



# Project Overview

## *Tasks Completed*

- Assembled a Resource Committee (comprised of county mayor, planning director, county commissioner, school administrative staff, and school board member) to provide technical assistance during data gathering steps of project.

# Project Overview

## *Tasks Completed*

- Collected and summarized background data:
  - Historic enrollments
  - School-by-school classroom inventories
  - Housing development activity
  - Demographics
  - Annexation plans
  - GIS map data: school attendance zones, land use, other data.

# Project Overview

## *Tasks Completed*

- Constructed enrollment projection models.
- Calculated school facility capacities.
- Compiled final report, *Enrollment Projections and Facility Capacity Analysis*.



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# Enrollment Projections and Facility Capacity Analysis

April 7, 2008

# Introduction

## *Project Components*

- Overview of recent trends in public school enrollment, demographics, and land development in Sullivan County.
- Ten-year series of systemwide and school-by-school enrollment projections (2008/09-2017/18).
- Measurement of enrollment capacities for all school facilities.
- Comparison of enrollments (actual and projected) to facility capacities.



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# Enrollment Trends



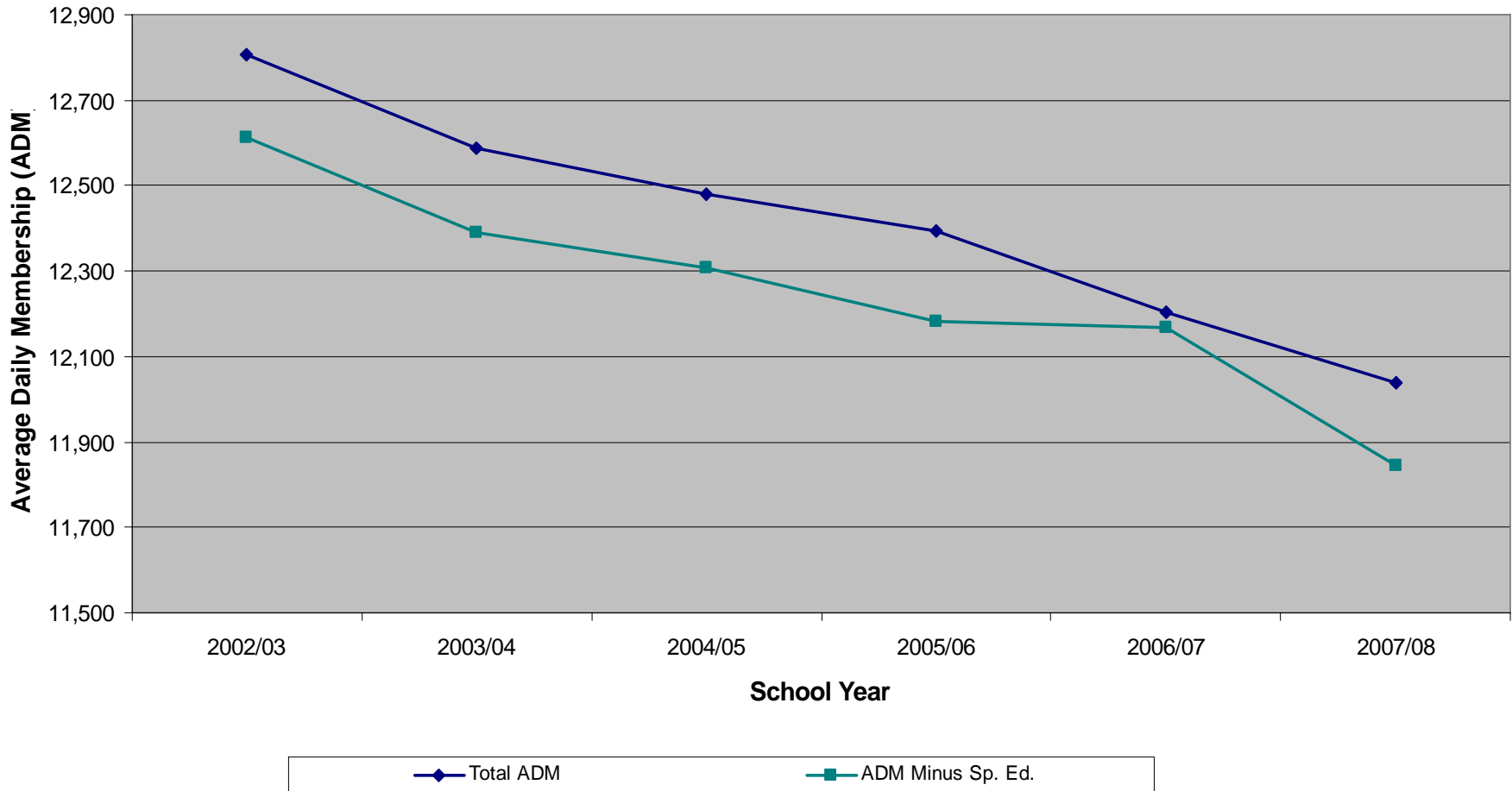
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# Enrollment Trends

## *Systemwide Enrollment*

- Total enrollment in Sullivan County schools showed continued decline over past several years.
- Loss of almost 800 students since 2002/03, a drop of 1.2 percent per year on average.
- 1,200 fewer students since the start of the decade.

### SULLIVAN COUNTY SYSTEMWIDE ENROLLMENT HISTORY AVERAGE DAILY MEMBERSHIP, 2002/03-2007/08



# Enrollment Trends

## *Systemwide Enrollment*

- 384-student decline from 2004/05 totals.
- Elementary enrollment shrunk 215, a 3.9 percent drop.
- Middle schools lost 135 students (4.5 percent decline).
- High school enrollment down only 34 students.
- Recent declining enrollments at the elementary school ranks hint at future losses in middle and high schools.

# Enrollment Trends

## *Out-Of-District Transfers*

- Almost 300 student residents of Kingsport, Bristol, and Johnson City attend Sullivan County schools this year.
- Over 600 student residents of Sullivan County attend Kingsport, Bristol, and Johnson City schools this year.
- Net loss of 353 Sullivan County children to city schools.

# Enrollment Trends

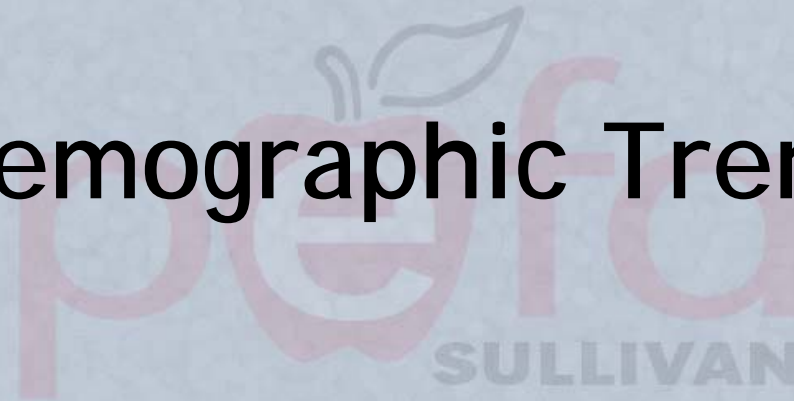
## *Split Between Public and Private Education*

- Approximately 94 percent of Sullivan County school-age children (outside incorporated places) attend public schools.
- The remaining 6 percent are homeschooled or attend private schools.



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# Demographic Trends



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# Demographic Trends

## *General Population Trends*

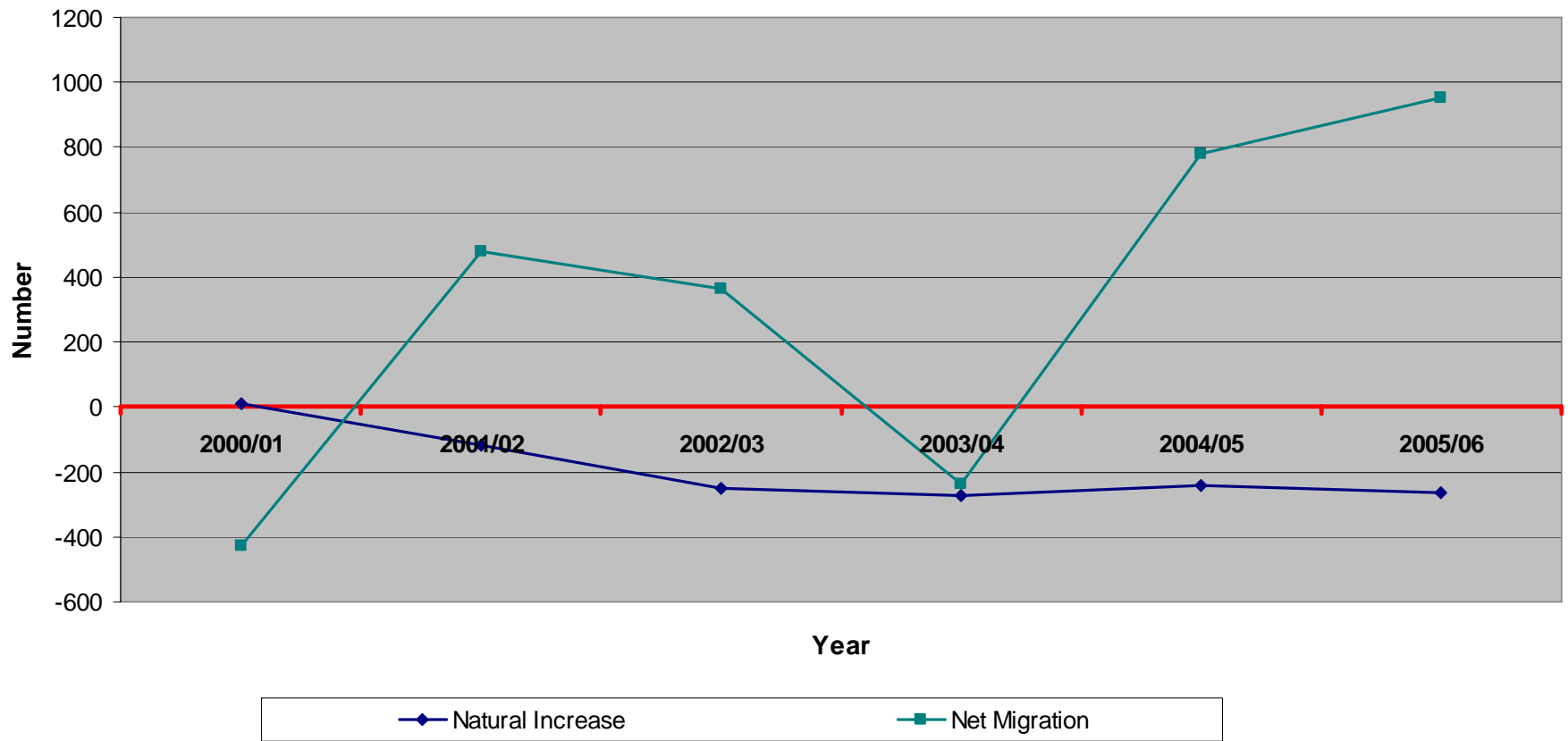
- 1980s: Sullivan County population dropped 0.3 percent.
- 1990s: Population grew by 9,100, a 6.3 percent increase.
- 2000s: Slight decline during first couple of years. Total population returned to level recorded at start of decade (net increase of 0.1 percent in past 6 years).
- Totals:
  - 1980: 144,400
  - 1990: 143,900
  - 2000: 153,000
  - 2006: 153,200

# Demographic Trends

## *Recent Population Change in Sullivan County*

- Births slowly declined over past 15 years.
- Deaths steadily increased since 1990.
- Between 1998 and 2006, deaths outnumbered births:
  - Average annual births = 1,674
  - Average annual deaths = 1,749.
- Average net migration since 2000: 319 persons per year.
- Modest population gains from positive net migration offset losses from deaths in excess of births.

**COMPONENTS OF POPULATION CHANGE, 2000/01-2005/06  
SULLIVAN COUNTY**



# Demographic Trends

## *Age-Group Population Trends*

- Child population (under 5 years) dropped from 8,900 in 1980 to 8,000 in 2005.
- School-age population steadily lost shares of total population since 1980. Down from 21.2 percent of total in 1980 to 15.3 percent in 2005.
- Senior population gained shares, up from 10.6 percent in 1980 to 16.7 percent in 2005.
- Median age in 1980 was 32.5 years. Increased to 42.0 by 2005.

# Demographic Trends

## *Average Household Size*

- Number of persons per household declined steadily since 1980:
  - 1980: 2.75
  - 1990: 2.49
  - 2000: 2.36
  - 2006: 2.26



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# Development Trends



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# Development Trends

## *Recent Rates of New Home Construction*

- 1990 to 2006: Sullivan County added 15,178 housing units, an average of 893 units annually (includes incorporated places).
- 1990s: Average number of units per year was 1,008.
- 2000s: New construction declined 28 percent to 728 units per year.
- Housing starts peaked in 1994 (1,376 units), while 2002 recorded fewest new units (590).

# Development Trends

## *New Home Construction by Unit Type*

- Single-dwelling detached units: 18 percent decline between 1990s (521 units per year) and 2000s (425 units per year).
- Single-dwelling attached (condos, townhomes): Annual construction rates dropped 16 percent between 1990s and 2000s.
- Mobile homes: Averaged 335 units per year during 1990s. Dropped to 164 units per year in 2000s, a 51 percent decline.
- Apartments: Few annual additions, but consistent since 1990s (44 units per year).

# Development Trends

## *New Construction Shares by Unit Type (2000-06)*

- Detached: 58 percent.
- Attached: 13 percent.
- Mobile homes: 23 percent.
- Apartments: 7 percent.

# Development Trends

## *Average Student Yields in Sullivan County*

- Detached housing units generate 0.407 school-age children per unit.
- Attached (condos, townhomes): 0.158
- Mobile homes: 0.476
- Apartments: 0.214

# Development Trends

## *Student Yields - Example*

New 100-unit, detached-home subdivision:

- Detached housing yields 0.407 children per unit.
- Approximately 41 children expected.
- 39 children (94 percent) will enter public schools.
- 2 children (6 percent) will be homeschooled/attend private school.
- Not all 39 children will enter public school system immediately. Enrollment will occur gradually over build-out period of subdivision.



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# Annexation



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# Annexation

## *Annexation History*

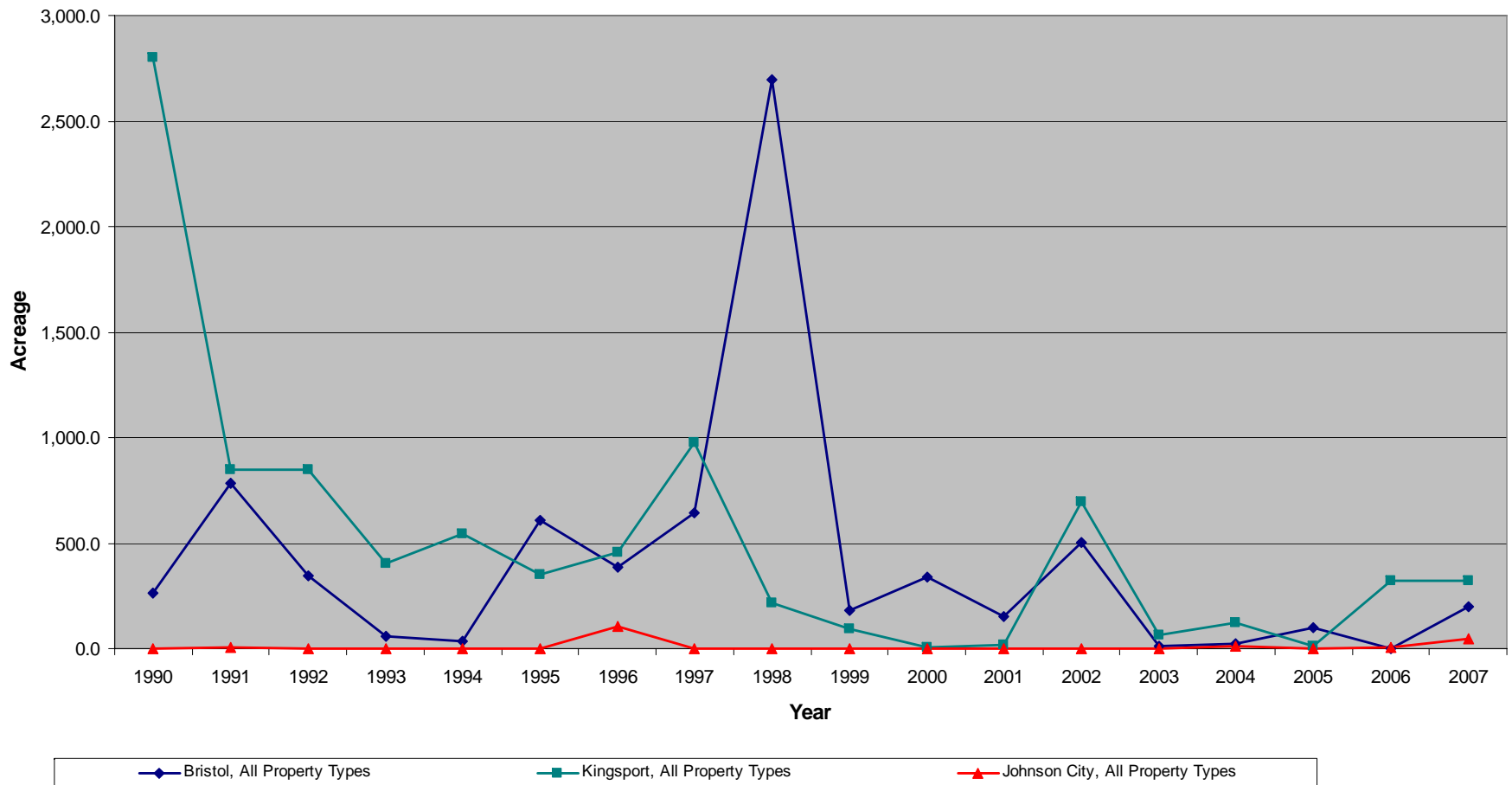
- Since 1990, 16,600 acres of unincorporated portions of Sullivan County were annexed by Bristol (44 percent share), Johnson City (1 percent), and Kingsport (55 percent).
- Of the 16,600-acre total, 2,760 acres are currently in residential use, representing a 16.6 percent share.

# Annexation

## *Annexation History*

- Annual annexation totals dropped sharply this decade when compared to activity in the 1990s:
  - Bristol averaged 599 acres per year in the 1990s. Dropped to 166 acres per year in the 2000s.
  - Kingsport's activity slowed from 754 acres per year in the 1990s to 195 acres per year in the 2000s.

**BRISTOL, KINGSPORT, AND JOHNSON CITY ANNEXATION HISTORY, 1990-2007**

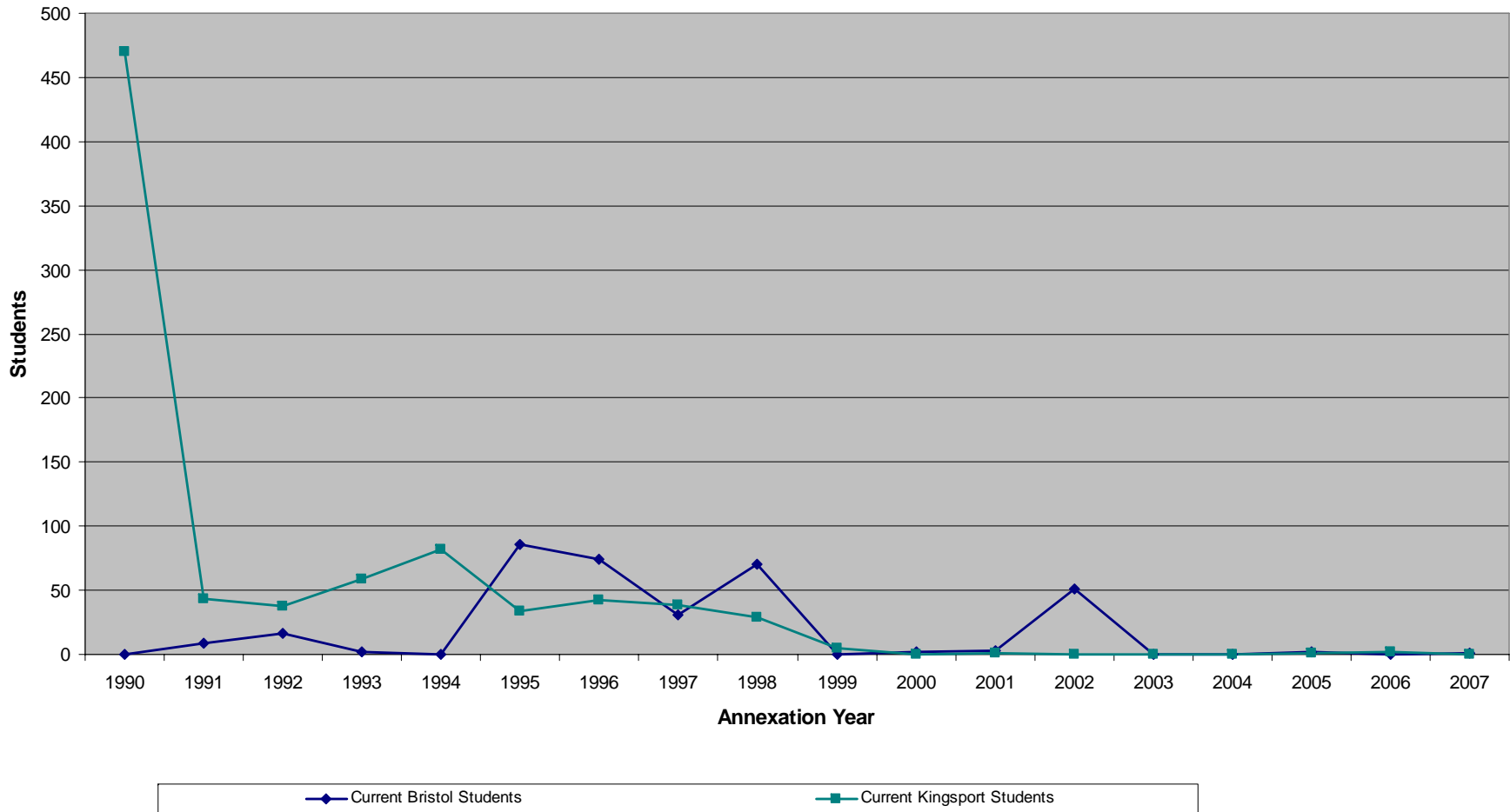


# Annexation

## *Students Affected by Annexation*

- Based on student address data, 37 Sullivan County public school children resided in areas annexed by Bristol and Kingsport in the past 4 years.
- No school children were annexed by Johnson City in the past 4 years.
- 1,100 current city-school children live in portions of Sullivan County that were annexed in the 1990s.

**CURRENT CITY SCHOOL SYSTEM STUDENTS LIVING IN ANNEXATION AREAS**



# Annexation

## *Students Affected by Annexation*

- Since 2002, Sullivan County systemwide enrollment declined 768 students.
- If current city-system students living in areas annexed since 2002 were added back into the Sullivan County system this year, only 57 children would be returned, and net loss would still be 711 students.
- The bulk of the decline in the Sullivan County school system cannot be attributed to recent annexations. Changing demographics and older (1990s) annexations are the sources.

# Annexation

## *Annexation Plans: Rock Springs*

- City of Kingsport's Rock Springs annexations in southwest Sullivan County have potential to affect county enrollments at a scale similar to annexations of the 1990s.
- Area is currently home to 436 public school children.
- Families can choose to remain in the Sullivan County system or switch to Kingsport city schools after annexation.
- Kingsport system is currently building John Adams Elementary School to serve the Rock Springs area (500-student capacity, scheduled to open Fall 2009).

# Annexation

## *Annexation Plans: Bristol and Johnson City*

- Plans not immediately known.
- If recent activity is indicative of plans for the next few years, annexations will be small and non-residential.
- Johnson City not likely to annex residential areas with households containing school-age children. Johnson City Schools system already faced with overcrowding issues.

# Annexation

## *Student Choice-Making in Annexation Areas*

- When given a choice, most Sullivan County children do not attend Sullivan County schools after annexation.
- Historical data show that a majority of annexed children opt for city schools. Rates vary by school level:
  - Elementary: 97 percent.
  - Middle: 89 percent.
  - High: 64 percent.



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# Enrollment Projections

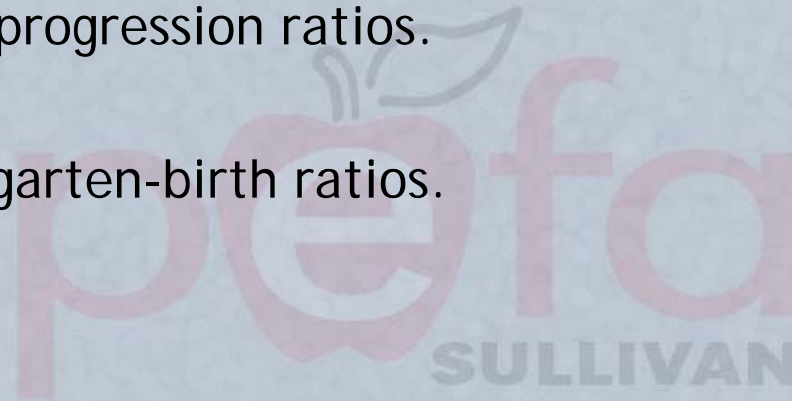


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# Enrollment Projections

## *Model Components*

- Grade progression ratios.
- Births.
- Kindergarten-birth ratios.



# Enrollment Projections

## *Grade Progression Ratios*

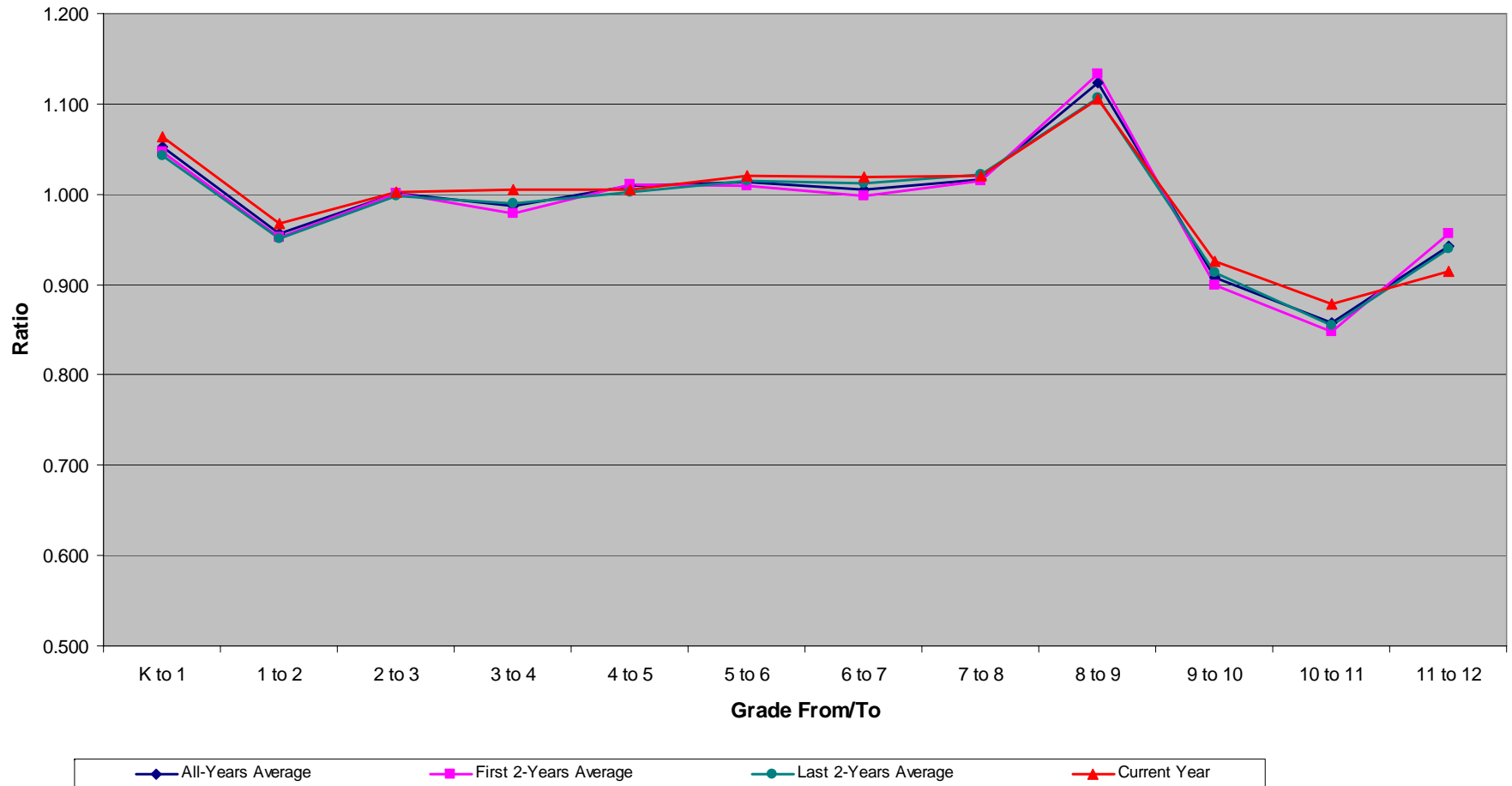
- Grade progression ratios (GPR) measure the advancement of a student *cohort* (a selected age-group or grade-level of students) through a school system between the first term of one school year and the first term of the next.
- Example:
  - 100 children in Gr. 1 in 2006/07
  - 80 children in Gr. 2 in 2007/08
  - 0.800 grade progression ratio for Gr. 1 to Gr. 2

# Enrollment Projections

## *Grade Progression Ratios*

- GPR will equal 1.0 if no students are lost or gained from one year to the next.
- A ratio less than 1.0 indicates a loss of students: drop-out, transfer, out-migration of families, movement to home/private school.
- A ratio greater than 1.0 indicates a gain in students: new residential development, in-migration of families, and transition of students into public school system from home/private school.

**GRADE PROGRESSION RATIOS, 2004/05-2007/08**

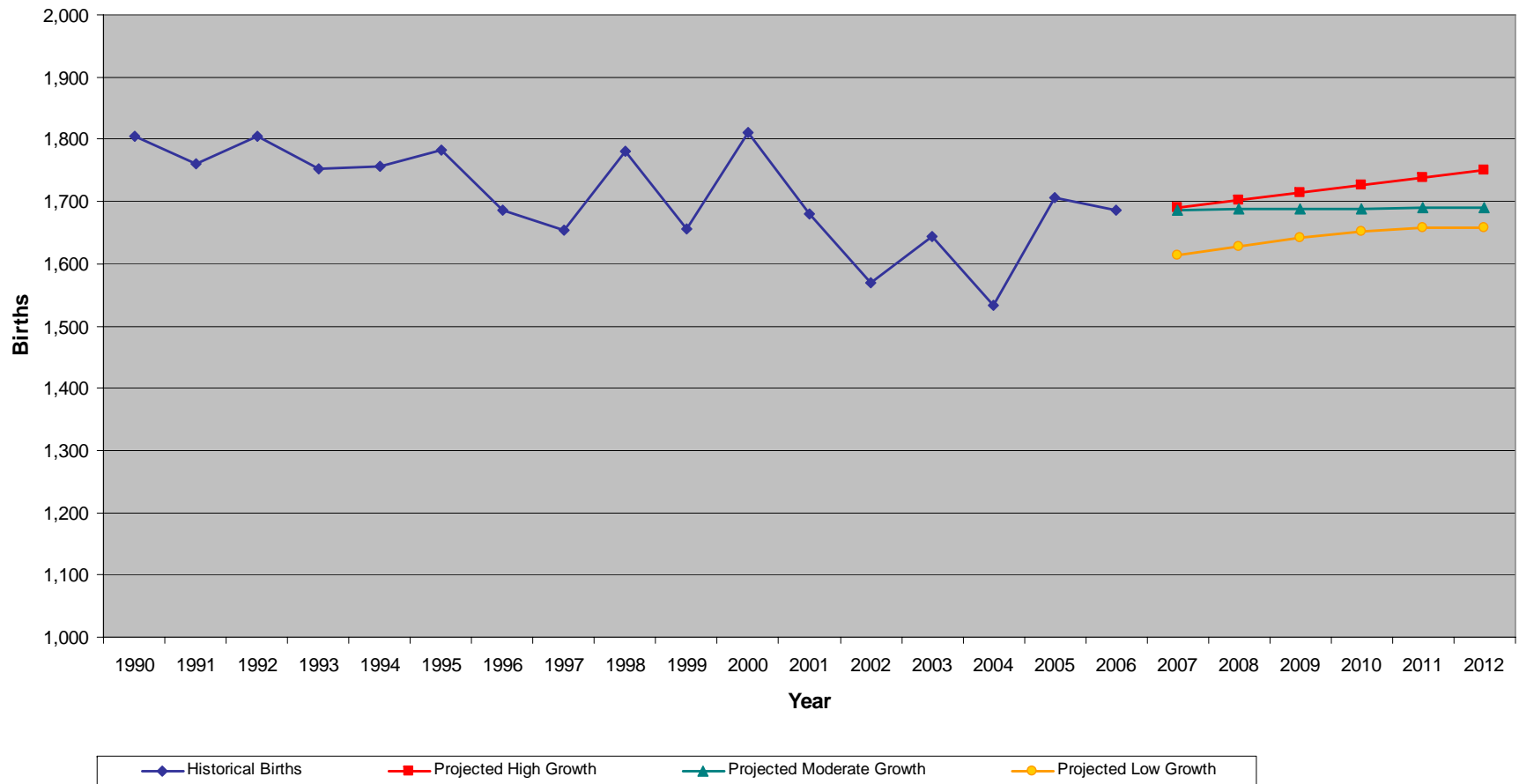


# Enrollment Projections

## *Births*

- Kindergarten students keep the school system populated throughout the projection period.
- Enrollment in kindergarten is a function of the number of births five years earlier (e.g., births in 2002 will comprise kindergarten population in 2007).
- To forecast kindergartners, local birth figures were used: actual (2003-2006) and projected (2007-2012) births were tabulated.

**SULLIVAN COUNTY BIRTH PROJECTIONS, 2007-2012**



# Enrollment Projections

## *Kindergarten-to-Birth Ratios*

- The number of births five years earlier does not translate exactly to current kindergarten enrollment. Factoring is necessary.
- The ratio between the number of kindergarten students and the number of children born five years earlier was measured (K-B ratio).
- A ratio less than 1.0 is the result of factors such as out-migration and enrollment in city schools/private kindergarten programs.
- A ratio greater than 1.0 indicates in-migration of new families.
- Recent Sullivan County school system average: 0.516.

# Enrollment Projections

## *Pre-School Enrollment*

- Enrollment projections in this report do not include pre-school children.
- Children are not required to attend pre-school.
- Many private pre-kindergarten opportunities exist in Sullivan County.
- Not practical to model decision-making processes of families in terms of pre-school participation.

# Enrollment Projections

## *Methodology Summary*

Ten-year school enrollment projection models were built on the following data:

- Actual school enrollment, 2004/05-2007/08.
- Grade progression ratios, 2004/05-2007/08.
- Actual births, 2003-2006.
- Projected births, 2007-2012.
- Kindergarten-to-birth ratios, 2004/05-2007/08.
- Annexation factor.

# Enrollment Projections

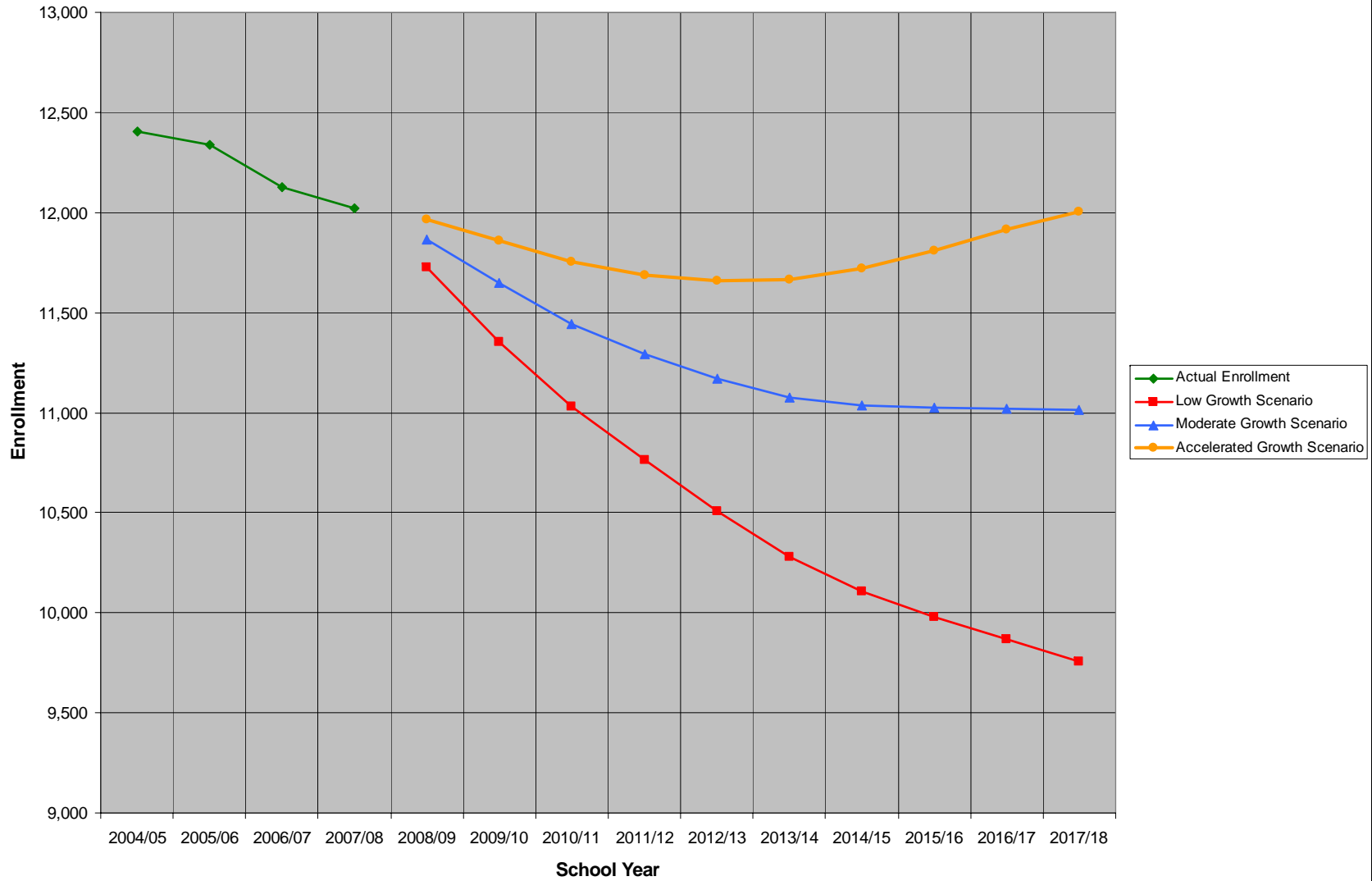
## *Growth Models*

- Low
- Moderate
- Accelerated

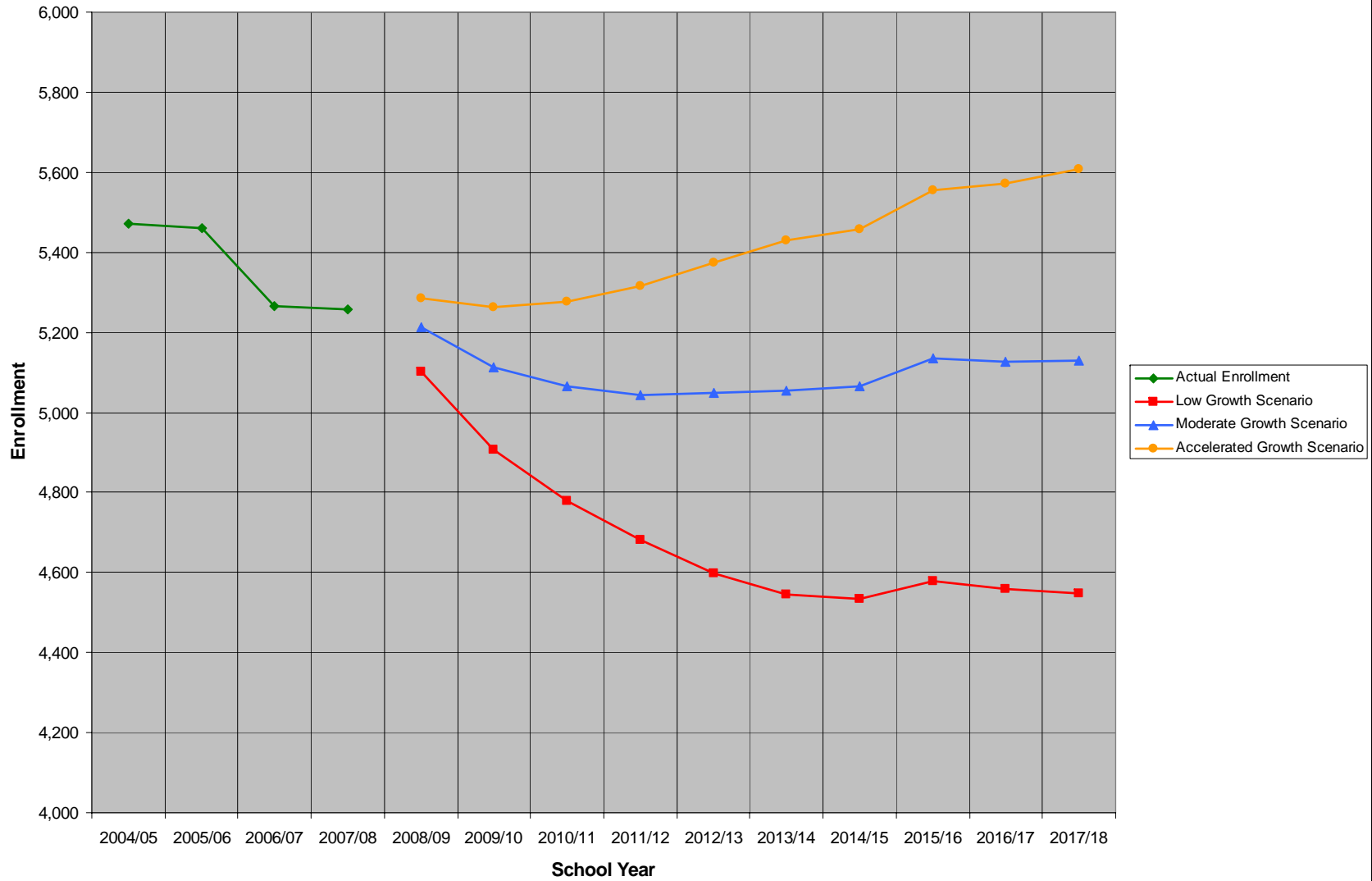
Differences between growth models were based on variations in grade progression ratios, projected births, and kindergarten-birth ratios.

	Enrollment 2007/08	Enrollment 2017/18	Change 2007-2017	% Change 2007-2017
<b>SYSTEMWIDE</b>				
Current enrollment	12,019			
Projected: Low		9,759	-2,260	-18.8
Projected: Moderate		11,011	-1,008	-8.4
Projected: Accelerated		12,006	-13	-0.1
<b>ELEMENTARY (Grades K-5)</b>				
Current enrollment	5,257			
Projected: Low		4,548	-709	-13.5
Projected: Moderate		5,130	-127	-2.4
Projected: Accelerated		5,607	350	6.7
<b>MIDDLE (Grades 6-8)</b>				
Current enrollment	2,884			
Projected: Low		2,215	-669	-23.2
Projected: Moderate		2,534	-350	-12.1
Projected: Accelerated		2,809	-75	-2.6
<b>HIGH (Grades 9-12)</b>				
Current enrollment	3,878			
Projected: Low		2,995	-883	-22.8
Projected: Moderate		3,347	-531	-13.7
Projected: Accelerated		3,590	-288	-7.4

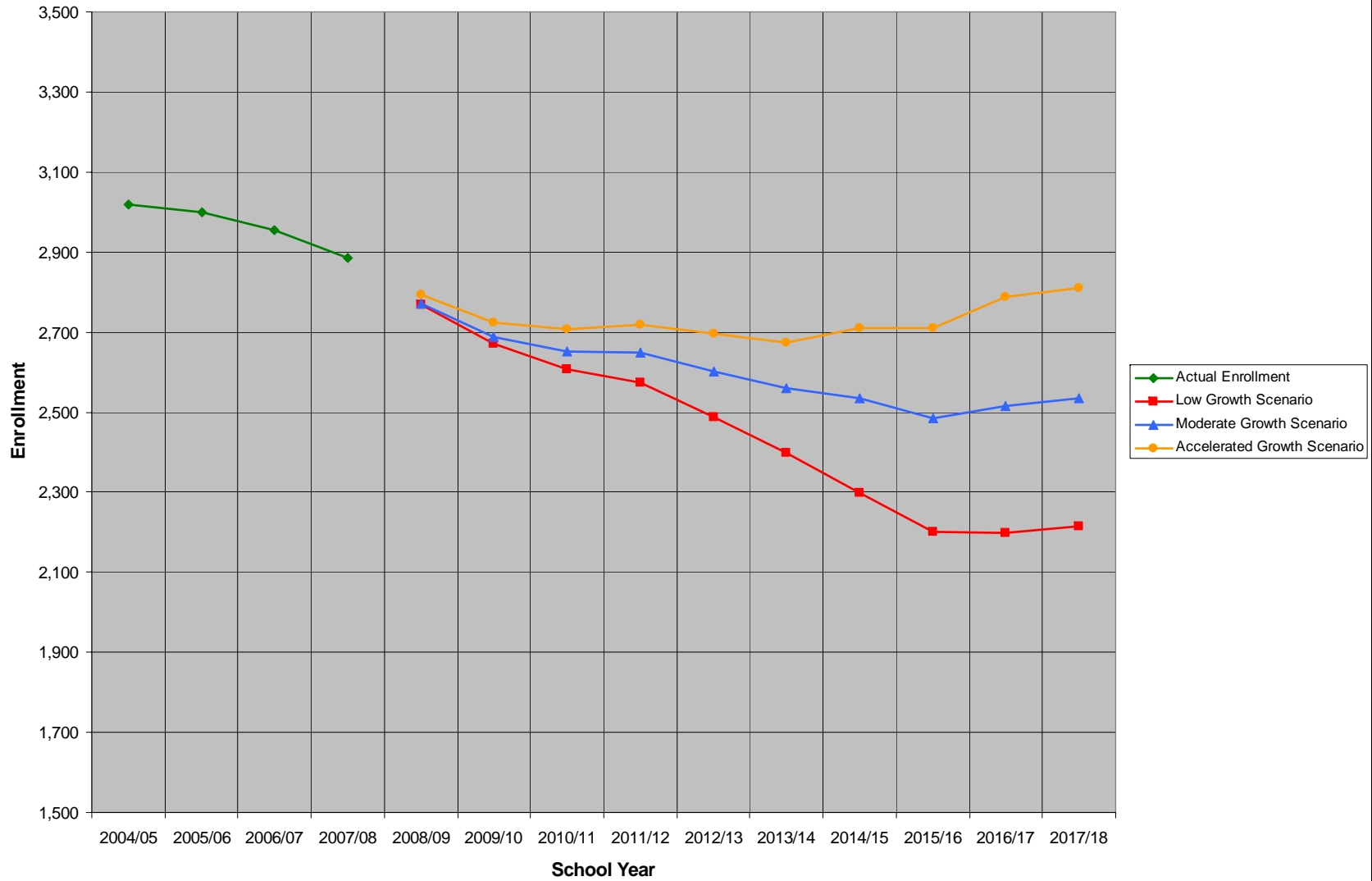
**SYSTEMWIDE: ACTUAL ENROLLMENT AND PROJECTION SCENARIOS, 2004/05-2017/18**



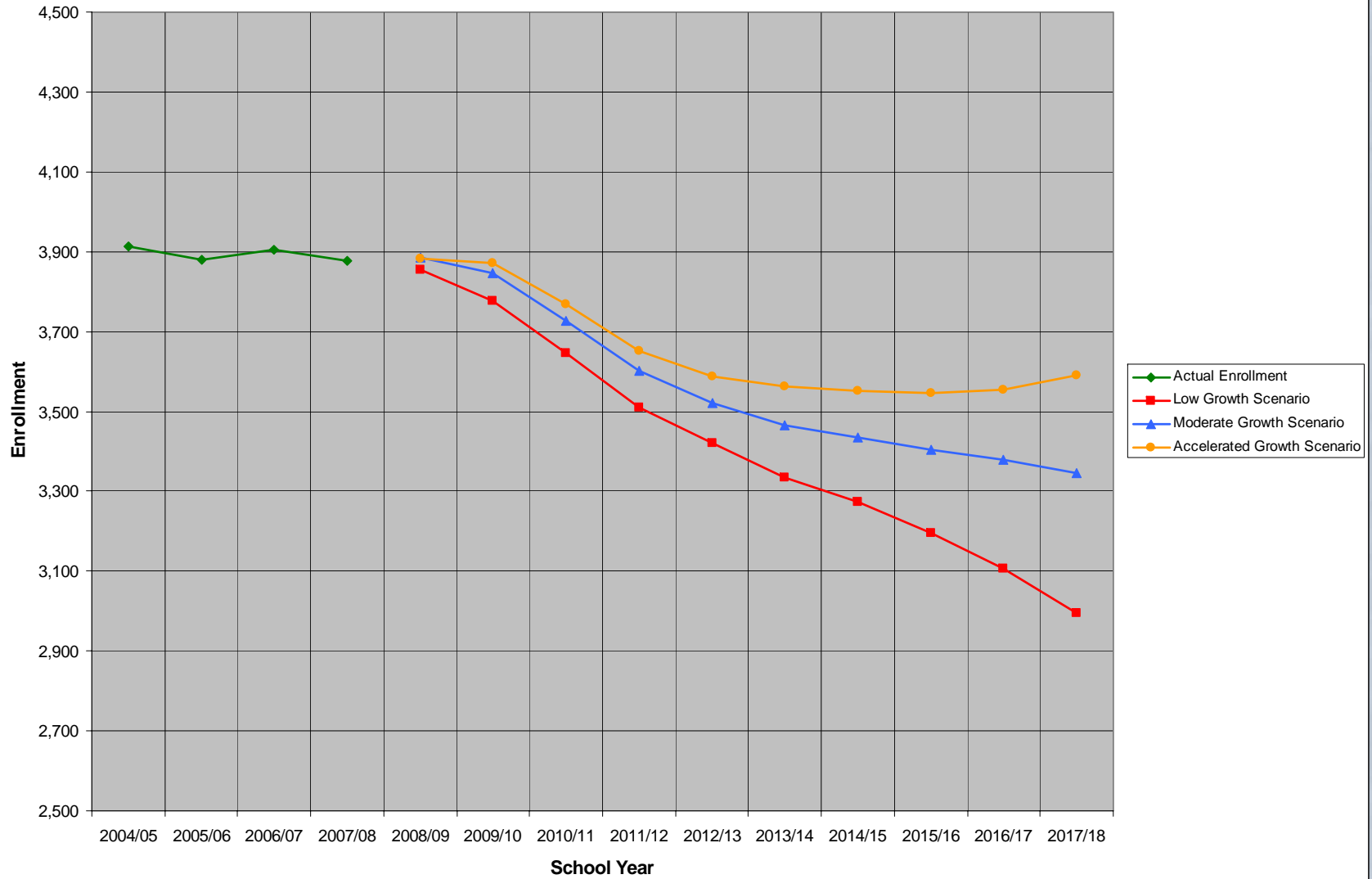
**ELEMENTARY SCHOOLS: ACTUAL ENROLLMENT AND PROJECTION SCENARIOS, 2004/05-2017/18**



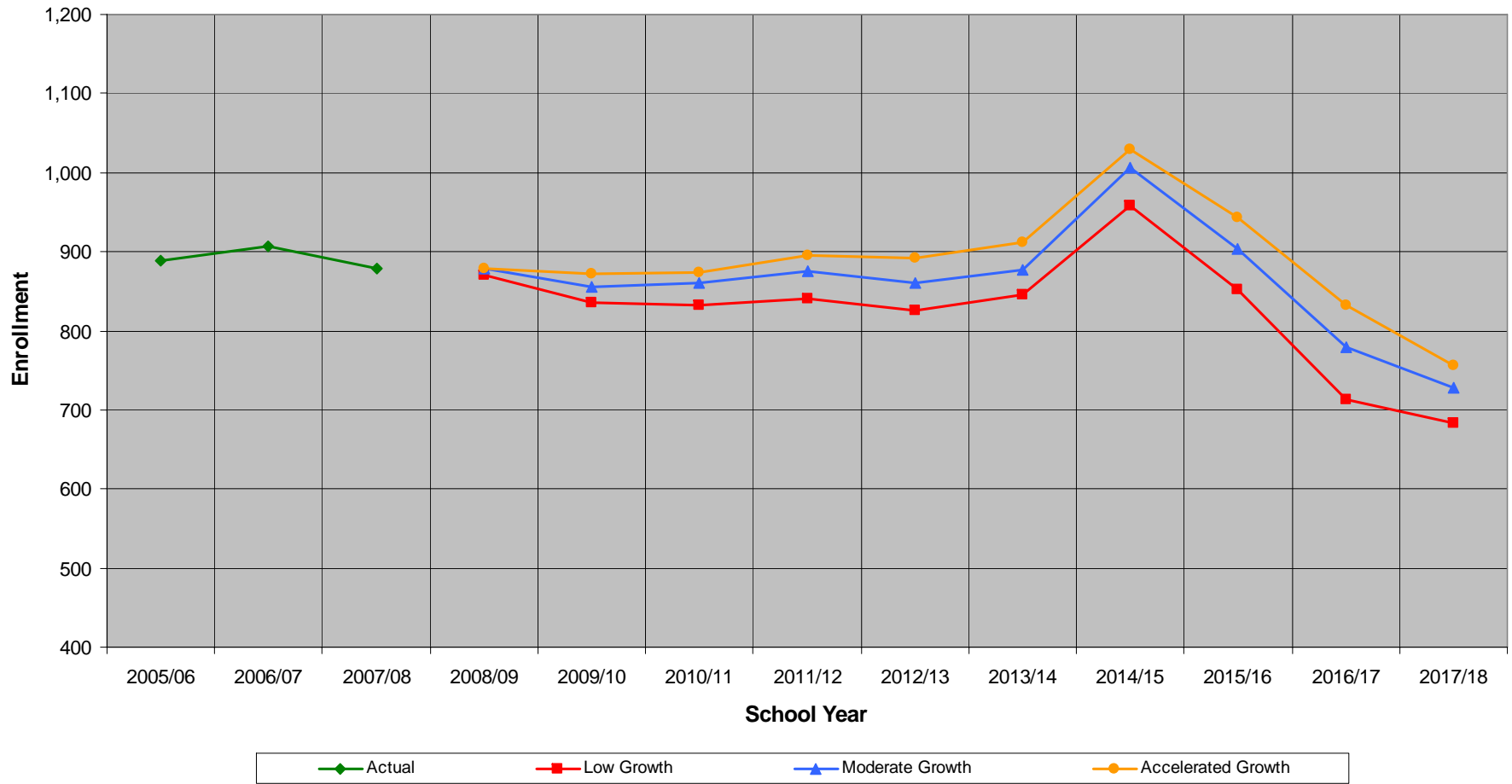
**MIDDLE SCHOOLS: ACTUAL ENROLLMENT AND PROJECTION SCENARIOS, 2004/05-2017/18**



**HIGH SCHOOLS: ACTUAL ENROLLMENT AND PROJECTION SCENARIOS, 2004/05-2017/18**



**CLASS OF 2017/18**





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# School-Level Projections



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ELEMENTARY SCHOOL ENROLLMENT PROJECTIONS (MODERATE GROWTH)

School	2007/08	2008/09	2012/13	2017/18	10 Yr. Change (%)
Akard	148	139	139	147	-0.6
Blountville	325	317	299	307	-5.7
Bluff City	517	535	545	559	8.0
Brookside	196	199	197	202	3.1
Cedar Grove	245	233	230	235	-4.0
Central Heights	250	245	234	240	-3.9
Emmett	221	205	201	203	-7.9
Holston	312	307	292	301	-3.4
Indian Springs	481	485	472	490	2.0
Kingsley	235	229	235	240	2.3
Miller Perry	552	540	523	537	-2.7
Rock Springs	473	442	363	354	-25.0
Sullivan	352	350	316	303	-13.9
Valley Pike	165	171	186	182	10.4
Weaver	306	320	327	329	7.4
Mary Hughes (K-8)	525	528	557	567	7.9



### MIDDLE SCHOOL ENROLLMENT PROJECTIONS (MODERATE GROWTH)

<b>School</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2012/13</b>	<b>2017/18</b>	<b>10 Yr. Change (%)</b>
Ketron	421	423	399	414	-1.7
Blountville	467	428	339	325	-30.3
Bluff City	410	383	418	421	2.7
Colonial Heights	574	553	482	463	-19.3
Holston	432	396	402	373	-13.7
Holston Valley	197	200	184	192	-2.3
Sullivan	186	176	148	141	-24.0



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## HIGH SCHOOL ENROLLMENT PROJECTIONS (MODERATE GROWTH)

<b>School</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2012/13</b>	<b>2017/18</b>	<b>10-Yr. Change (%)</b>
Central	1,058	1,099	972	838	-20.8
East	1,004	1,002	917	1,020	1.7
North	866	867	843	734	-15.2
South	1,105	1,097	950	894	-19.1



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# Facility Capacity



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# Facility Capacity

## *School System's Ability to Serve its Population*

### Over-Capacity:

- Class sizes exceed accepted teacher-pupil ratios; strained support services (cafeteria, parking, site access); auditoriums, gymnasiums, libraries, storage rooms serve as classroom space.
- Portable classrooms, building wings, entire facilities might be needed.
- Conditions of distraction and disruption, a poor environment for learning.

# Facility Capacity

*School System's Ability to Serve its Population*

Under-Capacity:

- Inefficient to operate physical plant that is not fully utilized.
- Unable to offer courses, programs, and extra-curricular activities available at fully-utilized facilities.

# Facility Capacity

## *Functional Capacity*

- Current usage of educational program space and pre-determined number of students assigned to each space (based on teacher-pupil ratios) comprise basic formula.
- Incorporates *utilization factor* that further reduces carrying capacity, under rationale that scheduling requirements make it impossible to assign students to all teaching stations every period of every day.
- Accommodates school curriculum.
- A more realistic measure of capacity, according to school administrators.

# Facility Capacity

## *Design Capacity*

- Count the number of classrooms in a school and multiply by maximum class size (teacher-pupil ratio).
- Curriculum-neutral: allows administrators flexibility when evaluating building space. During shortages, look at raw inventories to see how much room is available, irrespective of classroom use; adjustments made to programs as necessary to meet space demands.
- Limited by lack of attention to program-specific facilities.

# Facility Capacity

## *Floor Area Capacity*

- Ratio of number of students to total building floor area.
- Ratio compared to best-practice standards: 150 square feet per elementary student, 170 sf per middle schooler, and 190 sf for high school students.
- Often used by architects when designing new facilities.
- Mechanistic standard, detached from important programmatic considerations.
- Modern measures often applied to facilities built decades ago when different sets of building/campus elements were considered important.

# Facility Capacity

## *Comments about Capacity Measures*

- In this study, primary importance placed on functional and design capacity. More sophisticated and realistic measures of school capacity.
- Secondary importance placed on floor area capacity. Constrained in terms of applying modern standards to old buildings. Useful for future building plans, but challenging to use otherwise.

# Facility Capacity

## *Portable Classrooms*

- Capacity measures should exclude temporary or portable classrooms.
- Temporary space creates temporary capacity, which can mask real, longer-term facility needs.
- In this study, attention is given to additional facility capacity afforded by portable classrooms, but primary analysis adheres to best practices that recommend exclusion of temporary space.

# Facility Capacity

## *Core Space and Other Facility Space*

- Sense of capacity can be skewed by inadequate core space (library, cafeteria, auditorium), parking, site access, roadway, campus size, and classroom footage.
- Capacity calculations indicate how many students facility can hold based on state mandates and curriculum offerings, but other facility issues may necessitate follow-up inspection.
- Any re-evaluation of individual school capacity measure should be conducted with school officials and county's school assessment team.

# Facility Capacity

## *Pre-School Classrooms*

- Although enrollments were excluded, classroom space dedicated to pre-school education was addressed.
- Rooms assigned to pre-school instruction were set aside and reserved for future pre-school use, not re-assigned to current or future K-12 enrollments.

# Facility Capacity

## *Capacity Thresholds*

- If facility has reached 100 percent or more of its design or functional capacity, it is fully occupied.
- Professional educators warn that when enrollments reach 80 to 90 percent of design and functional limits, it is time to start looking at future enrollments, potential space needs, and options to alleviate strains.
- Don't wait until buildings are completely full before taking action.
- This study uses 85 percent capacity threshold as first indicator of potential strains.

# Facility Capacity

## *Capacity Thresholds*

- If facility is less than 65 percent occupied, it has surplus capacity.
- When enrollments fall below 65 percent of design and functional limits, it is time to start looking at future enrollments, potential space needs, and options to make better use of facility space.
- This study uses 65 percent capacity threshold as first indicator of potential space surplus.



SCHOOL CAPACITY AND ENROLLMENT COMPARISONS, 2007/08-2017/18: SYSTEMWIDE

School Year	Enrollment	Functional Capacity	Functional Capacity In Use (%)	Design Capacity	Design Capacity In Use (%)	Floor Area Capacity	Floor Area Capacity In Use (%)
2007/08	12,023	16,683	72.1	21,155	56.8	12,988	92.6
2012/13	11,170	16,683	67.0	21,155	52.8	12,988	86.0
2017/18	11,011	16,683	66.0	21,155	52.1	12,988	84.8





SCHOOL CAPACITY AND ENROLLMENT COMPARISONS: ELEMENTARY SCHOOLS

School	Functional Capacity	2007/08 Capacity In Use (%)	2012/13 Capacity In Use (%)	2017/18 Capacity In Use (%)
Akard	180	82.2	77.3	81.6
Blountville	435	74.7	68.7	70.5
Bluff City	570	90.7	95.6	98.0
Brookside	230	85.2	85.7	87.7
Cedar Grove	270	90.7	85.0	86.9
Central Heights	280	89.3	83.6	85.9
Emmett	305	72.5	65.8	66.6
Holston	365	85.5	79.9	82.5
Indian Springs	550	87.5	85.8	89.1
Kingsley	315	74.6	74.7	76.3
Miller Perry	645	85.6	81.1	83.3
Rock Springs	550	86.0	66.0	64.4
Sullivan	420	83.8	75.3	72.1
Valley Pike	180	91.7	103.1	101.1
Weaver	360	85.0	91.0	91.3
Mary Hughes	620	84.7	89.8	91.4



SCHOOL CAPACITY AND ENROLLMENT COMPARISONS: MIDDLE SCHOOLS

School	Functional Capacity	2007/08 Capacity In Use (%)	2012/13 Capacity In Use (%)	2017/18 Capacity In Use (%)
Ketron	570	73.9	70.0	72.7
Blountville	833	56.1	40.6	39.0
Bluff City	701	58.5	59.7	60.0
Colonial Heights	591	97.2	81.6	78.4
Holston	718	60.1	56.0	51.9
Holston Valley	378	52.1	48.6	50.8
Sullivan	472	39.4	31.5	30.0

SCHOOL CAPACITY AND ENROLLMENT COMPARISONS: HIGH SCHOOLS

School	Functional Capacity	2007/08 Capacity In Use (%)	2012/13 Capacity In Use (%)	2017/18 Capacity In Use (%)
Central	1,437	73.7	67.7	58.3
East	1,496	67.1	61.3	68.2
North	1,641	52.8	51.4	44.8
South	1,573	70.3	60.4	56.8

SPACE SHORTAGES

School	Enrollment	Functional Capacity	Functional Capacity In Use (%)
<b>2007/08</b>			
Bluff City Elementary	517	570	90.7
Cedar Grove Elementary	245	270	90.7
Valley Pike Elementary	165	180	91.7
Colonial Heights Middle	574	591	97.2
<b>2012/13</b>			
Bluff City Elementary	545	570	95.6
Valley Pike Elementary	186	180	103.1
Weaver Elementary	327	360	91.0
Mary Hughes Elem./Middle	557	620	89.8
<b>2017/18</b>			
Bluff City Elementary	559	570	98.0
Valley Pike Elementary	182	180	101.1
Weaver Elementary	329	360	91.3
Mary Hughes Elem./Middle	567	620	91.4

## SPACE SURPLUSES

School	Enrollment	Functional Capacity	Functional Capacity In Use (%)
<b><i>2007/08</i></b>			
Blountville Middle	467	833	56.1
Bluff City Middle	410	701	58.5
Holston Valley Middle	197	378	52.1
Sullivan Middle	186	472	39.4
North High	866	1,641	52.8
<b><i>2012/13</i></b>			
Blountville Middle	339	833	40.6
Bluff City Middle	418	701	59.7
Holston Middle	402	718	56.0
Holston Valley Middle	184	378	48.6
Sullivan Middle	148	472	31.5
North High	843	1,641	51.4
<b><i>2017/18</i></b>			
Blountville Middle	325	833	39.0
Holston Middle	373	718	51.9
Holston Valley Middle	192	378	50.8
Sullivan Middle	141	472	30.0
Central High	838	1,437	58.3
North High	734	1,641	44.8
South High	894	1,573	56.8



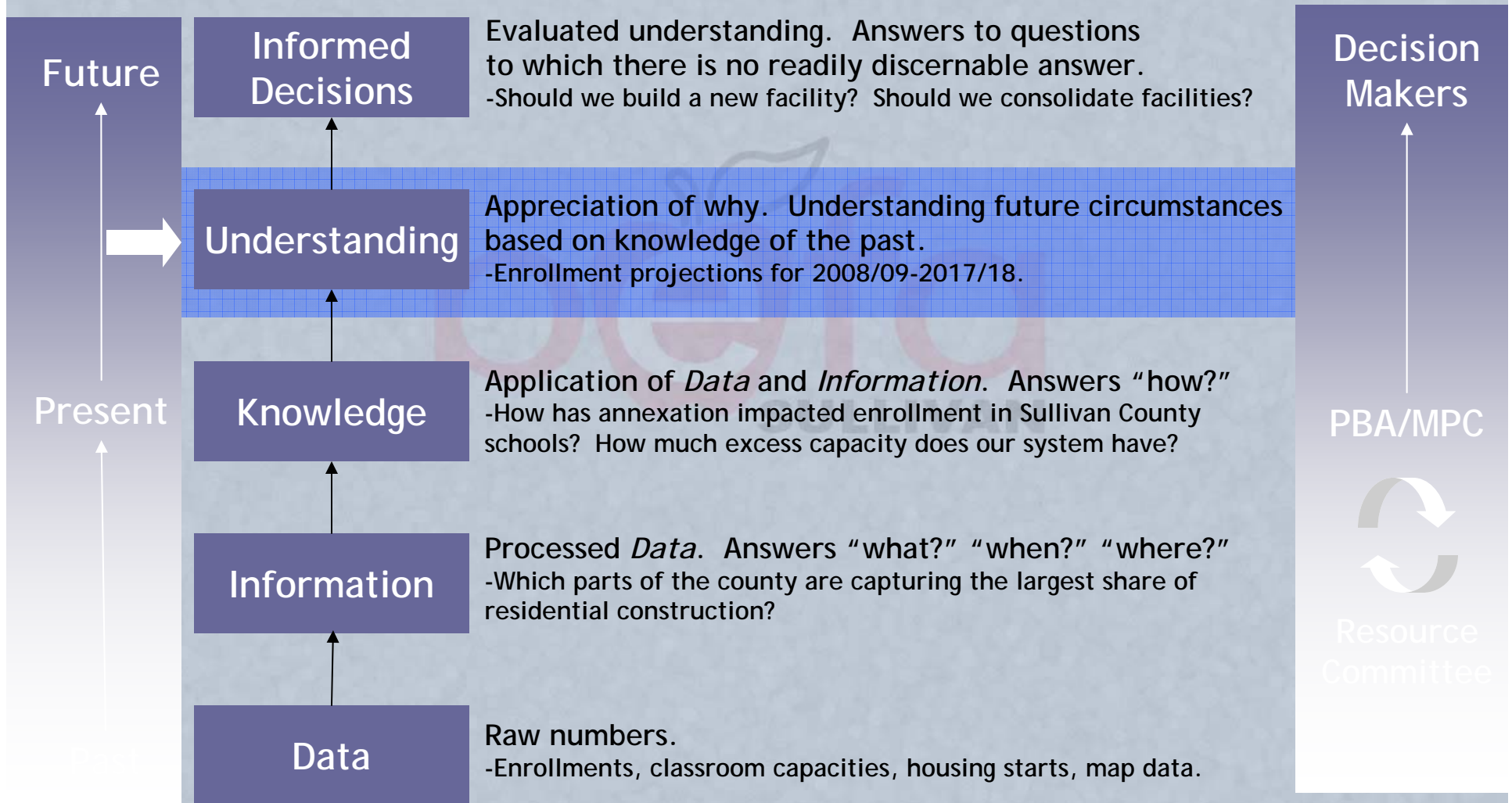
*Partnership for Education Facilities Assessment*

# Next Steps

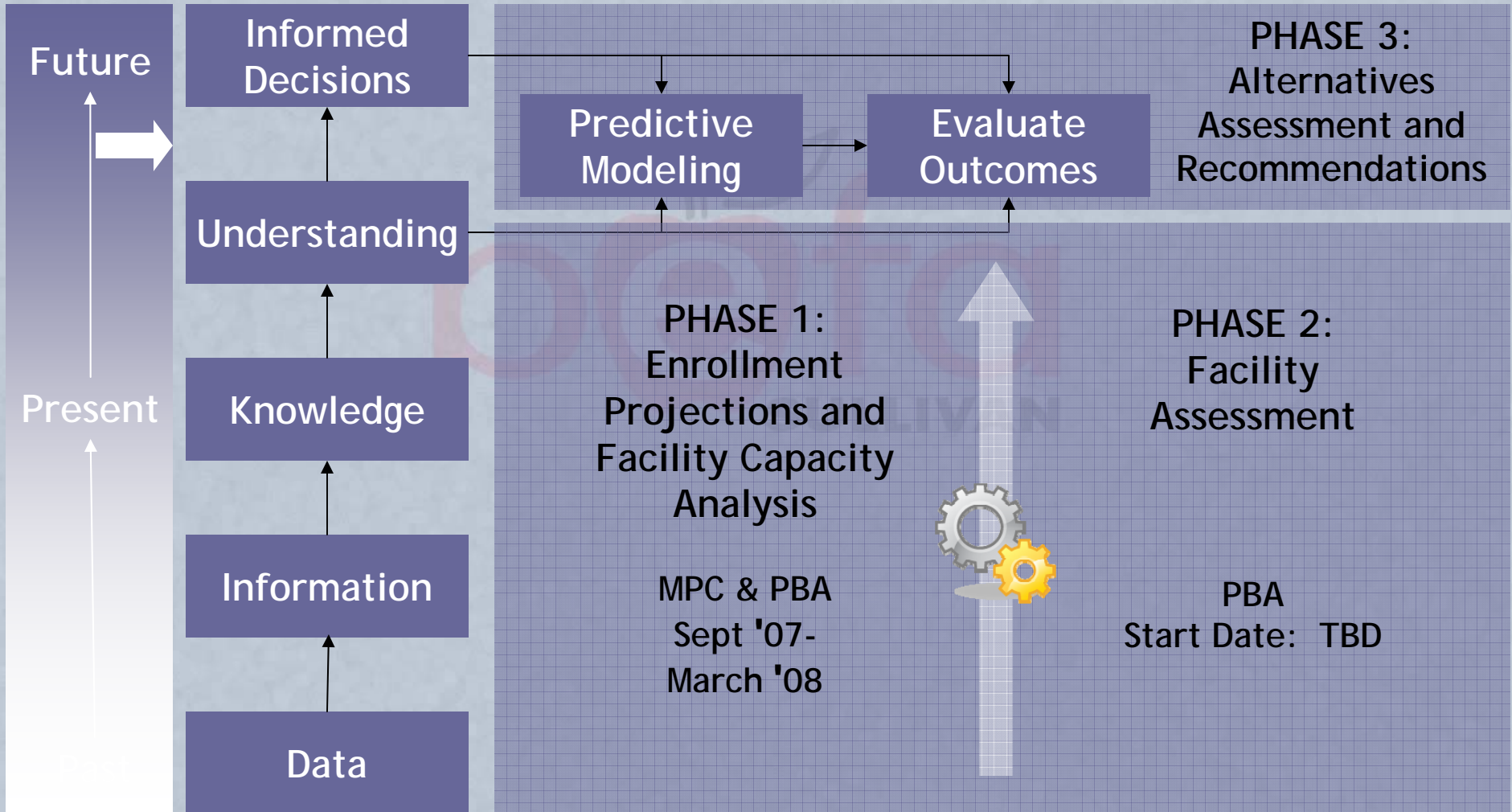


April 7, 2008

# Steps and Participants in the Planning Process



# Three-Phased Process





Partnership for Education Facilities Assessment

# Report Availability

*Metropolitan Planning Commission Website*

- Report and slide presentation available on-line.

[www.knoxmpc.org](http://www.knoxmpc.org)