

DEMOGRAPHIC AND ENROLLMENT ANALYSIS
Professional Consulting Services
Agreement for Services

This agreement is made and entered into by and between the Tucson Unified School District, Planning Services Section [hereinafter "Client"], 2025 East Winsett Street, Tucson, Arizona 85719 and, Applied Economics, an Arizona general partnership [hereinafter "Contractor"], 11209 North Tatum Boulevard, Suite 225, Phoenix, Arizona 85028.

Whereas, the Client seeks assistance in preparation of a Demographic and Enrollment Analysis; and

Whereas, the Contractor has the professional experience necessary to complete the project in accordance with the agreed upon Scope of Work and Budget (see Exhibit A); and

Whereas, the Contractor desires to enter into this Agreement for consulting services to provide this assistance and the Client wishes to employ the Contractor for these services under terms and conditions set forth hereinafter,

Now, therefore, for and in consideration of the mutual covenant, promises and considerations hereinafter contained, which are mutually agreed upon, the Client does hereby employ the Contractor and the Contractor does hereby accept employment in accordance with the provisions of the Agreement.

1. **Effective Date / Term / Renewal:** This Agreement shall be effective from September 25, 2013 through completion of project or the cancellation of this agreement, whichever comes first. The Agreement may only be renewed by subsequent agreement of the parties executed with the same formality as this Agreement.
2. **Scope of Work:** the work to be performed under this Agreement is that which is outlined in Exhibit A - Scope of Work.
3. **Fees:** In consideration for the performance of the services set forth pursuant to Section 2 of this agreement, the Contractor shall be compensated \$32,080. The Contractor will provide a billing at the end of each month detailing the number of hours devoted to specific tasks and the total amount due for that month's efforts. Client shall remit payment within 15 days of receipt.
4. **Cancellation of Agreement:** Either party may terminate this Agreement with or without cause with 10 days written notice to the other party.
5. **Agreement:** This Agreement constitutes the entire agreement between the parties pertaining to the subject matter hereof and correctly sets forth the rights, duties and obligations of each to the other as of its date. All prior or contemporaneous agreements and understanding, oral or written, are hereby superceded and merged herein. The provisions hereof may be modified, rescinded, or amended in whole or in part only by written instrument executed by the parties with the same formality as this document.

In witness whereof, the parties hereto enter into this Agreement on the date first written above.

Tucson Unified School District

Contractor

By: _____

By: Richard T. Beamaner

Title: _____

Title: Partner

Date: _____

Date: September 18, 2013

EXHIBIT A
DEMOGRAPHIC AND ENROLLMENT ANALYSIS
Scope of Work and Project Schedule

The analysis includes 10-year projections of enrollment by grade for the District and for small planning areas within the District, as well as an estimate of build-out enrollment. We will assemble a robust database of demographic, enrollment and development information. This will include an inventory of active, planned and proposed residential development and an estimate of the enrollment generated by that development, and other vacant lands, at build-out. We will customize both District-level and small-area enrollment projection models for the District, and expand them include the desired level of detail relative to income, race and ethnicity, and participation in programs like ELL and Exceptional Education.

The small-Area enrollment projections extend the analysis by creating projections of enrollment for small geographic areas within the District, which provide sufficient geographic detail to be used for facility and attendance area planning. At the District's option we can use the small-area projections to assist with facility and attendance area planning. This optional task can be modest in scope or expanded, depending on the needs and capabilities of the District. Therefore, we are not including an estimated fee for these services in this proposal. Using GIS, the small-area enrollment information can be manipulated in real time with the working group to explore "what-if" planning scenarios.

For this analysis, we have grouped the items in the requested scope of services into three tasks. These tasks and major subtasks include:

District Enrollment Projections

- Obtain available reports and student data
- Collect and analyze demographic and housing characteristics
- Assess development activity and potential
- Project school-age population by sub-group
- Develop student survival and capture rates
- Generate enrollment projections (annual for 10 years and build-out)

Small-area enrollment projections

- Create and populate small area geography
- Allocate development projections to projects / areas
- Develop demographic assumptions for existing and new residents
- Generate small-area forecasts

Documentation

- Generate executive-summary style report
- Facilitate internal and peer review
- Provide all data sets and GIS layers
- Make presentations to District staff and governing board

It will likely take six to eight weeks to complete the study and generate a draft report, with the review and documentation requiring another couple of weeks. This is consistent with the request for completion by November 27th, 2013, but we will need to get started soon. Any optional planning activities, like those described in Task 4, will likely extend beyond that. To meet this deadline, we will plan to complete most of Task 1 (District projections) by early October and Task 2 (small-area projections) by the end month, along with a draft report. This would leave ample time in November for review, delivery and presentation of the final report.

SCOPE OF WORK

TASK 1 – DISTRICT ENROLLMENT PROJECTIONS

1.1 Planning Database Development

- Obtain available reports and student data
- Collect and analyze demographic and housing characteristics
- Assess development activity and potential

The scope of work for Task 1.1 will begin by obtaining work the District has performed previously, including data on student populations, housing development and attendance patterns. We understand the value of beginning our work with a solid, consistent base of information and not duplicating work already completed. We would expect to receive District and school enrollment information by grade and population sub-group for a number of years. We would also like to have any information the District may have by geographic sub-area, especially point-specific student data files. We assume that geocoded student information is available; it would be helpful if we could get this data back to at least the 2009/10 school year.

In addition to enrollment data, we would like to have any information the District may have regarding charter and private schools located in, or very near, the District. This information can provide valuable insight into the difference between the school-age population and the number of students that actually attend District schools. All of the enrollment information will be loaded into the GIS to analyze enrollment distributions by attendance area and to assess the relationship between housing inventory and enrollment in small-areas of the District.

Next, we will gather other demographic and housing data, including available information on age, race, ethnicity, income, current birth rates, housing occupancy rates and mobility. We will also examine available information relative to other key demographic shifts, such as the apparent reduction in the Hispanic population caused by the Employer Sanctions law and SB1070. We will gather this information from the 2010 Census, the American Community Survey and from local sources. The new 2010 Census information gives us the ability to examine the age of householder, family structure and other variables important to producing accurate enrollment projections. The age of householder will help us identify neighborhoods that may be close to peaking in enrollment, or even in decline, versus those that could continue to grow.

Finally, for development activity and potential, we will inventory active residential projects and vacant land that could result in residential development in the future. This work would begin with data provided by the District and our database of developments in the Sun Corridor. For active residential projects, we will obtain current housing inventory and absorption rate information from the City of Tucson, Pima County and the Pima Association of Governments. We will also meet with municipal and county planning department representatives to refine our inventory of parcels with residential development potential within District boundaries and assess their likely timing for development. These discussions normally result in the need to follow-up with landowners, developers or builders to update the information on the current specifications and anticipated timing of their projects.

We will create housing absorption (construction & occupancy) projections for active and planned residential projects in the District based on their performance over the past year, projected regional population and housing growth and the District's market share. For the housing unit absorption we will review the past performance of the District, and portions of it, through analysis of Census and Assessor parcel data. The number, type and location of potential new units, along with regional growth capture rates and projections, will be employed in the analysis.

1.2 School Age Population and Capture Rates

- Project school-age population by sub-group
- Develop student survival and capture rates

In this subtask, the demographic and housing trends and projections will be used to project the school age population of the District. The projections will use trends in per-household student generation rates by sub-group, applied to the estimated number of occupied housing units, to calculate the school-age population. For student generation rates, we will examine per-household student generation rates for District sub-areas, assess the expected change over the next 10 years, and build up to District-level rates. Since the District serves a large and diverse community, it will be necessary to use the small-area (or point level) student enrollment information to accurately characterize the student population and predict how it is likely to change over the next 10 years.

Next, we can use the difference between the school-age population estimates and the actual enrollment data for the District to infer the share of students that are being served by alternative providers (i.e. other public school districts, private and parochial schools, charter schools, etc). School-age population will be adjusted to account for student survival rates before the capture rates are applied. The capture rates will vary by sub-area and will, over time, tend to reflect the increase in competition from other educational providers.

1.3 District Enrollment Projections

- Generate enrollment projections (annual for 10 years and build-out)

Using past enrollment data and current development, absorption, student generation and capture information, we will prepare 10-year enrollment projections by grade for the District. We will be using a modified cohort-survival model developed by Applied Economics that specifically accounts for the impact of changes in housing occupancy rates and new development, while at the same time adjusting for observed trends in demographic characteristics, including birth rates, student generation and survival rates.

For this analysis, we will extend our normal model to address the specific population sub-groups included in the District's Scope of Services. Income and race/ethnic distributions can be modeled from Census/ACS data; to determine exactly how this relates to programs like ELL and Exceptional Education, we expect to need more staff participation. We will also create a likely range for the projections based on the volatility in each of the most critical variables. Critical variables generally include the age structure of the population, but competition from charter schools and on-line education programs is now the biggest unknown for many districts in Arizona.

This analysis will also include a forecast of what the District's enrollment might be at "build-out." Build-out is defined as the full absorption of available land for residential development based on known land use plans. While this is a useful measurement, it is difficult to assess since the peak enrollment level is a function of timing and any redevelopment will impact land use and development density.

This model uses a top-down approach to the development of the enrollment projections that ensures consistency with regional forecasts and the long-term demographic trends and supply-demand patterns of the District. These projections are compared to, and sometimes modified based on, the results of the small-area enrollment projections described in the next section.

TASK 2 – SMALL-AREA ENROLLMENT PROJECTIONS

- Create and populate small area geography
- Allocate development projections to projects / areas
- Develop demographic assumptions for existing and new residents
- Generate small-area forecasts

Small-Area Enrollment Projections extend the analysis by creating projections of enrollment for small geographic areas within the District, which provide sufficient geographic detail to be used for facility and attendance area planning. These projections are created by combining student, demographic and residential development data for small-area geographies in an additional demographic model. This model works on a bottom-up basis and is used as a cross-check for the District projection model. The resulting small-area enrollment information is instrumental in effective facility and attendance area planning.

We will begin this task by working with the District to develop a small-area system of planning geographies, or "grids". We will look at what has been used in the past, current attendance areas, Census geography, neighborhoods, planned developments and major barriers/hazards to movement in creating these areas. Once created, these geographies, and aggregations of them, will be populated with available enrollment and demographic data. We will use the current and historical geo-coded student information to seed the enrollment data and use block-group to grid look-up tables for most of the demographic data.

Absorption information for active and near-term planned, residential development projects will be allocated from the District level to individual developments. The allocation will be based on past performance, remaining supply, market segmentation and the anticipated timing of new projects and subdivisions. The future housing inventory additions are translated into expected levels of student population by analyzing the type of units and the demographic characteristics of the population likely to inhabit them.

Next, sub-District demographic data will be used to create future student generation rates for existing households. Utilizing age, race/ethnicity and housing characteristics, we will create an expected rate of change to be applied to specific age groups in specific population groups. At the grid level, this often results in a sufficient population in each sub-area and group; therefore, this analysis will likely be performed at the sub-District level and then applied to grids within each sub-District area.

Finally, future student population by grid area will be projected based on the current student population, trends in per household student generation, projected housing unit vacancy changes and housing unit additions (or demolitions), and expected capture rates. The small-area projections by planning grid will be aggregated to project enrollment by grade for attendance area and then for schools, based on the mobility of students between schools.

TASK 3 – DOCUMENTATION & PRESENTATION

- Generate executive-summary style report
- Facilitate internal and peer review
- Provide all data sets and GIS layers
- Make presentations to District staff and governing board

The results of the Demographic and Enrollment Analysis will be transmitted to the District in an executive summary style report. The report will make extensive use of tables and charts to illustrate key input data and findings. The report will also include maps that show the existing distribution of students in the District, key demographic characteristics, active and potential residential development areas, and future enrollment growth patterns. The report will include a technical appendix to transmit more detailed information and modeling information to District staff.

Once the draft projections and report are complete, we will participate in the review by District staff and other peers. In addition to the review, we will analyze how the projections compare to other available projections for the District, if any. At a minimum, we will compare the overall population and housing projections with those developed by the Pima Association of Governments, assuming new projections are available during the timeframe for this study. Based on this review, we will make the appropriate changes to the enrollment projections and the draft report.

In addition to the final report, we will prepare electronic information for submittal to the District. This will include the databases and ArcGIS layers we create to perform the study, however, model files are considered to be proprietary and will not be included. We will plan to meet with staff in person at the end of the project to make sure that the information generated is transmitted and installed correctly.

Finally, we will create a PowerPoint presentation from the report and be available to present the findings of the Demographic and Enrollment Analysis to District management or the Governing Board. We can make additional presentations and produce informational materials related to the findings of our research, or participate in other planning activities, on a time-and-expenses basis.

TASK 4 – FACILITY PLANNING (OPTIONAL)

Using the small-area demographic, enrollment and projected enrollment information, we can assist the District with facility and attendance area planning. This optional task can be modest in scope or expanded, depending on the needs and capabilities of the District. Therefore, we are not including an estimated fee for these services in this proposal. Using GIS, the small-area enrollment information can be manipulated in real time with the working group to explore “what-if” planning scenarios. The value of this approach is in being able to work through everyone’s ideas and preconceived notions to clearly show what works and what does not.

Mr. Bryant Nodine
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If implemented, our work on this task would begin by incorporating the existing student information and the enrollment projections into the GIS “districting” software and working with staff to develop and refine some preliminary alternatives. After that, we can either simply provide technical assistance or be actively involved in the planning process. Often times this just includes an introductory presentation to a planning committee, but it can be expanded to include assistance in developing and refining solutions.

TIMING & FEE

It will likely take six to eight weeks to complete the study and generate a draft report, with the review and documentation requiring another couple of weeks. This is consistent with the request for completion by November 27th, 2013, but we will need to get started soon. Any optional planning activities, like those described in Task 4, will likely extend beyond that. To meet this deadline, we will plan to complete most of Task 1 (District projections) by early October and Task 2 (small-area projections) by the end month, along with a draft report. This would leave ample time in November for review, delivery and presentation of the final report.

The total budget for the three tasks of the Demographic and Enrollment Analysis is \$32,080, as detailed in Figure 1. The expense portion of the cost estimate, \$1,500, will be billed based on actual out-of-pocket costs without mark-up. Task 1, the development of the District enrollment projections, at \$14,780 includes all of the data collection necessary for our analysis, some of which would not need to be re-done if the study were updated on a regular basis. Task 2 includes the small-area projections, including the tabulations by grade by attendance area and school. The labor cost for this task is \$7,540. Finally, Task 3 includes an executive summary type report, internal and peer review and two presentations of the results of the study for \$8,260.

We expect that annual updates of this study could be performed for about half the cost of the original study, but we would want to work with District staff to determine what specifically needs to be done before providing a firm quote.

These costs and billing rates per hour would remain effective for three years. All of these services can be procured through the IGPA purchasing consortium under contract #13-12.

If you have any questions, please do not hesitate to call.

Sincerely,



Rick T. Brammer
Partner

FIGURE 1
TUCSON UNIFIED SCHOOL DISTRICT
DEMOGRAPHIC, DEVELOPMENT AND ENROLLMENT ANALYSIS
ESTIMATED HOURS BY TASK AND STAFF MEMBER AND COST

	Partner	Senior Associate	Associate	TOTAL	Task Cost
Task 1 - District Enrollment Projections	62.0	88.0	40.0	190.0	\$14,780
1.1 Planning Database Development					
Obtain/review reports and student data	6.0	12.0	8.0	26.0	
Demographic and housing characteristics	4.0	16.0	24.0	44.0	
Development Activity and potential	2.0	24.0	8.0	34.0	
1.2 School-age Population and Capture Rates					
School-age population by sub-group	16.0	8.0	0.0	24.0	
Student survival and capture rates	6.0	8.0	0.0	14.0	
1.3 District Enrollment Projections					
Housing and population	8.0	8.0	0.0	16.0	
Total enrollment	8.0	0.0	0.0	8.0	
Enrollment by sub-group	8.0	4.0	0.0	12.0	
Build-out enrollment	4.0	8.0	0.0	12.0	
Task 2 - Small-area Enrollment Projections	26.0	52.0	20.0	98.0	\$7,540
Create and population small area geography	2.0	8.0	12.0	22.0	
Allocate development projections	4.0	16.0	0.0	20.0	
Develop demographic trend assumptions	8.0	4.0	8.0	20.0	
General small-area forecasts					
Model setup and analysis	8.0	16.0	0.0	24.0	
Attendance area and school tabulations	4.0	8.0	0.0	12.0	
Task 3 - Documentation	46.0	48.0	8.0	102.0	\$8,260
Generate draft report	16.0	24.0	8.0	48.0	
Internal and peer review	12.0	8.0	0.0	20.0	
Data set delivery	2.0	4.0	0.0	6.0	
Presentations (2)	16.0	12.0	0.0	28.0	
Project Total Hours	134.0	188.0	68.0	390.0	
Hourly Rates	\$90	\$75	\$65		
Labor Cost	\$12,060	\$14,100	\$4,420	\$30,580	
Expenses:					
Travel				\$1,000	
Data				\$500	
Total Cost				\$32,080	