the courtyard.

11J. Drainage & Infiltration Basins		X	Swales leading to both infiltration basins show signs of erosion, standing water, and improper grading. Several pipe outlets to the infiltration basins do not contain end walls and show excessive erosion. The south infiltration basin contains areas of erosion and sediment buildup. The north infiltration area shows signs of wetland establishment. The storm sewer collecting water from the north campus seems inadequately sized. A manhole south of the south building has been left askew on the top of the structure.
12J. Landscaping		X	Minimal foundation landscape exists around existing buildings. An 18" strip of no vegetation exists along sides of the south building. Planters at main entry of both buildings require maintenance/new plantings.
13J. Lighting		X	Photocell lighting system requires adjustment; lights were operating in the middle of the day.
14J. Building Foundation Grading		X	Low spots and areas of settling exist around the building foundations.

## ARROWHEAD UNION HIGH SCHOOL DISTRICT BUILDING INSPECTION REPORT

Building Name: Arrowhead High School – North Campus      Address: 800 North Avenue, Hartland WI 53029

Contact Person: Kevin Lipscomb      Telephone: (262) 369-3611 ext. 4109

Inspector: Gary Woodward – EUA (Architectural)      Date: March 13, 2009

Bert Fredericksen – FEI (HVAC)

Pete Bartnik – Meurmann Engineering (Structural)

Curt Krupp – Meurmann Engineering (Electrical)

Curt Krupp – Meurmann Engineering (Plumbing)

Tom Perez / Mike Froehlich - Kapur & Associates (Site)

Maintenance Plan: Yes  No

Re-inspection Date: \_\_\_\_\_

Building Data		Use Data	
Total Building Area	272,854 s.f.	Grades Housed	11 & 12
Total Site Area	117.00 acres	Current Enrollment	1,116
Year Built	1969	No. of teaching stations	63
Additions	1974, 1989, 2000		
Portable Classrooms			
No. of Floors	1 - Primary Building 2- Phy. Ed (Pool)Area		

**The assessment of site and building systems identifies the condition of categorized elements observed during inspection, grading for relative fitness by the following criteria for expected service.**

**Good:** The reviewed element has been observed to have the following characteristics.

- Is between the beginning and middle of its expected service life.
- Meets optimum functional and / or performance requirements.
- Requires routine maintenance or minor repair.
- Less that 25% of the element is in substandard condition or has failed.

**Fair:** The reviewed element has been observed to have the following characteristics.

- Is between the middle and end of its expected service life.
- Meets minimum acceptable functional and / or performance requirements.
- Requires attention to repair beyond routine maintenance.
- 25 - 50% of the element is in substandard condition or has failed.

**Poor:** The reviewed element has been observed to have the following characteristics.

- Is at or has passed the end of its expected service life.
- Fails to meet functional and / or performance requirements.
- Requires excessive and constant attention, and major corrective repair.
- More that 50 percent of the element is in substandard condition or has failed.

**A: ROOF INSPECTION REPORT**

**\*AVAILABLE THROUGH AUHSD FACILITIES DEPARTMENT\***

**B: EXTERIOR WALLS AND OPENINGS**

TYPES OF EXTERIOR WALLS:

Brick  Block  Wood  Steel  Aluminum  Concrete  Window  Other

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1B. Brick/block deterioration	X			Some isolated areas of minor spalling.
2B. Mortar deterioration	X			Isolated minor areas requiring tuck pointing.
3B. Expansion/control joints	X			
4B. Masonry cracks	X			
5B. Signs of water penetration	X			
6B. Lintels/headers/sills deteriorating	X			
7B. Frames rusted/rotting	X			
8B. Exterior Doors	X			
9B. Windows	X			
Comments:				

**C: STRUCTURAL REPORT**

TYPE OF STRUCTURAL SYSTEM:

Reinforced Concrete  Steel  Wood Frame  Masonry  Other

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1C. Columns	X			
2C. Beams and Framing	X			
3C. Roof deck and support	X			
4C. Bearing walls	X			
5C. Non-bearing	X			
6C.. Foundation walls	X			
7C. Basement slabs	X			
8C. Indoor pool ceilings	X			
Comments:				

## D: HVAC INSPECTION REPORT

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1D. Boilers	X			Boilers are less than 15 years old, have been well maintained and are in very good condition.
2D. Circulating pumps	X			Pumps are variable flow using VFD's.
3D. Piping systems & insulation	X			Piping and associated insulation is in good condition.
4D. Rooftop Units		X		Some of the rooftop units are nearing their expected service life.
5D. Air handling units	X			While relatively old, the indoor air handling units have been well maintained and are in very good condition.
6D. Filters	X			Filters are routinely maintained.
7D. Temperature controls			X	The existing DDC system is no longer supported by the manufacturer and can no longer be expanded.
8D. Pool ventilation	X			The pool ventilation and dehumidification system was upgraded this year.
<p>Comments:</p> <p>1D. The boilers are sized to accommodate this building only and therefore are not capable of accommodating a large addition or expansion of the building. These boilers also serve to heat domestic hot water.</p> <p>4D. The rooftop units that were installed in 1994 are now 15 years old and nearing the end of their expected service life. Plans should be made for their replacement over the next 5 years. Units installed in 2000 are still relatively new and will not need replacement for another 10 years or more.</p> <p>5D. It was mentioned that the building occasionally falls under a negative pressure. If the negative pressure is small there is no adverse effect. However, if the negative pressure becomes large there would be energy and comfort control issues. We recommend monitoring the building pressure. If the negative pressure exceeds <math>-.05''</math> water column then a rebalancing of the air systems would be warranted. Nothing in our walk-thru led us to believe that the pressure even approached this level.</p> <p>7D. The temperature controls date back to 1994 and are a system that is no longer supported by the manufacturer. Without manufacturer support future parts availability is not guaranteed making repairs difficult and expensive. Additionally, the District maintenance staff has been very proactive in implementing innovative control strategies to minimize energy use. The control system is now out of memory and can no longer be expanded to accommodate even greater innovation. The best short and long term solution is to obtain competitive bids for the replacement of the existing control system with a new system offering all of the latest advancements in digital control technology.</p> <p>8D. The pool ventilation and dehumidification system was upgraded this year. The new system utilizes mechanical refrigeration and recovered heat to provide dehumidification for the space. This system is exceptionally efficient and effective. The only concern noted was that chlorine odors were noticeable in the commons area. This is an indication that the pool area is positive relative to the corridor. This should be monitored and the pool unit balanced if the issue persists.</p>				

## E: PLUMBING INSPECTION

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1E. Restroom Facilities	X			Throughout building
2E. Circulating Pumps		X		Water heater room by boiler room
3E. Water Heaters	X	X		Water heater system no. 1 is located in the boiler room. Water heater system no. 2 is located in the storage room by the field house.
4E. Backflow Protection	X			Boiler room
5E. Sprinkler System				N/A
6E. Gas Piping	X			Boiler room
7E. Roof Drainage		X		Throughout building above and below floor slab
8E. Sanitary Waste System				Throughout building below floor slab
9E. Water Service	X			Boiler room
<p>Comments:</p> <p>1E. The existing restroom facility plumbing fixtures are in good condition. There are ADA compatible plumbing fixtures throughout the building.</p> <p>2E. The existing circulating pumps appear to be in good condition. The existing circulating system should be reviewed for proper balancing.</p> <p>3E. Domestic hot water system no. 1 in the boiler room consists of one (1) vertical storage tank with a heat exchanger fed with hot water from the boilers. Hot water system no. 2 located in the storage room by the field house consists of one (1) sealed combustion gas fired water heater. Hot water system no. 1 does have capacity for expansion. However, depending on the location of any additions, it may be more cost effective to add a new water heater to the additions. Hot water system no. 2 does not have capacity for expansion.</p> <p>7E. The existing roof drainage system appears to be at capacity. Any additions would require a new storm sewer be extended into the additions.</p> <p>8E. The existing sanitary sewers below the floor appear to be at capacity. Any additions would require a new sanitary sewer be extended into the additions.</p> <p>9E. The existing 6" water service to the building does have capacity for expansion. However, depending on the location of any additions, it may be more cost effective to extend a new water service into the additions.</p>				

## F: ELECTRICAL INSPECTION

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1F. Main electric service & equipment North Campus Boiler Room			x	Service installed in 1970. Located in Boiler Room. This service is not expandable in its present state. 277/480 V 1600A
2F. Main electric service & equipment North Campus Pool	x			Service installed in pool storage. 277/480 V 1600A. This service is expandable.
3F. Main electric service & equipment North Campus Classroom Wing	x			Service installed in classroom addition. 277/480 V 2000A. This service is expandable
4F. Secondary distribution equipment	x	x		IF new additions are planned new panels will be required. Varying ages of panels are present. We do not recommend extending or reusing any secondary distribution panels for additions.
5F. Emergency generator		x		Installed on the boiler room service. One distribution feeds both EM and non EM loads. The generator appears to have room for small additions.
6F. Interior lighting controls		x		Existing lighting is controlled with a PCI low voltage system.
7F. Fire alarm system	x			Installed in 2000.
8F. Clock system	x			New recently installed Primex GPS system
9F. Intercom system		X		Existing intercom can be extended in its present state.
10F. Telephone/data/television cabling	X			Appears to be serving occupants as required. The systems are expandable
11F. Wide area network		x	x	Owner indicated existing fiber WAN is failing and plans to install new are being reviewed.

**Comments:**

1F. This facility contains 3 separate electrical services. This service was installed in 1970. The switchgear has exceeded its useful life, we recommend replacement if additions are planned to this service.

2F. This service is located near the pool on the north end of the facility. The gear is in good condition and has room for future additions.

3F. This service is located near the classroom addition east side of facility. The gear is in good condition and has room for future additions.

5F. Consider installation of emergency generator and automatic transfer switch to power exit lights and egress lighting. Consider installation of second automatic transfer switch to power non-life safety loads, such as boiler and pumps, data server equipment, and phone system to preserve equipment and electronic information.

6F. Consider installing occupancy sensors in all enclosed spaces for automatic shut-off of lighting. Where light fixtures are replaced or remodeling occurs, provide dual level lighting and separate controls for area adjacent to windows for additional energy savings. Also consider replacing light controls with standard low voltage GE "off the shelf" relays and interface to the energy management system. We do not recommend expanding this system.

7F. The system was installed new in approximately 2000. The system has capacity for future expansion. If any building additions are planned, coordination with the fire department will be required to determine if the facility will need additional detection.

8F. Clock extension is possible as the district recently installed a wireless Primex system.

9F. Intercom and IP phones are connect to allow Paging through entire facility.

11F. Depending on building expansion or future addition, locations may require providing new WAN fiber.

### G: INTERIOR REPORT

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1G. Smoke enclosure self closing doors	X			
2G. Exit doors-operable hardware	X			
3G. General condition of ceilings	X	X		Low ceilings in older classroom areas showing signs of minor abuse.
4G..General condition of corridor floors	X	X		Some isolated areas of VCT floor cracking.
5G. Handrails at stairs and ramps		X		Not in compliance with current ADA requirements.
6G.General condition of all other floors	X	X		Some isolated areas of VCT floor cracking.
7G. General condition of stairs		X		Stair covering material is showing effects of considerable use.
8G. Fire extinguisher inspection tags	X			
9G. Adequate classroom lighting	X			
10G. Bleachers	X	X		Bleachers in gym are in good condition. Bleachers in the pool are in fair condition.
11G. Gym flooring	X			
Comments:				

### H: SPECIALTY AREA REPORT

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1H. General condition of Kitchen	X			
2H. Kitchen Equipment	X			
3H. Cafeteria Equipment	X			
4H. General condition of Pool	X			
5H. Pool Heater	X			
6H.. Other				
Comments:				

**I: SECURITY**

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS
	GOOD	FAIR	POOR	
1I. Security Systems				
2I. Entrance Supervision			X	Main entrance to the building has a hall monitor.
3I. Entrance Control			X	Main entrance to the building has a hall monitor.
Comments: 1. There is no remote control electronic door lock or monitoring system in place. 2. Security cameras are throughout the building and exterior for security monitoring.				

**J: GROUNDS REPORT – NORTH & SOUTH CAMPUS AREAS**

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS (Refer to corresponding photos)
	GOOD	FAIR	POOR	
1J. Parking Lot – General Notes		X		South Campus parking lots appear to have sufficient capacity, though north lots are at capacity and may require expansion. Traffic flow throughout the campus appears inefficient and confusing; during our inspection one vehicle drove across a sidewalk path to gain access to a parking lot area. Considerable snow removal damage exists throughout the campus
2J. Parking Lot & Pathway Pavement		X		The parking lot pavement appears to be in good repair. Some striping is faded. The parking lot south of the soccer fields is gravel with considerable erosion and the asphalt connector path is deteriorating, as well as the asphalt along the west edge of the soccer field. Considerable settling is occurring around the light pole bases of the north parking lot.
3J. Curb and Gutter			X	Pavement edges, parking lot islands, and turf areas are deteriorating throughout the campus possibly due to a lack of curb and gutter.
4J. Bollards		X		The addition of Bollards near maintenance garage entries and along select walking paths may protect buildings and prevent vehicles from traveling along undesired paths.
5J. Handicap Signage and Ramp			X	The east parking lot of the north campus is missing the Accessible parking signs in front of the stalls. The south campus drop off zone does not have an ADA accessible ramp.

6J. Parking Lot Erosion			X	Major erosion is occurring in drainage areas near the parking lots in several areas of the campus. These include the culverts ends at the east & southeast entrance to the east parking lot of north campus, as well as the southwest corner of the lot itself.
7J. Sidewalks		X		No sidewalk exists along the east side of campus, nor does one connect the ice arena with the school buildings. The sidewalk at the Northwest corner of the south lot of north campus is deteriorating. A low spot exists by the service entry of the north campus.
8J. Fencing		X		Fencing along the east edge of the east parking lot at the south building requires repair and maintenance. The east fence of the south infiltration basin has been damaged by snow removal procedures and requires maintenance and repair. The gate to the main field requires maintenance; the wheel supporting the gate has sunk into the asphalt.
9J. Athletic Fields		X		Concrete slab in Southeast corner of ball fields has settled. Infield of Southwest ball field contains standing water. Backstop in SW corner of large ball field requires maintenance and repair. Northwest ball field contains excessive weed growth, standing water, exposed fence post footings, and the back stop requires maintenance and repair. Erosion is occurring in the swale and grass area leading from the parking lot to the north athletic fields. Track/Football field complex contains standing water at northwest corner.
10J. South Building Internal Courtyard		X		Door landings are 16"x16" pavers that have settled or heaved, causing the doors to rub against the ground while opening. Water from southwest corner does not appear to affectively drain to field inlet. Excessive moss growth is apparent. Field inlet appears to be filled with debris and clogged. Trees have been improperly pruned and maintained within the courtyard.

11J. Drainage & Infiltration Basins		X	Swales leading to both infiltration basins show signs of erosion, standing water, and improper grading. Several pipe outlets to the infiltration basins do not contain end walls and show excessive erosion. The south infiltration basin contains areas of erosion and sediment buildup. The north infiltration area shows signs of wetland establishment. The storm sewer collecting water from the north campus seems inadequately sized. A manhole south of the south building has been left askew on the top of the structure.
12J. Landscaping		X	Minimal foundation landscape exists around existing buildings. An 18" strip of no vegetation exists along sides of the south building. Planters at main entry of both buildings require maintenance/new plantings.
13J. Lighting		X	Photocell lighting system requires adjustment; lights were operating in the middle of the day.
14J. Building Foundation Grading		X	Low spots and areas of settling exist around the building foundations.

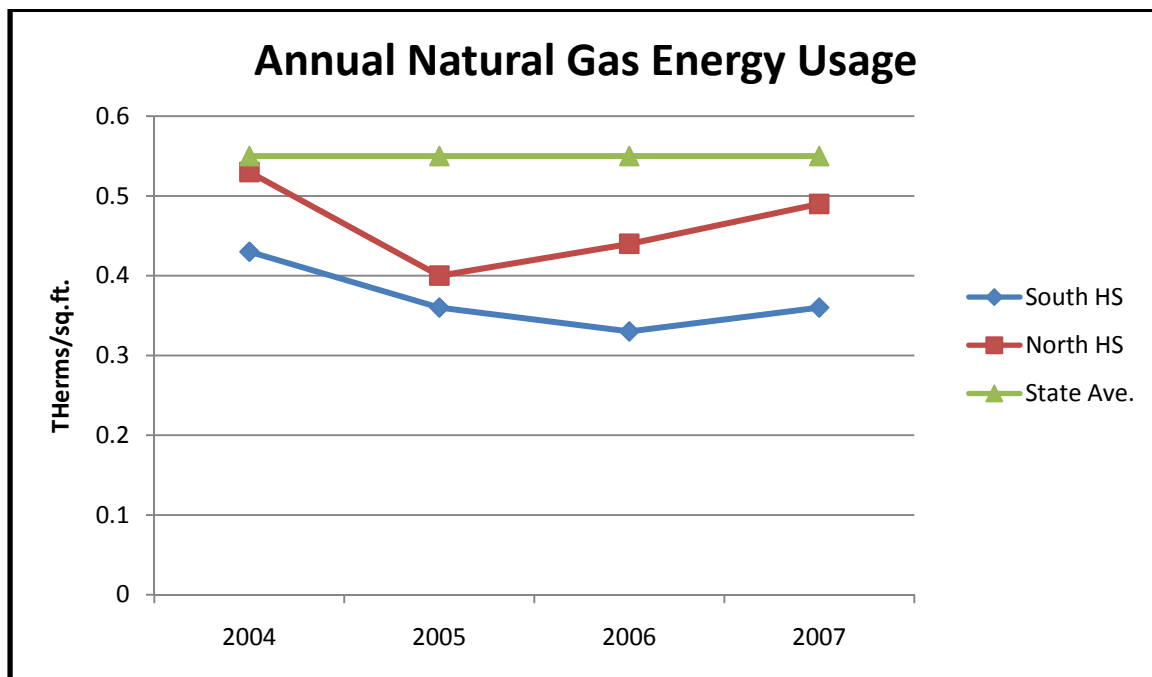
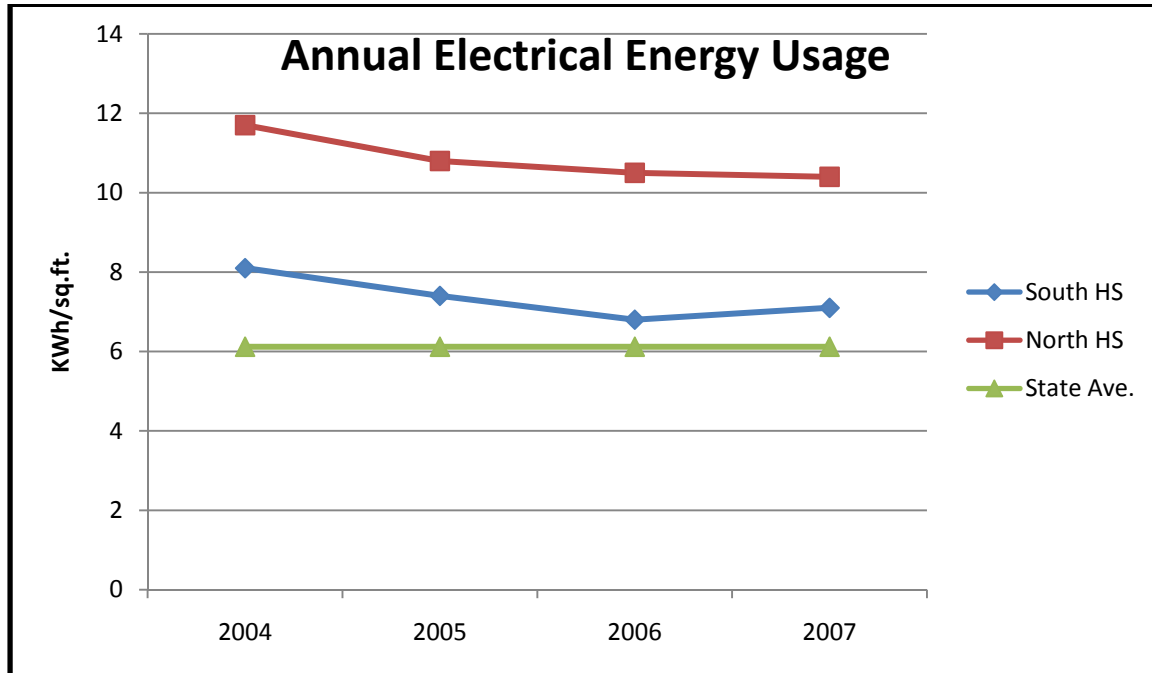
## J: GROUNDS REPORT

INSPECTION ITEM	CONDITION			LOCATION/DESCRIPTION of DEFECTS (Refer to corresponding photos)
	GOOD	FAIR	POOR	
1J. Parking Lot – General Notes		X		South Campus parking lots appear to have sufficient capacity, though north lots are at capacity and may require expansion. Traffic flow throughout the campus appears inefficient and confusing; during our inspection one vehicle drove across a sidewalk path to gain access to a parking lot area. Considerable snow removal damage exists throughout the campus
2J. Parking Lot & Pathway Pavement		X		The parking lot pavement appears to be in good repair. Some striping is faded. The parking lot south of the soccer fields is gravel with considerable erosion and the asphalt connector path is deteriorating, as well as the asphalt along the west edge of the soccer field. Considerable settling is occurring around the light pole bases of the north parking lot.
3J. Curb and Gutter			X	Pavement edges, parking lot islands, and turf areas are deteriorating throughout the campus possibly due to a lack of curb and gutter.
4J. Bollards		X		The addition of Bollards near maintenance garage entries and along select walking paths may protect buildings and prevent vehicles from traveling along undesired paths.
5J. Handicap Signage and Ramp			X	The east parking lot of the north campus is missing the Accessible parking signs in front of the stalls. The south campus drop off zone does not have an ADA accessible ramp.
6J. Parking Lot Erosion			X	Major erosion is occurring in drainage areas near the parking lots in several areas of the campus. These include the culverts ends at the east & southeast entrance to the east parking lot of north campus, as well as the southwest corner of the lot itself.
7J. Sidewalks		X		No sidewalk exists along the east side of campus, nor does one connect the ice arena with the school buildings. The sidewalk at the Northwest corner of the south lot of north campus is deteriorating. A low spot exists by the service entry of the north campus.

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14J. Building Foundation Grading		X		Low spots and areas of settling exist around the building foundations.

## Energy Usage

As part of this report we reviewed energy use in the two buildings and compared it to a data base consisting of all reporting school buildings in the State. This comprises more than 900 buildings covering elementary through high schools.



In reviewing the data shown in the charts we noted three interesting trends. The first thing that we noticed is that the electrical energy usage is running above the State average while the gas usage is

running below the average. We would expect a high school to run higher than average for both electrical and gas usage. This is due to much higher use of these buildings vs. the typical elementary school. Additionally, not all school buildings are air conditioned as these two are. The electrical energy necessary for air conditioning will almost always push a building above the State average. The fact that the natural gas consumption is below average is a significant achievement.

The second thing that jumps out is that the energy usage for North High School is as much as 41% higher than the usage at South High School. Much of this can be attributed to the fact that most of the after school activities occur at North and that North High School has the pool. However, this does not explain the increase in gas usage that occurs in 2006. Because South doesn't show a corresponding increase we cannot blame it on weather conditions. The recent installation of a heat recovery dehumidification system for the pool should show significant results in future gas consumption at North.

The third thing we noticed is that not only is the usage below the State average but there is also a definite downward trend in the building energy use. This can most likely be attributed to the effort maintenance has made toward better control of the building systems. The next step will be to direct additional attention to North and reverse its trend toward more gas usage and further reduce the electrical usage.

While there is still room for improvement, it is clear that there has been progress in energy consumption reduction as there is a definite downward trend in the data. While the 2008/2009 school year consumption data is not complete it definitely appears that it will prove to be a low energy use year. When considering the unusually cold winter a reduction of any kind would represent a significant accomplishment. If the District continues its pattern of updating and upgrading the energy systems there is every reason to believe that continued improvements will be achieved.

SECTION FIVE  
**EMERGING TRENDS IN EDUCATION**

## EMERGING TRENDS IN EDUCATION

**“We must give up a large proportion of the desk work done in schools and instead of enforcing silence encourage our scholars to enter into rational thought.”.....Board of Education 1898**

This quote is very similar to comments made over the last decade...over 100 years later. Change is finally happening, forced mostly by technology but in conjunction with research on multiple intelligences and learning styles.

Historically the classroom has been a “container”, a discipline focused, learning by listening knowledge based system utilizing resources which were directly in the classroom with limited outside exposure.

Today’s classroom is evolving toward “collaboration”, with a just in time, life and work focused and learning while doing approach. Active learning processes such as project based learning provide a wide variety of activities and assessment for the necessary skill acquisition for all learners, workers and community members to be successful in the rapidly evolving era of the 21<sup>st</sup> century.

*“Project based learning is an inquiry based method of teaching and learning that begins with a driving question determined by the students and planning by the teachers. Together they create the theme for the project. Projects are student led and encourage the building of relationships, communication skills, and the use of higher order thinking skills, such as critical thinking to define and solve problems.”*

*- Dr. Susan Wolff*

EUA has developed strategies on how educational facilities can be designed and renovated to support the collaborative environment. The focused approach for existing facilities is as follows.

1. Increase technology in the classroom and provide furniture which allows for organizing the room to support small group activities
2. Modify current under utilized common spaces with wireless hubs and furniture to support small group activities.
3. Look for opportunities in common areas or under utilized classrooms to add “thinkering spaces” to the facility.

*“ThinkeringSpaces are free standing, independent, scalable platform-based installations that are: linked to collections and resources; adaptable to activities that promote productive inquiry; fluid in the interplay of physical and virtual experiences; reconfigurable, independent of building architecture; easily maintained; and self-contained with their own infrastructure. These interactive spaces combine smart multimodal technologies, sensorial objects and symbolic cues to support different modes of interaction as well as learning preferences.”*

*- Heloisa Moura, Dale Fahnstrom and Greg Prygrocki*

The classroom of the future will be “without boundaries” where high school students, in particular, will be accessing resources and instruction from outside both through technology from inside the building and traveling outside the traditional school building. The focus will be on maximizing community/local resources and educational opportunities through off site educational partnerships. A high school student may only spend half their day in the school building, the other half on outside project-based learning.

The traditional high school building will not disappear. The teacher will still be critical to learning basic skills and for facilitation and analysis of offsite projects. Social learning, interaction and extracurricular activities will still be an important part of the future school building.

Examples of partnerships utilizing existing area resources to create greater opportunities or AP classes are: Discovery World Museum for Advanced Mathematics and Science; Junior Achievement for Advanced Political Science, Business and Finance and the Milwaukee Public Museum for Advance History, Linguistics, Sociology and Biology. With strong educational partnerships, a school could teach 1/3 more students in the same facility.

Maximizing community presence is also a trend worth noting, multi-generational opportunities with senior center and daycare on campus and stronger business relationships for school-to- work programs.

Following the outline of the 2020 Vision for Arrowhead Area School Districts, facility planning and design for the future must engage and advance emerging trends in education in support the goals of the 2020 Vision and beyond. The school of the future as it evolves from what we know it as to be today will do the following.

1. Re-structure the relationship between formal and informal learning environments. As technology expands learning opportunities, the where how and when students receive information will change as will how the information translates into instruction and experiential learning. The sequence of place and time becomes more decentralized and personal to the learner, adjusting to abilities and needs.
2. Ownership of technology may change from the “educator/facilitator” to the “learner” The established education provider may serve as a informational hub and repository, with the learners coming to it to access the data and socialize using their own personal portable technologies.
3. The structured learning environment will be defined by how a governmental unit organizes, administers, and records the progress and achievements a student makes through the educational activities they are accountable for providing to their constituents. The physical space required to support those activities must be adaptable to the tangible and intangible changes society, technology, and knowledge advances over time.
4. Physical building plants may become smaller due to flexible attendance schedules, allowing for “outside the box” learning time in sequence with planned activities. A larger number of students can be at a place for learning on their own schedule, spreading-out attendance over a longer period of time which reduces the number of students in any one place at a time. Schools may become more learning/activity center oriented, providing the social interaction important to the student’s educational experience through small and large group project areas and recreational activities.
5. Schools may become more of a small “campus” of laboratories and outside partnerships, equipped with technology that wouldn’t be provided in the home setting but would be in the working worlds of industry, the arts, and technology. Whether the labs are small interconnected structures, stand-alone buildings or outside partnerships is a matter of program and economies. The focus will be on maximizing local resources, not duplicating them.

Buildings and their supporting sites will continue to be needed, to be planned for and adapt to the requirements of new technologies and the way new spaces will need to be created to support a new and changing way of teaching and learning.

*\*Background information is provided in the appendix.*

SECTION SIX  
**RECOMMENDATIONS**

## **RECOMMENDATIONS**

### **Ultimate Enrollment Projection**

It is recommended that the Arrowhead Union High School District establish a plan to monitor residential developments in each of the municipalities serving the district. New developments should be tracked in two ways. First, new developments should be noted for the number of parcels per development. Second, it is recommended that the school district surveys each of the new developments to determine the number of school age children per household (for each new home built). In this way, the growth rate can be tracked against the predicted growth rate shown in this report.

Enrollment projections should be revisited on a regular basis (recommended yearly) to determine the need for facility growth and improvement and the timeframe in which it may be needed.

Based on the information gathered and the distribution of potential household growth at the writing of this report, it is evident that the most significant area of potential growth is in the Town of Merton and Town of Lisbon areas. This growth has been confirmed in discussions with representatives from these municipalities.

Land use plans currently adopted and in effect may be revised over time as municipalities adjust to various economic and political influences. These revisions may affect projected allowable densities which in turn change the impact of potential household growth in the district. Continued monitoring of land use plan revisions is recommended as a yearly task in order to anticipate trends that may affect adjustments to current ultimate household projections.

It should be noted there are a number of extractive and industrial land use areas within the district. It was determined that once many of these areas are no longer being used they will most likely be converted into residential developments. Although a timeframe on this could not be determined, many representatives felt this would happen in the distant future.

- It is recommended that the district monitor the growth in all areas of the district, with special focus on the Merton and Lisbon communities.
- It will be important to establish or continue dialog with each of these municipalities and to work closely with their planning representatives in order to determine the most appropriate timing of potential expansion or possible future schools in the District.

## Facility Development Options

Explore existing site opportunities to locate new educational facilities. The existing North and South Campus buildings are near the end of their feasible expandability both in their physical plant and adjacent supporting site features.

1. The South Campus building was planned for a general classroom addition on the north end, but reasonable site area is limited for any further physical expansion at that location. Proximity to the south property line, the west embankment, the east road, and the stadium to the north are limiting. The building systems infrastructure and site utility services for the South Campus building are also close to the limits of their ability to serve any additional space added beyond what was planned for.
2. The North Campus building has been expanded in size to the point where if it got any larger there would possibly be an adverse effect on operations and learning due to inefficiencies in distance and travel time between program areas. The present building overcame code requirements for fire sprinklering the large new areas by providing fire wall separations between them. The new IBC building code has reduced the size of areas allowed for fire wall separation, and now requires fire sprinklers for smaller areas. Adding significant additions to the North Campus building may require providing a new water service to supply a fire suppression system to the building, as the present water main isn't large enough to supply it. The location of the gyms, pool, and auditorium prohibit expansion to the west, while required road access and parking limit expansion to the north and south. The building systems infrastructure and site utility services for the South Campus building are also close to the limits of their ability to serve any additional space added beyond what was planned for.

Leveraging the possible uses for the district (Vilter) site north of Hwy K, athletic fields presently located on the main campus site could be re-located there to free up new buildable areas within reasonable proximity to the existing buildings. A small campus complex of smaller learning and lab centers could be constructed to alleviate program pressures in the main campus buildings, and provide the flexibility for the developing places where emerging trends in education can be established.

1. Re-locate the Varsity Soccer stadium, soccer practice fields, Varsity Baseball and Softball fields, and dedicated athletic practice fields and facilities to the Vilter site. Development of a school/and community use athletic complex would upgrade facilities, and alleviate event traffic and parking pressures on the main site. Activity fields would be maintained adjacent the primary academic buildings at the main site to support Physical Education and fitness programs.
2. New learning centers would be developed at the vacated field locations, connected by a network of walkways and drives designed to be pedestrian friendly and traffic calming. The location and proximity of these centers would depend upon the programs they house and support.
3. The development of the smaller learning centers would pull program areas common to the North and South campus buildings into one location. This would concentrate resources specific to a learning experience, realizing economies of scale and greater user resources. It would also free-up space within the buildings to refresh and upgrade areas, expand program space internally, and adapt easier to the emerging trends in education within the existing facilities.

4. Learning centers that could be developed will all be technology based, serving such specialized areas as fine arts (a new performing arts center with practice areas and learning labs); vocational tech (labs supporting manufacturing, technical services, allied health, culinary arts); resource/research (learning areas, small and large group areas), and whatever else can be dreamed of.
3. Creating a more campus-oriented site will open the possibility of an open campus concept for access to buildings and programs. Exploring flexible scheduling will distribute the number of students on site at any one time over multiple locations, and reducing the potential population by spreading it out over a longer day. Individual buildings could have their own schedules, and parking lots and drive areas for bus and drop-off/pick-up traffic serve multiple strategically placed transfer locations within proximity of each building. Parking lots will become smaller and more spread-out, being located along a perimeter ring road in close proximity to the various learning centers and activity areas.

Based on current building utilization and the educational adequacy assessments, it is the recommendation of this report that the District proceed with developing a comprehensive facilities master plan for future development of the site. The master plan must be developed in tandem with curriculum, to ensure the matching of facilities to support and advance the goals of curriculum in a proactive measured approach. Facilities development shouldn't be reactive just to one pressure, such as enrollment increases, but must take into account all aspects of growth affecting facilities, curriculum, and operations. The tipping points to consider improvements are as follows.

- Building utilization of general classrooms holds steady in the 85 – 95% range with an acceptable classroom occupant population. If classroom populations exceed a manageable capacity and there are no additional rooms to use, new space must be built
- Specialized class/lab rooms are too small and inadequately equipped for the curriculum and number of students using the rooms. Cost-benefit of remodeling and/or availability of space to expand will determine whether or not new space must be built.

The process to guide Boards of Education to create Master Plans and implement them is long and somewhat tedious. In order to gain the support and trust of constituent communities, the process must be transparent and have significant community involvement along the way so that the goals of the District are understood; That stated needs are seen as real and that the reasons for them are evident; That all options have been explored and that reasonable and responsible decisions are made; And that the community involvement has tempered solutions to have financial feasibility within the capacity of potential support. The following example is of a similar process timeline for consideration.

#### **1. Board of Education Develops a District Facilities Master Plan**

- **3-1/2 to 4-1/2 months.** Assistance by a design professional is recommended for planning, design and programming support. Will require School Board work sessions, either as part of or in addition to regular meetings. A Citizens Advisory Group is recommended to participate with the discussion.

## **2. Citizens Advisory Group**

- **3-1/2 to 4-1/2 months.** A citizens group is appointed by the Board of Education of constituents from all communities to review and affirm the master plan document and supporting facility and enrollment report with the following tasks.
  - Analyze growth trends and projections for the system and the community.
  - Examine financial context for the system that impacts both the short term and long term planning.
  - Analyze stakeholder feedback on programmatic and facility needs.
  - Review state and national standards, current research and best instructional practices, and innovative models from other school districts and communities for facilities implications.
  - Identify/verify facility needs and priorities based upon the reports.
  - Identify and analyze options that meet facility needs and priorities
  - Reach consensus on preferred option or options
  - Prepare findings and recommendations for the Board of Education.

**Citizens Advisory Group presents recommended options and process for consideration to the Board of Education for further study and action plan.**

## **3. Board of Education Action - Options Development**

- **1-1/2 to 2-1/2 months.** Will require School Board work sessions, either as part of or in addition to regular meetings. Assistance by a design professional is recommended for planning, design and programming support to identify the scope of each option for potential phasing and costing information. May include community focus group involvement.

## **4. Conduct Community Survey**

- **1 to 1-1/2 months.** Provide at least 2 - 3 weeks for distribution, response, and return time. Could overlap with Options Development phase, but only if it's far enough along to present conceptual cost and timing information on each option to inform the survey questions. 1-2 weeks to summarize and publish findings.

## **5. Refine a Solution**

- **1 month.** Respond to community survey results. Add/Reduce/Adjust scope and structure of options to refine into one comprehensive solution to best address the consensus needs.

## **6. Implementation Plan**

- **1 month.** Create a plan to implement the solution for final recommendation to the community for approval.

If the final recommendation to the community requires a referendum vote to fund implementation, the referendum must be publicly announced by the Board of Education 45 days prior to the next scheduled election.

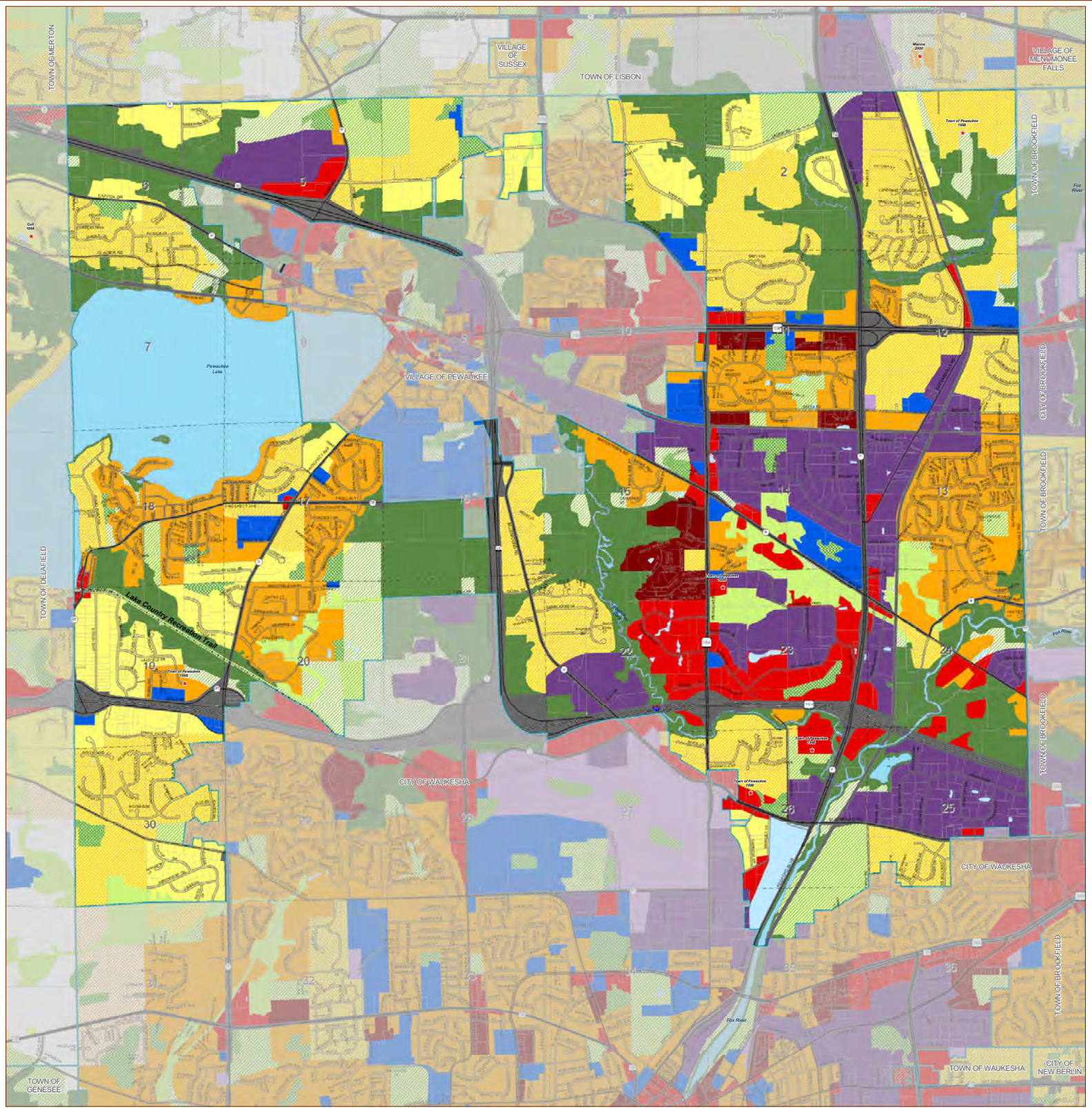
SECTION SEVEN

**APPENDICES**

Land Use Plan Maps

Emerging Trends in Education Reference





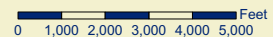
# Recommended Land Use Plan for Waukesha County - 2035 (Draft)

## CITY OF PEWAUKEE

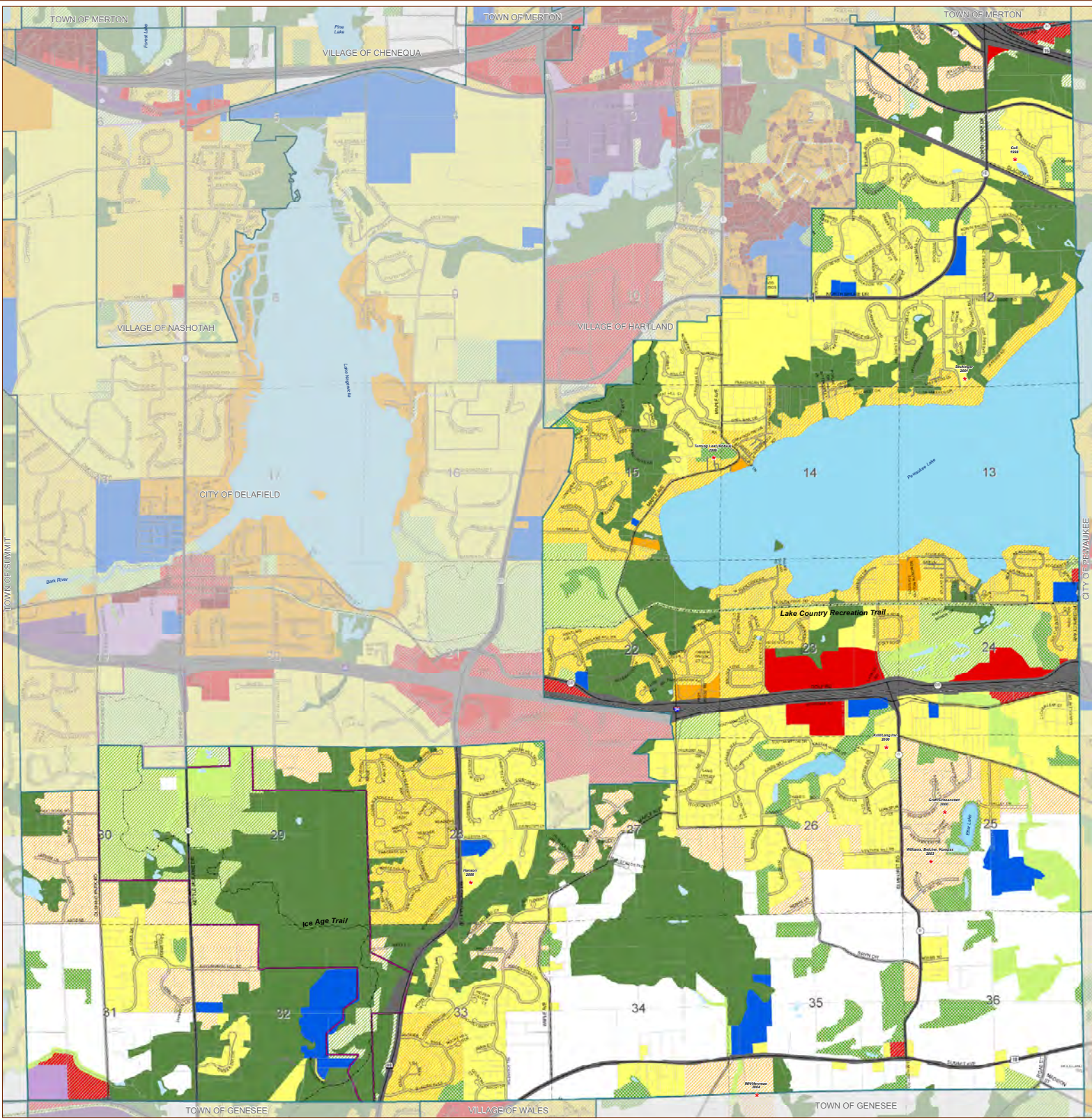
### Land Use Plan Categories

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #800000; border: 1px solid black; margin-right: 5px;"></span> High Density Residential<br/>(Less than 6,000 square feet of area per dwelling unit)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FFA500; border: 1px solid black; margin-right: 5px;"></span> Medium Density Residential<br/>(6,000-19,999 square feet of area per dwelling unit)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FFD700; border: 1px solid black; margin-right: 5px;"></span> Low Density Residential<br/>(20,000 square feet to 1.4 acres of area per dwelling unit)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FFFF00; border: 1px solid black; margin-right: 5px;"></span> Suburban I Density Residential<br/>(1.5 to 2.9 acres of area per dwelling unit)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FFC0CB; border: 1px solid black; margin-right: 5px;"></span> Suburban II Density Residential<br/>(3.0 to 4.9 acres of area per dwelling unit)</li> </ul> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FFFFFF; border: 1px solid black; margin-right: 5px;"></span> Rural Density and Other Agricultural Land<br/>(5.0 to 34.9 acres of area per dwelling unit or equivalent density)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #90EE90; border: 1px solid black; margin-right: 5px;"></span> Prime Agricultural<br/>(35 acres of area per dwelling unit or greater)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #90EE90; border: 1px dashed black; margin-right: 5px;"></span> Other Open Lands to be Preserved</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #90EE90; border: 1px solid black; margin-right: 5px;"></span> Recreational</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #3CB371; border: 1px solid black; margin-right: 5px;"></span> Primary Environmental Corridor</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #90EE90; border: 1px solid black; margin-right: 5px;"></span> Secondary Environmental Corridor</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #3CB371; border: 1px solid black; margin-right: 5px;"></span> Isolated Natural Resource Area</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #ADD8E6; border: 1px solid black; margin-right: 5px;"></span> Surface Water</li> </ul> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #0000FF; border: 1px solid black; margin-right: 5px;"></span> Governmental &amp; Institutional</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FF0000; border: 1px solid black; margin-right: 5px;"></span> Commercial and Office Park</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FF0000; border: 1px dashed black; margin-right: 5px;"></span> Mixed Use</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #800080; border: 1px solid black; margin-right: 5px;"></span> Industrial</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #800080; border: 1px dashed black; margin-right: 5px;"></span> Transportation, Communication &amp; Utilities</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #666666; border: 1px solid black; margin-right: 5px;"></span> Highway and Railway Rights of Way</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #CCCCCC; border: 1px solid black; margin-right: 5px;"></span> Landfill</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #CCCCCC; border: 1px dashed black; margin-right: 5px;"></span> Extractive</li> <li><span style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; margin-right: 5px;"></span> Adopted Wisconsin Department Of Natural Resources Project Boundary</li> <li><span style="display: inline-block; width: 15px; height: 15px; border: 1px dashed black; margin-right: 5px;"></span> Conditional Amendment<br/>(Labeled with Petitioner/Year)</li> <li><span style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; margin-right: 5px;"></span> Major Recreational Trails</li> </ul> |
|--|---|--|

Local Category	Matched To County Category
Agriculture	(No longer exists)
Low Density Res (< 2 AC/DU)	Suburban I Density Res (1.5-2.9 AC/DU)
Low-Med Density Res (.5 AC - 2 AC/DU)	Low Density Res (20000-1.4 AC/DU)
Med Density Res (6500 SF-5 AC/DU)	Medium Density Res (6000-19,999 SF/DU)
High Density Res (< 6500 SF/DU)	High Density Res (< 6000 SF/DU)
Office Commercial	Commercial and Office Park
Retail/Service Commercial	Commercial and Office Park
Mixed Commercial	Commercial and Office Park
Manufacturing/Fabrication/Warehousing	Industrial
Mining	(No longer exists)
Governmental/Institutional	Governmental and Institutional
Transportation/Utilities	Transportation, Communication & Utilities
Park and Recreation	Recreational
Environmental Corridors	PEC/SEC/NRA/Other Open Lands
Water	Surface Water



Environmental Corridor information from SEWRPC Environmental Corridor Inventory 2000  
 Prepared By The Waukesha County Department of Parks And Land Use September 29, 2008.



# Recommended Land Use Plan for Waukesha County - 2035 (Draft)

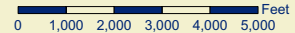
## TOWN OF DELAFIELD

**Land Use Plan Categories**

- High Density Residential  
(Less than 6,000 square feet of area per dwelling unit)
- Medium Density Residential  
(6,000-19,999 square feet of area per dwelling unit)
- Low Density Residential  
(20,000 square feet to 1.4 acres of area per dwelling unit)
- Suburban I Density Residential  
(1.5 to 2.9 acres of area per dwelling unit)
- Suburban II Density Residential  
(3.0 to 4.9 acres of area per dwelling unit)
- Rural Density and Other Agricultural Land \*  
(5.0 to 34.9 acres of area per dwelling unit or equivalent density)
- Prime Agricultural  
(35 acres of area per dwelling unit or greater)
- Other Open Lands to be Preserved
- Recreational
- Primary Environmental Corridor
- Secondary Environmental Corridor
- Isolated Natural Resource Area
- Surface Water

- Governmental & Institutional
- Commercial and Office Park
- Mixed Use
- Industrial
- Transportation, Communication & Utilities
- Highway and Railway Rights of Way
- Landfill
- Extractive
- Adopted Wisconsin Department Of Natural Resources Project Boundary
- Conditional Amendment (Labeled with Petitioner/Year)
- Major Recreational Trails

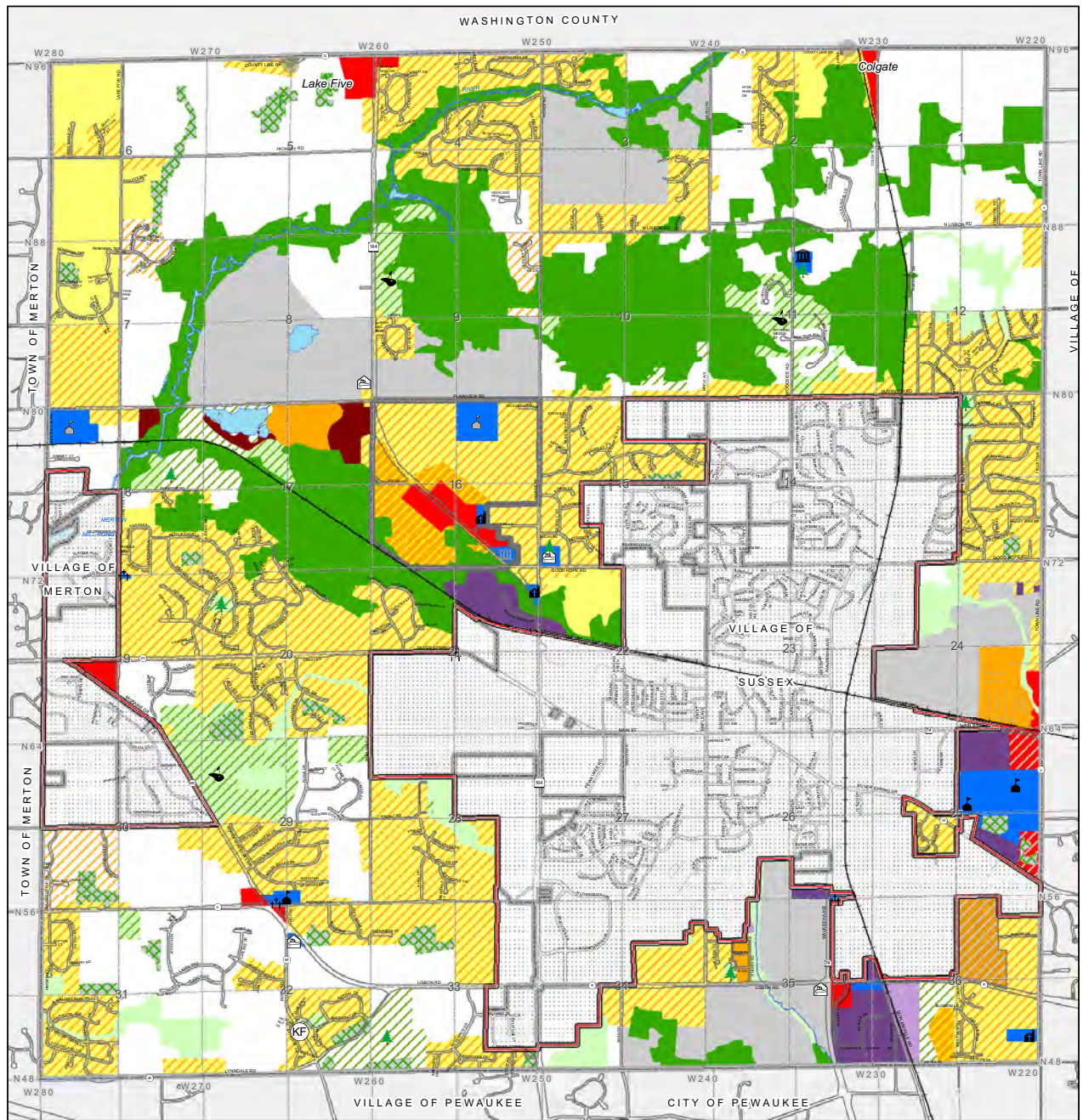
Local Category	Matched To County Category
Conservation	PEC/SEC/INRA/Open Lands
Conventional Residential (> 1.5 AC)	Suburban I Density
I-94 Corridor Development	Commercial and Office Park/Mixed Use
Institutional	Governmental and Institutional
Pewaukee Lake Redevelopment	Low Density Residential
Recreational	Recreational
Roadside Mixed-Use Development	Mixed Use
Rural Residential	Suburban I Density



Environmental Corridor information from SEWRPC Environmental Corridor Inventory 2000 Prepared By The Waukesha County Department Of Parks And Land Use September 29, 2008.

\* Refer to Town of Delafield Land Use Plan Unit Determination Chart for permissible rural density

# ADOPTED LAND USE PLAN TOWN OF LISBON

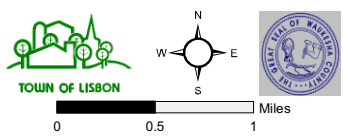


## LAND USE PLAN CATEGORIES

- |                                  |  |                                  |                                |  |                         |
|----------------------------------|--|----------------------------------|--------------------------------|--|-------------------------|
| High Density Residential         | Suburban I Density Residential               | Other Open Lands To Be Preserved | Recreational                   | Commercial (Special Use)   | Extractive              |
| Medium Density Residential       | Suburban II Density Residential              | Prime Agricultural               | Isolated Natural Resource Area | Transportation, Comm. & Utilities                                      | Landfill                |
| Low - Medium Density Residential | Rural Density Res., Other Ag. and Open Lands | Primary Environmental Corridor   | Commercial                     | Governmental & Institutional   | Industrial              |
| Low Density Urban Residential    | Urban Reserve                                | Secondary Environmental Corridor | Commercial (Office)            | Mixed Special Use (Light Industrial, Light Manufacturing, Office Park) | Boundary Agreement Area |

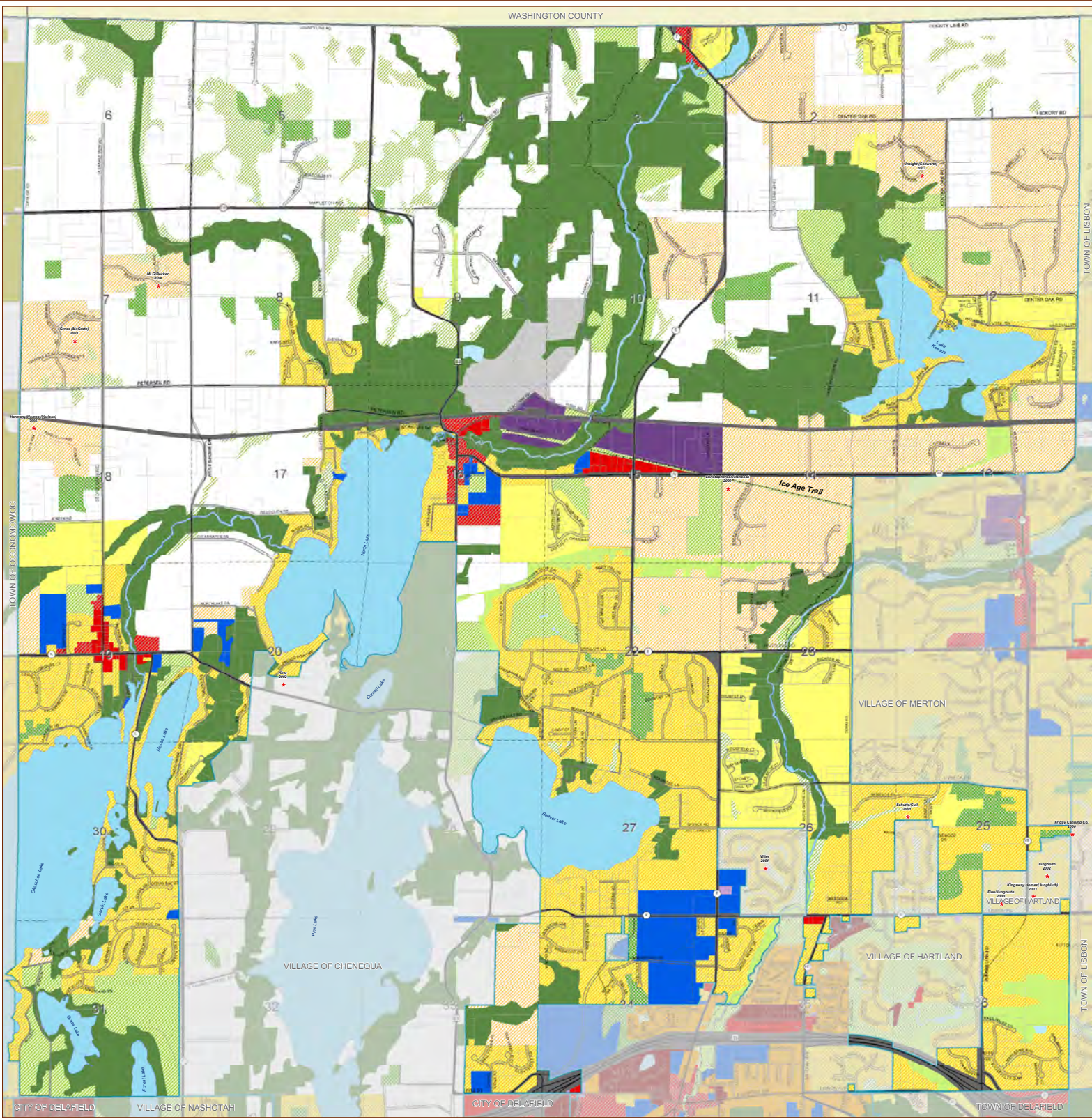
**STH 164 CORRIDOR MIXED USE SEWERED AREA**

The area within this boundary, in accordance with the Boundary Agreement with the Village of Sussex, consists of approximately 511 acres and will be a mixed land use area with no more than 60 acres of commercial use; a residential density of no more than one house per .71 acres; and a total sewer capacity for the area of no more than 231,000 gallons per day. The actual configuration of the land uses within this area is contingent upon a neighborhood plan approved by the Town of Lisbon Plan Commission.



Adopted by Town Plan Commission 10/07/04,  
Town Board 10/11/04, and Waukesha County  
Board of Supervisors 04/29/05  
Correction made on Jan. 9, 2006  
(Bound. Agreement in Sec. 33 and Plan Area in Sec 24)  
Formally Amended April 2006, May 2007

Prepared by the Waukesha County Department of  
Parks and Land Use



# Recommended Land Use Plan for Waukesha County - 2035 (Draft)

## TOWN OF MERTON

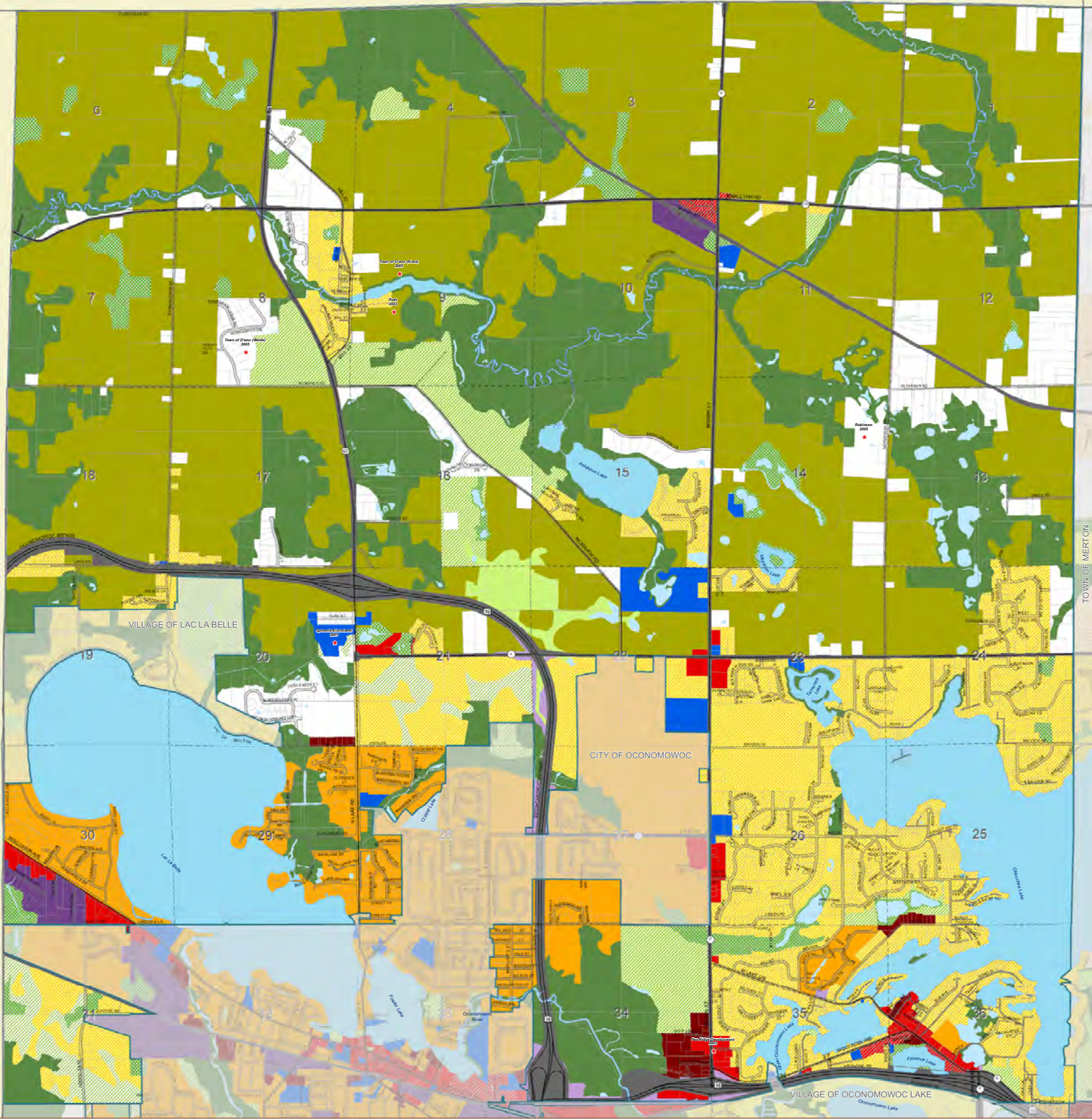
### Land Use Plan Categories

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #800000; border: 1px solid black; margin-right: 5px;"></span> <b>High Density Residential</b><br/>(Less than 6,000 square feet of area per dwelling unit)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FFA500; border: 1px solid black; margin-right: 5px;"></span> <b>Medium Density Residential</b><br/>(6,000-19,999 square feet of area per dwelling unit)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FFD700; border: 1px solid black; margin-right: 5px;"></span> <b>Low Density Residential</b><br/>(20,000 square feet to 1.4 acres of area per dwelling unit)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FFFF00; border: 1px solid black; margin-right: 5px;"></span> <b>Suburban I Density Residential</b><br/>(1.5 to 2.9 acres of area per dwelling unit)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FFD700; border: 1px dashed black; margin-right: 5px;"></span> <b>Suburban II Density Residential</b><br/>(3.0 to 4.9 acres of area per dwelling unit)</li> </ul> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FFFFFF; border: 1px solid black; margin-right: 5px;"></span> <b>Rural Density and Other Agricultural Land</b><br/>(5.0 to 34.9 acres of area per dwelling unit or equivalent density)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #90EE90; border: 1px solid black; margin-right: 5px;"></span> <b>Prime Agricultural</b><br/>(35 acres of area per dwelling unit or greater)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #D3D3D3; border: 1px solid black; margin-right: 5px;"></span> <b>Other Open Lands to be Preserved</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #90EE90; border: 1px dashed black; margin-right: 5px;"></span> <b>Recreational</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #3CB371; border: 1px solid black; margin-right: 5px;"></span> <b>Primary Environmental Corridor</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #90EE90; border: 1px dashed black; margin-right: 5px;"></span> <b>Secondary Environmental Corridor</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #3CB371; border: 1px dotted black; margin-right: 5px;"></span> <b>Isolated Natural Resource Area</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #ADD8E6; border: 1px solid black; margin-right: 5px;"></span> <b>Surface Water</b></li> </ul> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #0000FF; border: 1px solid black; margin-right: 5px;"></span> <b>Governmental &amp; Institutional</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FF0000; border: 1px solid black; margin-right: 5px;"></span> <b>Commercial and Office Park</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #FF0000; border: 1px dashed black; margin-right: 5px;"></span> <b>Mixed Use</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #800080; border: 1px solid black; margin-right: 5px;"></span> <b>Industrial</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #800080; border: 1px dashed black; margin-right: 5px;"></span> <b>Transportation, Communication &amp; Utilities</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #696969; border: 1px solid black; margin-right: 5px;"></span> <b>Highway and Railway Rights of Way</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #A9A9A9; border: 1px solid black; margin-right: 5px;"></span> <b>Landfill</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #A9A9A9; border: 1px dashed black; margin-right: 5px;"></span> <b>Extractive</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; margin-right: 5px;"></span> <b>Adopted Wisconsin Department Of Natural Resources Project Boundary</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; border: 1px dashed black; margin-right: 5px;"></span> <b>Conditional Amendment (Labeled with Petitioner/Year)</b></li> <li><span style="display: inline-block; width: 15px; height: 15px; border-bottom: 1px solid black; margin-right: 5px;"></span> <b>Major Recreational Trails</b></li> </ul> |
|--|---|--|

Local Category	Matched To County Category
Rural Lands (3 AC or greater)	Suburban II Density Residential
Suburban Estate (1.5-4.9 AC)	Suburban I Density Residential
Low Density Residential (1 AC)	Low Density Residential
Medium Density Residential (.75 AC)	Low Density Residential
High Density Residential (.5 AC)	Low Density Residential
Primary Environmental Corridor	Primary Environmental Corridor
Secondary Environmental Corridor	Secondary Environmental Corridor
Isolated Natural Resource Area	Isolated Natural Resource Area
Public Lands	Recreational/Governmental & Institutional
Commercial	Commercial and Office Park
Light Industrial	Industrial
Quarry	Extractive
Water	Surface Water
Mixed Use	Mixed Use

0 1,000 2,000 3,000 4,000 5,000 Feet

Environmental Corridor information from SEWRPC Environmental Corridor Inventory 2000  
Prepared By The Waukesha County Department Of Parks And Land Use September 29, 2008.

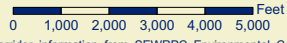


## Recommended Land Use Plan for Waukesha County - 2035 (Draft) TOWN OF OCONOMOWOC

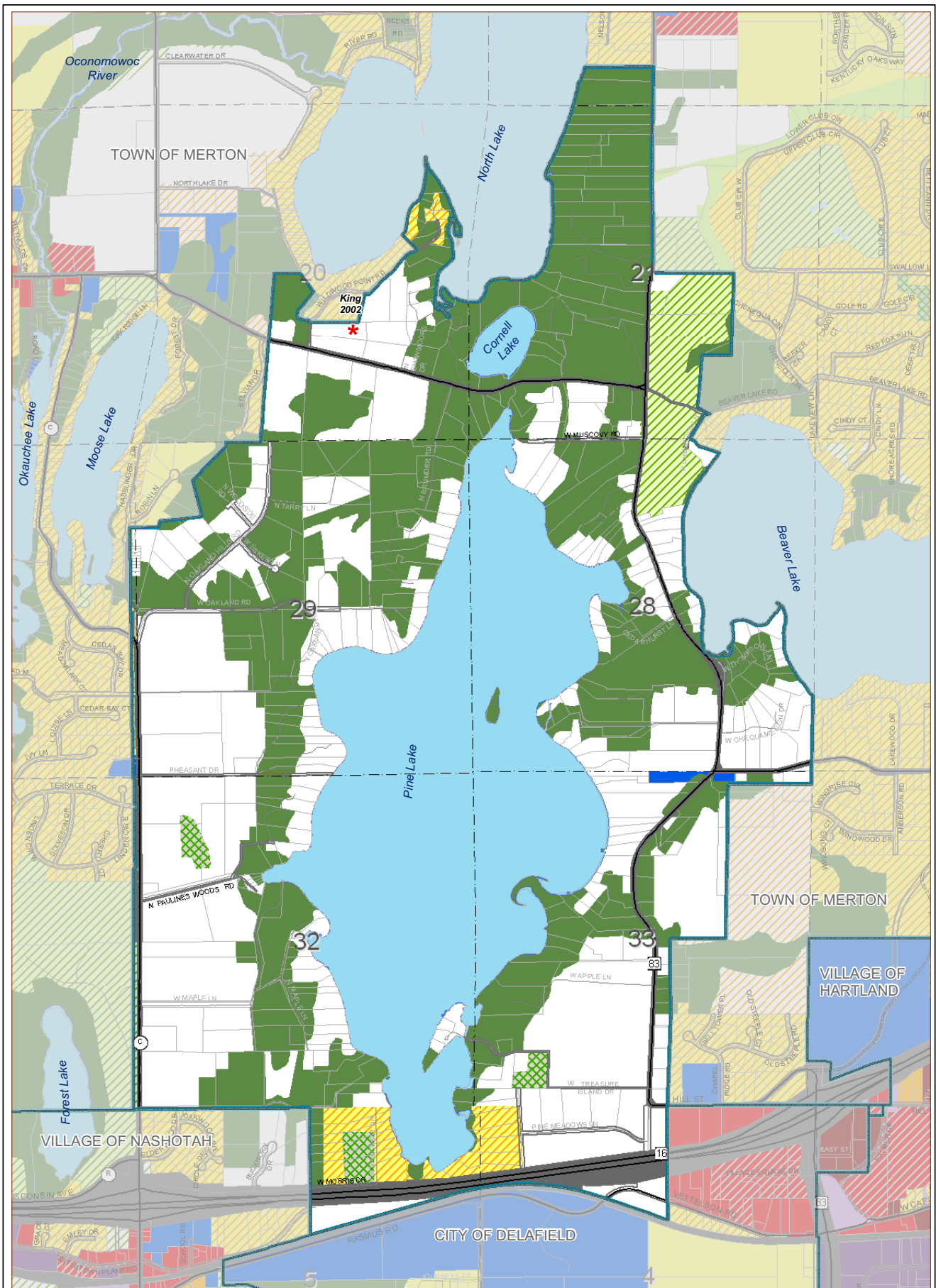
**Land Use Plan Categories**

- High Density Residential  
(Less than 6,000 square feet of area per dwelling unit)
- Medium Density Residential  
(6,000-19,999 square feet of area per dwelling unit)
- Low Density Residential  
(20,000 square feet to 1.4 acres of area per dwelling unit)
- Suburban I Density Residential  
(1.5 to 2.9 acres of area per dwelling unit)
- Suburban II Density Residential  
(3.0 to 4.9 acres of area per dwelling unit)
- Rural Density and Other Agricultural Land  
(5.0 to 34.9 acres of area per dwelling unit or equivalent density)
- Prime Agricultural  
(35 acres of area per dwelling unit or greater)
- Other Open Lands to be Preserved
- Recreational
- Primary Environmental Corridor
- Secondary Environmental Corridor
- Isolated Natural Resource Area
- Surface Water
- Governmental & Institutional
- Commercial and Office Park
- Mixed Use
- Industrial
- Transportation, Communication & Utilities
- Highway and Railway Rights of Way
- Landfill
- Extractive
- Adopted Wisconsin Department Of Natural Resources Project Boundary
- Conditional Amendment (Labeled with Petitioner/Year)

Local Category	Matched To County Category
35 Acre Agricultural	Prime Agricultural
Five Acre Agricultural	Rural Density and Other Agricultural Land
Low Density Residential	Low Density Residential
Medium Density Residential	Medium Density Residential
Multi-Family Residential	High Density Residential
Commercial	Commercial and Office Park
Industrial	Industrial
Institutional	Governmental and Institutional
Recreational	Recreational
Environmental Corridor	PEC/SEC/INRA depending on current category
DOT	Transportation, Communication & Utilities



Environmental Corridor information from SEWRPC Environmental Corridor Inventory 2000  
Prepared By The Waukesha County Department Of Parks And Land Use September 29, 2008.



**Recommended Land Use Plan for Waukesha County - 2035 (Draft)**  
**VILLAGE OF CHENEQUA**

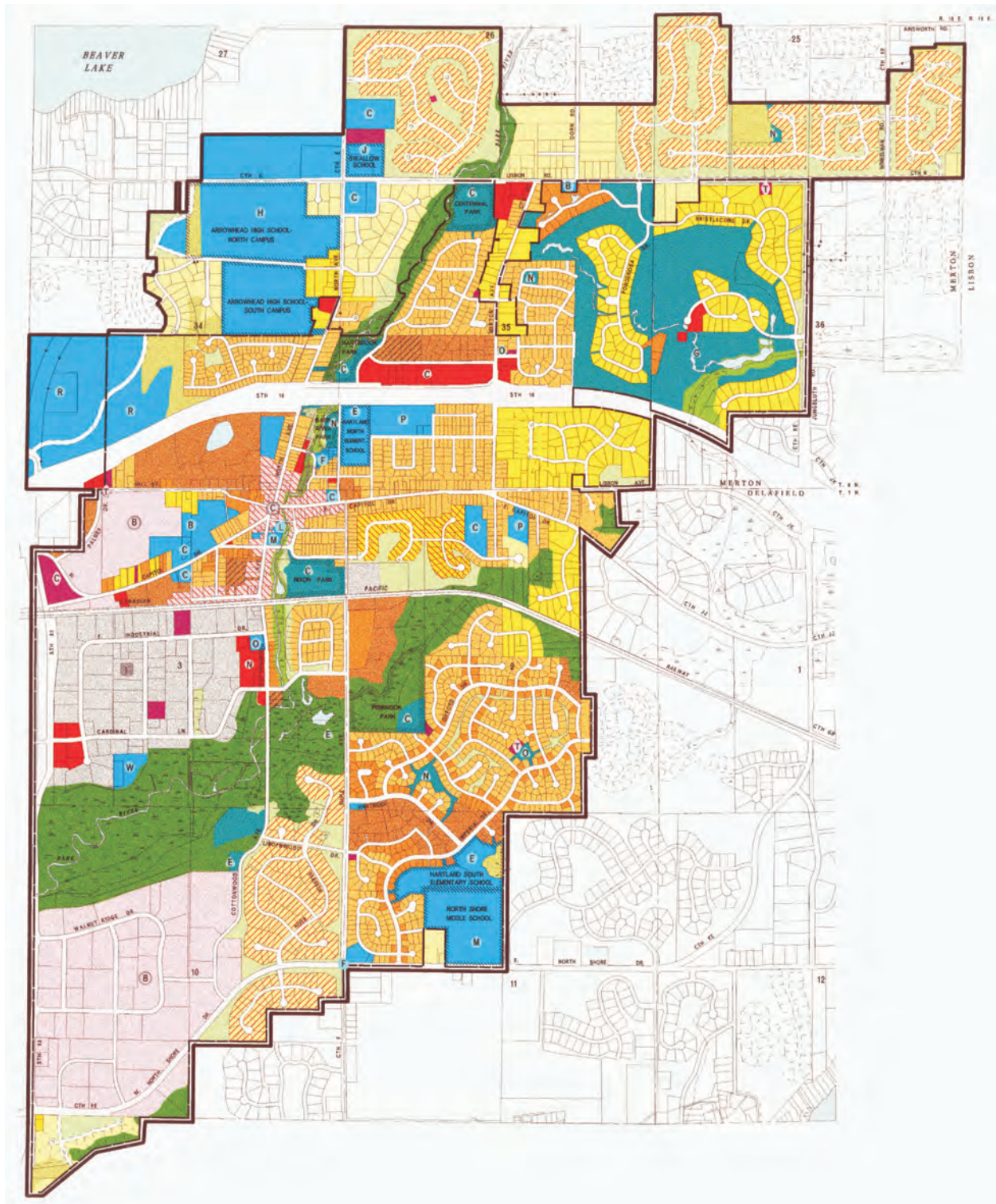
Land Use Categories			
High Density Residential (Less than 6,000 square feet of area per dwelling unit)	Suburban I Density Residential (1.5 to 2.9 acres of area per dwelling unit)	Other Open Lands to be Preserved	Commercial and Office Park
Medium Density Residential (6,000-19,999 square feet of area per dwelling unit)	Suburban II Density Residential (3.0 to 4.9 acres of area per dwelling unit)	Recreational	Mixed Use
Low Density Residential (20,000 square feet to 1.4 acres of area per dwelling unit)	Rural Density and Other Agricultural Land (5.0 to 34.9 acres of area per dwelling unit or equivalent density)	Primary Environmental Corridor	Industrial
	Prime Agricultural (35 acres of area per dwelling unit or greater)	Secondary Environmental Corridor	Transportation, Communication & Utilities
		Isolated Natural Resource Area	Highway and Railway Rights of Way
		Surface water	Landfill
		Governmental & Institutional	Extractive

0 500 1,000 1,500 2,000 2,500 Feet

Environmental Corridor information from  
 SEWRPC Environmental Corridor  
 Inventory 2000. Prepared By The  
 Waukesha County Department Of  
 Parks And Land Use September 29, 2008.

## Map 8-2

### RECOMMENDED MASTER PLAN FOR THE VILLAGE OF HARTLAND PLANNED URBAN SERVICE AREA: 2020



Source: SEWRPC.

# Recommended Land Use Plan for Waukesha County - 2035 (Draft) VILLAGE OF MERTON

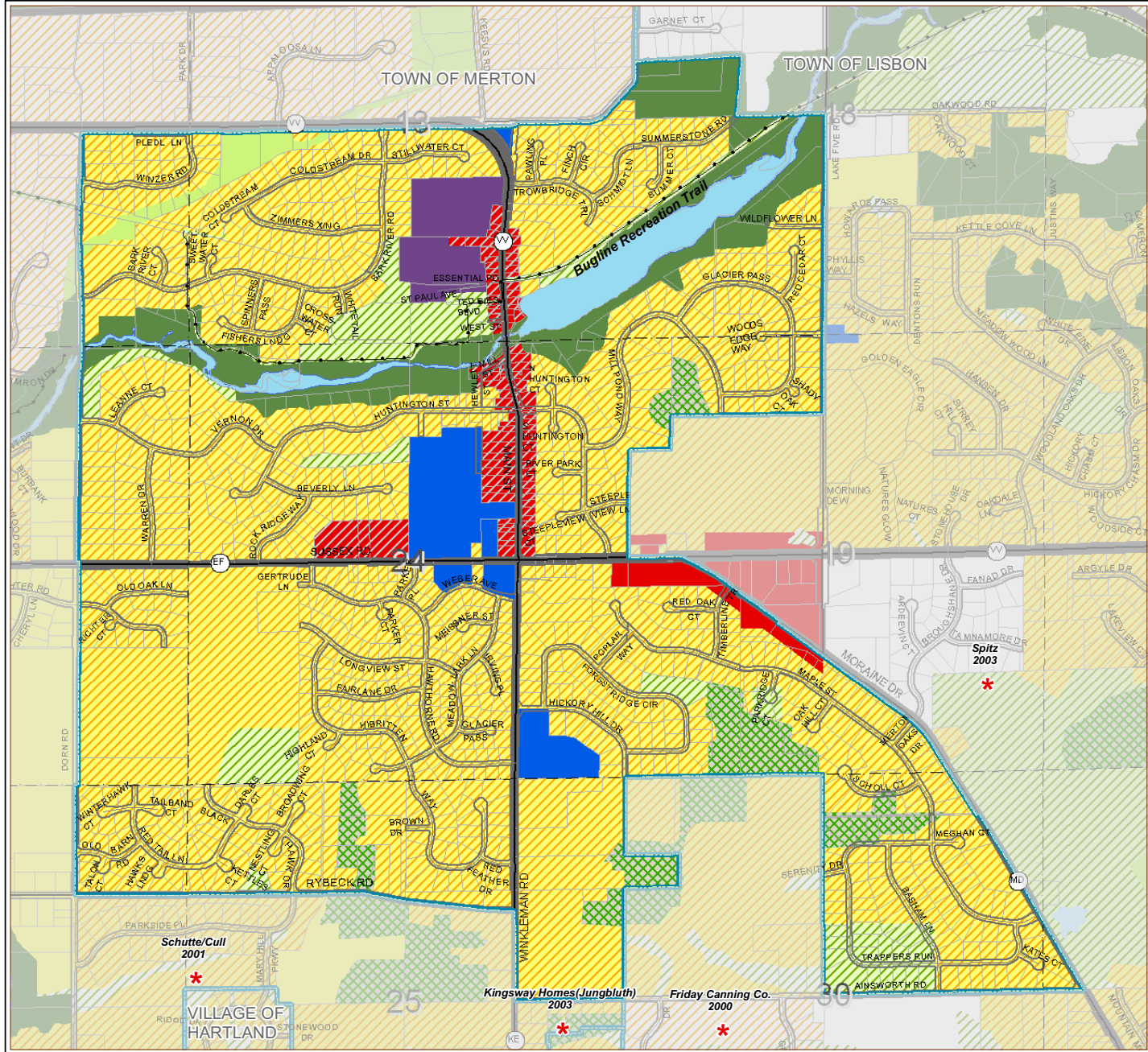
## Land Use Plan Categories

- High Density Residential  
(Less than 6,000 square feet of area per dwelling unit)
- Medium Density Residential  
(6,000-19,999 square feet of area per dwelling unit)
- Low Density Residential  
(20,000 square feet to 1.4 acres of area per dwelling unit)
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(1.5 to 2.9 acres of area per dwelling unit)
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- Isolated Natural Resource Area
- Surface Water
- Governmental & Institutional
- Commercial and Office Park
- Mixed Use
- Industrial
- Transportation, Communication & Utilities
- Highway and Railway Rights of Way
- Landfill
- Extractive
- Adopted Wisconsin Department Of Natural Resources Project Boundary
- Conditional Amendment (Labeled with Petitioner/Year)
- Major Recreational Trails

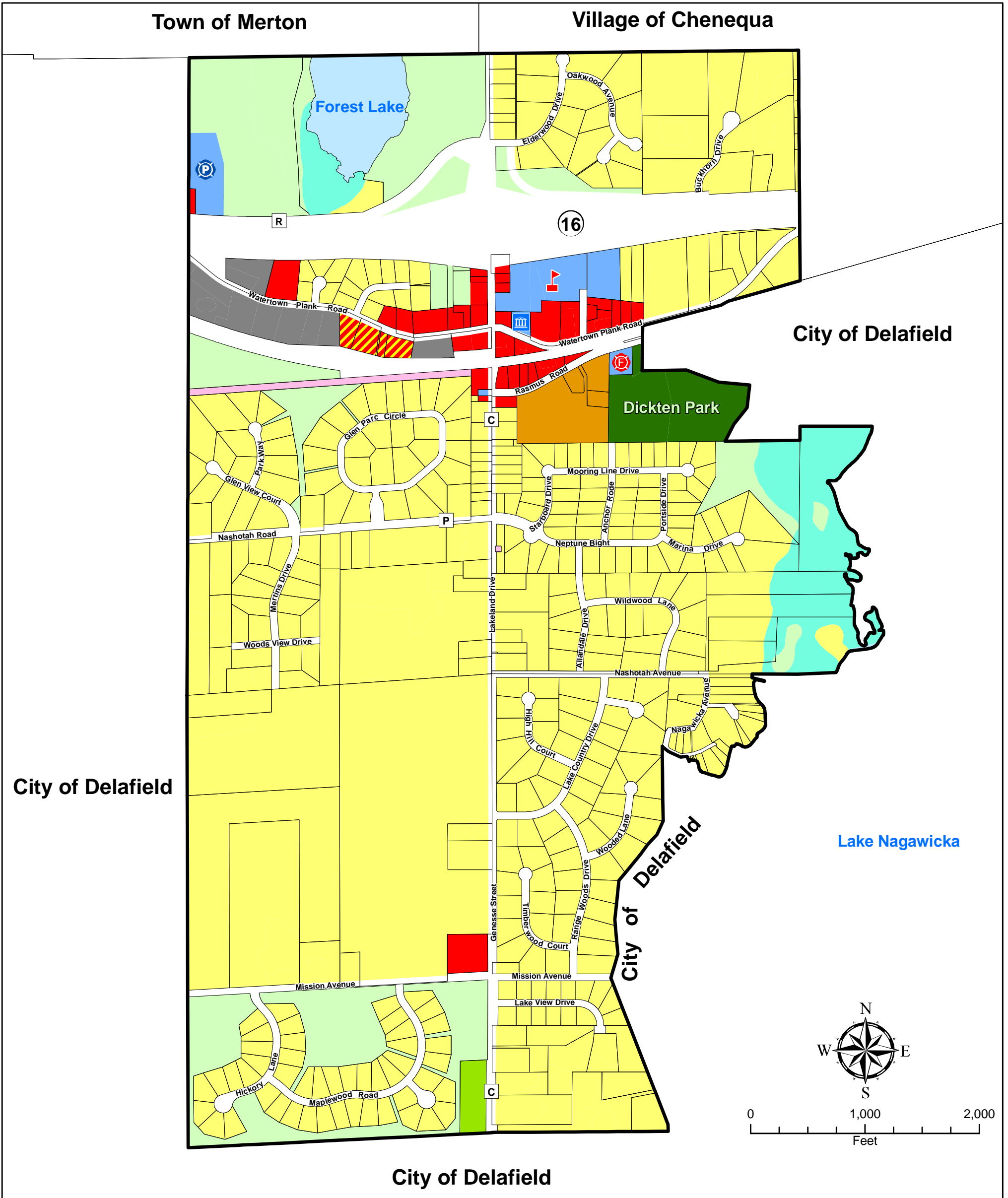
Local Category	Matched To County Category
Low Density Residential (1.3 AC)	Low Density Residential
Medium Density Residential (16,999-20,000 sq. ft.)	Medium Density Residential
Medium Density Residential II (20,000-1.0 AC)	Low Density Residential
Rural Residential and Agricultural (0.7 AC)	Suburban II Density Residential
Mixed Use Areas	Mixed Use
Commercial	Commercial and Office Park
Government and Institutional	Governmental and Institutional
Communications and Utilities	Transportation, Communication, & Utilities
Light Industrial/Professional Office	Industrial
Extractive	Extractive
Landfills and Dumps	Landfill
Composites	Governmental and Institutional
Biological/Recreational	Recreational
Existing Public Park and Recreational	Recreational
Wetlands	Primary Environmental Corridor
Woodlands	PEC, SEC, or INRA
Surface Water	Surface Water
Proposed Public Park and Recreational	Recreational





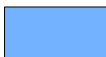




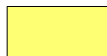



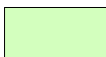



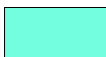


Environmental Corridor information from SEWSPC Environmental Corridor Inventory 2000. Prepared By The Waukesha County Department Of Parks And Land Use September 29, 2008.

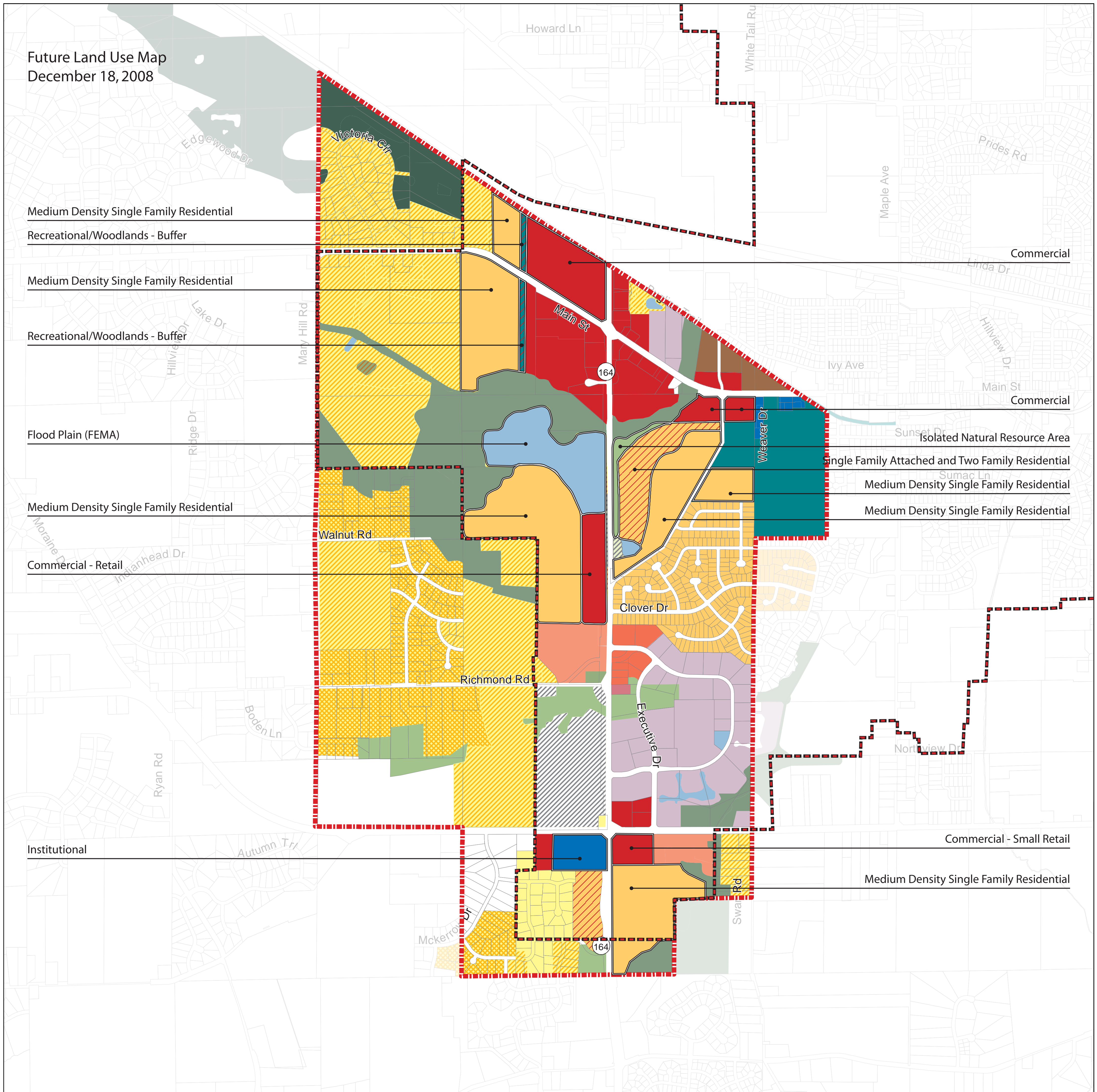


# Village of Nashotah 2008 Master Land Use Plan Update



- |  |  |  |
|--|--|--|
|  Railroad Right-of-Way             |  Industrial               |  Fire Station       |
|  Road Right-of-Way                 |  Government/Institutional |  Town Hall          |
|  Agriculture                       |  Utilities                |  Sheriff Substation |
|  Residential                       |  Recreation               |  School             |
|  Residential-Multifamily           |  Private Open Lands       |  |
|  Residential/Commercial Transition |  Surface Water            |  |
|  Commercial/Business               |  Wetland                  |  |








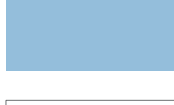










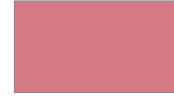




Future Land Use Map  
December 18, 2008



**Village of Sussex  
Land Use  
Future Extraterritorial Area: 2020**



**Legend**

- |  |  |   |
|--|--|---|
|  Suburban Density Residential                      |  Government/Institutional                |  Hwy 164 Corridor        |
|  Low Density Single-Family Residential Sewered     |  Recreational                            |  Future Village Boundary |
|  Low Density Single-Family Residential Unsewered   |  Surface Water                           |   |
|  Medium-Density Single-Family Residential          |  Open Lands                              |   |
|  Single-Family Attached and Two-Family Residential |  Woodlands                               |   |
|  Multi-Family Residential                          |  Publicly Owned Public Space             |   |
|  Commercial  |  Wetlands Outside Environmental Corridor |   |
|  Commerce Center                                   |  Primary Environmental Corridor          |   |
|  Commercial/Special Use                            |  Secondary Environmental Corridor        |   |
|  Railway, Communications, and Utilities            |  Isolated Natural Resource Area          |   |
|  Industrial  |  |   |



October 2, 2008



## Mixing Generations: New High School Enriches Senior/Student Life

By Philip J. Poinelli

*The lessons learned – and the intergenerational learning opportunities sparked by co-locating a high school and a senior center in Swampscott, Massachusetts are generating inquiries from other communities seeking to achieve a greater communitywide use and acceptance of new schools. The author reflects on how an intergenerational school model works and explains how stakeholders are reacting to this innovative concept. The article also explores how the community benefits from a multi-generation, shared space model.*

With just three square miles of land, Swampscott, Massachusetts, faces a daunting problem each time a new school or public facility is proposed. This picturesque but densely-populated seaside community contains little open space. Located 15 miles north of Boston, Swampscott had not opened a new school since 1958. Municipal facilities, for better or worse, stayed in place long beyond any normal life cycle.

So when planning began for the long-awaited new high school, town officials and the High School Building Committee saw a window of opportunity to creatively address the needs of a second age group: the town's seniors.

Run by the Council on Aging, the town's undersized Senior Center operated out of a converted 3-story house built around 1920. Rooms were small and cramped, a lack of handicap access limited most activities to the lower level, and on-street parking for seniors and staff was scarce.

The town had tried for years to find a new home for the Senior Center, and in the School

Committee's 2001 System Wide Master Plan, a 3,000 sf senior citizen room within a new high school was proposed as an adjunct to the existing center.

According to High School Building Committee Chair Joe Markarian, "The idea evolved over time, as we looked at the potential for additional state funding and at the practical issue of how to best utilize the new school facility." The Building Committee decided to take a fresh look at the issue, and to work with the Council on Aging and others, to review options for meeting the needs of both age groups within the new high school.

"What surprises people is that, in a community such as ours, the number of senior households is equal to the number of school-age households," Markarian observed. Providing senior services in a new civic facility is "a sound, logical thing to do for the community."

The result of careful planning and consensus-building, the new 200,000 square foot Swampscott High School integrates a 7,500 square foot, daylight-filled Senior Center on its ground floor. Both the



Senior Center and the high school opened in September of 2007, built on a portion of a town park.

The lessons learned – and the intergenerational learning opportunities sparked by this innovative co-location – are generating inquiries from other communities seeking to



achieve a greater communitywide use and acceptance of new schools. Most of their questions center on the planning and execution of an intergenerational school model, and the degree to which co-location is actually performing relative to the expectations of stakeholders: school officials, the Council on Aging, seniors, and the Swampscott community.

#### Key Planning Considerations

After receiving approval from the town meeting to design a new high school, the volunteer Swampscott High School Building Committee and design firm Symmes Maini and McKee Associates (SMMA) began an in-depth review of the logistical, financial, and social considerations of co-location. They examined four key questions:

- 1) What advantages could be created by relocating the Senior Center to the High School?
- 2) What potential disadvantages could be experienced by seniors, students, or the town?
- 3) How would integrating the senior center affect the design and the cost of the new school?
- 4) Could the Center be set up as a separate fiscal entity, paying its own utilities and overhead?

The planning also required consensus-building among all stakeholders. "There was some disagreement initially on it," recalled Markarian. "School administrators

wondered how a shared facility would impact their responsibilities, and the Council on Aging wondered how their daily program would be affected," he said.

An initial apprehension of Council on Aging members was the notion of mixing elders with high school students. Would there be a risk of physical harm when fast-moving teenagers encountered the slower paced seniors in the hallways, sidewalks and parking lots of the new high school?

Review of the costs and integration issues revealed that the potential benefits of relocating the Senior Center outweighed any downside risk. Central to the co-location argument: funding and building a new stand-alone Senior Center, and equipping it to modern standards, would not be feasible from an available land and available budget assessment. While the cost of the new school might be higher to include the Senior Center, the opportunity for a lasting return on investment for the town would be significant.

#### Consensus-Building on Identity, Shared Spaces

As discussion on co-location proceeded, SMMA identified the significant opportunities for seniors, including amenities not affordable in a stand-alone senior center facility. During the process of interviewing Council on Aging Board Members, SMMA realized how many Senior Center program requirements were already provided in the new high school program.

Envisioning the off-peak use by seniors of these amenities, the co-location discussion gradually shifted from questions of "why" to resolutions around "how."

Planned for the new school, shared amenities available when not in use by students included:

- Gymnasium with indoor track
- Weight training and fitness center
- Music suite with a chorus room and piano lab
- Computer room with Internet access
- Exercise, dance and aerobic studio
- Arts and crafts studios with photography lab and kiln for ceramics program
- Lecture halls and performance spaces

With easy access to shared high school spaces, the dedicated space for the Senior Center would be kept relatively small. Through cooperative scheduling, seniors could access the program and recreational spaces throughout the school, especially before and after peak school hours and during school vacations.

Additional support was gained by establishing a separate identity and access for the Senior Center in the design of the new school. Entrance to the Senior Center would be at the opposite end of the school from the classrooms. A dedicated front door and signage provided additional autonomy and safety benefits to the Council.

#### Dollars and Sense

The funding of the total Swampscott High project, \$56 million, had to be approved by a 2/3 majority vote at town meeting and a simple majority vote of the local voters by way of a ballot question. Though senior citizens historically supported new schools, incorporating a new facility for them rallied seniors and the general voting population to approve the project. The new facility was considered to be a

welcome resource for the entire town, not just for families with school age children.

Co-location provided advantages related to operation costs and budgeting. Shared, central mechanical, electrical and other engineering systems significantly reduced the cost of building separate and dedicated systems. The solution for tracking and billing utility costs came from establishing separate zones, allowing for isolation of utility costs. For natural gas use, which could not be separately metered, a formula based on square feet was established.

### Performance Outcomes and Benefits

Nine months after opening, the Center has exceeded expectations in a number of key outcomes. According to Senior Center Executive Director Marilyn Hurwitz, utilization of the new facility has quadrupled. "In our old place, we served about 75 seniors a week," she said. "Here, we are seeing 75 in a day. In the prior building, we could fit only 12 for meals. Today, we can serve 90 in one sitting."

The new Senior Center includes a living room with gas fireplace and comfortable furniture, sub-dividable dining space, a small commercial kitchen (most meals are pre-prepared by Meals on Wheels), three flexible activity rooms/classrooms, a multi purpose health clinic, and administrative spaces. Community space is designed to take full advantage of natural light, an important improvement that helps energize and motivate the service program inside.

An unexpected boon is the social connection created for both students and seniors. "Too many seniors are generationally isolated," said Hurwitz. "In a setting like this one, we can find countless ways to involve the kids within the seniors' activities." She cites the popular tutorials teens are providing on computer skills, e-mail, programming cell phones, and using digital cameras and VCR equipment.

In January, 25 fifth graders adopted pen pals among the town's seniors. On June 11th, the Center hosted its first annual 'Meet Your Pen Pal' lunch. During Veterans Day remembrances, a panel discussion featuring WWII and Korean War veterans was held in conjunction with social study classes.

### Conclusions and Lessons Learned

Among the lessons learned in mixing generations in the Swampscott High School project:

- The rising cost of land acquisition and construction for free-standing municipal facilities creates an opportunity for creative integration into new, multipurpose school buildings

- Facilities opportunities afforded by a new high school are far greater than would be possible in any free-standing project
- Approval and funding processes bring varying constituencies together behind a common cause
- A high school setting offers an added social value for all stakeholders. Students benefit from interaction with seniors, and seniors learn from students

Hurwitz described how one senior, who recently lost her spouse, finds comfort in simply coming to the Center and being around the sounds and bustle of a busy school. "Much of what we are experiencing is in the fledging stage," she said. "But I can tell you that the value we can provide in this setting is tremendous."

Markarian agrees. "It's a gradual process. But things are progressing very well," he said. "Both the school administrators and the Council are showing tremendous openness to the possibilities." ■

**Photo credits:** Nicole Becks, Symmes Maini and McKee Associates



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# What will

# SCHOOL

# look like in 2050?

## A Dozen Demographic and Educational Trends and Counter-trends You Need To Look For

By Kenneth R. Stevenson

*What will the physical place called school look like in the years 2025, 2050, or beyond? Will schools as we know them today even exist? These are not easily answered questions. Nor, does a crystal ball or computer program yet exist that provides a definitive picture of the world of tomorrow. However, demographic and educational changes are occurring that do give some insight about what the future holds. Interestingly, these changes themselves suggest alternative and sometimes conflicting scenarios as to the future shape and substance of education and the related impact on school facilities.*

What follows is an overview of twelve trends and their conflicting counter-trends that, depending on which emerge as reality, portend a different tomorrow for schooling – and for educational planning, design, and construction.

### #1 Rich “Wants” as Opposed to “Poor” Needs

**Trend:** In less than two decades the basic demographic structure of the United States will be transformed. The “baby boomers” are poised to enter retirement in mass. By 2025 approximately 65 million people will be 65 years of age or older, or one out of every five individuals. This number eventually will swell to 78 million (U. S. Census Bureau, 2004). The baby boomers will be a powerful group, seeking to use their accumulated wealth and potent collective political power to ensure their own well-being.

**Counter-trend:** At the same time, the face of education literally

will change. As late as 1980, nearly 80 percent of school-age students were white, and mostly middle class. But, by 2040, Hispanic and African-American children combined will be the new majority. Unfortunately, this new majority is much more likely to come to school educationally at-risk. A significant reason for this is these children, on average, will live in homes with family incomes of only 60 percent to 70 percent of that of white households (U. S. Census Bureau, 2007).

**Alternative Scenarios:** The children of tomorrow will need adequate schooling more than ever before. If this is recognized by the greater society, including the baby boomers, school facilities may be cutting edge places representing the commitment of communities to the education of all children. However, if baby boomers aren’t convinced of the interdependence of adequate education of children of poverty and their own quality of life, schools may

be educationally minimal, and nominal in scope and quality of facilities.

### #2 The “Common Good” as Opposed to Freedom to Choose

**Trend:** Education in the United States, and particularly public education, has been cited as lynchpin in maintaining a democracy and in assuring a workforce that keeps the country competitive in the world marketplace (U.S. Department of State, 2005). Enactment of federal legislation such as No Child Left Behind and state education accountability laws are regularly offered as evidence of a strong national commitment to making public education world-class for all students (ETS, 2007).

**Counter-trend:** At the same time, critics of public schooling continue efforts to create a system of educational choice for children and their parents. Noting that public education has little or no competition and, thus, has little incentive to

be effective, critics suggest that choice systems promote more student achievement, and do so with private sector efficiency. Several cities and states have embraced the choice concept through voucher systems and outsourcing public education to private sector vendors (Heritage Foundation, 2008).

**Alternative Scenarios:** The desire for some type of choice for parents and students is so strong that, even if private choice does not triumph, the form and substance of public education likely will change. Public schools probably will compete among each other, and with the private sector. Satisfying the “customer” will become ever more important. As a result, regardless of whether private or public, educational facilities of tomorrow will have distinctive designs supporting the unique “personalities” individual schools must assume to create their niche in the educational marketplace.

### **#3 Fear and Isolation as Opposed to Outreach and Community Service**

**Trend:** Nearly 30 percent of the adults in the U.S. now participate in some type of outreach or volunteer activity, up from only about 20 percent in 1989. Whether its students doing service learning projects, or adults assisting with delivery of meals for the elderly, or families assisting to construct homes for low income families, Americans are engaging in volunteer activities that cut across social, economic, racial/ethnic, and community barriers (Corporation for National and Community Service, 2007). Those promoting such volunteerism argue that this engagement helps individuals gain appreciation, respect, and understanding of others not necessarily of the same nature as themselves.

**Counter-trend:** However, much is written about the “Balkanization” of the country (Fry, 2000). Differing sub-groups are isolating themselves from one another for various rea-

sons, including the perception that the country is an increasingly perilous place to live. Whether from fear of physical harm or apprehension about others imposing unacceptable values on them, more Americans are “cocooning,” or separating themselves from the greater society. This isolationism takes many forms, from individuals living in gated and guarded communities, to parents electing to home school children, to entire religious sects segregating themselves in secluded communal settings.

**Alternative Scenarios:** If physical and social fears come to dominate American thinking, schools will move away from being centers of diversity to homogeneous places where attendees share specific beliefs, socio-economic status, educational philosophy, and even race/ethnicity. School facilities planning and design could become largely idiosyncratic, reflecting the unique perspectives of the community and families served. On the other hand, if the U.S. citizenry comes to agree that the country is made stronger through bringing distinct cultures and perspectives together, schools likely would be designed for a broader curriculum which accommodates the diverse student population served.

### **#4 Small Schools as Opposed to Large Schools**

**Trend:** Because of the complexities of the modern world, some Americans have grown nostalgic for a return to simpler times. One reflection of this is the movement to revisit smaller, more personal schools. Writers and researchers promote smaller schools as places that are safer, more intimate, better academically, and especially well-suited to satisfactorily educate at-risk students (Small Schools Project, 2008).

**Counter-trend:** However, others argue that research on the effects of school size is mixed, with some studies indicating that larger schools outperform smaller ones

because of expanded curricular opportunities and more diversity of teacher expertise. Further, communities have discovered that smaller facilities are “pricey” on two levels. First, small school per pupil operating costs exceed those of large ones. Second, the capital costs of building several small schools, as opposed to one larger one are significantly higher (Stevenson, 2006).

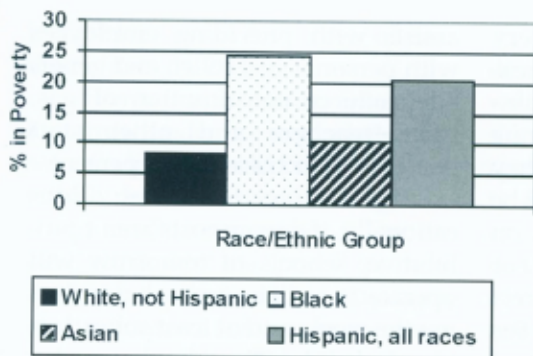
**Alternative Scenarios:** If the small schools movement grows, then the number of school facilities needed would increase appreciably. However, with the probability of mounting reluctance of aging taxpayers to spend their money on things for which they see little direct benefit, funding the small schools movement may be impossible, or at least limited.

However, parents and communities do want small schools, or at least the benefits of small schools. Therefore, a likely scenario is that larger schools will continue to operate, but will more fully embrace the concept of establishing internal small learning communities, or schools-within-schools.

### **#5 Lower Teacher/Pupil Ratios as Opposed to a Different Instructional Delivery Structure**

**Trend:** Pupil/teacher ratios have steadily dropped the last four decades from 20 to 1 in 1970, to 15.5 in this decade (U.S. Department of Education, 2007a). Projections indicate the ratio could fall to 14.5 to 1 by 2016 (U. S. Department of Education, 2007b). Those favoring this trend indicate that fewer students provide teachers more one-on-one time for instruction, more time to prepare lessons focused on individual student needs, and greater opportunity for students and teachers to engage in meaningful dialogue.

**Counter-trend:** However, some research is now questioning the value of reduced teacher/pupil ratios, especially in light of high personnel costs. Some critics suggest



Percentage of Each Race/Ethnic Subgroup Living in Poverty, 2006  
 From Table 3: People and Families in Poverty by Selected Characteristics: 2005 and 2006. Poverty. U. S. Census Bureau.

that the same or fewer dollars spent on instructional technology or higher quality teachers might produce better results. Others worry that the pool of qualified teachers is not sufficient to sustain further teacher/pupil ratio reductions as women and minorities opt for other professions (Snyder, 2004).

**Alternative Scenarios:** If the reduced teacher/pupil ratio trend continues, schools likely will require additional classrooms to support a greater number of teachers for the same number of children. However, if educational budgets become increasingly limited, and the teacher pool diminishes, a possible alternative that may emerge is the “doctor’s office” model. In this approach, a master teacher (doctor) oversees the instructional program for a large group of children. However, the other instructional team members are para-professionals, specially trained as educational and technology technicians. If this model becomes commonplace, educational facilities planning and design will need to undergo a paradigm shift as to what constitutes a place called school.

## #6 Technology as Opposed to Humans

**Trend:** With teacher shortages, restricted operating budgets, and increasing demand for consistent instruction aligned with accounta-

bility tests, more and more schools and school systems are embracing technology to do business. Approximately 40 percent of public high schools in the U.S. report having students enrolled in distance learning courses. A large majority (72 percent) of school districts that are using distance learning now expect to expand its use in the coming years (U. S. Department of Education, 2005). Further, virtual high schools have sprung up across the country, and

states have established online charter schools for children of parents who home school.

**Counter-trend:** However, not everyone has embraced online learning. Criticisms include lack of the human touch in the teaching/learning process, the suspect quality of online course content and instruction, unfairness to certain students because of limited technological equipment or Internet access, reduced opportunity for student social interaction and development, and the intangible loss of a child not being part of school community (Illinois Online Network, 2007).

**Alternative Scenarios:** If technology continues to grow, the roles of teachers and classrooms will change. Teachers will be facilitators more than imparters of knowledge. Classrooms will need to be carefully planned and designed to provide a variety of technological opportunities to learn, both hands on, and virtual. However, if face-to-face teaching/learning prevails, school planning and design will necessarily focus on creating environments that promote human interaction over technological interfaces.

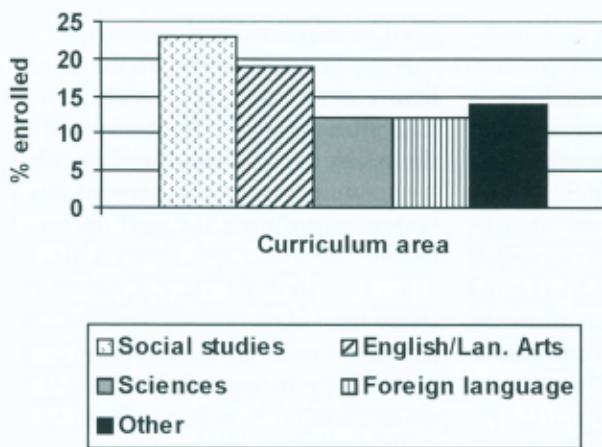
## #7 Teaching to the Test as Opposed to Educating the Whole Child

**Trend:** Because school productivity, as driven by NCLB, is now focused on accountability as meas-

ured by standardized scores, educators are scrutinizing more than ever before what is taught and what subjects students take. As a result, students are being encouraged to take “second helpings” of content that better assure they do well in areas tested, like math and language arts. Therefore, less time is available in the school day for non-tested subjects such as social studies, fine arts, physical education, foreign language, and life skills courses (Center for Public Education, 2007).

**Counter-trend(s):** However, others, such as the Association for Supervision and Curriculum Development (2007), contend that today’s curriculum is too limited and that the focus should be on broad-based education of each child. Such critics of standards-based education argue that it’s critically important that students complete their education in such a way as to be well-rounded – emotionally, physically, culturally, socially, and academically. Still others argue that focus on subject content or social development without context, does not prepare students for the real world. Those with this perspective advocate career-based learning that helps students identify their aptitudes and interests early, and then guides students through prescribed academic and occupational strands leading to employability as an adult (Howard, 2003).

**Alternative Scenarios:** If school success continues to be defined based on standardized content tests, school facilities will evolve into simpler structures, with fewer co-curricular amenities, and more general classrooms. If educating the whole child re-emerges as the focus of education, the curriculum will again expand, as will the diversity of facilities. If schools become places that focus primarily on career training, then greater numbers of labs, vocationally-related instructional spaces, and more spaces that generally support hands on learning can be expected.



The percentage of courses students regularly enroll in by curriculum field among all district enrollments in distance education

Distance Education Courses for Elementary and Secondary Public School Students. U.S. Department of Education, National Clearinghouse of Educational Statistics, 2005 Report.

the main delivery approach in education, school classrooms will continue to look much as they do today, and will be focused primarily on the teacher and/or technology to direct instruction. If the concept of learning/teaching styles eventually prevails, each classroom in a building may look different from every other as each is designed to support a unique approach to learning.

assists with providing employees with personal cost relief, and generally reduces consumption of gas, since teachers and other staff decrease their travel by 20 percent.

**Alternative Scenarios:** Educationally, if energy costs aren't prohibitive, schools of tomorrow will operate 16 to 18 hours each day during the week, and at least some during weekends. The school year also will expand to 210 to 220 days annually. Schools will have to be durable, flexible, and well thought out in terms of internal traffic flow, security, and supervision. If the energy crisis continues, schools of tomorrow will certainly have to be energy efficient, but also re-thought in terms of "in-school" learning versus "online learning." Instead of catching the big yellow bus on Fridays, teachers and students may meet in virtual classrooms to continue the learning process.

### #8 Teaching Via Learning Styles as Opposed to Directed/Prescribed Instruction

**Trend:** Because what is tested is what is taught, schools have moved to presenting course content in a highly directed, prescribed manner. Curriculum guides provide detailed instructions to teachers about what is to be covered, how, and when (National Center for Directed Instruction, nd). Technology is being used more and more because it brings a consistency to this process. Whether it be teachers or computers, the emphasis is on teaching efficiently and effectively to prescribed standards covered by accountability tests.

**Counter-trend:** Not all agree with the directed approach. As noted in an earlier section, some argue that the curriculum itself is too limited. Others argue that even if the focus is on prescribed content, not all students effectively learn that content the same way - that there are multiple intelligences (Willingham, 2004). Those with this perspective propose that the curriculum be delivered based on the learning style of the student and the instructional style of the teacher.

**Alternative Scenarios:** If prescribed/directed teaching remains

### #9 Extended School Time as Opposed to Compressed School Time

**Trend:** Because of the constant pressure on schools to meet many needs, educators continue to seek ways to expand the school day and the school year (Rocha, 2007). During the day, schools now offer everything from morning "early bird" sessions to "twilight" classes to accommodate course demand and student/parent lifestyles. More schools also are open extended days, accommodating the needs of special education and academically at-risk students. And, it's not unusual to find school facilities at all grade levels used at non-peak hours and days for adult education programs.

**Counter-trend:** Though possibly short-lived, the current energy crisis is placing a significant burden on school district budgets. To control costs state governments in several areas of the country have enacted legislation to permit schools to operate on a four-day per week schedule (National Conference of State Legislatures, 2008). This condensed school week allows cash-strapped school systems to considerably reduce support costs associated with school bus operation and energy consumption, as well as other areas. The four day week also

### #10 Extended Grade Spans as Opposed to Specialized Grade Spans

**Trend:** One movement gaining momentum across the country is reconsideration of which school grades to group together (McEntire, 2002, updated 2005). To increase program continuity, reduce loss of learning associated with transfer from one school to another, and to keep students as children longer, some schools and school systems are re-instituting such grade configurations as K-8 and K-12 schools.

**Counter-trend:** Other schools systems, in an effort to bring greater focus to the mission of specific schools and the expertise required to support that mission, are moving in the opposite direction. Such districts have implemented grade span structures that include early childhood/primary schools (usually grades K-2 or 3), intermediate or elementary schools (often grades 3 or 4 through 5), stand alone sixth grade centers, middle schools, stand alone ninth grade centers, and upper high schools. The intent is to have school grade spans aligned with the specif-

ic developmental level/age of students (Reeves, 2005).

**Alternative Scenarios:** Schools of tomorrow under the expanded-grade scenario likely would become educationally holistic centers, serving relatively small communities. On the other hand, with the “press” for more academic productivity, specialization of schooling as a solution may emerge as a major trend, with schools designed reflecting the very narrow developmental age of children served.

**Alternative Scenarios:** School design with community use in mind will necessarily embrace the ideas of shared and multiple use of spaces, security without exclusion, durability, and internal and external pedestrian and vehicular traffic flow. The design concepts for schools that serve only school age children more likely will emphasize external security and age-appropriate space configurations – and have less broad-based community support.

ing capsules that may be located at home, at the work location of a parent, or at a child care/socialization center (Stevenson, 2007).

**Alternative Scenarios:** If tradition maintains itself, school planning and design will continue, but will necessarily be more complicated. Evolving educational trends, increasing knowledge of how children learn, and advancing technology will mandate that new facilities be well-thought out, flexible, and adaptable. If virtual schooling becomes reality, planning and design will enter a new era that will be less about producing brick and mortar structures, and more about creating integrated systems of structural and electronic support for an educational process that will be ubiquitous and non-synchronous in time and location.

### #11 Schools as Places for Children as Opposed to Places for Communities

**Trend:** Though the concept of community schools has been around for decades, and some schools and districts have embraced it, the reality is that most K-12 educational facilities are not used to any great extent by individuals or entities from the outside. Except for extra-curricular school activities, many educational facilities are used only 180 to 190 days a year, seldom at night, and hardly ever on weekends (Silva, 2007). The advantage of this approach is that management and supervision are simplified since a limited audience has access to a school.

**Counter-trend:** Because some states and districts are beginning to realize that fuller use of schools creates good will in the community and potential added revenue, the concept of extended use of educational facilities is gaining popularity. Some schools offer everything from health services, to meals, to avocational activities for adults (New Schools Better Communities, 2004).

### #12 Brick and Mortar Schools as Opposed to Virtual Schools

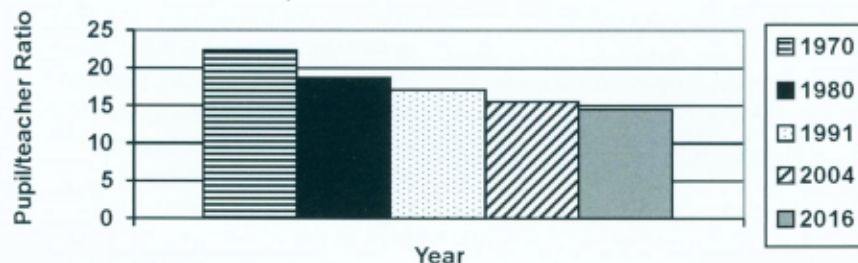
**Trend:** Because they have “always been there,” many educators, policy makers, and general population expect schools as physical places to continue into the foreseeable future. While, the size, shape, content, and even use may change somewhat over time, the commonly held expectation is that school facilities will be the focal point of imparting knowledge for a long time to come (American School and University, 2004).

**Counter-trend:** Others argue that because of growing pluralization of America, the increasing costs to operate schools, advances in technology, and escalating reluctance of taxpayers to fund education, places called school will disappear. They may well be replaced with a combination of virtual classrooms and community hubs that serve as instructional resource centers and focal points for face-to-face socialization and recreational activities. Students will access their studies through individual electronic learn-

### Lessons to Learn from the Trends and Counter-trends

For every scenario of the future of education and school facilities that can be imagined, plausible alternatives exist. The traditional idea of planning and designing a school to serve a generally static, stable educational program will have to give way to the realization that school facilities likely will need to change in form and substance several times during the life of a structure. School buildings that are highly flexible in design, readily adaptable to changing user demands, and capable of multiple uses will be the ones that probably will continue to exist as educational centers. Even these, though, will have to be built with the possibility in mind that the structure may assume non-educational uses as the age of virtual education emerges and grows.

In any event, careful educational and facilities planning and design, involving multiple stakeholders, and embedded in knowledge and understanding of best educational practice, will be more important than ever before. ■



Pupil/teacher ratios from 1970 through 2016

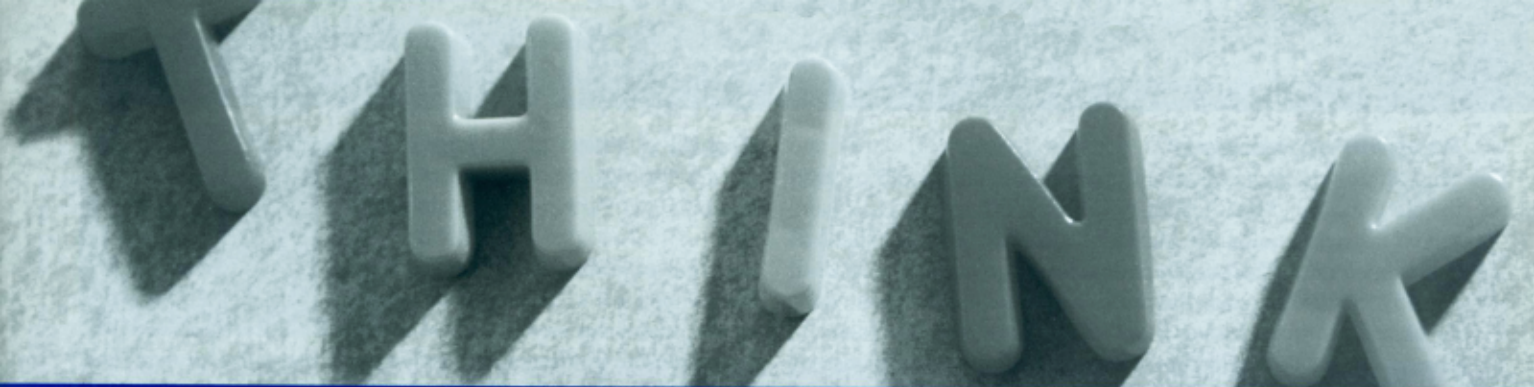
From Youth Indicators 2005 & Projections of Educational Statistics 2016. U.S. Department of Education, National Clearinghouse of Educational Statistics, 2005 Report.

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## ***Rethinking the Educational Environment***

**By David E. Anstrand, RA, REFP; Edward E. Kirkbride, RA, REFP**

*An Educational Environment Program (EEP) describes information and relationships as a trilogy, becoming the foundation for the future design of a new or renovated learning facility. This program systematically describes the desired community environment, learning environment and physical environment.*

Five trends – communication technology, brain based learning, life long learning, cost of educational facilities and environmental concerns – suggest that the scope of planning educational environments has expanded. Until recently, educational facility planning was confined to the preparation of “educational specifications,” a listing of space-by-space attributes of the proposed facility. Today, instead of educational specifications, an Educational Environment Program (EEP) describes information and relationships as a trilogy, becoming the foundation for the future design of a new or renovated learning facility.

The educational environment program systematically describes the desired community environment, learning environment and physical environment. The community environment addresses civic design, program planning and partnership development relationships. The learning environment focuses on interpersonal relationships, i.e., between student and student, student and teacher, student and parent(s), teacher and teacher, etc. This part of the trilogy also focuses on learning activities, time and the connections between learning relationships, activities and time. The physical environment examines the relationships of building to inhabitants, building to site and building to the greater environment. The programmed trilogy, community environment, learning environment and physical environment, frame the design “problem” in a broader, more comprehensive way than was possible in the old “ed. spec.” format. Ideally, the EEP captures the community’s hopes and dreams for their educational environment.

# Rethinking the Educational Environment

## **Program or Process?**

The EEP is a program, the result of a planning process. Similarly, the old Education Specification (ed. spec.), still used across many school districts, is also the result of a planning process, albeit, an abbreviated one. The processes are viewed to be different. Until recently, due to the static nature of curriculum, ed. specs. were developed by interviewing a relatively few decision-makers – usually school district administrators and department heads. A broader, more inclusive, participatory planning process is necessary for EEP programming. The “Information Age” constituency for educational facilities is the whole community. All stakeholders should be represented in the planning process.



Though beyond the scope of this article, a few comments on process may provide a better understanding of the educational environment program. The overall planning process should be “driven” by strategic thinking and, hopefully, a strategic plan jointly developed by all stakeholders. The strategies and dependent strategy plans provide a conceptual or a priori framework for further planning. The EEP planning process should proceed from data collection, data synthesis, analysis, to alternative program concepts. The alternative program concepts would be tested by planning participants and further refined. The refined concepts are then documented as the educational environment program. The EEP becomes the initial project information necessary to guide the education environment design team.

## **The Community Environment**

The community environment “contains” the learning environment and physical environment, at least the physical/local attributes. Historically, school boards and municipal governments have planned and implemented programs independently from one another. The result has been duplication of facilities and services. If common “visioning” can occur between government units, it may be possible to undertake joint planning to deliver cost

effective facilities and programs to the community. The first part of the “trilogy” covers three areas: Civic Design, Program Planning and Partnership Development.

*Civic design* is an old fashioned, “City Beautiful” term addressing the physical structuring of community. If educational environments are thought of as “community infrastructure,” they can be used as “tools” to influence community growth and change. Educational facilities can reinforce existing development patterns rather than spawn new sprawl. New planned development can be “anchored” by educational facilities. Facilities can be incorporated in community open space and park systems reinforcing and expanding community amenities. The location of other community amenities such as libraries, community centers, and parks might suggest joint development maximizing the tax dollar spent. By locating facilities in zones adequately served by utilities rather than non-served areas, significant construction cost penalties can be avoided. In many smaller communities the high school is the center of the community. If creatively programmed, this facility could physically shape more than just the school’s immediate site but become the true, symbolic, center of community adjacent to or incorporating facilities housing other community services and programs. Recent trends suggest the return to neighborhood schools – possibly an important urban revitalization ingredient. Civic design aspects of the planning process, often overlooked or ignored,

provide an essential basis for further planning and communication with other planning entities.

*Program planning* is often not coordinated between public and private entities. Most communities have a myriad of social and economic programs sponsored or provided by public and private organizations. School districts often plan new or expanded programs without full knowledge of existing programs provided by others. The result is a “patchwork quilt” of programs and services, many not well funded or advertised, providing benefits far below community expectations. Common vision and planning would insure against duplication of effort and better insure programs’ success. Examples of often duplicative programs include: municipal parks and recreation summer programs versus the school district’s sports camps; municipal library versus the high school library; private day care facilities versus school district pre-school programs; etc.

By understanding the range of existing program offerings and their effectiveness, the school district can better “design” complementary programs that provide unique services or reinforce existing programs. Most programs require space for their activities. Through the understanding of existing and

# Rethinking the Educational Environment



proposed programs, adequate facilities can be planned.

Every community has **partnerships**. *Partnerships* are “linkages” between the school district and the community. For example, assistant athletic

coaches are found through partnerships between the school district and interested athletic supporters and booster organizations. “School to Work” programs are based on apprenticeship opportunities provided by local businesses. Municipal governments and school districts work together to provide parks and recreation areas through joint use of school sites. The imaginative use of partnerships to solve educational facility needs has not been well developed. As a high school develops a medical and biological “house,” why can’t classes be held at the partnering hospital? Could partnerships be established between urban and suburban schools to share fine arts interests, talent and grant funding? Through proper identification of partners, program possibilities and opportunities, school district-to-community links could become much stronger.

Community civic design attributes, programs and partnerships opportunities can be discovered through a careful inventory of each area. The inventories can be recorded on a series of same scale maps. The maps can then be overlaid and analyzed to determine “areas of opportunities.” The areas of opportunities become resources for further evaluation and incorporation in the EEP.



## The Learning Environment

*Relationships, activities, and time* define the learning environment. Not many years ago, the learning environment would not be described as such, but would be discussed as the “school.”

Today, the learning environment is described as “anywhere, anyplace, anytime” and instead of teaching directed toward two intelligences, eight intelligences are thought important to learning (Howard Gardner’s Theory of Multiple Intelligences). According to Gardner, the learning environment can no longer be described by a set of classroom square footage minimums and maximums. In the past, the curriculum was static. Geometry followed Algebra I, Algebra II followed Geometry and Trigonometry followed Algebra II. The sciences were alphabetically organized, e.g., biology, chemistry and physics. Until recently, this arrangement of curriculum has been constant. Educational spatial requirements remained static, universally understood. As educators embrace the “Knowledge” or “Information Age,” learning becomes dynamic – interactive, multidisciplinary and problem based. Because of these new dynamics and rapidity of curriculum change, curricula have become an unreliable basis for

facility design. Instead, analysis of relationships, activities and time become a better predictor of educational facility needs.

*Relationships* central to learning are changing from the formal classroom setting, e.g. rectangular classroom, teacher and 25-30 students, to many learning relationships. Instead of learning formalized from teacher to learner, it is occurring from learner to learner, learner to teacher, teacher to learner, teacher to teacher, Internet to learner, etc. Communication technology makes an “individualized learning plan for each student” feasible in the near future. Teachers, parents and students alike can record and track learning progress via technology. The prospect of each student learning at his/her own pace and areas of interest changes learning relationships and learning space needs. For example, learning may be occurring at the learner’s desk or workstation, in small groups, in large groups, off site at a local business partner’s location, on the Internet, at home and in a number of other locations.

A variety of learning relationships suggests multiple types of learning spaces. Younger learners are often taught in small activity groups. Others learn in large groups, smaller learning groups, individual computer workstations, etc. The School of Environmental Sciences, a magnet high school located at the Minnesota Zoo, provides individual desks or “offices” for each student. There are also large group meeting spaces, seminar spaces, shared faculty offices, etc. New learning relationships suggest new and varied types or spaces, very different from a series of traditional classrooms organized along a corridor.

Another set of relationships exists in the hierarchies established between and within educational institutions (at a macro scale versus a micro scale). Instead of students relating to one large school, the *Breaking Ranks* report (the report of the National Association of Secondary School Principals [NASSP]) suggests that a school should be broken into smaller units no larger than 600 students each. Theory suggests students will know each other and their teachers on a more familial basis. The smaller units are often called an “academy,” “house” or “neighborhood.” The intent is to break the larger institution into more easily comprehended and “personalized” parts. Hierarchical groupings allowing learners to be a part of a smaller group, relate to a larger subpart of the whole and then relate to the whole seems to counter the prospect of a student lost in a large, mostly anonymous group.

*Activities* are the second parameter defining learning environments. Activities can be categorized as activities integral to learning, the activities of circulation or movement from one place to another, and social activities including relaxing with friends, eating, etc. Learning activities range from one learner interacting with one computer to hundreds of people watching a fine arts performance. Other familiar learning activities are science experiments, physical fitness, painting, music and library research. Less traditional learning activities include distance learning, on-line learning, project based learning, simulation, experiential learning, etc. The activities of circulation and movement typically happen on streets, walks and building

corridors. This activity has been thought of as occurring on “a” site. If learning becomes community based instead of school building based, the movement of learners expands to a new dimension. Finally, there are social activities. These are the formal and less formal activities between peers. Social activities can occur between peer groups. Teachers and administrators can socialize with students, another *Breaking Ranks* idea.



Matapeake Elementary School (Promenade) – The building plan is organized around a linear, naturally lit Promenade with large windows which allow connections to the exterior Courtyard.

**Time**, the fourth dimension, is the third learning environment parameter. Traditionally, school began with a bell and ended with a bell. The use and scheduling of time has to be considered equally with “relationships” and “activities.” Elementary schools often have a beginning and ending bell, middle and high schools have been organized around six, seven or eight periods a day. Periods generally last from 40 to 60 minutes depending on the mandated length of school day and number of periods. New ways of organizing time are emerging. Block scheduling reduces the number of periods to three or four 90–120 minute periods thus allowing project based, individualized or continuous learning. Other scheduling schemes include “year round school,” split shifts, 24-hour use of facilities, etc. Communications technology now allows us to learn “anywhere, anyplace, anytime.” “Seat time” no longer has the relevance it once had. High school learners might take a science laboratory course at a school facility, a history course at a regional museum and history of the Vietnam War online.

Changing the way time is organized directly affects learning facility needs. A very simple example is the planning of a cafeteria. If all children eat at the same time or if they eat in three shifts dramatically changes the amount of space required for the cafeteria. Likewise, if learners spend half of their school day off-site, the overall facility can be reduced in size. A clear understanding of how time will be organized is essential facility programming information.

## The Physical Environment

**The Physical Environment** is the “setting” where learning relationships and activities take place. It resides in the community. This is where relationships, activities and time define indoor or outdoor learning spaces. The settings can range from a “learning room” designed for one person’s use located in a house to a university campus designed for thousands of learners. It could be a museum, business location, or park. Assuming that in most cases the physical environment will be a building situated on a site, there are three general sets of relationships to be met: **Building to Inhabitants, Building to Site and Building to Greater Environment.** All three must be considered in the planning, design, construction and operation of a high performance building.

**Building to Inhabitants** considers the user’s needs. First time visitors to a building should easily understand the building’s organization. There should be clearly defined entrances, pedestrian circulation and hierarchies of spaces. People should be able to identify with the building in terms of personal space and human scale. Spaces should be adaptable to meet a range of users’ present and future needs. The building should have elements of architectural surprise and delight. It should be fun to be there because of interesting

forms, textures and colors. Handicapped accessibility is not an option. Ventilation, temperature and humidity control, appropriate lighting (including day lighting) and proper acoustics should meet high standards. User and building safety and security should be carefully considered and built into the design solution. The building should be “maintainable” such that current and future building uses are not compromised. Finally, the building can be thought of as a “text book.” Many physical, and mathematical principles can be demonstrated by the building itself. Lighting circuits can have volt meters and amp meters installed above light switches to help students understand the principles of electrical energy. The building can be designed to express regular building modules demonstrating proportion. Ductwork, piping, structural members and electrical conduit can be exposed in areas of the building so students can visualize how the building “works.” The “text book” building can demonstrate “real world” examples to building users.

**Building to Site** looks at the relationships between the building and its site. Site background information should include: natural features, adjacent site conditions, site circulation or movement requirements, building orientation and views opportunities, site utilities and storm water drainage. Building design and site development should work with natural features such as geology, slope, aspect and vegetation. Adjacent site conditions include adjacent land uses, building shapes and massing, noise and light pollution and other attributes that can be addressed as either assets

or liabilities. Site circulation requirements address pedestrian and vehicular movements. Adequate provisions should be made to separate vehicles from pedestrians, cars from buses and service/delivery vehicles from cars and buses. Short- and long-term parking requirements should be established. Careful consideration should be given to building orientation such that passive solar opportunities can be gained, and close and distant views can be captured. Almost without saying, the site must be served with adequate public utilities, e.g., water, sewer, gas, electricity, telephone and cable TV. Many areas require storm water drainage designs to handle additional water run-off on site. This requirement can impose a stiff site cost penalty.



Matapeake Elementary School (Exterior) – Stormwater pond provides environmental study areas and reflects the local context.

The building site is also a place where outdoor learning spaces can be developed. Examples include environmental centers, athletic fields, recreation areas, playgrounds, school gardens, etc. The grounds surrounding a building should reflect the uses in the building and support users' relationships and activities. There should be easy "communication" between building and grounds. There should also be easy "communication" between site and adjacent community.

As energy efficiency and environmental issues become higher priorities, site development takes on new dimensions. Building orientation is critical to effective use of passive solar strategies such as "daylighting" and effective use of solar heat gain during winter months. The site can house rainwater storage tanks to be used for irrigation and toilet flushing. Trees can be strategically planted or used to shade or protect the building from sun and prevailing wind. Locations can be made available for windmills and photovoltaic systems (some facilities are selling surplus electrical energy to the "grid"). Geothermal heat pump heating and cooling systems make use of large heat exchangers buried in the earth. Many of these energy saving and "environmentally friendly" strategies are integral to the concepts of high performance buildings. If the concepts are to be achieved they must be addressed in the program phase.

**Building to Greater Environment** considers the relationships between the building and the overall surrounding environment. As global warming and other environmental issues become increasingly more urgent, shouldn't the learning environment be a positive example for future "custodians" of planet earth? A positive example to learners is an environment that is sustainable and does not require additional resources to operate. A high performance building uses less energy and creates less waste and pollution. It does not emit gases that affect the ozone layer. It uses materials sustainable (or replaceable) by the environment. It uses supplies which when used-up, their residual waste is recyclable. Every community can have a facility promoting environmental excellence. Shouldn't that be a place where children learn?

## Conclusion

The three "environments" discussed are an abstraction and perhaps not the best use of the word "environment." The abstraction is a trilogy – "community," "learning," and "physical" environments. In the past, school facility planners have focused on the learning environment to the exclusion of other environmental considerations. Other than population forecasts, community needs were, for the most part, ignored. The physical environment was left to the architect and his consulting engineers. Many building design solutions were insensitive to building users' needs. Many classrooms have been equipped with unit ventilators located along a window wall. Learning then occurs in the environment of a machine room.

The 21st century learning environment starts with an EEP. It should be developed in an open, participatory, forum led by an architect, educational planner and an urban designer/physical planner. The EEP can serve as a guide and benchmark for an integrated or multidisciplinary design process. The benchmark can be revisited as the planning and design process proceeds to implementation.



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## EDUCATIONAL ENVIRONMENTS

# ThinkingSpaces: A New Genre of Exploratory Environments for Kids

By Heloisa Moura, Dale Fahnstrom and Greg Pryrocki

*This article presents core concepts that ground the development of a new genre of interactive environments, called ThinkingSpaces. These “places in spaces,” within content rich institutions such as libraries seek to bridge the gap between physical and virtual learning experiences, allowing school-age children to think concretely and abstractly, reflect upon what they do and discover, and elaborate their ideas in ways they can share with others, locally or remotely.*

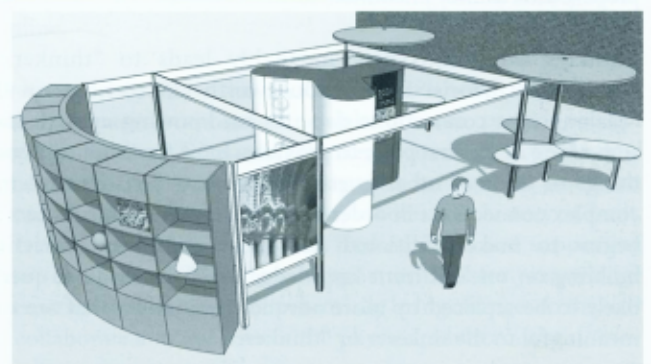
### Concept Sketch (image top of page)

Prototyping platform system structures are based on products compatible with concepts being explored. (The Steelcase Pathways system is illustrated as the environmental framework.)

### New Opportunities for Learning

Multimodal technology is creating new experiential opportunities for exploring, tinkering, learning and interacting in the virtual world. When full sensorial activities in the physical world are combined with a rich interactional space, a new genre of networked learning environments emerges – called ThinkingSpaces.

ThinkingSpaces are interactive environments that seek to encourage school-age children to tinker with things, both physical and virtual, reflect upon what they discover, and elaborate their ideas in ways they can share with others. Situated in content rich institutions such as libraries, and remotely accessible, these fully independent, drop-in environments or “places in spaces,” take children through the dialectic experience of physical and virtual, and of concrete and symbolic, generating new integrated knowledge and skills.



### Concept Sketch

Drawing illustrating three activity zones: individual/team study and work, display/interaction kiosk and presentation

The ThinkerSpaces project, funded by the MacArthur Foundation, is being developed at the Institute of Design, Illinois Institute of Technology. The initial project phase sought to define guidelines for the design of these new kinds of environments; the current research goal is to develop continuous behavioral prototyping environments in two libraries in the Chicago metropolitan area. Early prototypes environments are largely about engaging kids in activities as a way to gain a deeper understanding of their behaviors and enable on-going changes in response to interactions within the spaces.

## **Tinkering as a Way of Understanding**

Tinkering seems deeply rooted in shops and factories and other places where individual farmers, craftsmen, engineers and inventors set about playing with and learning about materials and objects in the physical world. Mostly, tinkering is thought to be about understanding situations, diagnosing problems, exploring solution possibilities focused on repairing, adapting, re-purposing and inventing.



### **Creating Creatures Prototype**

Unique creatures are created from different animal segments. Characteristics and behaviors combine to build survival narratives in alternate biomes. The prototype models a digital version created subsequently.

Today, our understanding of tinkering and the practice of the tinkerer is evolving, just as in the evolution of the digital landscape. Tinkering now has new meaning: it is not necessarily a solitary activity; it is gender and age agnostic; it can be abstract and conceptual; and importantly, it can take place in both physical and virtual dimensions.

Tinkering for the sake of one's own discovery promotes more than just learning about the topic of inquiry. According to Stager (2003) "A child comfortable tinkering with familiar items and playing with ideas will gain the confidence and self-awareness required to solve a wide variety of problems." Tinkering further promotes the development of critical thinking skills that will prepare kids as they encounter future, more-complex scenarios.

Thinking while tinkering inevitably leads to "thinking." Educational theorist Eleanor Duckworth (1996) observes that: "Making new connections depends on knowing enough about something in the first place to provide a basis for thinking of other things to do – of other questions to ask – that demand more complex connections in order to make sense." As one tinkers and begins to make additional and more complex connections, building on one's current knowledge base, the original query is likely to be replaced by more advanced initiatives that are more meaningful to the tinkerer or "thinker."

## **Connecting Heads and Hands**

ThinkerSpace, resulting from the semantic conjunction of the words "thinking" and "space," is used here both literally and

figuratively. These interactive environments define unique activity areas in libraries where school-age kids independently explore, experiment, author and mentor others. These remotely accessible spaces make use of multimodal technologies in combination with sensorial activities, helping kids to bridge concrete experience and abstract understanding. Through this dynamic, newly integrated knowledge and skills are generated, allowing cycles of engagement and reflection to be accompanied by couplings and de-couplings of technology (Anastopoulou, 2004). ThinkerSpaces acknowledges the value of connecting head and hands in the discovery process.

### **Interactive Image Table**

Web map images are projected onto an air-table where readable artifacts are used to explore interaction with the image. Simulates a playing surface for collaborative strategies.



## **An Open Platform Model**

ThinkerSpaces are freestanding, independent, scalable platform-based installations that are: linked to collections and resources; adaptable to activities that promote productive inquiry; fluid in the interplay of physical and virtual experiences; reconfigurable, independent of building architecture; easily monitored and maintained; and self-contained with their own infrastructure. These interactive spaces combine smart multimodal technologies, sensorial objects and symbolic cues to support different modes of interaction as well as learning preferences. Other core characteristics include: encouraging community building through membership networks; providing anywhere, anytime access; and delivering evolving content.

## **Activity Nodes**

Activity nodes are core planning elements in ThinkerSpaces. Nodes are the spatial sections where kids actually work with materials, objects and images and where they interact with digital tools and other digital media devices as well as with each other. The activities that kids choose to engage in must be supported within the environmental setting regardless of the overall design systems approach. Support means providing access to selected resources and tools, as well providing an internet link, enabling kids to work in situ or online, individually or collaboratively.

## **Interplay of the Physical and Virtual Worlds**

ThinkerSpaces integrate physical and virtual interaction, instead of encouraging one dimension at the expense of the other. Properties, such as tangibility, are best explored through action in the physical world; other properties, such as reproducibility, are more easily explored through action in the virtual world. For example, geometric blocks can be manually explored and combined to build a bridge structure, allowing kids to master physical properties such as the gravity force. Once digitized, these blocks can easily be scaled, multiplied, manipulated and receive different surface characteristics. The interplay of physical and

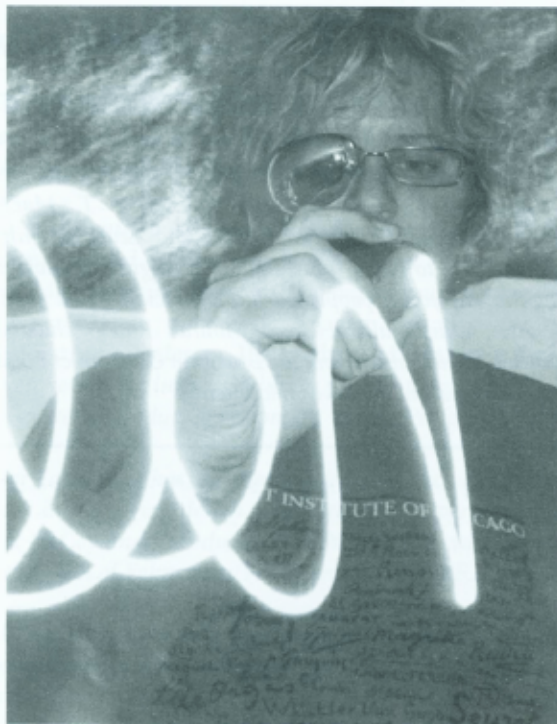
virtual and of concrete and symbolic creates opportunities for new integrated knowledge and skills.

## **Spaces, Technologies, Objects, Cues & Activities**

In order to support kids' interactions in both physical and virtual worlds, ThinkingSpaces combine smart spaces, multimodal technologies, sensorial objects and symbolic cues, in a variety of open-ended activities with evolving content.

*Smart spaces* or intelligent environments are envisioned as systems equipped with visual and audio sensing technology, pervasive devices, sensors, and networks that can perceive and react to people, sense ongoing human activities and respond to them (Singh, Bhargava & Kain, 2006).

*New technologies* provide interactants with multiple modes of interfacing with a system beyond the traditional keyboard or mouse input and output. Multimodality is important because it deals with all the means human beings have for making sense of everyday experiences, representing information and conveying meanings (Kress, 2004). Each modality, based on its affordances (Gibson, 1986; Gaver, 1992), creates different possibilities and limitations for interaction and communication, and, therefore, forces individuals into making commitments about meaning, whether intended or not. In this way, multimodal technologies open the doors for new ways of expression, interaction and communication in the virtual world, supporting individual preferences, differences in context and desired output. Overall, they create new experiential opportunities for exploring, tinkering, learning and interacting in the virtual world.



**Light Drawing Prototype**

Early prototyping exploration of air-drawing using laser light sources.

*Sensorial objects* allow individuals to be more fully immersed in the learning experience. According to Ackerman (1990), people utilize their sensorial channels to meaningfully relate to their environment. The five basic senses – touch, taste, hearing, sight and smell – once stimulated in an integrated fashion, causes human cognition to be more fully engaged. In this sense, the overall sensory integration results in a more meaningful, emotional and personal experience (McDonagh, Hekkert, Van Erp & Gyi, 2004).

*Symbolic cues* prime interaction and incite exploration by providing hints for action. They subtly suggest what the possibilities are, what can be acted upon, without giving a definite direction or path to follow. They make the options apparent, or perceptible, and propose how they can be approached or explored. They provide a foundation for learners to tinker with the possibilities and set a track of action. Together with open-ended activities, which are fed by evolving content, they structure the interaction without defining routes. Consequently, individuals are free to set their own goals for exploration and to evolve their goals iteratively as they move on.

## **Exploratory Environments Network**

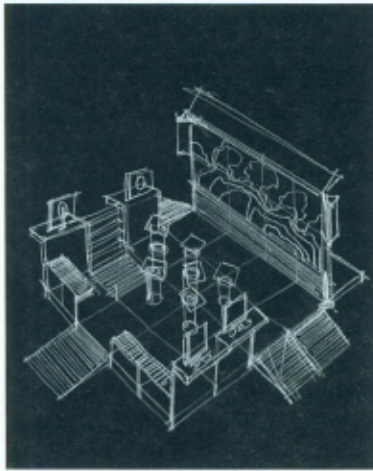
With over 115,000 libraries nationwide, and over 9,200 of these public (American Libraries Association, 2005), libraries present a unique opportunity to integrate ThinkingSpace installations into the broader community. ThinkingSpaces, however, can be much more than that. The idea of interactive environments situated within libraries where kids can explore, experiment, reflect on and share their own interests and “wonderful ideas” (Duckworth, 1996) rapidly leads to the idea of a networked space supported by a physical and virtual community of experts of all ages.

ThinkingSpaces are structured to provide ways for kids' to author, to make their creations and ideas visible, and to share them with others locally and remotely, adapting to different individual interests and communication styles. Additionally, the network dimension of ThinkingSpaces is designed to encourage community building where kids and adult experts can support thinkerers in doing what they really like to do or finding out more about, either through face-to-face mentoring at the library space or online.

Therefore, beyond the local experience within the ThinkingSpace environment, thinkerers can provide or get immediate feedback from other thinkerers around the world. And as the networked community expands and more platforms become available for remote access, a collective history is built, and creative portfolios are stored, feeding ideas and supporting future thinkerers. The new opportunities for knowledge construction and sharing will potentially bring changes to the way kids collaborate and experience the physical environment.

## **Initial Research**

Earlier research has enabled framing of important issues for ThinkingSpaces. The fuzzy idea about kids tinkering in libraries

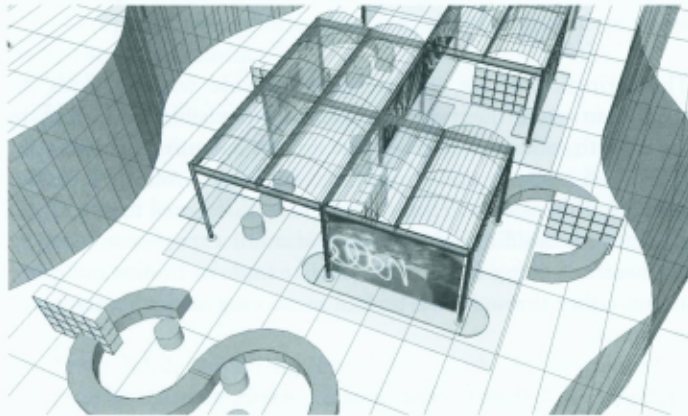


## Early Concept Sketch

Environments are independent from the architecture. Activity nodes plug into the floor matrix where power and data infrastructure is contained and distributed.

## Systems Thinking

A system strategy is adopted for the design and development of environmental structures, based on open platform models. Unlike typical museum or trade show exhibits built as one-off's, ThinkeringSpaces will be built from manufactured components, produced from production tooling, materials and integrated processes. Because installations will widely vary in use and situation over time, kit-of-parts solutions will enable flexible layouts that adapt to available space and meet an individual library's program intent.



## Concept Sketch

Prototyping platform includes activity components designed to extend the functionality of the system. (*The Steelcase Pathways system is illustrated as the environmental framework.*)

## Current Research

Because ThinkeringSpaces will be closely integrated into library settings, understanding the particular library culture, observing how librarians and staff do their work, knowing how facilities operate and how libraries relate to and serve their respective communities is requisite. A library assessment study of a small number of local libraries is underway currently. The results of this

study will guide prototype environment design and implementation criteria for a continuous, iterative prototyping environment.

## What's Next

The current grant focus is to use prototyping as a learning tool to inform and guide the design of the actual, implementable design system behind ThinkeringSpaces. Placing kids in a real context with real content doing exploratory activities will enable a deeper understanding of their behaviors and reveal opportunities for engaging them. As stated earlier, observation will be continuous, modifications periodic and evaluations summative. And finally, a user manual will describe how libraries who choose to participate can engage with the program and get value from ThinkeringSpaces.

## Summary

This article presents core concepts that ground the development of a new genre of interactive environments, called ThinkeringSpaces. These "places in spaces", within content rich institutions such as libraries, seek to bridge the gap between physical and virtual learning experiences, allowing school-age children to think concretely and abstractly, reflect upon what they do and discover, and elaborate their ideas in ways they can share with others, locally or remotely. By combining smart spaces, multimodal technologies, sensorial objects, symbolic cues, open-ended activities and evolving content, new opportunities for knowledge construction and sharing are created. With community participation, ThinkeringSpaces become part of a larger network where kids collaborate face-to-face or at a distance, doing what they really love to do — tinker. ■

More information can be found at: [www.thinkeringspace.org](http://www.thinkeringspace.org)

## Acknowledgements

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His professional experience has included work in the areas of identity, signage, publication and book design. His own work and examples of his students' projects have appeared in various national and international publications. He holds a B.I.D. from the University of Manitoba, Canada, and an M.V.A., University of Alberta, Canada.



## PROJECT-BASED LEARNING

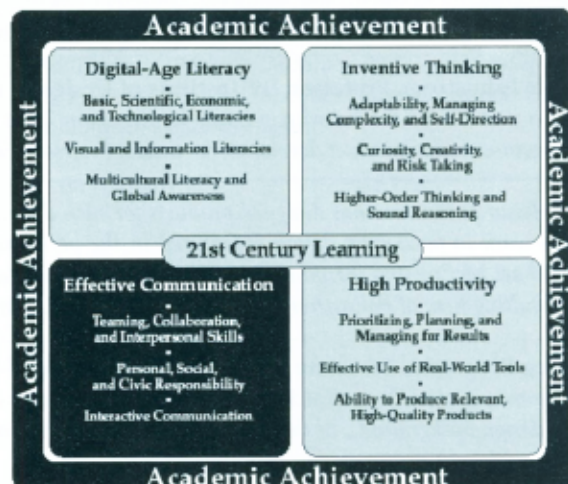
# Project-Based Learning: A Learning Strategy for Acquiring 21<sup>st</sup> Century Skills

By Dr. Susan J. Wolff

*In today's world, learning is not confined to a classroom, school or college, and is an essential part of everyday lives and continues throughout life. New technologies have created additional avenues and enhancements for learning. Creating environments that embrace communities, celebrate cultural differences, nurture and hone practical and advanced skills, and encourage innovation and collaboration is the implicit challenge in designing 21st century education facilities.*

According to the research conducted by the Partnership for 21st Century Skills organization, high school graduates need to have high levels of learning and thinking, information and communication, literacy, and life skills (2006). In 2004, the RAND report, *The 21st Century at Work: Forces Shaping the Future Workforce and Workplace in the United States*, described the skills needed by knowledge workers in every industry. These skills include high-level cognitive skills for managing, interpreting, validating, transforming, communicating and acting on information. Analytical skills that are necessary are abstract reasoning, problem-solving, communication, and collaboration. This research closely reflects earlier studies done by the U. S. Department of Labor's Secretary's Commission on Achieving Necessary Skills (SCANS) in 1991 and the 1996 publication by the National Skills Standards Board (NSSB).

Thomas L. Friedman, author of *The World is Flat* (2005) was quoted in the *New York Times* as saying, "There is a certain American confidence that whatever we lack in preparing our kids with strong fundamentals in math and science, we make up for by encouraging our best students to be



Partnership for 21st Century Skills. (2006). Results that Matter: 21st Century Skills and High School Reform

independent, creating thinkers.” He goes on to say that “the Chinese recognize that they are good at making new things and copying the next new thing, but not imagining the next new thing.” China is now focusing on how to transform classrooms so students become more innovative.

## **Project-Based Learning**

According to Kirk (2000), learners are increasingly less willing and able to learn in a lecture format and want teaching and learning to be more active and process-oriented while learning content. Dede (1993) described learning processes to prepare learners for the work place and society as changing from “the more traditional classroom-based, discipline-focused, learning-by-listening approaches to” just-in-time, life- and work-focused, and learning-while-doing approaches” linked to everyday situations (p. 3).

Active learning processes such as project-based learning provide a wide variety of activities and assessment for the necessary skill acquisition for all learners, workers, and community members to be successful in the rapidly evolving era of the 21st century. Project-based learning is an inquiry based method of teaching and learning that begins with a driving question determined by the students and planning by the teachers. Together they create the theme for the project. Projects are student led and encourage the building of relationships, communication skills, and the use of higher order thinking skills, such as critical thinking to define and solve problems.

Other ways to describe project-based learning includes using and manipulating technology; promoting creativity, meaningful learning, and connecting new learning to past performance or learning; incorporating authentic self and outside reflection and assessment; and instilling lifelong learning patterns (Eckert, Goldman, & Wenger, 1997; Kraft, 1999; Wankat & Oreovicz, 2000).

Assessment of project-based learning involves outside experts who have knowledge and practical experience with the topic of the project, stakeholders who will use or take ownership of the outcomes and products, teachers and staff, and peers. “Students involved in project-based learning repeatedly demonstrate confidence in their knowledge and skills, and are excited when talking about their own work,” according to Bobbie May a member of an early 1990s Washington State education reform committee (Edutopia, 2003).

## **Physical Environment that Supports 21st Century Learning**

The Partnership for 21st Century Skills’ report, *Results that Matter: 21st Century Skills and High School Reform (2006)*, strongly states that “we should not design another high school until we’ve agreed on the knowledge, skills, and attributes that matter today: 21st century skills should become the design specs for every American high school. Often, the physical learning environment is a barrier to project-based learning by limiting the ability to form teams and create a sense of community, integrate curriculum, and actively engage in the activities of authentic project-based learning (Kraft, 1999; Lindblad, 1995).

In today’s world, learning is not confined to a classroom, school, or college, and is an essential part of everyday lives and continues throughout life. New technologies have created additional avenues and enhancements for learning. Creating environments that embrace communities, celebrate cultural differences, nurture and hone practical and advanced skills, and encourage innovation and collaboration is the implicit challenge in designing 21st century learning facilities (Wolff, Troyer, & Pang, 2003, p. 5).

According to Wolff (2001), the six areas of consideration in designing physical learning environments to support and enhance project-based learning are: 1) spaces to support a variety of size of groups; 2) spaces, services, and functions to support psychological and physiological well-being of learners and teachers; 3) spaces that are furnished with moveable, flexible furniture, storage, display areas, and task lighting; 4) spaces that are physically and programmatically adjacent to provide visibility, connection, and sharing of resources and tools; 5) spaces that support functionality such as lectures/seminars, laboratories, production, practice, presentations, and demonstration; and 6) spaces that are flexible, adaptable, have core and fixed-elements, and have a visible infrastructure so the building becomes a learning tool.

## **Project-Based Schools**

The following high schools use project-based learning as a primary means to provide multiple opportunities for students to achieve high academic and 21st century skill acquisition:

### **School of Environmental Studies – Zoo School**

The School of Environmental Studies (SES) was designed and funded in partnership with the Independent School District (ISD) 196, the Minnesota Zoological Gardens, and the City of Apple Valley, Minnesota. It opened in 1995 and is located next to the Zoological (Zoo) Gardens. The SES is a focus or magnet school for ISD 196 high school juniors and seniors using environmental studies as the theme for learning. The learning process at SES integrates language arts, social studies, and sciences using an environmental theme in a collaborative, project-based approach. The projects are developed around real local, state, regional, or global issues that need to be addressed and solved. A student quoted in Edutopia, *It’s All Happening at the Zoo School*, by Diane Curtis (2002) states, “I feel like I’m not learning in a box of fluorescent lights like I was in my first years in high school. I’m learning in a classroom, and I’m learning outside by a pond. I’m learning in a local park. I’m learning at the zoo, working with people who are doing stuff in the field...We do a lot of stuff that has a significant impact on the community.”

### **Lake Washington School District**

In 2001, the state Board of Education in the State of Washington voted to require a culminating student project as a part of their graduation requirements. The first requirements went into effect in 2004 and will be demonstrated by students graduating in 2008. Students choose their own project as a means to demonstrate mastery in reading, writing, and communication; knowing and applying the core concepts of math, the social, physical, and life sciences, civics and history, geography, the arts, and health and

# Project-Based Learning

fitness; thinking analytically and creatively and integrating experience and knowledge to form reasoned judgments and to solve problems; and understanding the importance of work. The Lake Washington School District stresses the need for and supports using technology in this project.

## The Minnesota New Country School – MNCS

*“It’s not being smart but self-motivated that gets you some place in this school.” — Chelsey*

*“MNCS gives you a safe place to stand on your own—and fail. Success here is trial and error. You might try one project and it doesn’t work. You try another, and it does. It’s like life. You learn from your mistakes. But here you get to learn with a safety net.” — Tim*

The above quotes are from the Website of the Minnesota New Country School. The school is located in rural Henderson, Minnesota and mixes the intimacy of a one-room school house with 21st century technology. The school combines freedom with responsibility, structure with flexibility, and book learning with practical experiences like working at the corner drugstore. In helping students negotiate these dualities and gain the skills they need, MNCS overturns many conventions of teaching and learning. The young woman pictured below created her own business doing the logo embroidery for the regional Emergency Services agencies.

## The East Valley Institute of Technology – EVIT

The East Valley Institute of Technology (EVIT) is one of the best resources Arizona’s students have to guarantee themselves success. Upheld as a model for career and technical education by the U.S. Department of Education, EVIT provides students with the

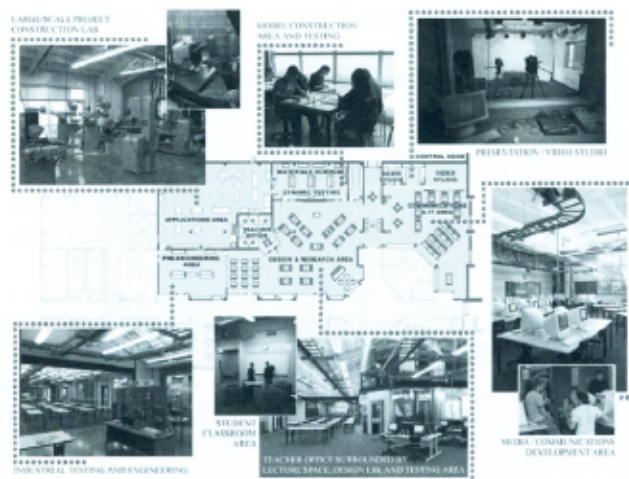
advanced skills and training needed to thrive in today’s competitive job market. EVIT adds to a student’s academic instruction with hands-on learning provided by experienced professionals and excellent resources. By allowing students to earn elective credit in 35 occupation-specific programs, EVIT enhances the future of every type of student. EVIT is a public school district that serves students from ten East Valley school districts. High school students from Apache Junction, Chandler, Fountain Hills, Gilbert, Mesa, Queen Creek, Scottsdale, Tempe, Higley and J.O. Combs.



Look at the joy of learning in the students faces.

## Canby High School – The Applied Technology Center

The Canby Applied Technology Center (ATC) opened in mid school year 2002. The facility completion represents the initial phase of transformation from an Industrial Arts Program into an integrated academic and technical learning using rigorous project-based curriculum. The physical environment provides a strong framework for the educational program with its industrial feel and exposed infrastructure that serves as a learning tool with its mechanical, electrical, and structural systems exposed and labeled. ■



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**Dr. Susan J. Wolff** is the Chief Academic Officer for Columbia Gorge Community College and the Director of Wolff Designs. Dr. Wolff leads development of academic or learning plans that address necessary knowledge, skills, and abilities needed by learners; advises on master facility plans; and guides the design of the physical learning environment for all educational levels. She possesses specific expertise in community involvement; collaborative, project-based learning; and career and technical education.

Dr. Wolff has worked with clients from all levels of education and architecture firms across the country and internationally. She has presented at state, regional, and international CEFPI conferences, the California Coalition for Adequate School Housing (CASH), the Society of College and University Planners international conference, and Design Share's World Forum in Barcelona in addition to presentations at many educational conferences. She has served on award juries and teams for the AIA, CEFPI, CASH, and Design Share and has several publications related to the topic of educational and facilities design and education.