MACIAS CONSULTING GROUP

# Final Report
# New School Construction Grant Adequacy Study

## Office of Public School Construction

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# Macias Study Brief

## Why Macias Conducted the Review

The Office of Public School Construction (OPSC) requested that Macias determine whether or not new construction allocations under the OPSC School Facilities Program (SFP) are adequate to build "complete" schools in California.

To analyze the adequacy of new school construction funding, Macias analyzed trends in funding allocations and construction costs for 366 schools built between 1999 and 2007 and compared funding allocations and costs for a selected group of 46 school projects identified by the California Department of Education (CDE) as having the essential components of a "complete" school.

For more detailed information, Macias administered a survey to 207 school districts, requesting self-reported information on funding sources such as SFP and State/Federal grants, Mello-Roos district funding, and developer fees as well as total new school construction costs and information about the types of school facilities built by the school districts.

In addition, we conducted six case studies to determine the manner in which individual school districts met the challenge of bringing construction projects in on budget or failed to do so, and the reasons why. The case studies include one set of three schools that came within budget and another set of three schools that did not.

For this study, Macias formed a methodology working group primarily comprised of the Legislative Analyst's Office, Department of Finance and the Office of State Audits and Evaluations that assisted with the development and review of the study design and subsequent results of the study.

## Analysis of New School Construction Allocations and Costs

## What Macias Found

For 366 schools that were built between 1999 and 2007, average Funding Allocations of $24.5 million (e.g. School Facility Program grant allocations[1] and the expected district's local matching share contribution) for the school's construction exceeded average construction costs of $16.2 million (e.g. cost for school construction, site development, planning, and furniture and equipment if it was included in the primary construction of the new school) in every year. Funding Allocations covered from 139 percent to 170 percent of construction costs among elementary, middle and high schools where costs ranged from $11.5 million to $35.3 million. SFP grant allocations (excluding matching share contributions) covered from 72 to 93 percent of construction costs for each type of school.

For 46 schools built between 2001 and 2007 and identified by CDE as having the essential components of a "complete" school for data analysis, average Funding Allocations of $42.3 million exceeded average construction costs of $25.7 million. Funding allocations covered from 124 to 185 percent of construction costs for elementary, middle and high schools where costs ranged from $12.1 to $43.0 million. SFP grant allocations covered from 55 to 84 percent of the cost of construction for each type of school.

Using self-reported data for 86 schools, average Funding Allocations of $22.1 million did not exceed average construction costs of $28.6 million. Construction costs reported by the school districts additionally included supplies, public relations, and other non-capital items that is generally not reimbursed by SFP grants. Funding Allocations covered from 65 percent to 89 percent of construction costs among elementary, middle and high schools; costs ranged from $16.9 to $76.4 million. SFP grant allocations covered from 50 to 54 percent of construction costs for each type of school. The analysis provided additional data on the school district's own budget for the construction project; the data shows that the all the revenue used for the school's construction exceeded the cost of construction.

The six case studies showed variability in the school's characteristics and features regardless of the funding level or the costs incurred in their construction.

[1] Funding allocations exclude site acquisition grants.

## Study Background

The Office of Public School Construction (OPSC) implements and administers the School Facility Program of the State Allocation Board (SAB). The School Facility Program (SFP) provides state grant funding assistance for two major types of facility construction projects: new construction and modernization.

To receive state construction grants, school districts must first apply for eligibility. Three application forms were developed by the SFP to assist districts in collecting the information needed to establish eligibility for new construction funding. To establish eligibility, a district must demonstrate that existing seating capacity is insufficient to house the pupils, existing and anticipated, in the district using a five-year enrollment projection. Applications for eligibility are approved by the SAB and this approval establishes that a school district or county office of education meets the criteria under law to receive assistance for new construction. Eligibility applications do not necessarily result in state funding.

To request new construction or modernization funding under the SFP, districts are required to submit several documents and forms for the OPSC to process. The minimum documentation required for a funding application includes the following:

- Completed Application for Funding (Form SAB 50-04)
- California Department of Education (CDE) design/site approval (current)
- Final Division of the State Architect (DSA) plan approval (with approval date)
- DSA-approved plans and specifications
- Completed architect cost estimates for site and off-site development, if requested, signed and dated by the architect
- Appraisal of site to be acquired (when appropriate)
- Escrow closing statement or court order
- When applicable, DSA-approved Energy Compliance Review (This must be part of any application that includes a request for Prop 1-D High Performance Incentive grant funds).
- When applicable, CDE-approved Overcrowding Relief Grant calculation worksheet.

The funding for new construction projects is provided in the form of grants that are intended to fund project planning, construction, testing, inspection, furniture and equipment, and other costs closely related to the actual construction of the school buildings. The new construction grants are primarily based on a per-pupil calculation (baseline grant). In addition to the baseline grant, a number of other new construction supplemental grants are available for energy conservation, fire code compliance, accommodations for individuals with exceptional needs, labor code compliance, multi-level construction, site acquisition, site development, environmental hardship, facility replacement, and hazardous waste removal.

Any grant funding provided to school districts shall require a district matching share contribution on a dollar-for-dollar basis, except in cases where the school district qualifies for "financial hardship" under the Financial Hardship Review program. Under this program, the district is eligible for up to 100 percent funding of the new facility construction. It is important to note that school districts must contribute their local share based on the amount determined from the per-pupil-funding formula and supplemental grants received. Section 1859 Title 2, California Code of Regulations does not stipulate that matching share requirements are based on the total construction cost of the new facility.

In December 2005, the OPSC created the Grant Adequacy Ad Hoc Committee to determine, among other things, whether the new school construction allocations under the SFP were adequate to build "complete" schools in California.

## Purpose

The purpose of the study is to determine whether or not Funding Allocations for new school construction (i.e. SFP grant allocations plus local district's matching share contributions) provided to school districts are adequate to build new school facilities including "complete" new schools.

## Scope

Macias examined California new school construction allocations, other funding, and cost levels from Fiscal Years (FYs) 1999 to 2007 for elementary, middle and high schools.

This study compares new school construction costs to Funding Allocations for school districts that participated in the School Facility Program. School districts that did not participate in the SFP and built new school facilities were excluded from this review because of time and contract considerations.

Modernization projects (e.g. renovations or additions) were excluded from the study, including stand-alone construction projects sponsored by county offices of education, because it would have required different data collection and analytical methods which could not have been performed under the current timeframe provided for this study. Nonetheless, special education facilities that were part of the school's primary construction budget and expenditures were included in the study, as self-reported by the school districts.

This study captures construction costs incurred from the initial planning phases of the new school construction projects through to construction completion. The key types of construction costs analyzed throughout the study included planning, project management, general construction, test and inspection, furniture and equipment. Other costs as reported by the school districts were analyzed as well. Some of the "other" costs reported are reimbursable by OPSC (such as Division of the State Architect

inspections) while others are not reimbursable by OPSC, such as costs for public outreach.

Macias did not include general site acquisition allocations or costs so that comparisons of the data could be made across the multiple components of this study.

This study did not include a comparison of the study's results with other state or national benchmark data.

This study did not examine the adequacy of Funding Allocations to meet the unmet pupil housing needs of the state.

This study did not examine if a "complete" school as described by CDE supports the world-class academic standards to which students, teachers, administrators, and elected officials are held accountable.

## Methodology

### Overview of Approach

To assess the adequacy of funding for new construction projects under the SFP, Macias examined the issue using multiple analytical methods. First, Macias conducted an analysis of Funding Allocations (e.g. SFP grant allocations and local district's matching share contribution) and new school construction costs using two datasets from the Office of Public School Construction School Facility Program (OPSC dataset) and the McGraw-Hill Construction Analytic Database (McGraw-Hill dataset). Second, Macias compared Funding Allocations and new school construction costs for selected schools that were identified by the California Department of Education as having essential components of a "complete" school. Third, Macias developed and administered a survey to California school districts that participated in the School Facility Program from 1999 to 2007 to collect data on new school construction funding and costs. Finally, Macias developed case studies of school districts that were and were not able to build new schools without cost overruns.

Our analysis reflects changes over time in Funding Allocations and construction costs, including an analysis of allocations and costs on a per-pupil and per-square-foot basis. We also examined the new school construction allocations and costs by type of school and geographic region, when possible. To allow comparisons across years, all funding and cost data are adjusted to 2006 constant dollars using the McGraw-Hill ENR Construction Cost Index.

For this study, Macias formed a methodology working group that assisted with the development and review of the study design and subsequent results of the study. The methodology working group was comprised of staff from the Legislative Analyst's Office, Department of Finance, Office of State Audits and Evaluations, and the Division of the

State Architect. Participation from the Division of the State Architect involved discussions of the initial study design.

This study was completed between July 2007 and January 2008 in accordance with generally accepted government auditing standards. We obtained verbal comments on the draft from OPSC and well as from members of the State Allocation Board. Their comments were incorporated as appropriate, as reflected in pages 3, 13, 21, 29 and Appendix I.

Description of Approach

### Analysis of OPSC Allocations and McGraw-Hill Construction Costs (Trend Analysis)

From July 2007 to August 2007, Macias conducted research to identify databases available that captured construction costs for new school building projects in California for a ten-year period, 1997-2007. Macias determined that the best dataset available was developed by McGraw-Hill Construction Analytics because it captured all general and subcontractor construction costs for all school construction projects in California at the start of the facility construction. The McGraw-Hill dataset is utilized by other state agencies, research organizations, and universities to study the adequacy of public funding for school construction. Federal agencies, such as the U.S. Census Bureau, Bureau of Labor Statistics and the Federal Reserve Bank Board also use the McGraw-Hill dataset. As reported by McGraw-Hill, the Federal Reserve Bank System uses the database to track construction costs regionally and nationally.

### Background on the McGraw-Hill Dataset

Macias contacted McGraw-Hill to assess the reliability of data in its database. The standards that we applied to make the assessment are based on generally accepted government auditing standards for assessing the reliability of third party databases.

McGraw-Hill documented that its data-gathering network includes nearly 1,000 reporters, correspondents and information processing specialists. Annually, over 200,000 unique projects (excluding single-family houses) are reported in the Dodge Network. Each Dodge Reporter is assigned a list of sources whose work they are responsible to cover. They interview more than 53,000 assigned sources on a regular basis. These sources are generally contacted every three to four months for new project information and updates to construction costs are made on existing projects, if large variances – generally 10 percent - are reported.

As Dodge Reporters add new reports and update existing ones each day, they are then subjected to a series of screening checks to determine which ones should be included in the statistical database. All reports issued to the construction start stage with a total dollar valuation of $50,000 or more are included in the statistical feed. These reports then undergo additional validation checks to ensure that the data are reasonable and correct, and that nothing is missing. This validation process covers both projects that

are being newly added to the statistical database, and revisions to projects that are already present. All of the Dodge Reports that survive this initial screening receive additional processing to be accepted into the statistical database. Dodge Report fields included in the McGraw-Hill dataset are as follows:

- Dodge Report Number
- Project Type
- Project Dollar Valuation
- Square Footage of Floor Area [2]
- Type of Work (New, Addition, Alteration)
- State
- County
- Zip Code (when available)
- Street Address
- City
- Number of Stories
- Number of Buildings
- Number of Units (residential)
- Owner type (private, federal, state, local)
- Framing (Wood, Steel, Concrete etc.)
- Start Date

All projects slated for inclusion in the statistical database receive several validation checks to ensure the data are complete and accurate. Dodge Reports that require no additional follow-up (approximately 70 percent) are accepted into the statistical database immediately.

Some Reports are initially rejected because they either lack required data or contain invalid data. Examples include missing square footage or a cost per square foot that is outside the accepted range for the project type. Reports may also be rejected for further analysis because they may appear to be duplicates of reports already in the database or because the project is either a manufacturing plant or a power plant without a specified SIC Code. These “rejected” projects are reviewed manually to determine if they can be corrected and completed. Once this is done, the projects are re-submitted to the validation system.

Certain Dodge Reports must be reviewed manually because they contain multiple values for fields such as State, County, or Project Type. Depending on the nature of the project, such as a highway or pipeline, these reports may need to be split among two or more counties or project types. Similarly, a large multi-use project will be split into records for each major type of construction. A common example is a hospital or hotel with a parking garage. While the contract is awarded to the general contractor for the

[2] Floor area is included for buildings only and for new construction or additions; no floor area is included for alteration projects.

overall project, two statistical records are generated – one for the garage and one for the hotel – that reflect the different sizes, values, framing of the two structures.

Because very large projects have a disproportionate effect on the database, they receive a more rigorous review. All projects with a valuation between $40 million and $50 million are sent to inquiry to be verified with one source, such as an Owner, General Contractor, or Architect. Projects greater than or equal to $50 million in value must have their data verified with two sources.

Some Dodge Reports on apartment complexes cover numerous buildings. These Reports will generate an inquiry every 60 to 90 days, until the start of construction of each building has been accounted for. If a construction project consists of several different types of buildings, the Dodge Report must show separate costs and floor areas for each type, so that they can all be included under the proper project type code. The same requirement with respect to cost data applies to engineering projects that are reported under multiple project codes. Automatic inquiries will also be performed for buildings having more than 60 stories, and projects having more than 20 buildings.

Major adjustments after a project has appeared in the statistical database are also subjected to a set of validation rules. This is done so that any known significant changes reported by Dodge on a construction project after it has been awarded in the following fields will be reflected in the statistical database:

- Project Valuation
- Square Feet
- Target Start Date
- Number of Buildings
- Number of Stories
- Building Frame
- Number of Dwelling Units
- State and/or County
- Type of Work (New, Addition, Alteration)
- Project Type

Abandoned or deferred projects are retroactively deleted from the database. While this generates a revised historical series, it most correctly reflects the actual construction activity over time. A total of more than 150 validation rules, similar to those described here, maximize the accuracy and quality of the McGraw-Hill Construction statistical database.

In addition to contacting randomly assigned sources on a regular basis, McGraw Hill tracks time-sensitive updates through a project-oriented call schedule. The specific source contacted by the Reporter depends on the status of the project at the time and can include the Owner, Architect or General Contractor. In addition to the information the Reporters gather from many sources, building permit data is collected from 3,000 municipalities, providing broad coverage of large and small projects when they begin construction because it helps ensure that project reports are entered into the database by the Start stage of the facility construction.

Based on the information provided by McGraw-Hill, Macias determined that McGraw-Hill maintained acceptable protocols for ensuring the accuracy of the database, which led to

a recommendation to OPSC to purchase the McGraw-Hill Analytics dataset for California school construction projects initiated between 1997 and 2007. The OPSC then entered into a licensing agreement with McGraw-Hill to purchase the dataset that included provisions to provide a copy of the dataset to Macias.

McGraw-Hill provided to Macias its dataset for *all* school construction projects in California. This means that the dataset represented schools that did and did not participate in the OPSC School Facility Program. The dataset contained 1,878 California school construction projects.

Below in Table A.1 are descriptive statistics about the unmatched McGraw-Hill Construction Research and Analytics database:

**Table A.1: Descriptive Statistics of the McGraw-Hill Construction Research and Analytics Database**

| | Square Feet (Area) of Construction | Dollar Value of Construction |
|---|---|---|
| **Mean** | 44,553 | $7,759,573 |
| **Median** | 33,000 | $5,000,000 |
| **Min** | 1,000 | $15,000 |
| **Max** | 400,000 | $150,535,000 |
| **Standard Deviation (a)** | 50,397 | $9,756,266 |
| **Skewness (b)** | (+)2.399 | (+)3.693 |

(a) The standard deviation is a measure of how widely values are dispersed from the average value (the mean).
(b) Skewness is a measure of the distribution of values in a dataset and specifically measured the degree of asymmetry of a distribution around its mean. A positive skewness indicates the extreme values in the dataset are very high that will cause the mean to be greater than the median statistic.

## Use of the McGraw-Hill Dataset in this Study

The primary field from the McGraw-Hill dataset that was used in the Macias analysis was "Value", recorded in the dataset in thousands of dollars. McGraw-Hill's definition of this variable is: "dollar value of construction," meaning:

> "CONSTRUCTION VALUE: The valuation figures reported by McGraw-Hill Construction Research & Analytics represent, as nearly as possible, actual construction costs in nominal dollars. Construction cost of a project is EXCLUSIVE of land, architects fees, and, as in the case of manufacturing buildings, the cost of equipment that is not an integral part of the structure. Construction costs include all sub-contracts and normal connecting utilities."

For the purpose of presenting the results of the Macias analysis, the name of the variable "VALUE" was revised to "construction costs."

To capture Funding Allocation data (SFP grant allocations[3] and local district matching share contributions), we requested OPSC to provide the data for new California school construction projects from 1997 to 2007. The initial parameters utilized to generate a dataset of construction projects were: pseudo site code, proposed acreage, site acquisition apportionment, new school project apportionment, general site apportionment, or as identified as a new site on the applications. OPSC then filtered the initial dataset to exclude renovation and addition projects using the following parameters:

- Excluded projects within an invalid (pseudo) site code.
- Include projects with proposed acreage and 8 or more classrooms.
- Excluded projects with existing acres, *except* those projects that had a DSA number match.
- Included projects with apportionments (non-zero dollar amounts) for site acquisition, new school project, and general site.

After these criteria were applied, the OPSC provided the dataset to Macias. This dataset contained 677 projects. Before using the dataset in its analysis, Macias first removed all projects from the sample dataset where a county office of education or no district (one project) was listed as the district. The scope of this review did not include projects sponsored by a county office of education.

The resulting sample from the OPSC database contained 601 projects. As shown in Table A.2, 391 projects were for new elementary school construction projects, 123 were for new high school construction projects and 87 were for new middle school construction projects.

**Table A.2: OPSC Dataset Projects by Grade Level**

| | Number of Projects | Percent | Cumulative Percent |
|---|---|---|---|
| **Elementary** | 391 | 65.1 | 65.1 |
| **High** | 123 | 20.5 | 85.6 |
| **Middle** | 87 | 14.5 | 100.0 |
| **Total** | 601 | 100.0 | --- |

## Match of the OPSC and McGraw Hill Datasets

Macias hand-matched the projects contained in the McGraw-Hill dataset to the projects contained in the OPSC dataset. Macias matched by the project name in the McGraw-Hill dataset and the site name in the OPSC dataset. Matches were made when the project and site name were identical or sufficient detail was available to be certain of a match. A match was not made if there were more than one possible match in the McGraw-Hill dataset for the OPSC identified project. If the McGraw-Hill dataset had multiple listings for a matched project, then an assessment of the information was made to determine the match with the most complete project information. If the McGraw-Hill

[3] Funding allocations exclude site acquisition grants.

match appeared to represent a subset of the OPSC project, no match was made. If McGraw-Hill had multiple correct matches and the combined projects appeared to equal the whole, then the value was summed and included in the dataset. This creates a potential bias toward over-representing construction costs.

### Process Used for Cleaning and Verification of the Matched Dataset

The matched dataset was verified by another Macias analyst/auditor. The activities that were implemented to validate the matched dataset included comparing project title and site name and comparing dates of projects between the two datasets. The Macias analyst/auditor also verified projects that were multiple matches.

Eleven schools were excluded from the matched dataset because we were uncertain it was a 99.9 percent match for the following reasons:

- Reference on the type of project as facility addition.
- Different project initiation dates (1999 and 2005).
- McGraw-Hill dataset is based on cost for the two elementary schools while OPSC dataset has allocations for one school.
- Different project initiation dates between the two datasets.
- OPSC dataset recorded the project as completed in 2002 while the McGraw hill dataset recorded the project began construction in 2005.
- OPSC project is a middle school and the McGraw-Hill dataset shows that it is an elementary school.

The Macias analyst further verified 10 percent of the 233 projects that we could not initially match between the OPSC and McGraw-Hill datasets. Based on this review, two additional middle school projects were added to the matched dataset.

**Table A.3: Cleaned Matched Dataset Projects by Grade Level**

| | Sample | | Population | |
|---|---|---|---|---|
| **Type of School – a** | **Number of Projects** | **Percent of Sample** | **Number of Projects** | **Percent of Population** |
| **Elementary** | 260 | 70.5 | 391 | 65.1 |
| **High** | 51 | 13.8 | 123 | 20.5 |
| **Middle** | 57 | 15.4 | 87 | 14.5 |
| **Total** | 367 | 100 | 601 | 100 |

Notes a: Elementary School serves pupils typically Kindergarten through 6th but may be up to 8th grade; Middle School serving pupils grade level 6-8; High School serves 9th through 12th grades but could serve 7th and 8th grades.

Macias then verified the accuracy of the matched dataset again and excluded another project because it was a questionable match. Two schools were reported in the

McGraw-Hill dataset with the construction start date as 1995 and 1997 which fell outside the scope of our study. No further review was necessary for additional matching because the testing necessary for the acceptance of the matched database was exceeded.

Our universe of schools in the matched dataset is 366, as shown in Table A.4. Elementary schools have the largest representation in the sample followed by middle and high schools, which are similar in sample size.

**Table A.4: Final Cleaned Matched Dataset Projects by Grade Level**

| | Sample | | Population | |
|---|---|---|---|---|
| | Number of Projects | Percent of Sample | Number of Projects | Percent of Population |
| Elementary | 259 | 71 | 445 | 62.7 |
| Middle | 50 | 14 | 168 | 23.7 |
| High | 57 | 16 | 97 | 13.7 |
| Total | 366 | 100 | 710 | 100 |

## Preparation of the Dataset for Analysis

After verification adjustments were made as indicated above, Macias deleted the projects without matches from the dataset and the result is the "cleaned matched dataset." There are 366 schools in this dataset.

Some fields in the OPSC and McGraw-Hill datasets were excluded from the analysis because after using them to build the dataset, the fields were no longer needed to perform the statistical analysis. The fields that were deleted are:

- School District, Contractor, Architect contact information and addresses. These data were maintained in the original datasets for reference.
- In the fields from the McGraw-Hill dataset:
  - The New/Add/Alt field was deleted because all projects were coded as "New"
  - The "Project Type" (primary, junior high, senior high); the OPSC determination of school type was used in the analysis.
- In the fields from the OPSC dataset:
  - Deleted the column "facility hardship" because there were no data in the column
  - Deleted the DSA number
  - Deleted Joint Use Project numbers and LPP Project numbers
  - Deleted Concept Approval and Construction Delivery Method because of incomplete data for all projects in matched dataset
  - Deleted all variables related to acres because these will not be used in analysis. These variables are: Master Plan Acres, Existing Acres, Proposed Acres, and Recommended Acres.

Macias also created new variables to assist in the statistical analysis of the dataset:

- All Pupils: This variable is the sum of the number of students by grade level to be served at the new school. According to OPSC, sometimes an elementary school (or middle/high school) applies to use middle and high school funding (or a middle or high school to use elementary funding) to pay for the school construction. As a result, the distribution of pupils across the grade levels may not reflect the grade levels of the students actually served by the school. To most accurately reflect the number of pupils to be served by the new school, Macias summed the given variables "K-6", "7-8", "9-12" to get the total number of pupils to be served by the school, and called the variable "AllPupils."
- Fund Release Year: Year OPSC released the "apportioned funds to the appropriate county treasury/County School Facility Fund for the district."
- EL (elementary school), MI (Middle school), HI (High school) dummy variables: Created these variables to be used in multivariate analysis.
- Created two State Funding Variables. The difference between the funding variables is that Total Funding Allocation includes the expected district contribution and the OPSC Grant Allocation does not:
    - Total Funding Allocation (Funding Allocation) = Total Apportionment - Site Acquisition + LPP Apportionment + Joint Use Apportionment + District Contribution
    - OPSC Grant Allocation (SFP Grant Allocation) = Total Apportionment - Site Acquisition + LPP Apportionment + Joint Use Apportionment

Where OPSC has defined those allocations to be:

| | |
|---|---|
| Total Apportionment: | Combined total of the State Share amounts of eligible School Facility Program allowances. |
| Site Acquisition: | Additional grant amount calculated as Fifty percent of the lesser of the actual cost or the appraised value of the site; Title 25 relocation cost; DTSC review and oversight cost; Two percent of the determined site value (25,000 minimum) and Hazardous waste removal (within one and one half times the appraised value) to be used to acquire and develop school site. |
| LPP: Apportionment (a): | Prior apportionments made for planning, site acquisition, and/or construction under the Lease Purchase Program reduced from the eligible New Construction Adjusted Grant under the SFP for the project. |
| Joint Use Apportionment: | Additional Apportionment(s) for the project received under the School Facility Program Joint Use provisions for a Library, Gymnasium, Multipurpose Room, Teacher Education or Childcare Facility. |
| Dist Contribution: | School District contribution toward the local match requirement based upon the total State Share amount (dollar for dollar). |

(a) While the scope of this study excludes site acquisition allocations and costs, Macias did not separate site acquisition allocations that OPSC had provided a district for construction of a new school facility under the Lease Purchase Program because the dollar value of the site acquisition allocations included in the 44 schools that received an LLP Apportionment are so small that it would not have an influence on the results of the study. The total dollar value of the site acquisition funding provided within the LPP Apportionment is $7,299,799 or 0.17 percent of the nearly $4.2 billion in funding allocations, as shown in Tables A.5 and A.6 below.

**Table A.5: LLP Apportionment for 44 schools in the Matched Dataset**

| | LPP Apportionment |
|---|---|
| **Number** | 44 |
| **Minimum** | $720 |
| **Maximum** | $2,415,900 |
| **Sum** | $15,670,310 |
| **Mean** | $356,143 |
| **Std. Deviation** | $505,742 |
| **Site Acquisition Apportionment within LPP Allocation** | $7,299,799 |

**Table A.6: Total Funding Allocations only (Unadjusted)**

| | Total Funding Allocations Only |
|---|---|
| **Number** | 366 |
| **Minimum** | 1,074,902 |
| **Maximum** | 73,850,561 |
| **Sum** | $4,192,735,568 |
| **Mean** | $11,455,562 |
| **Std. Error** | $558,306 |
| **Std. Deviation** | $10,681,018 |

## Adjustment to Include Planning Costs in the Cost of Construction

Neither the OPSC nor the McGraw-Hill dataset included an estimate of the costs associated with planning the construction of a new school. Under the advice of the methodology committee, Macias created an estimate of the cost to plan a new school based on the OPSC defined of planning costs, such as architect/engineering fees, DSA Fees, CDE Fees, Energy Analysis, Preliminary tests, and other costs.

Macias requested from OPSC the planning costs for 15 schools for each year between 1999 and 2007. Macias requested OPSC to record all the planning costs as defined above including all of the “other District reported costs” that may not have been necessarily reimbursed by OPSC.

OPSC provided ten elementary schools, three middle schools, and two high schools for each year (according to the SAB date), which resulted in a dataset of 134 schools.

Macias reviewed the dataset prior to analysis and excluded 25 schools from the analysis to estimate planning costs. These schools were excluded for the following reasons:

- duplicate school in dataset (1 school)
- OPSC was unable to separate planning costs (1 school)
- missing expenditure reports and planning costs could not be determined (2 schools)
- where no state funds were released because there were no audit reports (2 schools)
- the school was built by the County Office of Education (18 schools)

After verification, the dataset had 109 schools constructed between 1999 and 2007. Macias then imported the data into SPSS to calculate the planning cost adjustment. For each school type, the average planning costs were calculated and are shown in the table below. On average, planning costs were approximately 5.7 percent of total state funding.

**Table A.7: Amounts to Adjust Construction Costs to Reflect Planning Expenses**

| School Type | Average Planning Expenses | Number of Schools |
|---|---|---|
| **Elementary** | $696,571 | 76 |
| **Middle** | $1,384,780 | 24 |
| **High** | $2,246,646 | 9 |
| **Entire Group** | $976,091 | 109 |

For each school in the OPSC dataset, Macias added the average planning costs to the McGraw-Hill estimate of construction costs according to the school's type (elementary, middle, high school). For non-traditional school types (any combination of grades K-12), the overall average planning cost adjustment was added to the construction costs.

### Converting Construction and State Funding Dollars in to Constant Dollars

To allow comparisons of dollar values across years, Macias adjusted both the state funding and construction cost estimates to reflect changes in prices of goods and services due to inflation. Macias used the McGraw-Hill ENR Construction Cost Index to convert the current dollar values reported in each dataset into constant dollars. Macias purchased and downloaded the ENR construction cost index from the McGraw-Hill website and then calculated a multiplier for each year 1999-2007. The multiplier for each year was calculated by dividing the annual average index for 2006, the Macias designated base year, by the average annual index for the given year. Macias used 2006 as the base year because the annual average index was not yet available for

2007. For the 2007 annual average index, Macias took the average of the available monthly index factors (Jan-Sept). The multipliers are not reprinted here because the data is proprietary.

To convert the Funding Allocations and construction costs into constant 2006 dollars, Macias multiplied each current dollar value by the multiplier.

It is important to note that information is not available in the OPSC and the McGraw-Hill Datasets to determine the construction costs of new schools that meet the CDE description of a "complete" school, or the cost level for various construction phases of projects. Nor is the information available in the OPSC and the McGraw-Hill datasets to conduct an analysis on the complexity or sophistication of the school construction design, or changes in school facilities funding programs.

## Analysis of CDE "Complete" Schools Sample

To further assess the adequacy of new school construction allocations, Macias utilized information contained in a May 2007 report issued by CDE.[4] This report identified 60 schools that CDE described as a "complete" new school. For the purposes of this analysis, Macias applied the assertion that it was the intent of the school district to build a "complete" school. The CDE documented that the components of a "complete" school are as follows:

<u>"Complete" elementary school:</u>

Classroom

- Standard classrooms supporting both small group and large group instruction
- Kindergarten classrooms
- Specialized classrooms for science, art, and music
- Classrooms and support spaces for special education

Physical Education Space

- Hardcourts with a variety of fixed equipment to accommodate basketball and other activities
- Turf and field areas
- Apparatus area

Support Facilities

- Computer Room

[4] Report by the California Department of Education, State Allocation Board Meeting, May 23, 2007

- Small group areas
- Resource Specialist Program (RSP) area
- Speech specialist office
- Psychologist office
- Academic support such as Title 1

Common Essential Facilities

- Media/center library
- Administration
    - Principal's office
    - Vice Principal's office
    - Office space for itinerant staff
    - Health professional office
    - Conference areas
    - Teacher workroom
    - Staff room
    - Parent room
    - Student record storage
    - General storage
- Multipurpose Room
    - Dining area
    - Food service (preparation or serving)
    - Stage
    - Outdoor dining area
    - Storage for chairs and tables

Infrastructure

- Staff restrooms
- Student restrooms
- Storage rooms
- Custodian room(s)
- Mechanical, data and electrical space
- Staff parking area
- Covered circulation
- Space for preschool buildings

<u>“Complete” middle school:</u>

Classroom

- Standard classrooms supporting both small group and large group instructions
- Specialized classrooms for science (both lab and non-lab), art, language, career technical instruction, and music
- Classrooms for special education and special education support spaces
- Facilities for performing arts (can be in multipurpose room)

Physical Education Space

- Gymnasium
- Shower/locker room
- Office of physical education teachers
- Physical education classroom
- Storage for equipment
- Hardcourts with a variety of fixed equipment to accommodate basketball and other activities
- Field areas including track, soccer, and softball

Support Facilities

- Computer Room
- Small group areas
- Resource Specialist Program (RSP) area
- Speech specialist office
- Psychologist office
- Academic support such as Title 1

Common Essential Facilities

- Media/center library
- Administration
    - Principal's office
    - Vice Principal(s)' office
    - Counselor(s)' office
    - Office space for itinerant staff
    - Health professional office
    - Conference areas
    - Teacher workroom

    - Staff room
    - Parent room
    - Clerical support
    - Student record storage
    - General storage
- Multipurpose Room
    - Dining area
    - Food service (preparation or serving)
    - Adjunct serving areas
    - Stage
    - Outdoor dining area
    - Storage for chairs and tables

Infrastructure

- Staff restrooms
- Student restrooms
- Storage rooms
- Custodian room(s)
- Mechanical, data and electrical space
- Staff parking area
- Covered circulation

"Complete" high school:

Classroom

- Standard classrooms supporting both small group and large group instructions
- Specialized classrooms for science (both lab and non-lab), art, language, career technical instruction, and music
- Classrooms for special education
- Student store

Physical Education Space

- Gymnasium(s)
- Space for wrestling
- Space for dance
- Space for weightlifting

- Shower/locker room
- Office of physical education teachers
- Physical education classroom
- Storage for equipment
- Hardcourts with a variety of fixed equipment to accommodate basketball and other activities
- Field areas including football, track, soccer, softball, baseball, and physical education space
- Pool

Support Facilities

- Computer Room
- Small group areas
- Resource Specialist Program (RSP) area
- Speech specialist office
- Psychologist office
- Academic support such as Title 1

Common Essential Facilities

- Media/center library
- Administration
    - Principal's office
    - Vice Principal(s)' office
    - Counselor(s)' office
    - Office space for itinerant staff
    - Health professional office
    - Security office
    - Conference areas
    - Teacher workroom
    - Staff room
    - Parent room
    - Clerical support
    - Student record storage
    - General storage
    - Career center
- Multipurpose Room
    - Dining area

- Food service (preparation or serving)
- Adjunct serving areas
- Stage
- Outdoor dining area

Infrastructure

- Staff restrooms
- Student restrooms
- Storage rooms
- Custodian room(s)
- Mechanical, data and electrical space
- Staff parking area
- Student parking
- Covered circulation

Each school within the CDE group of 60 was manually matched to the same school included in the OPSC dataset and the McGraw-Hill Construction Analytic dataset. By comparing the data in these two resources, Macias was able to develop a matched dataset containing 46 of the 60 schools. Thirteen of the remaining 14 schools did not appear in the OPSC database and/or the McGraw-Hill Construction Analytic database because the schools had (1) not yet applied for SFP allocations; (2) not yet received OPSC allocations at the time of our review; or (3) the schools were under construction and cost data was not yet available. The remaining one school was excluded because Macias could not identify a precise match of the school between the McGraw-Hill and OPSC datasets. Two other schools had been listed as separately constructed schools by CDE but they were built and funded as one entity by OPSC and McGraw-Hill, so Macias combined as needed the available CDE allocations and construction costs for each of these two schools. According to the CDE, these schools share a media center library.

Our universe of schools in the "complete" school analysis is 46, as shown in Table A.8. Elementary schools have the largest representation in the sample and then middle and high schools, which are similar in sample size.

**Table A.8: CDE Sample of "Complete" Schools by Grade Level**

| | Sample | | CDE Population | |
|---|---|---|---|---|
| | **Number of Projects** | **Percent of Sample** | **Number of Projects** | **Percent of Sample** |
| **Elementary** | 20 | 43 | 27 | 45 |
| **Middle** | 11 | 24 | 15 | 25 |
| **High** | 15 | 33 | 18 | 30 |

| | | | | |
|---|---|---|---|---|
| **Total** | 46 | 100 | 60 | 100 |

To test the data integrity for this component of the study, Macias compared the construction data reported in the McGraw-Hill dataset to the construction data that Macias had requested from DSA, which are self-reported to the DSA by the school district. Macias found that there was a significant correlation between the variables (estimates for each school generally increased and decreased together) to mitigate any concerns about data integrity. The average and median values are shown in Table A.9 below.

To perform further validation of the analysis of CDE "Complete" schools, we requested from DSA data on the number of pupils, square feet, and the cost of the contract that was reported to CDE by the school districts. Compared to the McGraw-Hill construction cost data, the CDE Original Cost Estimate was, on average, about the same for all schools in the sample: $25.7 million (McGraw Hill) and $25.2 million (CDE).

It is interesting to note that there is a statistically significant correlation (r=0.824) between the square footage data collected by McGraw-Hill and CDE. This means that the two sets of figures exhibit similar trends. However, the data are not identical. The CDE estimate of square footage is about 30,000 square feet on average greater than the McGraw-Hill estimate. For about 25 percent of the schools, the McGraw-Hill estimate of square footage was greater than the CDE. There are also two large outliers – two schools were the CDE estimate is 100K and 200K square feet more than the McGraw-Hill Hill estimate – that influence that average difference. The median difference between the two datasets is 5,250 square feet (CDE more than McGraw Hill).

The number of pupils is more closely correlated between the OPSC and CDE data (Total Number of Pupils and SFP Loading/Master Plan Capacity). The average differences between the two sets of estimators are 98 students (OPSC-CDE SFP) and 197 pupils (OPSC-CDE Master Plan). The median differences are 22 and 135 students, respectively. McGraw-Hill does not collect data on the number of pupils to be housed in the new facility.

**Table A.9: Comparison of McGraw-Hill and DSA Construction Data**

| | **Estimated Dollar Value of Construction (b)** | |
|---|---|---|
| | **McGraw-Hill** | **DSA (a)** |
| **Mean (a)** | $24,609,976 | $25,151,426 |
| **Median** | $16,721,609 | $16,000,000 |

(a) DSA data on the dollar value of construction was not available for one of the 46 schools within this sample. The values presented in this chart differ from those reported in the body of the report because this data integrity check was based only the subset of 45 schools.
(b) The figures in this table are unadjusted and expressed in current dollars. These dollar values have not been converted into constant dollars (2006 base year). For this reason, these dollar values will also differ from reports presented elsewhere in this report.

Although originally Macias had planned to analyze differences in Funding Allocations and construction costs between urban and rural schools, Macias determined that a meaningful analysis could not be performed because CDE had not selected the sample of "complete" schools to be representative of all urban/rural designations. As a result, Macias examined the data based on school type and geographic region, such as North Inland, North Coastal, South-Los Angeles, South San Diego.

A limitation in the CDE universe of "complete" schools is that construction may not have been completed for districts that began construction on the new school facility in 2007. According to the McGraw-Hill data, there are five schools in this sample that began construction in 2007. As a result, the dollar value of construction and area of construction could change during the construction of these facilities but these changes will not be reflected in this study.

Districts that had at least two new schools within this CDE-identified sample of "complete" schools were Los Angeles Unified (four schools), Irvine Unified (two), Etiwanda Elementary (two), Perris Elementary (two), Roseville City Elementary (two), Antelope Valley High (two), Folsom-Cordova (two) and San Diego Unified (two).

## Analysis of New School Construction Cost Survey

To further examine the adequacy of Funding Allocations (e.g. SFP grant allocation and local district's matching share contributions) for new school construction, we administered a survey to the 207 school districts (excluding county offices of education) represented in the OPSC database. The survey was developed to capture information on the amount of allocations provided for new school construction projects, and to capture information on the associated cost of construction for each new school that was built by the school district. New schools were defined as those that include buildings or facilities constructed to provide education to elementary, middle, and high school students. Modernization and renovation of existing facilities were excluded from the survey. The survey also excluded county office of education projects unless construction of the county of education facilities was part of the new school construction project.

Section 1 of the School Construction Cost Survey asked respondents for information on the following areas:

- Initial name of construction project
- School Board adopted name for the new school
- Completion of new school
- Tracking numbers for new school
- Application number assigned to new school by Division of State Architect
- Total pupil capacity based on traditional or year-round school

Section 2 of the School Construction Cost Survey asked respondents for information on New School Funding. The first question in Section 2 referred to the funding sources and dollar amounts used by the district to construct its new school(s). Some of the funding sources suggested in the survey included OPSC, SAB, other state or federal grants, Mello-Roos Community Facility District Funds, and School Facility Improvement (SFID) funds.

The second question in Section 2 asked the respondent if the district had used any money it received from the OPSC base grant for a construction project unrelated to the new school. Respondents were allowed the opportunity to identify other uses in a box provided for that purpose.

The third question in this section asked if the district had received any SAB supplemental or excessive hardship grants for the new school(s). Respondents were asked to identify the uses to which the grants were applied, such as fire detection systems, utility service development, energy assistance and special day classes (per pupil).

The fourth question asked if the district had obtained and the amount of any other non-SAB supplemental grants for construction of this new school.

Section 3 of School Construction Cost Survey asked respondents to capture the cost of constructing a new school. Macias informed respondents that the costs associated with acquisition of the site proposed for construction were to be excluded for the purpose of this survey. This was done to allow for uniform comparison across all of the components in the study design. All other costs, such as those pertaining to planning activities, construction, testing and inspection, project management, security, furniture and equipment were to be excluded on the survey. Respondents were asked to identify all of the types of furniture and equipment that were paid for as part of the construction contract.

Where applicable, respondents were prompted to describe the circumstances that led to construction costs exceeding or not exceeding the original contract amount of the construction, and to share any other information about the costs of constructing the new school.

The final section of the new school construction survey – Section 4 – requested respondents to describe the physical characteristics of the new school, such as amount of acreage of the site for the new school; the square footage of the interior space, disregarding covered walkways or circulation areas; if the school were multistory; construction delivery methods, (i.e., design-bid build, developer built, etc.); reuse of any existing architectural plans for construction purposes; primary frame type (e.g., wood, steel, or metal); primary materials for roofing; and grade levels for the new school. The survey further prompted respondents about the extent to which the new school included components of a “complete” new school as defined by CDE, including facilities that have not been identified as a component of a “complete” new school, such as pre-

school and after school facilities. Components of a "complete" new school were previously discussed on pages 15 - 20 of this study.

For new elementary school construction projects, Macias asked respondents the types and number of teaching stations built as part of the new school. Choices included standard 1-6 teaching stations; those for special education and kindergarten; specialized types for science, art, music and computer lab; pre-K and Adult stations; and those designated for before/after school childcare programs only. We also asked if the school had "relocatable" teaching stations and if so, how many and to name the primary reason for including "relocatable" stations in the school.

In addition, we asked respondents to indicate if special education areas were built for purposes such as office space for psychologists and space for speech and language programs. If administrative facilities were built, respondents noted their use, such as for principal and vice principal offices, health professional office, or teacher workroom.

Respondents also answered questions on the presence of media centers/libraries and the features in multipurpose rooms/areas in the new school. The survey also asked about indoor/outdoor physical education space, additional facilities, such as an auditorium, and the square footage of teaching stations, multipurpose rooms, media center, food preparation and service areas, platform or stage, and gymnasium, if applicable.

For new middle school construction projects, respondents were asked to describe the number and type of teaching stations: standard, special education, specialized for science, art, language, music, computer/data lab, adult, and before/after school childcare program. As in our questions about elementary school teaching stations, we asked if the school had "re-locatable" stations, the number, and reasons for acquiring this type of station. Questions also referred to special education areas, administrative facilities, media centers/libraries, multipurpose rooms, physical education spaces, and square footage for interior spaces.

For new high school construction projects, questions requesting high school details in this subsection were similar to those asked about elementary and middle schools with the exception of two facilities in Administration: Security office and Career Center. Physical education spaces (indoor/outdoor) also differed from the other types of schools. They included space for wrestling and dance, space for weight-lifting equipment, field areas for track, soccer, softball and baseball, physical education, pool and stadium.

Finally, for new school construction projects that variously combined K-12 facilities, respondents were asked to complete the same questions as those asked for new elementary, middle, and high school construction projects.

The survey was reviewed by the Legislative Analyst's Office (LAO), the Department of Finance, Office of State Audits and Evaluations and the Division of State Architect.

Their suggestions were incorporated into the survey, such as asking school districts to identify all sources of revenue and to ask the district to identify non-essential facilities, such as multi-stage theater. The survey was then pre-tested with two school districts, one in Southern California and one in Northern California. The school district in Southern California was selected because it had multiple school construction projects captured in the OPSC database. The second school district was selected because it did not contain any new school construction projects in the OPSC school database to help ensure an unbiased pre-test of the survey. The school district officials at this school had extensive new school construction experience because of new school construction experience from employment at other school districts. Identical comments were received by both school districts. All suggestions were incorporated into the survey.

There are no hard and fast rules for the number of organizations to participate in the pre-test of a survey. Surveys are pre-tested until the researchers are confident that the survey will capture the information needed. In this case, Macias was confident that after two pre-tests, the needed information would be reported by the school districts. Upon the school districts' receipt of the survey, the types of feedback received by nearly all of the school districts that contacted us provided evidence of the adequacy of our pre-testing efforts. Inquiries received from other school districts, except for two, reported no significant issues with the questions included in the survey.

To administer the new school construction survey and to encourage an adequate response rate, eligible school districts were contacted four times within a three-week period. OPSC in early November 2007 sent a notification letter to 207 district superintendents on behalf of the SAB. OPSC had provided allocations to these school districts to build 577 new school facilities. On November 9, 2007, Macias sent another notification e-mail to all of the district superintendents with a link to our online school survey. The e-mail also included a Microsoft Word version of the survey. The following week, OPSC sent a reminder to all the district superintendents about the initial November 23, 2007 due date of the survey. On November 20, Macias sent an e-mail reminder to all district superintendents to complete the survey and also announced the extension of the survey to November 30, 2007.

Macias responded to e-mail and telephone inquiries about the surveys from representatives of 30 school districts during the survey period. These inquiries were about the possibilities of time extensions to allow for the completion of the survey, difficulties accessing our web portal or requests for a Word version. After consultation with OPSC, the timeframe for survey completion was extended to November 30, 2007.

Macias also received requests for assistance from other school districts to help them complete their surveys. For these school districts, Macias requested all relevant documentation to complete this survey for the school districts. Other schools requested a Word version of the survey and our firm entered the survey data onto the web portal. Other school districts inquired whether or not the survey was required by law.

After the survey completion date, Macias was requested by OPSC to help two school districts complete their survey. These school districts originally submitted the letters citing significant issues with the survey and the lack of time and resources to complete the survey. To address this need and to include the data in our school survey database on a timely basis, Macias took the following steps:

Macias determined the number of new school construction projects funded by OPSC under the School Facility Program. The extracted and cleaned database contains 601 schools (excluding County Office of Education-sponsored projects, school renovations, and additions).

Of these 601 schools, 35 schools (or 5.8 percent) belong to one school district and 15 (or 2.5 percent) belong to the other school district, as shown in Table A.10. Macias then determined the first school district would need to submit information on five schools and the second school district would need to submit information on two schools to maintain proportional representation in the survey if all schools surveyed participated fully in the survey.

**Table A.10: Sample Size Selection for Two School Districts That Later Participated in the School Survey**

| School District | Number of Schools in Sample Population (OPSC dataset, criteria 4, excluded COE) | Proportion of Population | Number of Schools to Be In Proportion With Sample (87 completed school responses at the time of analysis) | School Level |
|---|---|---|---|---|
| **First School District** | 35 | 0.058 | 5 | 3 EL, 1 MI, 1 HI |
| **Second School District** | 15 | 0.025 | 2 | 1 EL, 1 MI/HI |
| **Total in OPSC Sample (minus COE)** | 601 | | | |

Macias then determined that the OPSC database of 601 schools is approximately 60 percent elementary schools, 20 percent middle schools, and 20 percent high schools. Applied to each school district, the first would need to submit information for three elementary schools, one middle school, and one high school and the second school district would need to submit information for one elementary school and one middle or high school to provide proportional representation.

Macias then used software to randomly assign numbers to each school (by school level) for each school district to determine which five of the 35 schools to request information from the first school district and which two schools to request information from the other school district. Macias then selected the randomly assigned projects by ascending numbers, starting with one. Finally, for the schools selected, Macias checked the

school in the OPSC database to confirm that funding had been released and funding data fields contained dollar amounts.

Macias followed this process to ensure that the two school districts had proportional representation without introducing any bias into the study. Merely selecting the most recent projects would distort the study findings. By following this approach, Macias was able to reduce the school districts' workload to participate in the study while maintaining the integrity of the study. These school districts completed the surveys after the formal completion date of the survey of November 30, 2007.

Prior to the inclusion of the eight additional schools, the information contained in the original school survey database was subsequently tested for accuracy and reliability (data integrity checks). To accomplish this, we determined the ratio of all revenue used for the constructions to total construction costs for each school survey. The ratios were then ranked from highest to lowest. The distribution of the ratios between rankings was then analyzed and outliers were identified. Fifteen outliers were identified and subsequent review of allocations and construction costs reported by the school districts occurred by contacting the applicable school district to request supporting documentation to verify either the allocation or construction cost data reported by the school district, and for those school districts that used the MS Word version of the construction cost data, our firm manually checked them to determine if the school district entered the correct information. Where discrepancies were identified, the school district was contacted to confirm the accuracy of the data reported in the MS Word version of the survey. Updates were made as corrections were needed. Of the 15 outliers, corrections were made to seven school districts regarding allocations or construction costs. Macias did not determine the amount of construction costs or allocations that were revised because tracking the amount of incorrect expenditures is not a generally accepted practice for conducting public sector evaluations. Macias then manually reviewed all revenue and construction data contained in the dataset to identify other abnormalities of the data. Data was updated for two schools on cost and revenue information.

Upon receiving eight additional school construction surveys for the two school districts to which OPSC afforded a time extension to them (two were partial surveys from one school district), Macias repeated the data integrity checks and identified four outliers among the combined data set. Two outliers were resolved by checking the MS Word Version of the survey to verify the data contained in the database. One other outlier was resolved by identifying a duplicate survey and including in the database the survey that provided all of the survey data and provided the precise data on allocations and construction. The first duplicate of the school survey was not complete and reported data in whole numbers. OPSC contacted the remaining school that was identified as an outlier and requested support documentation so that Macias could verify the information that was reported. The documentation provided support for most of the costs except for about $6 million in "other" costs. While this could represent a bias by over-representing construction costs, Macias did not adjust the construction costs reported by this school district.

Macias received surveys from 40 of 207 school districts, submitting surveys for 114 new school projects representing a response rate of 20 percent.

The school survey database was downloaded into a SPSS dataset and additional data integrity checks were performed on 10 percent of the population to ensure that the new school survey data downloaded correctly into SPSS software. Macias did not identify any errors in the sample. The new school survey dataset was analyzed to determine the existence of duplicate surveys; one was found and removed. Another 24 surveys were removed because school districts did not report either allocation data or construction cost data, or both. Without a complete set of allocation and construction cost data, an analysis cannot be completed. Table A.11 shows the final sample number of completed new school construction cost surveys.

The final data integrity check performed was to assess the accuracy of the OPSC Base Grant Allocation data reported by the school districts. Forty-one of the now 89 records in the new school survey dataset were selected to compare the OPSC Base Grant data reported by the school district to the Base Grant Allocation data reported by OPSC. This sample was judgmentally selected based upon whether the school district provided a project code number and/or correct project code to validate the allocation data reported by the school district to the OPSC dataset.

The results of the data integrity check show that the OPSC Base Grant Allocation data reported by the school districts appears slightly lower than the OPSC dataset. OPSC Base Grant allocations self-reported by the school district is $305,529,868.00 and the OPSC dataset for Base Grant Allocations is $324,512,738.30 – a difference of $18,982,870. This suggests that the Funding Allocation data reported by the school district may likely be under-reported. Macias did not adjust new school survey dataset to reflect the more reliable OPSC dataset because the survey data, by its nature, is self-reported information. Additionally, the influence that the difference may have on the results for the group as a whole is very small and even negligible.

**Table A.11: New School Construction Costs Survey Sample**

| | Number of Projects | Percent of Sample |
|---|---|---|
| **Elementary (any grades K-6)** | 51 | 57.3 |
| **Middle (any grades 6-8)** | 16 | 18.0 |
| **High (any grades 9-12)** | 13 | 14.6 |
| **Non-Traditional (any combination of grades K-12) (a)** | 9 | 10.1 |
| **Total** | 89 | 100 |

(a) Non-traditional is defined as a school that does not fit into the definitions of an elementary, middle, or high school.

Some school districts did not report complete facility description data on the number of facilities built, square footage, and/or pupil information despite providing data on funding allocations and construction costs. These five schools could not be included in the

analyses involving facility descriptions and the number of schools used in the analysis, when different from 89, is reported for each statistic reported for this sample.

Before the school construction cost survey was analyzed, Macias added the same planning cost adjustments to the database that was done for the McGraw-Hill dataset. See Table A.12. This was done to treat the school survey dataset in the same manner as the other dataset. In the school survey, we specifically requested school districts to exclude planning costs so that we can control the definition of construction costs per the other datasets; however, there were school districts that included the planning costs anyway. Because it is self-reported data and the school districts did not separate the planning costs, Macias could not adjust the data. As a result, when Macias added the planning cost adjustments, it likely led to over-reporting of the planning cost, but we could not determine the extent of the over-reporting.

**Table A.12: Amounts to Adjust Construction Costs to Reflect Planning Expenses**

| School Type | Average Planning Expenses |
|---|---|
| **Elementary** | $696,571 |
| **Middle** | $1,384,780 |
| **High** | $2,246,646 |
| **Overall** | $976,091 |

It is important to note that for the analysis of the school survey data, all construction costs captured in the survey were reviewed but not adjusted. This means that "furniture and equipment" and "other costs," such as supplies, community outreach, library books, and carts that were not necessarily required for the actual construction of the new school facility, but needed for the overall project were not excluded from the analysis. OPSC officials have reported that their staff has allowed expenses for goods and supplies even when these types of expenses are not allowable under the definitions of equipment in California School Accounting Manual[5]. While Macias attempted to keep

[5] The California School Accounting Manual, 2007 Edition, published by the California Department of Education, contains Procedure 770 – Distinguishing Between Supplies and Equipment. The procedure sets out five tests for whether something is a supply or equipment:

1. Does the item lose its original shape and appearance with use?
2. Is it consumable, with a normal service life of less than one year?
3. Is it easily broken, damaged, or lost in normal use?
4. Is it usually more feasible to replace it with an entirely new unit than to repair it?
5. Is the cost of the item below the LEA's capitalization threshold?

Under the procedure, any question that is answered "no" disqualifies the good as equipment.
The procedure further defines Capitalization threshold:

> Capitalization Threshold
>
> The capitalization threshold is the per-unit cost at which a given item qualifies for capitalization. Capitalization thresholds may differ from one LEA to another depending on materiality. Typically, the larger the LEA, the higher is its capitalization threshold.
>
> The Government Finance Officers Association (GFOA) recommends that capitalization thresholds be set so that about 80 percent of the dollar value of an LEA's assets are capitalized (not 80

the definition of construction costs consistent throughout the Study, school districts reported construction costs, including those pertaining to overall "project" costs in the survey. As a result, the definition of construction costs between Chapters 1 and 2 compared to Chapter 3 is inconsistent.

Information about the analysis of the school construction cost survey data is reported on Chapter 3 of this study.

### Analysis of Case Studies

For the final component of the study, a case study, Macias performed a preliminary analysis on Funding Allocations and construction costs for each school district submitting a survey. The data was then sorted and grouped to show schools that had the largest to the smallest, including negative differences between Funding Allocations (e.g. SFP grant allocations and local district's matching share contribution) and construction costs. To make the selection for the case studies, Macias did not select schools that had the largest and the least differences, as originally planned, between Funding Allocations and construction because they were not generally representative of the sample and thus, the data reported may not provide noteworthy information to other school districts. Instead, Macias selected case studies throughout the sample with most representing the "norm". The case studies selected included one set of three new schools that were built at or within the new school Funding Allocations (e.g. SFP grant allocations and local district's matching share contribution) provided for the project and another set of three new schools that could not be built within the new school Funding Allocation provided for the project. For each set of schools, one elementary, one middle, and one high school were selected that represented the Southern California and Northern California regions.

Finally, it is important to note that a sample size of six case studies is not sufficient to identify trends and patterns among the group and should not be considered in decision-making on the adequacy of construction allocations, and the results cannot be projected to the general population of schools.

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percent of the individual items of property), but in no case should the threshold be less than $5,000.

# Chapter 1: Analysis of New School Construction Funding and Construction Costs

## Section Overview

The purpose of this section is to provide an analysis of Funding Allocations and new school construction costs (construction costs) from 1999-2007 and to examine Funding Allocations and construction costs for each type of school. It is important to note that for the analysis of the data, Macias applied the assertion that Funding Allocations were the "expected" budget for the new school construction budget. OPSC does not require school districts to build new schools within the Funding Allocations provided for the project.

Funding Allocations[6] are SFP grant allocations provided by OPSC plus the expected local district matching share contributions for new school construction.

Construction costs in the McGraw-Hill database included construction, testing and inspection, subcontractor costs, and equipment costs if they were an integral part of the structure. Macias adjusted the McGraw-Hill database to include planning costs incurred by school type (e.g. elementary, middle, high) and adjusted to 2006 constant dollars.[7]

The number of schools included in this component of the analysis was 366 elementary, middle and high schools. Elementary schools were represented most often (259), followed by high schools (57) and middle schools (50).

## Funding Allocations were Higher than New School Construction Costs from 1999-2007

As shown in Chart 1.0, for each year from 1999 to 2007, Funding Allocations for all schools in the sample were higher than new school construction costs on average.

Average Funding Allocations grew from $14,457,227 in 1999 to $22,740,859 in 2007. The growth in average Funding Allocations over the eight-year time period was $8,283,632, which is statistically significant. This means that the observed change in Funding Allocations is so large that it is unlikely that the change is due to random chance.

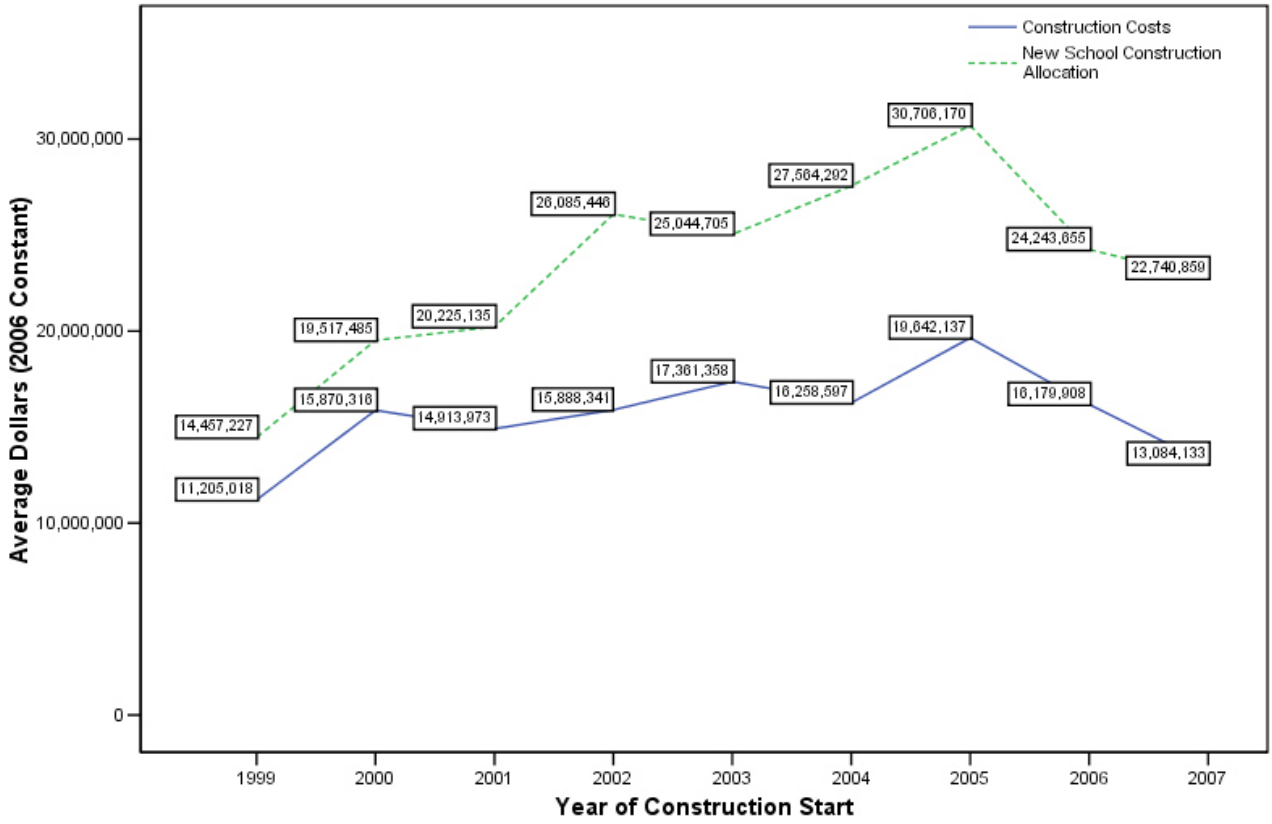
Average new school construction costs began at $11,205,018 in 1999 peaked to $19,642,137 in 2005, but since then fell sharply back to about 1999 levels of $13,084,133. The growth in construction costs for new schools averaged $1,879,115 over the eight-year time period of 1999-2007 although this growth was not statistically significant. This means that the change in construction costs observed in the sample

[6] Funding allocations exclude site acquisition grants.
[7] Refer to page 13 for a detailed discussion on how the McGraw-Hill database was adjusted.

was not large enough to validate that a change actually occurred in the full population of California schools built over this time.

The gap (or difference) between average Funding Allocations and average new school construction costs grew significantly over the time period. This difference increased by $3,264,285 million from the period of 1999-2002 to the period of 2003-2007. This increase in the gap between average Funding Allocations and average new school construction costs was statistically significant. This means that the observed change in Funding Allocations is so large that it is unlikely that the change is due to random chance.

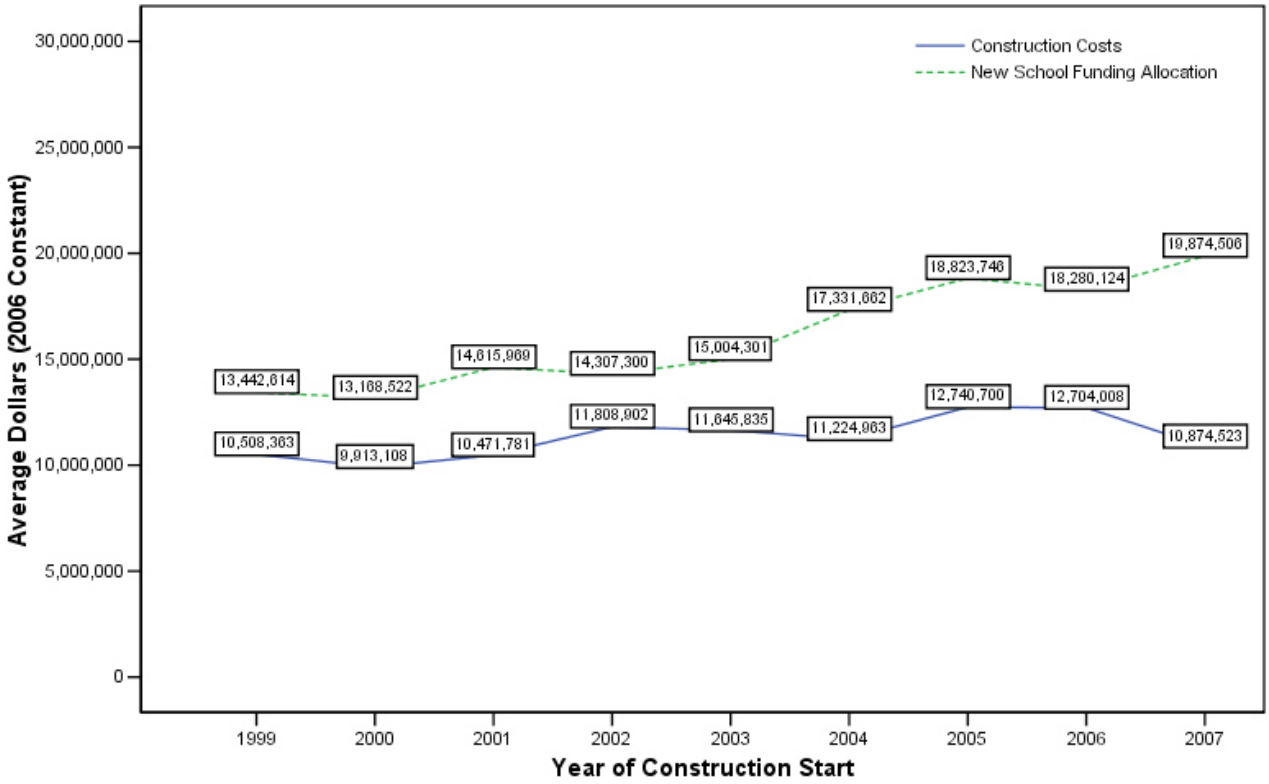
**Chart 1.0: Eight-year trend of New School Funding Allocation and Construction Costs -a**




a - New School Construction Allocations are Total Funding Allocations (SFP grant allocations plus local district's matching share contributions.

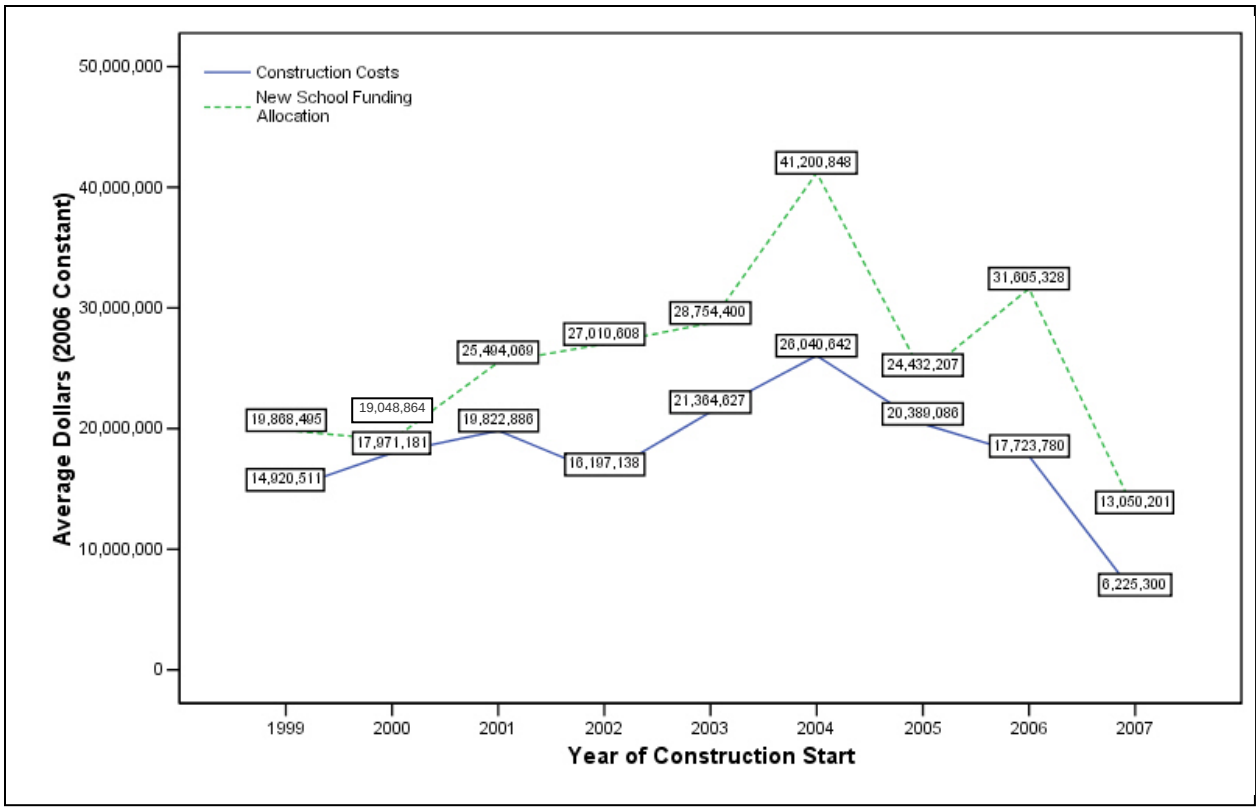
As shown in Chart 1.1, for each year from 1999 to 2007, average Funding Allocations for elementary schools were higher than the corresponding average for new school construction costs.

**Chart 1.1: New School Funding Allocations and Construction Costs for Elementary Schools, 1999-2007.**



As shown in Chart 1.2, for each year from 1999 to 2007, average Funding Allocations for middle schools were higher than the corresponding average for new school construction costs.

**Chart 1.2: New School Funding Allocations and Cost of Construction for Middle Schools, 1999-2007.**



As shown in Chart 1.3, for each year from 1999 to 2007, average Funding Allocations for high schools were higher than the corresponding average for new school construction costs.

**Chart 1.3: New School Funding Allocations and Cost of Construction for High Schools, 1999-2007.**

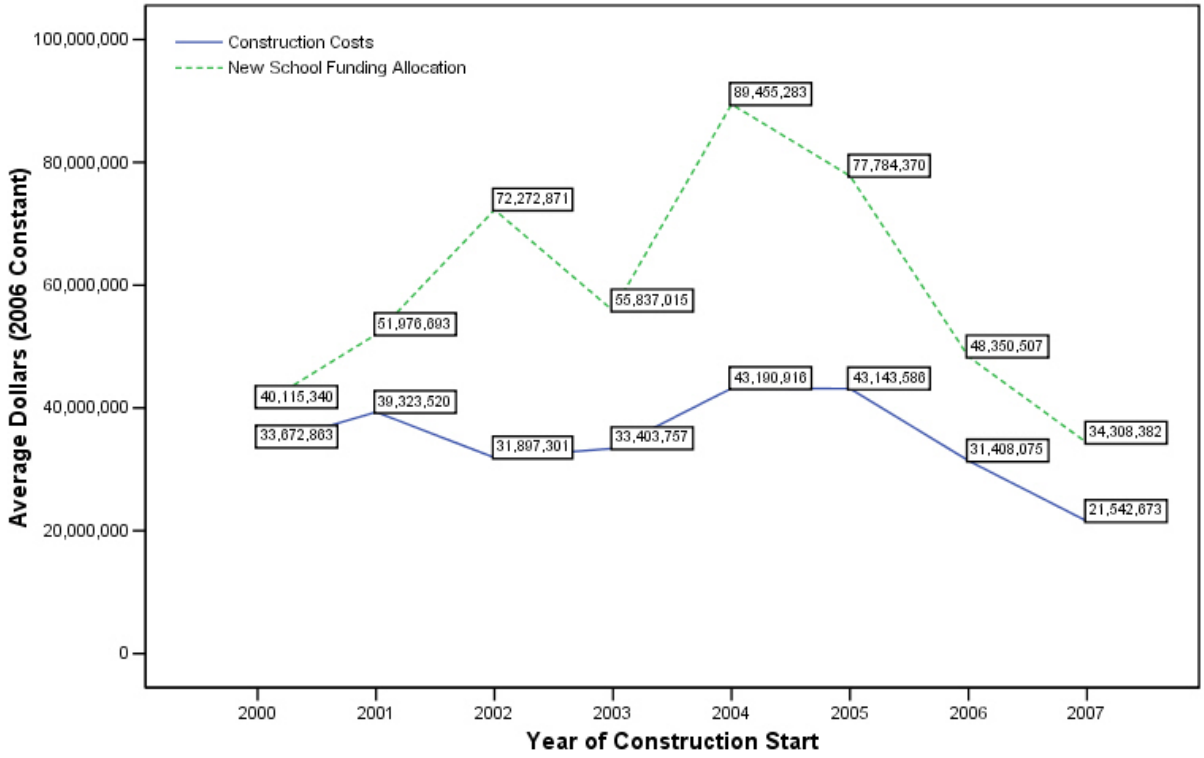


Chart 1.4 shows the change in the size of the gap (or difference) between the average Funding Allocations and the average new school construction costs for each type of school between two periods of time, 1999-2002 and 2003-2007.

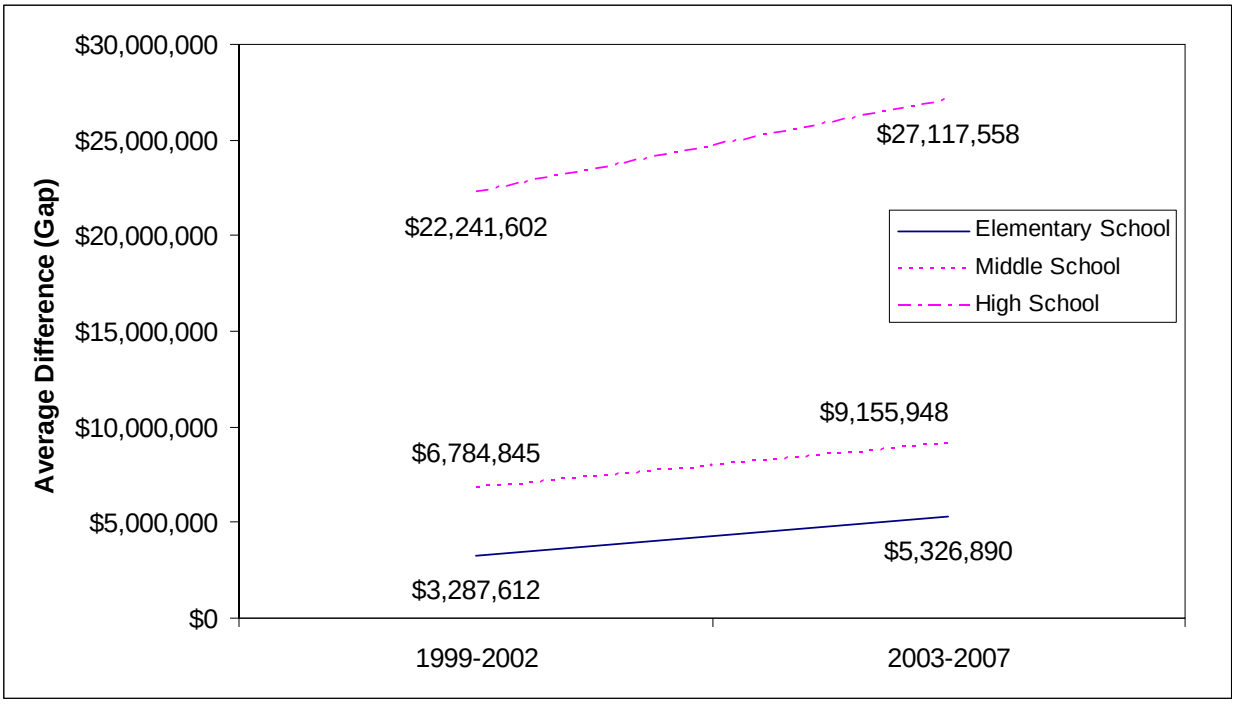
For elementary schools, the difference between average Funding Allocations and average new school construction costs increased by $2,039,278 from $3,287,612 during the time period 1999-2002 to $5,326,890 during the 2003-2007 time period. This change was found to be statistically significant.

For middle schools and high schools, there was not a statistically significant change between the two periods of time in the size of the gap between average Funding Allocations and average new school construction costs, although a numerical increase occurred for the schools in our sample.

For middle schools, the difference between average Funding Allocations and average new school construction costs for 1999-2002 was $6,784,845. This gap numerically increased by nearly $2,371,103 to $9,155,948 during the 2003-2007 time period.

For high schools, the difference between average Funding Allocations and average new school construction costs for 1999-2002 was $22,241,602. This gap numerically increased by nearly $4,875,956 to $27,117,558 for the time period 2003-2007.

**Chart 1.4: Differences between Average Funding Allocation and Average Construction Costs by School Type**



## Average Funding Allocations Fully Covered Average New School Construction Costs

Macias examined the extent to which Funding Allocations (SFP grant allocations and expected local matching share contributions) covered the cost of new school construction for each year from 1999 to 2007 as shown in Table 1.5.

Average Funding Allocations covered from 123 to 174 percent of average construction costs.

**Table 1.5: Average Funding Allocations and Construction Costs, By Year of Start of Construction[8]**

| Year of Start | Number of Schools | Average Funding Allocations | Average Construction Costs | Percent of Construction Costs Covered by Funding Allocations |
|---|---|---|---|---|
| **1999** | 19 | $14,457,227 | $11,205,018 | 129 |
| **2000** | 24 | $19,517,485 | $15,870,316 | 123 |
| **2001** | 43 | $20,225,135 | $14,913,973 | 136 |
| **2002** | 42 | $26,085,446 | $15,888,341 | 164 |
| **2003** | 72 | $25,044,705 | $17,361,358 | 144 |
| **2004** | 68 | $27,564,292 | $16,258,597 | 170 |
| **2005** | 43 | $30,706,170 | $19,642,137 | 156 |
| **2006** | 42 | $24,243,655 | $16,179,908 | 150 |
| **2007** | 13 | $22,740,859 | $13,084,133 | 174 |
| **Total** | 366 | $24,599,590 | $16,242,963 | 151 |

Macias examined the extent to which Funding Allocations covered the cost of new school construction for each type of school in our sample as shown in Table 1.6.

As shown in Table 1.6 for all 259 elementary schools in the sample, Funding Allocations covered 140 percent of new school construction costs. Funding Allocations averaged $16,076,315 and new school construction costs averaged $11,481,675 — a difference of $4,594,640 that is statistically significant.

For all 50 middle schools in the sample, Funding Allocations covered 143 percent of new school construction costs. Funding Allocations averaged $27,683,878 and new school construction costs averaged $19,381,527 – a difference of $8,302,351 that is statistically significant.

For all 57 high schools in the sample, Funding Allocations covered 171 percent of new school construction costs. Funding Allocations averaged $60,916,447 and new school

[8] The start of construction was based on reported data in the McGraw-Hill database.

construction costs averaged $35,253,122 — a difference of $25,663,325 million that is statistically significant.

**Table 1.6: Average Funding Allocation and Average Cost of New School Construction, by School Type**

| School Type | Number of Schools | Average Funding Allocations | Average Construction Costs | Percent of Construction Costs Covered by Funding Allocations |
|---|---|---|---|---|
| **Elementary** | 259 | $16,067,315 | $11,481,675 | 140 |
| **Middle** | 50 | $27,683,878 | $19,381,527 | 143 |
| **High** | 57 | $60,196,447 | $35,253,122 | 171 |
| **Entire Group** | 366 | $24,599,590 | $16,242,963 | 151 |

## SFP Grant Allocations Covered About 80 Percent of Average New School Construction Costs

Macias also examined the extent to which the SFP grant allocations (excluding the expected local district's matching share contributions) covered the cost of new school construction for each type of school as shown in Table 1.7.

While OPSC reported that the School Facility Program was not intended to provide full funding of new school construction, SFP grant allocations (excluding the expected local district's matching share contribution) covered an average of 80 percent of new school construction costs among the 366 schools in our sample.[9] Among elementary, middle, and high schools, the portion of total new school construction costs covered by SFP grant allocations by themselves ranged from 72 to 93 percent.

**Table 1.7: Percentage of SFP Grant Allocations that Cover New School Construction Costs, by School Type**

| School Type | Number of Schools | Average SFP Grant Allocations | Average Construction Costs | Percent of Construction Costs Covered by SFP Grant Allocations |
|---|---|---|---|---|
| **Elementary** | 259 | $8,389,533 | $11,481,675 | 73% |
| **Middle** | 50 | $13,883,948 | $19,381,527 | 72% |
| **High** | 57 | $32,919,716 | $35,253,122 | 93% |
| **Entire Group** | 366 | $ 12,947,956 | $16,242,963 | 80% |

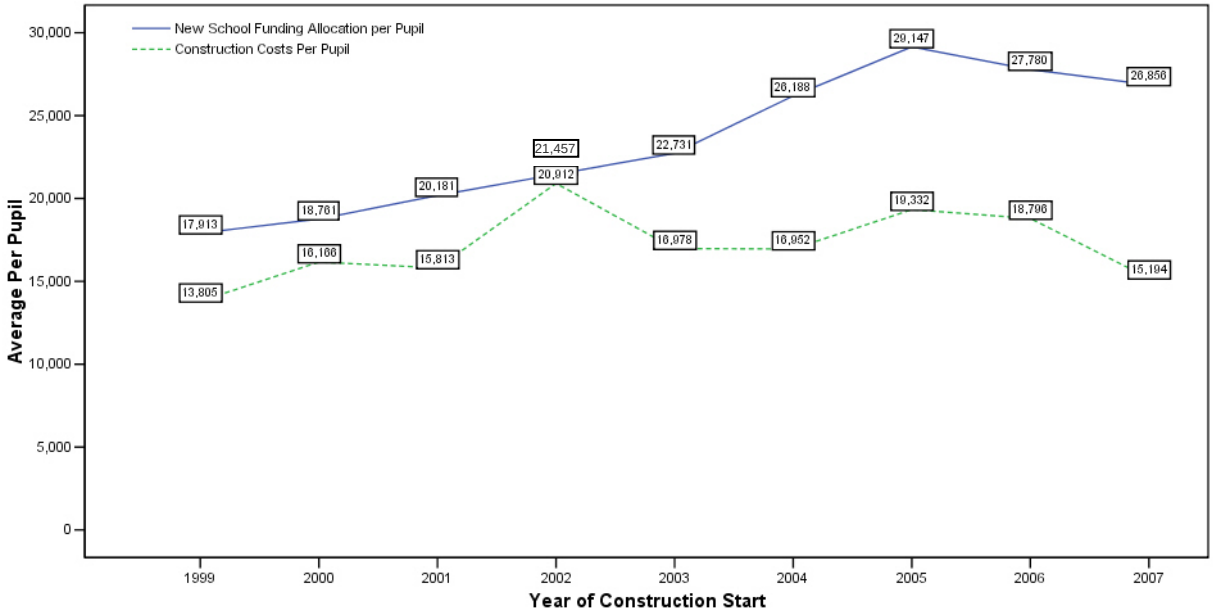
[9] Our sample size represents about 52 percent of the original 710 schools in the OPSC dataset provided to us, and those schools in which we could identify a valid match in the McGraw Hill database.

Average new school construction costs were $3,083,248 more than average SFP grant allocations for elementary schools; $5,497,579 more for middle schools, and $2,333,406 for high schools – the differences for elementary and middle schools are statistically significant but there is not a statistically significant difference in the SFP grant allocations and new school constructions costs for high schools.

## Funding Allocations per Pupil Were Higher than Construction Costs per Pupil

As shown in Chart 1.8, Funding Allocations per pupil increased 61 percent from an average of $17,913 in 1999 to $28,856 in 2007. Construction costs per pupil increased 10 percent from an average of $13,805 in 1999 to an average of $15,194 in 2007. The increase in the difference (or gap) between Funding Allocations per pupil and construction costs per pupil from 1999-2002 to 2003-2007 was statistically significant.

**Chart 1.8: Funding Allocations per Pupil versus Construction Costs per Pupil, 1999-2007.**




As shown in Table 1.9 for all 259 elementary schools in the sample, Funding Allocations per pupil averaged $22,121 and new school construction costs per pupil averaged $16,935 – a difference of $5,186 that was statistically significant.

For all 50 middle schools in our sample, Funding Allocations per pupil averaged $23,310 and new school construction per pupil averaged $17,008 – a difference of $6,302 that was statistically significant.

For all 57 high schools in our sample, Funding Allocations per pupil averaged $32,485 and new school construction per pupil averaged $20,592 – a difference of $11,893 that was statistically significant.

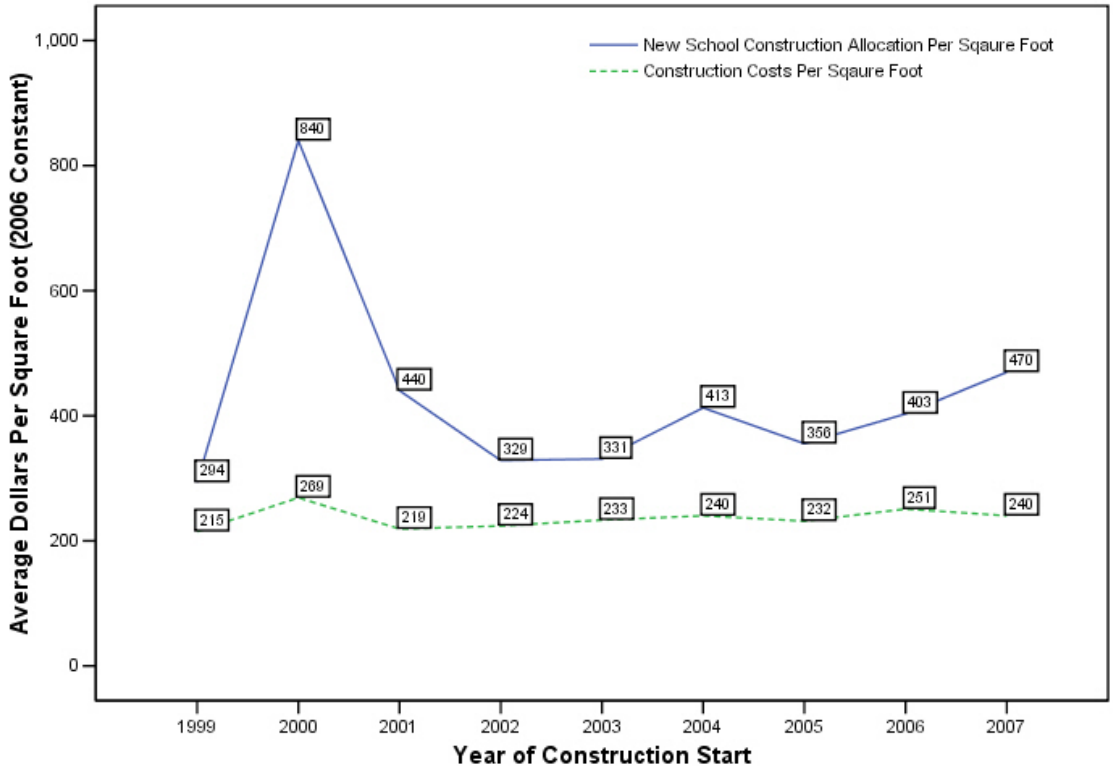
**Table 1.9: Funding Allocation per Pupil versus Construction Costs per Pupil by School Type**

| School Type | Number of Schools | Average Funding Allocations per Pupil | Average SFP Grant Allocations per Pupil | Average Cost of New School Construction per Pupil |
|---|---|---|---|---|
| **Elementary** | 259 | $22,121 | $11,260 | $16,935 |
| **Middle** | 50 | $23,310 | $11,980 | $17,008 |
| **High** | 57 | $32,485 | $17,498 | $20,592 |
| **Entire Group** | 366 | $23,892 | $12,326 | $17,513 |

### Funding Allocations per Square Foot Were Higher than Construction Costs for New Schools per Square Foot

As shown in Chart 1.10, Funding Allocations per square foot increased 60 percent from an average of $294 in 1999 to $470 in 2007. Construction costs per square foot increased 12 percent from an average of $215 in 1999 to an average of $240 in 2007. However, the size of the gap (or difference) between Funding Allocations and construction costs per square foot for new schools did not change from 1999-2002 to 2003-2007 because there was not a statistically significant change in the difference between the average Funding Allocations and construction costs per square foot.

**Chart 1.10: Funding Allocations per Square Foot versus Construction Costs per Square Foot, 1999- 2007**



## For Each School Type, Funding Allocations per Square Foot Were Higher than Construction Costs per Square Foot

As shown in Table 1.11 for all 259 elementary schools in the sample, Funding Allocations per square foot averaged $400 and new school construction costs per square foot averaged $229 – a $171 difference that is statistically significant.

For all 50 middle schools in our sample, Funding Allocations per square foot averaged $372 and new school construction costs per square foot averaged $237 – a difference of $135 that was statistically significant.

For all 57 high schools in our sample, Funding Allocations per square foot averaged $461 and new school construction costs per square foot averaged $261 – a difference of $200 that was statistically significant.

**Table 1.11: Funding Allocation per Square Foot versus Construction Costs per Square Foot by School Type**

| School Type | Number of Schools | Funding Allocations per Square Foot | SFP Grant Allocations per Square Foot | Average Cost of New School Construction per Square Foot |
|---|---|---|---|---|
| **Elementary** | 259 | $400 | $210 | $229 |
| **Middle** | 50 | $372 | $196 | $237 |
| **High** | 57 | $461 | $253 | $261 |
| **Entire Group** | 366 | $405 | $214 | $235 |

# Chapter 2: Analysis of CDE Identified "Complete" Schools

## Section Overview

The purpose of this section is to compare Funding Allocations and new school construction costs for schools identified by the California Department of Education as a "complete" school. This section also includes an analysis of funding and costs per pupil and per square foot. It is important to note that for the interpretation of the data, Macias applied the assertion that Funding Allocations were the "expected" budget for the new school construction budget.

The CDE identified the elements of a "complete" school in its May 2007 report to the State Allocation Board[10]. Pages 15 – 20 of this report describe the CDE identified elements of a "complete" school for elementary, middle and high schools.

While the CDE has identified 60 "complete" schools in its report to the SAB, funding and construction cost data for this study were available for only 46 of these schools. These schools were located throughout California and built between 2001 and 2007, with most schools in the sample built between 2005 and 2007. The CDE selected the schools based on input from local districts on schools that best suited their needs. It is important to note that because the CDE identified the schools as having all of the components of a "complete" school, Macias assumed that is was the intent of the school district to build all of the essential facilities.

Elementary schools comprise 20 (43 percent) of the 46 schools included in the analysis. There are 15 high schools (33 percent) and 11 middle schools (24 percent) in the sample. The school with the fewest pupils, an elementary school, was located in rural North Inland Region with 319 students, and the school with the most pupils, a high school was located in South San Diego Region with 3,915 total students. The size of the smallest school was 10,900 square feet (for an elementary school located in North Inland Region) and the largest school had 343,000 square feet (a high school in South Los Angeles Region).

The geographic location of complete schools in this sample is divided almost evenly between Northern and Southern California, as shown in Table 2.0 below. There are 24 schools located in the two Northern California regions and 22 schools located in the two Southern California regions. Elementary, middle, and high schools are also evenly distributed across the regions.

[10] California Department of Education Report on Complete Schools, State Allocation Board Meeting, May 23, 2007.

**Table 2.0: Distribution of School Type by Geographic Region for the CDE group of "Complete" Schools**

| Region | Total Number of Schools in Region | Elementary | Middle | High |
|---|---|---|---|---|
| **North Inland**[11] | 12 | 5 | 2 | 5 |
| **North Coastal**[12] | 12 | 6 | 3 | 3 |
| **South-Los Angeles**[13] | 8 | 1 | 3 | 4 |
| **South-San Diego**[14] | 14 | 8 | 3 | 3 |
| **Total** | 46 | 20 | 11 | 15 |

## Average Total Funding Allocations Are Greater Than Average Total New School Construction Costs

Macias examined the extent to which Funding Allocations (e.g. SFP grant allocations and local district's matching expected share contributions) covered the cost of new school construction for the schools in our sample. As shown in Table 2.1, average Funding Allocations of $42,293,807 for the 46 "complete" elementary, middle and high schools covered 165 percent of the average school construction cost, $25,699,782. This difference between the Funding Allocations and construction costs averaged $16,594,025 and is statistically significant. This means that this difference is so large that it is unlikely to be due to random chance.

**Table 2.1: Average Funding Allocations and Construction Costs for CDE Group of "Complete" Schools**

| Number of Schools | Average Funding Allocations | Average Construction Costs | Percent of Construction Costs Covered by Funding Allocations |
|---|---|---|---|
| 46 | $42,293,807 | $25,699,782 | 165% |

Based on CDE's May 2007 report to the SAB, building a "complete" middle or high school requires more facilities than an elementary school, such as a gymnasium with

[11] North Inland Region 1 includes Alpine, Amador, Butte, Colusa, Contra Costa, Del Norte, El Dorado, Glenn, Humboldt, Lake, Lassen, Marin, Mendocino, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Sierra, Siskiyou, Solano, Sonoma, Sutter, Tehama, Trinity, Yolo, and Yuba counties.
[12] North Coast Region 2 includes Alameda, Calaveras, Fresno, Inyo, Kern, Kings, Madera, Mariposa, Merced, Mono, Monterey, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Stanislaus, Tulare, and Tuolumne counties.
[13] South-Los Angeles Region includes Los Angeles, San Bernardino, San Luis Obispo, Santa Barbara, and Ventura counties.
[14] South-San Diego Region 4 includes Imperial, Orange, Riverside, and San Diego counties.

locker rooms. Likewise, construction costs for the middle and high schools included in the analysis are greater than those for the elementary schools. While smaller in number, middle and high schools have higher Funding Allocations and construction costs which increase the averages for all schools in the sample. As a result, an analysis of the median, rather than the mean, was undertaken. The medians for Funding Allocations and new school construction costs (i.e. revenue and cost value for the school located in the middle of the sample) is lower than their averages because of the number of elementary schools included in the analysis, but Funding Allocations at the median point continue to cover more than 100 percent of school construction costs, as shown in Table 2.2.

**Table 2.2: Median Funding Allocations and Construction Costs for "Complete Schools"**

| Number of Schools | Median Funding Allocations | Median Construction Costs | Percent of Construction Costs Covered by Funding Allocations |
|---|---|---|---|
| 46 | $27,338,657 | $17,477,748 | 156% |

When stratified by type of school, average Funding Allocations continue to cover all of the construction costs, ranging from 124 to 185 percent, as shown in Table 2.3.

For the 20 elementary schools in the sample, Funding Allocations averaged $19,307,557 and school construction costs averaged $12,084,630 — a difference of $7,222,927. An analysis of statistical significance was not performed among each school type because the sample size was too small.

For the 11 middle schools in the sample, Funding Allocations averaged $33,382,807 and school construction costs averaged $26,891,479 – a difference of $6,491,328.

For the 15 high schools in the sample, Funding Allocations averaged $79,476,875 and new school construction costs averaged $42,979,405 – a difference of $36,597,470.

**Table 2.3: Average Funding Allocations and Average Construction Costs by School Type**

| School Type | Number of Schools | Average Funding Allocations | Average Construction Costs | Percent Average Funding Allocations of Average Construction Cost |
|---|---|---|---|---|
| **Elementary** | 20 | $19,307,557 | $12,084,630 | 160% |
| **Middle** | 11 | $33,382,807 | $26,891,479 | 124% |
| **High** | 15 | $79,476,875 | $42,979,405 | 185% |
| **Entire Group** | 46 | $42,293,807 | $25,699,782 | 165% |

When the sample of 46 is stratified by geographic region (North Inland, North Coastal, South-Los Angeles, South-San Diego), Funding Allocations continue to cover construction costs, ranging from 118 to 213 percent, as shown in Table 2.4.

For the 12 schools in the North Inland region, average Funding Allocations amounted to $44,743,446 and average construction costs totaled $20,990,288.

For the 12 schools in the North Coastal region, average Funding Allocations amounted to $23,793,096 and average construction costs totaled $20,181,720.

For the eight schools in the South-Los Angeles region, average Funding Allocations amounted to $66,872,093 and average construction costs totaled $43,167,537. For the 14 schools in the South-San Diego region, average Total Funding Allocations amounted to $42,007,135 and average construction costs totaled $24,484,684.

**Table 2.4: Average Funding Allocations and New School Construction Costs by Region**

| Region | Number of Schools in the CDE Sample | Average Funding Allocations | Average Construction Costs | Percent Average Total Funding Allocations is of Average Total Construction Cost |
|---|---|---|---|---|
| **North Inland** | 12 | $44,743,446 | $20,990,288 | 213% |
| **North Coastal** | 12 | $23,793,096 | $20,181,720 | 118% |
| **South-Los Angeles** | 8 | $66,872,093 | $43,167,537 | 155% |
| **South-San Diego** | 14 | $42,007,135 | $24,484,684 | 172% |
| **Entire Group** | 46 | $42,293,807 | $25,699,782 | 165% |

### Funding Allocations were Higher than New School Construction Costs for Each Year from 2001 to 2007

For each year from 2001 to 2007, Funding Allocations (SFP grant allocations and the expected local district's matching share contribution) for all schools in the sample for that year were higher than new school construction costs on average, as shown in Table 2.5.

The gap (or difference) between average Funding Allocations and average new school construction costs did not grow significantly from the 2001-2005 period to the 2006-2007 period. This means that, statistically, the size of the gap between average Funding Allocations and average new school construction costs did not change. It is important to note that this analysis is limited by the sample size, with fewer than 30 schools in each comparison group. It is due to the small sample size that the change in the gap over time for each school type was not analyzed.

**Table 2.5: Average Funding Allocation and Construction Costs by Year of Construction Start**

| Year | Number of Schools | Average Funding Allocations | Average Construction Costs | Difference Between the Averages |
|---|---|---|---|---|
| **2001** | 1 | $28,855,921 | $17,522,881 | $11,333,040 |
| **2003** | 1 | $84,775,811 | $31,861,596 | $52,914,215 |
| **2004** | 5 | $58,190,461 | $34,569,645 | $23,620,816 |
| **2005** | 18 | $45,197,544 | $26,315,496 | $18,882,048 |
| **2006** | 16 | $37,005,058 | $24,764,558 | $12,240,500 |
| **2007** | 5 | $27,058,876 | $18,009,080 | $9,049,796 |
| **Total** | 46 | $42,293,807 | $25,699,782 | $16,594,025 |

Note: No school in our group of CDE schools was built in 2002.

## SFP Grant Allocations Covers Most of the Construction Costs

Macias examined the extent to which the SFP grant allocations (excluding local district matching share contributions) covered the cost of new school construction for the CDE sample of "complete" schools, as shown in Table 2.6.

While the SFP grant allocation apportionments are not intended to provide full funding of new school construction, SFP grant allocations covered an average of 74 percent of average construction costs among the 46 schools in our sample. However, the difference between the averages for SFP grant allocations and construction costs is not statistically significant, which means there is not a difference between the average funding and costs among these schools. Again, it is important to note that this analysis is limited by the sample size. If other schools were added to the group, the results could be the same or the difference between the averages could be smaller or larger.

Among the 46 elementary, middle, and high schools, the portion of average total new school construction costs covered by SFP grant allocations ranged from 55 to 84 percent. An analysis of statistical significance was not performed among each school type because the sample size was too small.

For the 20 "complete" elementary schools in the sample, SFP grant allocations averaged $8,671,343 and construction costs averaged $12,084,630.

For the 11 "complete" middle schools in the sample, SFP grant allocations averaged $14,866,073 and construction costs averaged $26,891,479.

For the 15 "complete" high schools in the sample, SFP grant allocations averaged $36,104,220 and construction costs averaged $42,979,405.

Average new school construction costs were about $3,413,287 more than average SFP grant allocations for elementary schools; about $12,025,406 more for middle schools, and about $6,875,185 for high schools.

**Table 2.6: Percentage of Average Construction Costs Covered by SFP Grant Allocations, by School Type**

| School Type | Number of Schools in the CDE Sample | Average SFP Grant Allocations | Average Construction Costs | Percent SFP grant Allocations Covers Construction Costs |
|---|---|---|---|---|
| **Elementary** | 20 | $8,671,343 | $12,084,630 | 72% |
| **Middle** | 11 | $14,866,073 | $26,891,479 | 55% |
| **High** | 15 | $36,104,220 | $42,979,405 | 84% |
| **Entire Group** | 46 | $19,098,195 | $25,699,782 | 74% |

When the sample of 46 is stratified by geographic region, the portion of new school construction costs covered by SFP grant allocations ranged from 59 to 86 percent, as shown in Table 2.7.

For the 12 “complete” North Inland region schools in the sample, average SFP grant allocations averaged $18,043,017 and construction costs averaged $20,990,288.

For the 12 “complete” North Coastal region schools in the sample, average SFP grant allocations averaged $11,947,510 and construction costs averaged $20,181,720.

For the eight “complete” South-Los Angeles region schools in the sample, SFP grant allocations averaged $35,673,476 and construction costs averaged $43,167,537.

For the 14 “complete” South-San Diego region schools in the sample, SFP grant allocations averaged $16,660,201 and construction costs averaged $24,484,684.

**Table 2.7: Percentage of Average Construction Costs Covered by SFP Grant Allocations, by School Type**

| Region | Number of Schools in the CDE Sample | Average SFP Grant Allocations | Average Construction Costs | Percent SFP Grant Allocations Covers Construction Costs |
|---|---|---|---|---|
| **North Inland** | 12 | $18,043,017 | $20,990,288 | 86% |
| **North Coastal** | 12 | $11,947,510 | $20,181,720 | 59% |
| **South-Los Angeles** | 8 | $35,673,476 | $43,167,537 | 83% |
| **South-San Diego** | 14 | $16,660,201 | $24,484,684 | 68% |
| **Entire Group** | 46 | $19,098,195 | $25,699,782 | 74% |

## Average Funding Allocations per Pupil was Higher than Average Total Construction Costs per Pupil

Among the 46 schools in our sample, Funding Allocations (e.g. SFP grant allocations and local district's expected matching share contribution) amounted to $33,227 per pupil and construction costs per pupil were $21,222, as shown in Table 2.8. This difference is statistically significant.

When the sample is stratified by school level (elementary, middle, and high school), Funding Allocations per pupil continued to be higher than construction costs per pupil.

For the 20 elementary schools within our sample, Funding Allocations per pupil averaged $32,916 compared to construction cost per pupil of $19,654. Average SFP grant allocations averaged $13,435 per pupil.

For the 11 middle schools within our sample, Funding Allocations per pupil averaged $28,839 compared to construction costs per pupil of $24,764. Average SFP grant allocations averaged $12,900 per pupil.

For the 15 high schools within our sample, Funding Allocations per pupil were $36,859 compared to construction cost per pupil of $20,714. Average SFP grant allocations averaged $16,610 per pupil.

**Table 2.8: Average Funding Allocations and Construction Costs per Pupil, by School Type**

| School Type | Number of Schools in the CDE Sample | Number of pupils per School | Funding Allocations per pupil | Construction Costs per Pupil | SFP Grant Allocations per Pupil |
|---|---|---|---|---|---|
| **Elementary** | 20 | 665 | $32,916 | $19,654 | $13,435 |
| **Middle** | 11 | 1,157 | $28,839 | $24,764 | $12,900 |
| **High** | 15 | 2,234 | $36,859 | $20,714 | $16,610 |
| **Entire Group** | 46 | 1,294 | $33,227 | $21,222 | $14,343 |

When the sample of 46 schools is stratified by geographic region (North Inland, North Coastal, South-Los Angeles, South-San Diego), Funding Allocations per pupil were larger than construction costs per pupil, as shown in Table 2.9.

For the 12 North Inland region schools, Funding Allocations amounted to $31,294 per pupil compared to construction costs per pupil of $16,590. SFP grant allocations were $14,415 per pupil.

For the 12 North Coastal region schools, Funding Allocations amounted to $25,458 per pupil compared to construction costs of $20,789 per pupil. SFP grant allocations were $12,676 per pupil.

For the eight South-Los Angeles region schools, Funding Allocations amounted to $36,243 per pupil compared to construction costs of $25,072 per pupil. SFP grant allocations were $18,189 per pupil.

For the 14 South-San Diego region schools, Funding Allocations amounted to $39,818 per pupil compared to construction costs of $23,362 per pupil. SFP grant allocations were $13,511 per pupil.

**Table 2.9: Average Funding Allocations and Construction Costs per Pupil by Region**

| Region | Number of Schools in the CDE Sample | Number of Pupils Per School | Funding Allocations Per Pupil | Construction Cost Per Pupil | SFP Grant Allocations Per Pupil |
|---|---|---|---|---|---|
| **North Inland** | 12 | 1,343 | $31,294 | $16,590 | $14,415 |
| **North Coastal** | 12 | 942 | $25,458 | $20,789 | $12,676 |
| **South-Los Angeles** | 8 | 1,865 | $36,243 | $25,072 | $18,189 |
| **South-San Diego** | 14 | 1,227 | $39,818 | $23,362 | $13,511 |
| **Entire Group** | 46 | 1,294 | $33,227 | $21,222 | $16,610 |

### Average Funding Allocation per Square Foot is Larger than Average Total Construction Costs

Among the 46 schools in our sample, Funding Allocations amounted to $451 per square foot compared to construction costs of $259 per square foot, as shown in Table 2.10. This difference is statistically significant.

For the 20 elementary schools within our sample, Funding Allocations amounted to $405 per square foot compared to construction costs per square foot of $240. SFP grant allocations were $210 per square foot.

For the 11 Middle schools within our sample of 46 schools, Funding Allocations amounted to $333 per square foot compared to construction costs per square foot of $265. SFP grant allocations were $147 per square foot.

For the 15 High schools within our sample, Funding Allocations amounted to $599 per square foot compared to construction costs per square foot of $279. SFP grant allocations were $273 per square foot.

**Table 2.10: Average Funding Allocations and Construction Costs per Square Foot, by School Type**

| School Type | Number of Schools in the CDE Sample | Number of Square Feet per School | Funding Allocations per Square Foot | Construction Costs per Square Foot | SFP Grant Allocations per Square Foot |
|---|---|---|---|---|---|
| **Elementary** | 20 | 50,340 | $405 | $240 | $210 |
| **Middle** | 11 | 106,000 | $333 | $265 | $147 |
| **High** | 15 | 158,947 | $599 | $279 | $273 |
| **Entire Group** | 46 | 99,065 | $451 | $259 | $215 |

When the sample of 46 schools is stratified by geographic region (elementary, middle, and high school), Funding Allocations per square foot were larger than construction costs per square foot, as shown in Table 2.11.

For the 12 North Inland region schools within our sample, Funding Allocations amounted to $633 per square foot compared to construction cost of $264 per square foot. SFP grant allocations were $304 per square foot.

For the 12 North Coastal region schools within our sample, Funding Allocations amounted to $316 per square foot compared to construction cost of $250 per square foot. SFP grant allocations were $160 per square foot.

For the 8 South-Los Angeles region schools, Funding Allocations amounted to $447 per square foot compared to construction costs of $284 per square foot. SFP grant allocations were $246 per square foot.

For the 14 South-San Diego region schools, Funding Allocations amounted to $414 per square foot compared to construction costs of $246 per square foot. SFP grant allocations were $168 per square foot.

**Table 2.11: Average Funding Allocations and Construction Costs per Square Foot by Geographic Region**

| School Region | Number of Schools in the CDE Sample | Number of Square Feet per School | Funding Allocations per Square Foot | Construction Costs per Square Foot | SFP Grant Allocations per Square Foot |
|---|---|---|---|---|---|
| **North Inland** | 12 | 79,142 | $633 | $264 | $304 |
| **North Coastal** | 12 | 77,558 | $316 | $250 | $160 |
| **South-Los Angeles** | 8 | 155,588 | $447 | $284 | $246 |
| **South-San Diego** | 14 | 102,279 | $414 | $246 | $168 |
| **Entire Group** | 46 | 99,065 | $451 | $259 | $215 |

# Chapter 3: Analysis of the New School Construction Cost Survey

## Section Overview

The purpose of this section is to provide an analysis of school district reported Funding Allocations (SFP grant allocations and the local district's matching share contributions) used for reported new school construction costs (construction costs) from 1999-2007. This analysis includes a comparison of the reported Funding Allocations with reported construction costs for each type of new school, geographic region, and by per pupil and per square foot. Within this analysis, Macias also analyzed the size of reported SFP grant allocations (Funding Allocations excluding local district matching contributions) compared with new school construction costs.

Funding Allocation includes SFP grant allocations provided by the OPSC and the local district matching share contribution. All data was self-reported by the school districts. Districts were asked to report the Funding Allocation in five parts: OPSC New School Facility Base Grant, OPSC Required Local Match Fund Contribution, OPSC Lease Purchase Program, OPSC Financial Hardship Program Grant, and SAB Supplement Grant(s).

School districts were also requested to report total construction costs, including expenses for subcontractors and change orders pertaining to the building of a new school. Data for construction expenditures were collected under the following categories: site development that occurred as part of construction budget (which may include normal connecting utilities, demolition, grading, earthwork, drainage & containment); building(s) construction (such as materials and labor); construction management fees; construction tests and inspections; equipment and furniture (costs for those items/services that were included in the construction contract(s); construction supervision/security; contingency (if applicable); and other related expenditures. Macias adjusted the reported construction costs to include planning costs incurred by school type (e.g. elementary, middle, high, and non-traditional). This might have led to over-reporting of construction costs for some schools because some districts reported some of these planning costs in their survey response. The data reported by the school districts were adjusted to constant 2006 dollars to aid in the analysis across the nine-year period (1999-2007).[15]

Number of Pupils is based on the reported district loading standard. All total pupil capacities reported were for traditional school years (none were year-round).

Square feet is the interior space of the new school excluding covered walkways and circulation areas.

[15] Refer to page 13 of the Methodology section for a detailed discussion on how the McGraw-Hill database was adjusted.

For the analysis examining Funding Allocations, the population of schools was 84, as shown by geographic region in Table 3.0 below.[16] There are two more schools (43) located in the combined North Inland and North Coastal regions than in the combined South-Los Angeles and South-San Diego southern regions (41). The South-San Diego and North Coastal regions have the highest number of schools followed by North Inland region and the South-Los Angeles region. All four regions have the same number of middle schools (four); the North Inland did not have a high school in the sample. Elementary schools are the most common (six to 17 schools) school type in each region.

**Table 3.0: Distribution of School Type by Geographic Region for Analysis of Funding Allocations**

| Region Name | Total Number of Schools in Region | Elementary | Middle | High | Non-Traditional |
|---|---|---|---|---|---|
| **Entire Group** | 84 | 47 | 16 | 12 | 9 |
| **North Inland[17]** | 19 | 10 | 4 | 0 | 5 |
| **North Coastal[18]** | 24 | 14 | 4 | 5 | 1 |
| **South-Los Angeles[19]** | 13 | 6 | 4 | 2 | 1 |
| **South-San Diego[20]** | 28 | 17 | 4 | 5 | 2 |

Elementary schools (any combination grades (K-6) were represented most often (47 or 56 percent), followed by 16 (19 percent) middle schools (any combination of grades 6-8), 12 (14 percent) high schools (any combination of grades 9-12), and nine (11 percent) schools that had a non-traditional combination of grade levels (any combination of grades K-12). Table 3.1 below shows the grade level combinations reported by the nine non-traditional schools.

[16] While school districts had submitted complete funding and construction cost data for 89 schools, school districts did not submit data on the year that construction began for three schools (two elementary schools and one high school) in this sample. Because Macias relied upon this construction date information in order to adjust construction costs for inflation, Macias had to exclude these schools from the analysis of trends in funding allocations, total revenues, and construction costs over time. Macias also excluded two elementary schools from the analysis of Funding Allocations because of missing SFP grant allocations. This resulting sample contains 84 schools.

[17] North Inland Region 1 includes Alpine, Amador, Butte, Colusa, Contra Costa, Del Norte, El Dorado, Glenn, Humboldt, Lake, Lassen, Marin, Mendocino, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Sierra, Siskiyou, Solano, Sonoma, Sutter, Tehama, Trinity, Yolo, and Yuba counties.

[18] North Coast Region 2 includes Alameda, Calaveras, Fresno, Inyo, Kern, Kings, Madera, Mariposa, Merced, Mono, Monterey, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Stanislaus, Tulare, and Tuolumne counties.

[19] South-Los Angeles Region includes Los Angeles, San Bernardino, San Luis Obispo, Santa Barbara, and Ventura counties.

[20] South-San Diego Region 4 includes Imperial, Orange, Riverside, and San Diego counties.

**Table 3.1: Distribution of Grade Levels in Non-Traditional Combination of Grade Level Schools**

| Non-Traditional Grade Levels Combination Reported | Number of Schools | Traditional School Grade Levels | | |
|---|---|---|---|---|
| | | Elementary | Middle | High |
| K-3 | 1 | X | | |
| K-8 | 7 | X | x | |
| 7-12 | 1 | | x | x |

Macias compared all school district reported funding sources (Total Revenue) to reported new school construction costs (construction costs). This analysis was performed because the school district, as requested, reported all the resources used for the new school construction project. The findings of the analysis of Total Revenues are presented at the end of this chapter. It is important to note that for the analysis of the data, Macias applied the assertion that revenues reported were the District's defined resources for the new school construction budget. The population of schools that were used for this analysis was 84 schools.[21]

## Funding Allocation for New School Construction Covered 77 Percent of Construction Costs

If the purpose of the School Facility Program is to establish the "expected" budget of the new school construction, the average Funding Allocation (SFP grant allocations and local district matching contribution) covered 77 percent of the average new school construction costs. The average Funding Allocation (SFP grant allocations and local district matching contribution) were $22,077,866 and average new school construction costs were $28,565,706. The $6,487,840 difference between the average Funding Allocation and construction costs is statistically significant. This means that the observed difference between Funding Allocation and construction costs is so large that it is unlikely that the difference is due to random chance.

However, the gap (or difference) between average Funding Allocation and average new school construction costs did not change over the nine-year period. There was not a statistically significant change in the average difference between Funding Allocation and construction costs from the period of 1999-2003 to the period of 2004-2007.

Year-to-year changes in the difference between average Funding Allocation and construction costs were also not analyzed because of the small number of schools

[21] While school districts had submitted complete funding and construction cost data for 89 schools, school districts did not submit data on the year that construction began for three schools (two elementary schools and one high school) in this sample. Because Macias relied upon this construction date information in order to adjust construction costs for inflation, Macias had to exclude these schools from the analysis of trends in funding allocations, total revenues, and construction costs over time.

represented in the first and last year of the time period. For the same reason (insufficient sample size), the change in the gap (or difference) between average Funding Allocation and construction costs was not analyzed by school type or by geographic region.[22]

### Average Annual Funding Allocations Covered At Least 75 Percent of Average New School Construction Costs for Six of Nine Years

Macias examined the extent to which Funding Allocation covered the cost of new school construction for each year from 1999 to 2007 as shown in Table 3.2 and Chart 3.3.

Average Funding Allocation covered from 48 to 111 percent of average construction costs. However, for six of the nine years in the time period, average Funding Allocation covered at least 75 percent the cost of new school construction. For the years 1999, 2004, and 2006, average Funding Allocation fell short by about $26.8, $8.4, and $6.6 million, respectively.

**Table 3.2. Average Funding Allocation and Construction Costs, By Year of Start of Construction[23]**

| Year of Start | Number of Schools | Funding Allocation | Construction Costs | Percent of Construction Costs Covered by Funding Allocation |
|---|---|---|---|---|
| **1999** | 4 | $24,394,791 | $51,199,359 | 48% |
| **2000** | 6 | $18,879,901 | $20,712,788 | 91% |
| **2001** | 2 | $31,303,423 | $34,257,727 | 91% |
| **2002** | 9 | $23,264,640 | $26,277,602 | 89% |
| **2003** | 13 | $34,594,474 | $41,286,069 | 84% |
| **2004** | 22 | $20,355,256 | $28,750,813 | 71% |
| **2005** | 16 | $18,877,518 | $21,790,673 | 87% |
| **2006** | 11 | $13,253,855 | $19,845,783 | 67% |
| **2007** | 1 | $29,240,075 | $26,317,062 | 111% |
| **Total** | 84 | $22,077,866 | $28,565,706 | 77% |

[22] The first section of the report examined the change in the gap (or difference) between average funding allocations and construction costs from the period of 1999-2002 to the period of 2003-2007.There was an insufficient number of schools in this sample to replicate the same analysis because the schools were not evenly distributed across the eight-year period.
[23] The start of construction was based on the year reported for when the notice to proceed was given for construction to begin.

**Chart 3.3: Average Funding Allocation and Construction Costs, By Year of Start of Construction[24]**

To ensure that no outlying cases had an undue impact on the mean values used in the analysis above, Macias conducted a parallel analysis using median values. The results show that in 1999, one of the four schools had larger construction costs than the other three schools, resulting in a much higher average than median measure of construction costs. As a result, the percent of construction costs covered by the Funding Allocation increased from 48 to 105 percent. For eight of the nine years in the time period, median Funding Allocation covered at least 75 percent the cost of new school construction. Median Funding Allocation covered from 68 to 105 percent of average construction costs, as shown in Table 3.4.

[24] The start of construction was based on the year reported for when the notice to proceed was given for construction to begin.

**Table 3.4: Median Funding Allocation and Construction Costs, by Year of Start of Construction**

| Year of Start | Number of Schools | Funding Allocation | Construction Costs | Percent of Construction Costs Covered by Funding Allocation |
|---|---|---|---|---|
| **1999** | 4 | $23,173,208 | $22,147,283 | 105% |
| **2000** | 6 | $16,165,160 | $15,350,109 | 105% |
| **2001** | 2 | $31,303,423 | $34,257,727 | 91% |
| **2002** | 9 | $14,060,077 | $15,682,017 | 90% |
| **2003** | 13 | $22,597,273 | $24,971,569 | 90% |
| **2004** | 22 | $15,321,171 | $20,468,918 | 75% |
| **2005** | 16 | $14,593,500 | $14,974,541 | 97% |
| **2006** | 11 | $12,401,086 | $18,217,462 | 68% |
| **2007** | 1 | $29,240,075 | $26,317,062 | 111% |
| **Total** | 84 | $15,025,311 | $18,337,509 | 82% |

### Average Funding Allocation Covered At Least 75 Percent of Average Construction Costs by For All School Types except High Schools, and in Two of the Four Geographic Regions

Macias also examined the extent to which the Funding Allocation covered the cost of new school construction for each type of school and geographic region. Average Funding Allocation covered at least 75 percent of average construction costs for all school types (elementary – 89 percent; middle – 83 percent; non-traditional – 76 percent) except high schools (which covered 65 percent). When examined by geographic region, average Funding Allocation covered at least 75 percent of average construction costs in the North Inland and South-San Diego regions, but covered at least 60 percent in the North Coastal (68 percent) and South-Los Angeles (62 percent) regions.

As shown in Table 3.5, for elementary, middle, high and non-traditional schools, the portion of total new school construction costs covered by Funding Allocations ranged from 65 to 89 percent.

**Table 3.5: Percentage of Average Construction Costs covered by Average Funding Allocations, by School Type**

| School Type | Number of schools | Funding Allocations | Construction Costs(a) | Percent of Construction Costs covered by Funding Allocations |
|---|---|---|---|---|
| **Entire Group** | 84 | $22,077,866 | $28,565,706 | 77% |
| **Elementary** | 47 | $15,031,934 | $16,869,175 | 89% |
| **Middle** | 16 | $25,954,719 | $31,444,045 | 83% |
| **High** | 12 | $49,307,589 | $76,426,699 | 65% |
| **Non-traditional** | 9 | $15,674,804 | $20,715,883 | 76% |

Average new school construction costs were $6,487,840 more than average Funding Allocations for all 84 schools in our sample, a statistically significant difference as expected given the size of the gap between costs and Funding Allocations. Average new school construction costs were $1,837,241 more for elementary schools; $5,489,326 more for middle schools; $27,119,110 more for high schools; and $5,041,079 for non-traditional schools. However, only the difference for high schools is statistically significant.

Because of the small sample sizes, Macias also examined the extent to which median Funding Allocation covered the cost of new school construction for each type of school in our sample as shown in Table 3.6. As shown in Table 3.7, when the median Funding Allocation and construction costs are examined, Funding Allocations covered from 70 to 87 percent for each school type.

**Table 3.6: Percentage of Median Construction Costs Covered by Funding Allocations, by School Type.**

| School Type | Number of schools | Funding Allocations | Construction Costs | Percent of construction costs covered by Funding Allocations |
|---|---|---|---|---|
| **Entire Group** | 84 | $15,025,311 | $18,337,509 | 82% |
| **Elementary** | 47 | $12,100,081 | $15,546,262 | 78% |
| **Middle** | 16 | $22,130,523 | $25,353,502 | 87% |
| **High** | 12 | $51,168,949 | $73,566,736 | 70% |
| **Non-traditional** | 9 | $13,403,523 | $18,321,593 | 73% |

When examined by geographic region, as shown in Tables 3.7 below, the average Funding Allocations covered 62 to 87 percent of the average construction costs in each region.

**Table 3.7: Average Funding Allocations and Average Cost of New School Construction, by Geographic Region**

| School Type | Number of schools | Funding Allocation | Construction Costs | Percent of construction costs covered by Funding Allocations |
|---|---|---|---|---|
| **Entire Group** | 84 | $22,077,866 | $28,565,706 | 77% |
| **North Inland** | 19 | $18,942,790 | $21,713,790 | 87% |
| **North Coastal** | 24 | $19,024,529 | $28,024,562 | 68% |
| **South-Los Angeles** | 13 | $21,584,058 | $34,648,090 | 62% |
| **South-San Diego** | 28 | $27,051,651 | $30,855,093 | 88% |

Median Funding Allocations covered from 56 to 92 percent of the cost of new school construction, as shown in Table 3.8 below.

**Table 3.8: Median Funding Allocation and Construction Costs, by Geographic Region**

| School Type | Number of schools | Funding Allocation | Construction Costs | Percent of construction costs covered by Funding Allocations |
|---|---|---|---|---|
| **Entire Group** | 84 | $15,025,311 | $18,337,509 | 82% |
| **North Inland** | 19 | $13,755,063 | $16,079,440 | 86% |
| **North Coastal** | 24 | $13,859,978 | $16,653,978 | 83% |
| **South-Los Angeles** | 13 | $11,172,540 | $20,038,013 | 56% |
| **South-San Diego** | 28 | $21,487,416 | $23,373,796 | 92% |

## SFP Grant Allocations Covered More Than Half of Average New School Construction Costs for All School Types and Southern Regions

Macias also examined the extent to which the SFP grant allocations (OPSC SFP grant allocations excluding local district matching share contributions) covered the cost of new school construction for each type of school, as shown in Table 3.9, Average SFP grant allocations covered at least 50 percent of average construction costs for all school types and in the Southern California regions (Los Angeles – 55 percent; San Diego – 65 percent). In the two North regions (North Inland and North Coastal), average SFP grant allocations covered 48 percent and 37 percent, respectively, of average construction costs.

SFP grant allocations covered an average of 52 percent of new school construction costs by themselves, for the 86 schools in our sample. For elementary, middle, high and non-traditional schools, the portion of total new school construction costs covered by SFP grant allocations ranged in coverage from 50 to 54 percent.

**Table 3.9: Percentage of Average Construction Costs covered by Average SFP Grant Allocations, by School Type.**

| School Type | Number of schools | SFP Grant Allocations | Construction Costs | Percent of construction costs covered by SFP Grant Allocations |
|---|---|---|---|---|
| **Entire Group** | 86 | $14,716,938 | $28,202,496 | 52% |
| **Elementary** | 49 | $8,731,424 | $16,709,114 | 52% |
| **Middle** | 16 | $17,124,267 | $31,444,045 | 54% |
| **High** | 12 | $39,195,987 | $76,426,699 | 51% |
| **Non-traditional** | 9 | $10,386,312 | $20,715,883 | 50% |

Average new school construction costs were $13,485,558 more than average SFP grant allocations for the 86 schools in our sample, a statistically significant difference as expected given the size of the gap between costs and SFP grant allocations. Average new school construction costs were $7,977,690 for elementary schools; $14,319,778 more for middle schools; $37,230,712 more for high schools; and $10,329,572 for non-traditional schools. The differences for elementary and high schools are statistically significant.

Because of the small sample sizes, Macias also examined the extent to which median SFP grant allocations covered the cost of new school construction for each type of school in our sample as shown in Table 3.10. When the median Funding Allocations and constructions are examined, Funding Allocations SFP grant allocations covered from 42 to 56 percent for each school type. High school were the only school type for which SFP grant allocations covered less than half (42 percent) of construction costs.

**Table 3.10: Percentage of Median Construction Costs Covered by SFP Grant Allocations, by School Type**

| School Type | Number of schools | SFP Grant Allocations | Construction Costs | Percent of construction costs covered by SFP Grant Allocations |
|---|---|---|---|---|
| **Entire Group** | 86 | $10,192,634 | $18,298,641 | 56% |
| **Elementary** | 49 | $7,983,744 | $15,436,571 | 52% |
| **Middle** | 16 | $13,043,289 | $25,353,502 | 51% |
| **High** | 12 | $30,857,438 | $73,566,736 | 42% |
| **Non-traditional** | 9 | $10,246,504 | $18,321,593 | 56% |

When examined by geographic region, as shown in Table 3.11 below, the average SFP grant allocations covered 37 to 65 percent of the average construction costs in each region.

**Table 3.11: Average SFP Grant Allocation and Average Cost of New School Construction, by Geographic Region**

| School Type | Number of schools | SFP Grant Allocation | Construction Costs | Percent of construction costs covered by SFP Grant Allocations |
|---|---|---|---|---|
| **Entire Group** | 86 | $14,716,938 | $28,202,496 | 52% |
| **North Inland** | 19 | $10,391,640 | $21,713,790 | 48% |
| **North Coastal** | 26 | $9,957,984 | $26,864,802 | 37% |
| **South-Los Angeles** | 13 | $19,216,070 | $34,648,090 | 55% |
| **South-San Diego** | 28 | $19,982,108 | $30,855,093 | 65% |

Median SFP grant allocations covered from 49 percent to 62 percent of the cost of new school construction, as shown in Table 3.12. The median percent covered in the North Coastal region (58 percent) is higher than the average (37 percent) due to median construction costs that were lower than the average construction costs.

**Table 3.12: Median SFP Grant Allocations and Construction Costs, by Geographic Region**

| School Type | Number of schools | SFP Grant Allocations | Construction Costs | Percent of construction costs covered by SFP Grant Allocations |
|---|---|---|---|---|
| **Entire Group** | 86 | $10,192,634 | $18,298,641 | 56% |
| **North Inland** | 19 | $8,086,278 | $16,079,440 | 50% |
| **North Coastal** | 26 | $9,120,804 | $15,623,127 | 58% |
| **South-Los Angeles** | 13 | $9,905,579 | $20,038,013 | 49% |
| **South-San Diego** | 28 | $14,550,255 | $23,373,796 | 62% |

### Per Pupil Funding Allocation Covered 82 Percent of per Pupil Construction Costs, and 75 percent in All School Types Except High Schools, and in All Geographic Regions Except South-Los Angeles

Macias examined the extent per pupil Funding Allocation covered percent of per pupil construction costs. The Funding Allocations per pupil averaged $22,122 per pupil and construction costs per pupil were $25,646, as shown in Table 3.13 below. Average Funding Allocations per pupil covered 82 percent of average construction costs per pupil, although the percent covered drops to 69 percent for high and non-traditional schools. The differences between the average Funding Allocations and construction costs per pupil were statistically significant. This means that the observed difference is so large that it is unlikely that the difference is due to random chance.

**Table 3.13: Average Funding Allocation per Pupil versus Construction Costs per Pupil, by School Type**

| School Type | Number of schools | Average Funding Allocations per pupil | Construction Costs per pupil | Percent of Construction Cost Covered by Funding Allocation |
|---|---|---|---|---|
| **Entire Group** | 64 | $22,122 | $25,646 | 82% |
| **Elementary** | 35 | $21,881 | $24,090 | 91% |
| **Middle** | 10 | $18,752 | $22,070 | 85% |
| **High** | 11 | $23,650 | $34,404 | 69% |
| **Non-traditional** | 8 | $17,287 | $24,879 | 69% |

Macias also examined the extent SFP grant allocations per pupil covered median construction costs per pupil, as shown in Table 3.14.

**Table 3.14: Median Funding Allocation per Pupil versus Construction Costs per Pupil, by School Type**

| School Type | Number of schools | Median Funding Allocations per pupil | Construction Costs per pupil per pupil | Percent of Construction Cost Covered by Funding Allocation |
|---|---|---|---|---|
| **Entire Group** | 64 | $20,684 | $22,503 | 92% |
| **Elementary** | 35 | $19,884 | $21,881 | 91% |
| **Middle** | 10 | $20,495 | $21,642 | 95% |
| **High** | 11 | $23,356 | $34,730 | 67% |
| **Non-traditional** | 8 | $18,011 | $21,553 | 84% |

This section of the analysis is based on 66 schools by school type and 64 by geographic region. In the survey, districts reported the total number of pupils for 70 of the 86 schools that had complete funding and construction cost data reported. Of these 70 schools, districts did not report data on the year of construction start for three of these schools; as a result, these three schools were excluded from the analysis because funding and construction cost data could not be adjusted for inflation. One more school was excluded because the number of pupils reported (100 – an outlier) created a very high per pupil ratio, which distorted the mean and median statistics for the entire sample of 66 schools. Data was incomplete for another two schools in the geographic region analysis. This resulted in a sample size of 64 for this analysis. Year-to-year comparisons and analysis of changes in the ratios from the beginning to the end of the nine-year time period were not made due to the uneven distribution and resulting small sample size of schools per year for certain years within the time period 1999-2007.

As shown in Table 3.15. Average Funding Allocations per pupil covered 57 percent to 96 percent of construction costs per pupil across the regions.

**Table 3.15: Average Funding Allocation per Pupil and Average Cost of New School Construction per Pupil by Geographic Region**

| School Type | Number of schools | Funding Allocation per pupil | Construction costs per pupil | Percent of per pupil construction costs covered by Funding Allocation |
|---|---|---|---|---|
| **Entire Group** | 64 | $21,122 | $25,646 | 82% |
| **North Inland** | 17 | $19,099 | $24,262 | 79% |
| **North Coastal** | 21 | $19,136 | $24,896 | 77% |
| **South-Los Angeles** | 4 | $19,921 | $34,835 | 57% |
| **South-San Diego** | 22 | $24,798 | $25,760 | 96% |

As shown in Table 3.16, median Funding Allocations per pupil appear to cover a larger percentage of construction costs per pupil in the South-San Diego region compared to the North Coastal region, which has a similar number of schools within it from the sample of 64 schools.

**Table 3.16: Median per Pupil Funding Allocations by Geographic Region**

| School Type | Number of schools | Funding Allocations per pupil | Construction Costs per pupil | Percent of construction costs covered by Funding Allocations |
|---|---|---|---|---|
| **Entire Group** | 64 | $20,684 | $21,553 | 96% |
| **North Inland** | 17 | $19,147 | $22,504 | 85% |
| **North Coastal** | 21 | $19,577 | $21,949 | 89% |
| **South-Los Angeles** | 4 | $20,649 | $33,231 | 62% |
| **South-San Diego** | 22 | $22,820 | $24,545 | 93% |

## Per Pupil SFP Grant Allocation Covered 54 Percent of Average per Pupil Construction Costs

The SFP grant allocations averaged $13,717 per pupil and construction costs per pupil averaged $25,512, as shown in Table 3.17 below. The differences between the average SFP grant allocations and construction costs per pupil were statistically significant. This means that the observed difference is so large that it is unlikely that the difference is due to random chance.

When examined by school type, the 37 elementary schools in the sample had average per pupil SFP grant allocations of $12,782 and average new school construction costs per pupil of $23,936 – a difference of $11,154 that was statistically significant. While average SFP grant allocations per pupil were lower than average costs for middle, high, and non-traditional schools, the differences between these measures were not tested for statistical significance due to the small sample sizes.

**Table 3.17: Average SFP Grant Allocations per pupil versus Construction Costs per Pupil, by School Type**

| School Type | Number of schools | Number of pupils per school | SFP Grant Allocations per pupil | Average Construction Cost per pupil | Percent of Construction Cost Covered by Funding Allocation |
|---|---|---|---|---|---|
| **Entire Group** | 66 | 1,050 | $13,717 | $25,512 | 54% |
| **Elementary** | 37 | 712 | $12,782 | $23,936 | 53% |
| **Middle** | 10 | 1,062 | $13,865 | $22,070 | 63% |
| **High** | 11 | 2,252 | $18,266 | $34,404 | 53% |
| **Non-traditional** | 8 | 943 | $11,605 | $24,879 | 47% |

Table 3.18 below shows median SFP grant allocations per pupil versus construction costs per pupil by school type.

**Table 3.18: Median SFP Grant Allocation per Pupil versus Construction Costs per Pupil, by School Type**

| School Type | Number of schools | Number of pupils per school | SFP Grant Allocations per pupil | Median Construction Cost per pupil | Percent of Construction Cost Covered by Funding Allocation |
|---|---|---|---|---|---|
| **Entire Group** | 66 | 768 | $12,274 | $22,503 | 55% |
| **Elementary** | 37 | 737 | $11,863 | $21,881 | 54% |
| **Middle** | 10 | 980 | $12,622 | $21,642 | 58% |
| **High** | 11 | 2,500 | $21,632 | $34,730 | 62% |
| **Non-traditional** | 8 | 1,069 | $11,808 | $21,553 | 55% |

Average SFP Funding Allocations per pupil covered at least 50 percent of average construction costs per pupil in one region (South-San Diego), as shown in Table 3.19. Average SFP grant allocations per pupil covered 44 percent to 70 percent of construction costs per pupil across the regions.

**Table 3.19: Average per Pupil SFP Grant Allocation and Average Construction Costs, by Geographic Region**

| School Type | Number of schools | SFP Grant Allocations per pupil | Construction costs per pupil | Percent of per pupil construction costs covered by SFP Grant Allocations |
|---|---|---|---|---|
| **Entire Group** | 64 | $11,605 | $24,879 | 47% |
| **North Inland** | 17 | $10,677 | $24,262 | 44% |
| **North Coastal** | 21 | $10,873 | $24,577 | 44% |
| **South-Los Angeles** | 4 | $19,182 | $34,835 | 55% |
| **South-San Diego** | 22 | $18,046 | $25,760 | 70% |

As shown in Table 3.20, median SFP grant allocations per pupil appear to cover a larger percentage of construction costs per pupil in the South-San Diego region (76 percent) compared to the North Coastal region (53 percent), which has a similar number of schools within it from the sample of 64 schools.

**Table 3.20: Median per Pupil SFP Grant Allocations, by Geographic Region**

| School Type | Number of schools | SFP Grant Allocations per pupil | Construction Costs per pupil | Percent of construction costs covered by SFP Grant Allocations |
|---|---|---|---|---|
| **Entire Group** | 64 | $11,808 | $21,553 | 55% |
| **North Inland** | 17 | $11,165 | $22,504 | 50% |
| **North Coastal** | 21 | $11,539 | $21,949 | 53% |
| **South-Los Angeles** | 4 | $19,701 | $33,231 | 59% |
| **South-San Diego** | 22 | $18,659 | $24,545 | 76% |

### Average Funding Allocation per Square Foot Covered 82 Percent of Average Construction Costs Per Square Foot; SFP Grant Allocation Coverage was 55 Percent

This section of the analysis is based on 80 schools. In the survey, districts reported the total number of square feet for 80 of the 86 schools that had complete Funding Allocation and construction cost data reported. Year-to-year comparisons and analysis of changes in the differences from the beginning to the end of the nine-year time period were not made due to the uneven distribution within the time period 1999-2007, as shown in Table 3.21 below. Instead, the first five years of the time period (1999-2003) are compared to the four later years (2004-2007).

**Table 3.21: Distribution of Schools in Sample by Year of Construction Start**

| Year of construction start | Number of schools | Percent of sample |
|---|---|---|
| **1999** | 4 | 5% |
| **2000** | 6 | 8% |
| **2001** | 2 | 3% |
| **2002** | 8 | 10% |
| **2003** | 13 | 16% |
| **2004** | 20 | 25% |
| **2005** | 16 | 20% |
| **2006** | 10 | 13% |
| **2007** | 1 | 1% |
| **Total** | 80 | 100% |

As shown in Table 3.22, the average Funding Allocation was $288 per square foot and the average construction cost per square foot was $352. The differences between these averages and the average new school construction costs per square foot were statistically significant. This means that the differences are so large that it is unlikely that the observed differences are due to random chance.

There was no statistically significant change in the size of the gap (or difference) between Funding Allocations and construction costs per square foot, from 1999-2003 to 2004-2007.

**Table 3.22: Average per Square Foot Funding Allocations and Construction Costs**

| School Type | Number of schools | Number of Square Feet per School | Funding Allocations per square foot | Construction Costs per square foot | Percent Construction Costs Covered by Funding Allocations |
|---|---|---|---|---|---|
| **Entire Group** | 80 | 79,728 | $288 | $352 | 82% |
| **Elementary** | 45 | 52,526 | $287 | $330 | 87% |
| **Middle** | 15 | 80,004 | $308 | $392 | 79% |
| **High** | 11 | 207,900 | $249 | $367 | 68% |
| **Non-Traditional** | 9 | 55,599 | $314 | $377 | 83% |

As shown in Table 3.23, SFP grant allocations were $194 per square foot. The differences between these averages and the average new school construction costs per square foot were statistically significant. Also, there was a statistically significant change in the gap (or difference) between the average SFP grant allocations per square foot and average construction costs from 1999-2003 to 2004-2007. During the 1999-2003 period, SFP grant allocations were, on average, $100 per square foot lower than average construction costs per square foot. During the 2004-2007 period, SFP grant allocations were, on average, $199 per square feet lower than average construction costs per square foot.

Funding Allocations and SFP grant allocations per square foot covered 82 percent and 55 percent, respectively, of construction costs per square foot for the 80 schools in this sample.

**Table 3.23: Average per Square Foot SFP Grant Allocations and Construction Costs, by School Type**

| School Type | Number of schools | Number of Square Feet per School | SFP Grant Allocations per square foot | Construction Costs per square foot | Percent Construction Costs Covered by Funding Allocations |
|---|---|---|---|---|---|
| **Entire Group** | 80 | 79,728 | $194 | $352 | 55% |
| **Elementary** | 45 | 52,526 | $177 | $330 | 54% |
| **Middle** | 15 | 80,004 | $211 | $392 | 54% |
| **High** | 11 | 207,900 | $208 | $367 | 57% |
| **Non-Traditional** | 9 | 55,599 | $227 | $377 | 60% |

Median per square foot measures illustrated in Table 3.24 followed a similar pattern to the averages, as discussed above.

**Table 3.24: Median Total Revenue per Square Foot and Construction Costs per Square Foot, by School Type**

| School Type | Number of schools | Number of square feet per school | Funding Allocations per square foot | SFP Grant Allocations per square foot | Construction costs per square foot |
|---|---|---|---|---|---|
| **Entire Group** | 80 | 57,134 | $252 | $165 | $325 |
| **Elementary** | 45 | 50,719 | $250 | $167 | $316 |
| **Middle** | 15 | 81,538 | $297 | $165 | $325 |
| **High** | 11 | 211,446 | $242 | $234 | $360 |
| **Non-Traditional** | 9 | 58,698 | $262 | $161 | $423 |

When examined by geographic region, as shown in Table 3.25, average Funding Allocations covered about 82 percent of the construction costs per square foot in all regions. The percent of average construction costs per square foot covered by average Funding Allocations per square foot covered between 60 and 99 percent.

**Table 3.25: Average per Square Foot Funding Allocations and Construction Costs, by Geographic Region**

| School Type | Number of schools | Number of square feet per school | Funding Allocations per square foot | Construction costs per square foot | Percent Construction Cost covered by Funding Allocations |
|---|---|---|---|---|---|
| **Entire Group** | 80 | 79,728 | $288 | $352 | 82% |
| **North Inland** | 17 | 54,636 | $284 | $356 | 80% |
| **North Coastal** | 22 | 79,111 | $265 | $342 | 77% |
| **South-Los Angeles** | 13 | 87,382 | $235 | $389 | 60% |
| **South-San Diego** | 28 | 90,998 | $335 | $340 | 99% |

As shown in Table 3.26, average SFP grant allocations covered about 55 percent of the construction costs per square foot in all regions. The percent of average construction costs per square foot covered by average SFP grant allocations per square foot covered between 47 and 67 percent of average construction costs.

**Table 3.26: Average per Square Foot SFP Grant Allocations and Construction Costs, by Geographic Region**

| School Type | Number of schools | Number of square feet per school | SFP Grant Allocations per square foot | Construction costs per square foot | Percent Construction Cost covered by SFP Grant Allocations |
|---|---|---|---|---|---|
| **Entire Group** | 80 | 79,728 | $194 | $352 | 55% |
| **North Inland** | 17 | 54,636 | $167 | $356 | 47% |
| **North Coastal** | 22 | 79,111 | $170 | $342 | 50% |
| **South-Los Angeles** | 13 | 87,382 | $190 | $389 | 49% |
| **South-San Diego** | 28 | 90,998 | $229 | $340 | 67% |

As shown in Table 3.27, median per square foot Funding Allocations covered between 63 and 84 percent of construction costs per square foot across the regions.

**Table 3.27: Median per Square Foot Funding Allocations and Construction Costs, by Geographic Region**

| School Type | Number of schools | Number of square feet per school | Funding Allocations per square foot | Construction costs per square foot | Percent Construction Cost covered by Funding Allocations |
|---|---|---|---|---|---|
| **Entire Group** | 80 | 57,134 | $252 | $325 | 78% |
| **North Inland** | 17 | 50,741 | $291 | $353 | 82% |
| **North Coastal** | 22 | 55,075 | $245 | $292 | 84% |
| **South-Los Angeles** | 13 | 51,909 | $229 | $364 | 63% |
| **South-San Diego** | 28 | 67,896 | $293 | $357 | 82% |

As shown in Table 3.28, median per square foot SFP grant allocations covered from 45 percent to 56 percent of construction costs per square foot across the regions.

**Table 3.28: Median per Square Foot SFP Grant Allocations and Construction Costs, by Geographic Region**

| School Type | Number of schools | Number of square feet per school | SFP Grant Allocations per square foot | Construction costs per square foot | Percent Construction Cost covered by SFP Grant Allocations |
|---|---|---|---|---|---|
| **Entire Group** | 80 | 57,134 | $165 | $325 | 51% |
| **North Inland** | 17 | 50,741 | $159 | $353 | 45% |
| **North Coastal** | 22 | 55,075 | $146 | $292 | 50% |
| **South-Los Angeles** | 13 | 51,909 | $191 | $364 | 52% |
| **South-San Diego** | 28 | 67,896 | $200 | $357 | 56% |

## No Schools in this Sample Meet CDE Definition of a "Complete" School

Macias also examined the extent to which the 86 schools in this sample met the CDE definition of a complete school. For purposes of this analysis, a "complete" new school was constructed if it contained all the facilities identified in the CDE's definition of a complete school. While the CDE does not consider it necessary for a school to contain all these facilities to be considered "complete" and fully functional, and districts may chose to build some facilities and not others as meets their individual needs, for purposes of this analysis it was necessary to use a pre-defined set of facilities for a complete school. Macias also examined the extent to which the schools in this sample partially constructed a new school with "complete" facilities by identifying schools that included all facilities of a similar type (e.g. administrative facilities, physical education facilities, a media/center library, multipurpose room) as identified in the CDE definition.

To analyze whether a "complete" school was built for the nine schools in our sample with non-traditional grade level combinations, Macias recoded these schools into one of the three traditional school type categories (elementary, middle, and high school) based on the highest grade level served by the school, because the CDE defines the facility requirements for a "complete" school according to these traditional categories. One self-identified non-traditional school that served grades K-3 was recoded as an elementary school; one school that served grades 7-12 was recoded as a high school; and the other seven schools served the grade levels K-8 and were coded as middle schools. The sample of 86 schools contains 50 elementary, 23 middle, and 13 high schools. It is important to note that for the purposes of analyzing the data, Macias made the assertion that it was the intent of the school district to build a "complete" school when that may not have been the case.

None of the 86 schools in this sample contained all the facilities identified in the CDE description of a "complete" school. As a result, Macias did not compare the Funding Allocation, SFP Grant Allocation, or Total Revenues and construction costs for "complete" and "other" schools as

originally planned. Instead, Macias examined the extent to which the schools in this sample included the facilities identified in the CDE definition of a complete school.

As shown in Table 3.29, about two-thirds (63 percent) of the schools built "complete" teaching stations, defined as building all types of teaching stations (standard grade level, special education, and specialized) and allocated at least the minimum amount of square feet for each standard teaching station. Almost all (33 of 36) of the middle and high schools built included a media center or library. Few schools (seven of 86) built all of the administrative facilities identified by the CDE. And while half of all new elementary schools (26 of 50) built all of the identified physical education facilities, very few middle and high schools built all of the identified physical education facilities. Although a theater or auditorium was not identified as a facility as part of a complete school, 12 schools built one (one elementary, one middle, and 10 high schools), including almost all high schools. Four high schools built a stadium and three high schools built a pool, also facilities that the CDE did not identify as part of a complete school.

**Table 3.29: Facilities Constructed As Part of the New Schools**

| Facility Type Category(a) | Number of Schools Containing All Identified Facilities within Category | | | |
|---|---|---|---|---|
| | Entire | Elementary | Middle | High |
| **Number of schools in Sample** | **86** | **50** | **23** | **13** |
| "Complete" school (all facilities) | 0 | 0 | 0 | 0 |
| Teaching Stations | 54 | 31 | 17 | 6 |
| Special Education Areas | 10 | 3 | 5 | 2 |
| Administrative Facilities | 7 | 3 | 2 | 2 |
| Media Center or Library(b) | 33 | --- | 22 | 11 |
| Multipurpose Room/area | 28 | 19 | 8 | 1 |
| Physical Education | 33 | 26 | 4 | 3 |
| Additional Facilities (high school only) | 7 | --- | --- | 7 |

(a) See the list of facilities identified under each category on pages 15 – 20.
(b) Identified as a complete school facility for middle and high schools only.

## Geographic Location, Frame Type, and Multi-Prime Construction Delivery Method Had Conclusive Effects on the Ability to Build a New School within State Funding Allocations

Macias also examined the extent to which various factors in the design of a new school facility or the management of the construction process affected the ability of school districts to build the 86 new schools in this sample within the amount of the Funding Allocations reported on the survey.

This sample of 86 schools includes 50 elementary, 23 middle, and 13 high schools. Macias coded the schools identified as having a non-traditional combination of grade levels into the

traditional school type categories (elementary, middle, and high school) to increase the sample size for analysis.

The dependent variable used in this analysis is the ratio of the Funding Allocations (SFP Grant Allocation and expected local district contribution) to the cost of construction for the new school, as reported by the school district. If the school was built within its reported Funding Allocations, then the value of the ratio was equal to or greater than 1. If the school was not built within its reported Funding Allocations, then the value of the ratio was less than 1. The average ratio of reported Funding Allocations to construction costs was 0.86. The average ratio of SFP Grant Allocation to construction costs was 0.57.

Macias conducted a multiple regression analysis to determine which, if any, of the following factors had a significant influence on the ratio of Funding Allocations to construction costs. The data for the factors were gathered as part of the same survey questionnaire used to gather data on the sources of revenues and costs to construct each new school.

The regression model considers the individual effects of each factor, holding constant all other factors included in the model. The 21 factors examined in the model were:

- Square feet per student
- Geographic region (Northern California versus Southern California)
- Construction of a multi-story building
- Re-use of architectural plans
- Use of “relocatable” teaching stations
- Type of building material used (frame type)
    - Wood
    - Steel or Metal
    - Concrete or Concrete Block
    - Pre-fabricated material
    - Other
- Construction delivery method used
    - Design-Bid-Build
    - Design-Build
    - Lease lease-back
    - General contracting
    - Multi-prime (District served as general contractor)
    - Contract Management or Contract Management At-Risk
    - Other
- Whether or not specific additional facilities were built that are considered beyond the essential facilities of a “complete” school (theater/auditorium, pool, stadium, covered circulation)
- Type of school
    - Elementary (reference case)
    - Middle
    - High school

Of the 86 schools in this sample, complete data on all the factors listed above was available for 62 of the schools. The multiple regression analysis showed that all of these factors combined explained 39 percent (R Square = 0.387) of the variation in the ratio of Funding Allocations to costs. The analysis found that six of the 21 factors influenced the ratio of Funding Allocations to construction costs. We could not determine whether or not the 15 other factors had an influence on the ratio, either because the factor does not have a significant effect on the ratio or because the size of the sample was too small.

The analysis found that geographic region (Northern versus Southern California), a multi-prime construction delivery method, and four different frame types (Wood, Steel, concrete, and other frame type) influenced the ability of a district to build a school within the Funding Allocations. The manner in which each of these six factors influenced the ability of a district to build a new school within the Funding Allocations (defined as the ratio of Funding Allocations to construction costs for this analysis) is shown in Table 3.30 below. If the coefficient is positive, the presence of the factor increased the ability of the district to build the school within the Funding Allocations (by increasing the ratio of Funding Allocations to construction costs); if the coefficient is negative, the factor reduced the ability of the district to build the school within the Funding Allocations (by decreasing the ratio of Funding Allocations to construction costs). The value of the co-efficient is the amount that the ratio would change if the factor is applied to the construction of an individual school.

**Table 3.30: Factors Influencing a District's Ability to Build a New School within Funding Allocations**

| Factor | Coefficient | t | Significance level-a |
|---|---|---|---|
| **Geographic Location (School is located in Northern California)** | -0.414 | -2.768 | 0.008 |
| **Multi-prime (District served as the general contractor) used as a primary construction delivery method** | -0.404 | -2.240 | 0.031 |
| **Wood used as a primary frame type** | 0.456 | 2.603 | 0.013 |
| **Steel/Metal Frame used as a primary frame type** | 0.454 | 2.290 | 0.027 |
| **Concrete or concrete block used as a primary frame type** | -0.524 | -2.171 | 0.036 |
| **Other material (identified by district) as a primary frame type** | 0.859 | 2.591 | 0.013 |

Note: A significance level that is lower than 0.05 indicates that the effect of this factor is statistically significant at the 95% confidence level.

For the new schools constructed in Northern California, these schools had a ratio of Funding Allocations to construction costs that was 0.41 lower than that of identical schools built in Southern California. This means that districts in Southern California were better able to build the schools within the Funding Allocation (had a higher ratio of Funding Allocation to construction costs) than those in Northern California, holding all other 19 factors constant.

Using multi-prime (the district served as the general contractor) as one of the primary construction delivery methods reduced the ability of the district to build the school within the Funding Allocations, compared to cases in which multi-prime was not used. Districts that used multi-prime as a primary construction delivery method had a ratio of Funding Allocations to construction costs that was 0.40 lower than that of the schools that did not use it. Of the 62 schools, districts reported using multi-prime to build nine schools.

Districts were asked in the survey to identify all the primary frame types used to construct the new school. The use of wood, steel or metal frame, and "other" identified primary frame types increased the ability of a district to build a school within the Funding Allocations, and the use of concrete or concrete block reduced the ability of a district to build a school within the Funding Allocations. For schools using steel or metal frame as one of the primary frame types in the construction of the new school, the ratio of Funding Allocations to construction costs that was 0.45 higher than that of a comparable school that did not use steel or metal frame as a primary frame type. This means that the use of steel or metal frame helped to keep costs lower relative to Funding Allocations, holding all 19 other factors constant. Similarly, the use of wood increased the ratio of Funding Allocations to construction costs by 0.46 compared to those schools where wood was not used, and the use of "other" identified primary frame types increased the ratio by 0.86 (compared to not using "other"). The use of concrete or concrete block as a primary frame type reduced the ratio by 0.52, compared to schools that did use concrete or concrete block as a primary frame type. Of the 62 schools, 35 schools were built using steel or metal frame as one of the primary frame types, 36 were built using wood, six were built using concrete or concrete block, and two used "other" identified methods. Given that only two schools in the sample of 62 schools were built using "other" primary frame types, it is possible that the apparent influential effect could be the result of unmeasured factors of these two schools. These schools described their primary frame types as "Wood/Stucco".

### Total Revenue for New School Construction was Higher than Construction Costs

The purpose of this section is to provide an analysis of school district reported funding sources (Total Revenue) used for new school construction costs (construction costs) from 1999-2007. Total Revenue includes all funding used for the construction of the new school as reported on the survey by the school district. This includes SFP grant allocations provided by OPSC, other state and federal grants, and all sources of local funding. Sources of local funding include donations, developer fees, developer built, local bonds, Mello Roos Community Facility District funds, school facility improvement district funds, parcel taxes, redevelopment funds, and other sources.[25]

During the eight-year period, average Total Revenue (e.g. SFP allocations, the local district's matching share contributions, other state and federal grants, and other local funding sources) were $34,475,366 and average new school construction costs were $28,202,496. The $6,272,871 difference between the average funding allocations and construction costs is statistically significant. This means that the observed difference between Total Revenue and construction costs is so large that it is unlikely that the difference is due to random chance.

[25] Macias did not include revenues for school districts that reported revenues from other local sources that were used for the local district's matching share contribution.

However, the gap (or difference) between average Total Revenue and average new school construction costs did not change over the nine-year period. There was not a statistically significant change in the average difference between Total Revenue and construction costs from the period of 1999-2003 to the period of 2004-2007.

Year-to-year changes in the difference between average Total Revenue and construction costs were also not analyzed because of the small number of schools represented in the first and last year of the time period, as shown in Table 3.31 below. For the same reason (insufficient sample size), the change in the gap (or difference) between average Total Revenue and construction costs was not analyzed by school type or by geographic region.[26]

### Average Total Revenue Covered Average New School Construction Costs for Seven of Nine Years

Macias examined the extent to which Total Revenue covered the cost of new school construction for each year from 1999 to 2007 as shown in Table 3.31 and Chart 3.32.

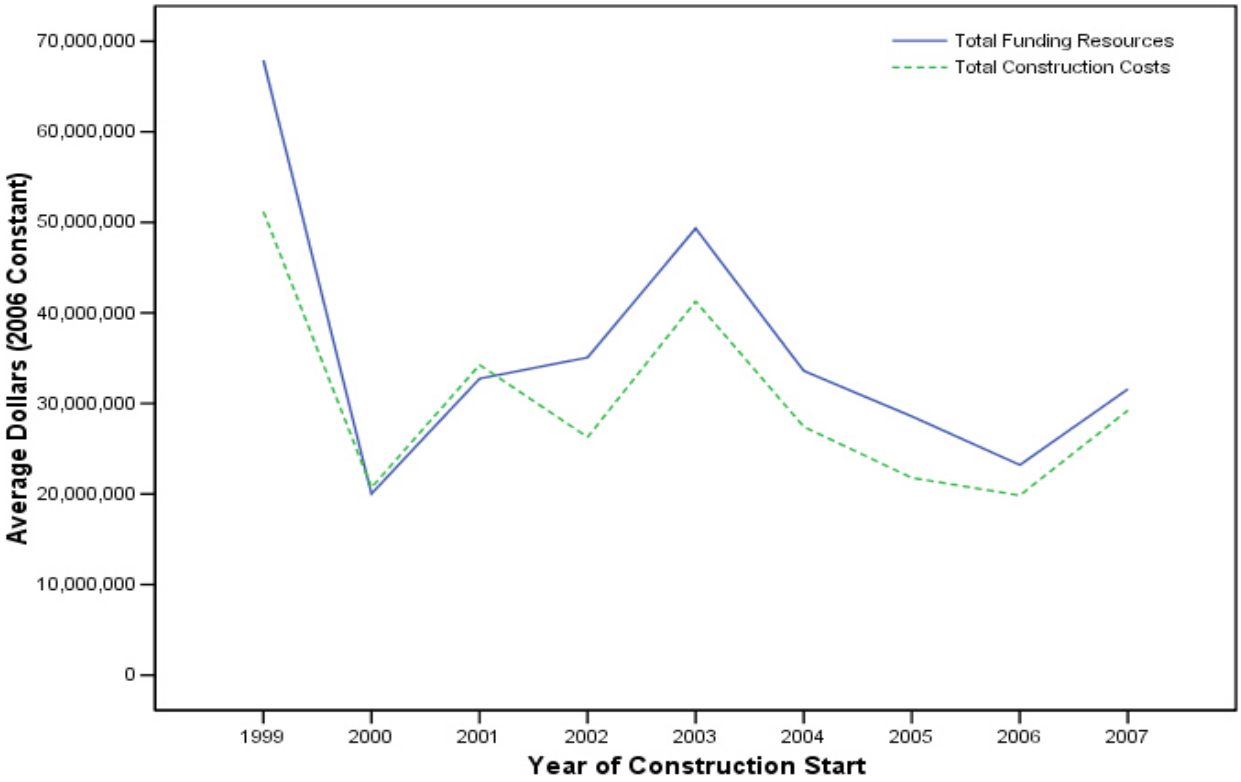
Average Total Revenue covered from 96 to 133 percent of average construction costs. For seven of the nine years in the time period, average Total Revenue covered the cost of new school construction. For the years 2000 and 2001, average Total Revenue fell short by about $700,000 and $1.5 million, respectively.

**Table 3.31: Average Total Revenue and Construction Costs, By Year of Start of Construction[27]**

| Year of Start | Number of Schools | Total Revenue | Construction Costs | Percent of Construction Costs Covered by Total Revenue |
|---|---|---|---|---|
| **1999** | 4 | $67,914,802 | $51,199,359 | 133% |
| **2000** | 6 | $20,026,156 | $20,712,788 | 97% |
| **2001** | 2 | $32,739,426 | $34,257,727 | 96% |
| **2002** | 9 | $35,076,813 | $26,277,602 | 133% |
| **2003** | 13 | $49,336,228 | $41,286,069 | 119% |
| **2004** | 24 | $33,597,798 | $27,433,886 | 122% |
| **2005** | 16 | $28,579,515 | $21,790,673 | 131% |
| **2006** | 11 | $23,211,031 | $19,845,783 | 117% |
| **2007** | 1 | $31,583,509 | $29,240,075 | 108% |
| **Total** | 86 | $34,475,366 | $28,202,496 | 122% |

[26] The first section of the report examined the change in the gap (or difference) between average funding allocations and construction costs from the period of 1999-2002 to the period of 2003-2007.There was an insufficient number of schools in this sample to replicate the same analysis because the schools were not evenly distributed across the eight-year period.
[27] The start of construction was based on the year reported for when the notice to proceed was given for construction to begin.

**Chart 3.32: Average Total Revenue and Construction Costs, By Year of Start of Construction[28]**




To ensure that no outlying cases had an undue impact on the mean values used in the analysis above, Macias conducted a parallel analysis using median values. The results are similar to the analysis using mean values. Median Total Revenue covered from 96 to 157 percent of average construction costs, as shown in Table 3.33

[28] The start of construction was based on the year reported for when the notice to proceed was given for construction to begin.

**Table 3.33. Median Total Revenue and Construction Costs, by Year of Start of Construction**

| Year of Start | Number of Schools | Total Revenue | Construction Costs | Percent of Construction Costs Covered by Total Revenue |
|---|---|---|---|---|
| **1999** | 4 | $34,782,711 | $22,147,283 | 157% |
| **2000** | 6 | $19,045,291 | $15,350,109 | 124% |
| **2001** | 2 | $32,739,426 | $34,257,727 | 96% |
| **2002** | 9 | $18,771,051 | $15,682,017 | 120% |
| **2003** | 13 | $30,206,818 | $24,971,569 | 121% |
| **2004** | 24 | $23,713,799 | $20,213,691 | 117% |
| **2005** | 16 | $20,154,151 | $14,974,541 | 135% |
| **2006** | 11 | $22,289,161 | $18,217,462 | 122% |
| **2007** | 1 | $31,583,509 | $29,240,075 | 108% |
| **Total** | 86 | $22,354,143 | $18,298,641 | 122% |

### Average Total Revenue was Higher than Average New School Construction Costs for all school types and regions

As shown in Table 3.34, Macias examined the extent to which Total Revenue covered the cost of new school construction for each type of school and region in our sample. Total Revenues were higher than construction costs for each school type and region. However, the analysis found that this difference was statistically significant only for elementary and middle schools. The differences between Total Revenues and construction costs for each region were not tested for statistical significance due to small sample sizes.

For all 49 elementary schools in the sample, Total Revenue covered 131 percent of new school construction costs. Total Revenue averaged $21,843,463 and new school construction costs averaged $ 16,709,114.

For all 16 middle schools in the sample, Total Revenue covered 129 percent of new school construction costs. Total Revenue averaged $40,453,866 and new school construction costs averaged $ 31,444,045.

For all 12 high schools in the sample, Total Revenue covered 110 percent of new school construction costs. Total Revenue averaged $84,370,754 and new school construction costs averaged $76,426,699.

For all 9 non-traditional schools in the sample, Total Revenue covered 126 percent of new school construction costs. Total Revenue averaged $26,093,435 and new school construction costs averaged $ 20,715,883.

**Table 3.34: Total Revenue and Construction Costs by School Type**

| School Type | Number of schools | Total Revenue | Construction Costs | Percent of construction costs covered by Total Revenue |
|---|---|---|---|---|
| **Entire Group** | 86 | $34,475,366 | $28,202,496 | 122% |
| **Elementary** | 49 | $21,843,463 | $16,709,114 | 131% |
| **Middle** | 16 | $40,453,866 | $31,444,045 | 129% |
| **High** | 12 | $84,370,754 | $76,426,699 | 110% |
| **Non-Traditional** | 9 | $26,093,435 | $20,715,883 | 126% |

Because of the small sample sizes, Macias also examined the extent to which median Total Revenue covered the cost of new school construction for each type of school in our sample as shown in Table 3.35. When the median Total Revenue and constructions are examined, the Total Revenue for each school type is higher than all of the median construction costs. The percentage of costs covered by Total Revenues is lower than when the averages are examined, except for the non-traditional combination of schools (primarily schools with a combination of grades K-8), where it is 155 percent.

**Table 3.35: Median Total Revenue and Construction Costs by School Type.**

| School Type | Number of schools | Total Revenue | Construction Costs | Percent of Construction Costs Covered by Total Revenue |
|---|---|---|---|---|
| **Entire Group** | 86 | $22,354,143 | $18,298,641 | 122% |
| **Elementary** | 49 | $17,833,980 | $15,436,571 | 116% |
| **Middle** | 16 | $29,724,496 | $25,353,502 | 117% |
| **High** | 12 | $74,582,118 | $73,566,736 | 101% |
| **Non-Traditional** | 9 | $28,394,901 | $18,321,593 | 155% |

When examined by geographic region, as shown in Table 3.36, average Total Revenue covered average construction costs in each region. The percent of construction costs covered by Total Revenue ranged from 108 to 137 percent in each region. In two regions of comparable sample size, Total Revenue covered a slightly higher percentage of construction costs in the South-San Diego region compared to the North Coastal region. North Inland had the highest percentages.

**Table 3.36: Average Total Revenue and Construction Costs by Geographic Region**

| School Type | Number of schools | Total Revenue | Construction Costs | Percent of Construction Costs Covered by Total Revenue |
|---|---|---|---|---|
| **Entire Group** | 86 | $26,093,435 | $20,715,883 | 126% |
| **North Inland** | 19 | $29,666,483 | $21,713,790 | 137% |
| **North Coastal** | 26 | $30,116,503 | $26,864,802 | 112% |
| **South-Los Angeles** | 13 | $37,284,143 | $34,648,090 | 108% |
| **South-San Diego** | 28 | $40,481,978 | $30,855,093 | 131% |

Table 3.37 shows the median Total Revenue covering average construction costs in each region.

**Table 3.37: Median Total Revenue and Construction Costs by Geographic Region**

| School Type | Number of schools | Total Revenue | Construction Costs | Percent of Construction Costs Covered by Total Revenue |
|---|---|---|---|---|
| **Entire Group** | 86 | $22,354,143 | $18,298,641 | 122% |
| **North Inland** | 19 | $22,806,200 | $16,079,440 | 142% |
| **North Coastal** | 26 | $18,158,657 | $15,623,127 | 116% |
| **South-Los Angeles** | 13 | $21,395,507 | $20,038,013 | 107% |
| **South-San Diego** | 28 | $30,666,939 | $23,373,796 | 131% |

### Total Revenue per Pupil Were Higher than Construction Costs per Pupil During the 1999-2007 Period

This section of the analysis is based on 66 schools. In the survey, districts reported the total number of pupils for 70 of the 86 schools that had complete Funding Revenues and construction cost data reported. Of these 70 schools, districts did not report data on the year of construction start for three of these schools; as a result, these three schools were excluded from the analysis because Total Revenue and construction costs could not be adjusted for inflation. One more school was excluded because the number of pupils reported (100 – an outlier) created a very high per pupil ratio, which distorted the mean and median statistics for the entire sample of 66 schools. Year-to-year comparisons and analysis of changes in the ratios from the beginning to the end of the nine-year time period were not made due to the uneven distribution and resulting

small sample size of schools per year for certain years within the time period 1999-2007, as shown in Table 3.38 below.

**Table 3.38: Distribution of Schools in Sample by Year of Construction Start**

| Year of Construction Start | Number of schools | Percent of Sample |
|---|---|---|
| **1999** | 3 | 4.5 |
| **2000** | 5 | 7.6 |
| **2001** | 2 | 3.0 |
| **2002** | 5 | 7.6 |
| **2003** | 10 | 15.2 |
| **2004** | 16 | 24.2 |
| **2005** | 13 | 19.7 |
| **2006** | 11 | 16.7 |
| **2007** | 1 | 1.5 |
| **Total** | 66 | 100 |

During the nine-year period, average Total Revenue per pupil was $31,399 and average new school construction costs per pupil were $25,512 during 1999-2007, as shown in Table 3.39 below. The $5,887 difference between the average Total Revenue and construction costs is statistically significant. The findings are similar when examined by school type. For all 37 elementary schools in the sample, Total Revenue per pupil averaged $31,232 and new school construction costs per pupil averaged $23,936 – a difference of $7,296 that was statistically significant.

**Table 3.39: Average Total Revenue per pupil and Construction Costs per pupil, by School Type**

| School Type | Number of schools | Number of pupils per school | Total Revenue per pupil | Average Construction Cost per pupil |
|---|---|---|---|---|
| **Entire Group** | 66 | 1,050 | $31,399 | $25,512 |
| **Elementary** | 37 | 712 | $31,232 | $23,936 |
| **Middle** | 10 | 1,062 | $25,719 | $22,070 |
| **High** | 11 | 2,252 | $38,209 | $34,404 |
| **Non-traditional** | 8 | 943 | $29,912 | $24,879 |

Table 3.40 below shows the median Total Revenue per pupil versus construction costs per pupil by school type.

**Table 3.40: Median Total Revenue per pupil and Construction Costs per pupil, by School Type**

| School Type | Number of schools | Number of pupils per school | Total Revenue per pupil | Median Construction Cost per pupil |
|---|---|---|---|---|
| **Entire Group** | 66 | 768 | $27,609 | $22,503 |
| **Elementary** | 37 | 737 | $26,883 | $21,881 |
| **Middle** | 10 | 980 | $24,249 | $21,642 |
| **High** | 11 | 2,500 | $37,303 | $34,730 |
| **Non-traditional** | 8 | 1,069 | $30,897 | $21,553 |

When examined by geographic region, as shown in Tables 3.41, average Total Revenue per pupil covered construction costs per pupil in all of the regions. Average Total Revenue per pupil covered 103 to 137 percent of the cost of construction.

**Table 3.41: Average per Pupil Total Revenue and Construction Costs, by Geographic Region**

| School Type | Number of schools per region | Total Revenue per pupil | Construction costs per pupil | Percent of per pupil construction costs covered by Total Revenue |
|---|---|---|---|---|
| **Entire Group** | 66 | $29,912 | $24,879 | 120% |
| **North Inland** | 17 | $28,863 | $24,262 | 119% |
| **North Coastal** | 23 | $28,768 | $24,577 | 117% |
| **South-Los Angeles** | 4 | $35,846 | $34,835 | 103% |
| **South-San Diego** | 22 | $35,302 | $25,760 | 137% |

When the medians are examined, Total Revenue covers the cost of new school construction, ranging from 100 percent to 143 percent, as shown in Table 3.42 below.

**Table 3.42: Median Per Pupil Total Revenue by Geographic Region**

| School Type | Number of schools | Total Revenue per pupil | Construction Costs per pupil | Percent of construction costs covered by Total Revenue |
|---|---|---|---|---|
| **Entire Group** | 66 | $30,897 | $21,553 | 143% |
| **North Inland** | 17 | $30,108 | $22,504 | 134% |
| **North Coastal** | 23 | $24,348 | $21,949 | 111% |
| **South-Los Angeles** | 4 | $33,240 | $33,231 | 100% |
| **South-San Diego** | 22 | $32,354 | $24,545 | 132% |

### Total Revenue per Square Foot Was Higher than Construction Costs for New Schools per Square Foot

This section of the analysis is based on 80 schools. As shown in Table 3.43, average Total Revenue was $436 per square foot and average new school construction costs were $352 per square foot. The $84 per square foot difference between the average Total Revenue and construction costs is statistically significant. This means that the differences are so large that it is unlikely that the observed differences are due to random chance. There was no statistically significant change in the size of the gap (or difference) between Total Revenue and construction costs per square foot for new schools, from 1999-2003 to 2004-2007.

### Total Revenue per Square Foot Was Higher than Construction Costs per Square Foot for Each School Type

For the 45 elementary schools in the sample, Total Revenue was $421 per square foot and new school construction costs were $330 per square foot – a $91 per square foot difference that is statistically significant.

For the 15 middle schools in our sample, Total Revenue was $479 per square foot and new school construction costs were $392 per square foot – a difference of $87 per square foot.

For the 11 high schools in our sample, Total Revenue was $405 per square foot and new school construction costs were $367 per square foot — a difference of $38 per square foot.

For the 9 non-traditional schools in our sample, Total Revenue was $483 per square foot and new school construction costs were $377 per square foot – a difference of $106 per square foot.

**Table 3.43: Average per Square Foot Total Revenue and Construction Costs, by School Type**

| School Type | Number of schools | Number of Square Feet per School | Total Revenue per square foot | Construction Costs per square foot | Percent of Construction Costs Covered by Total Revenues |
|---|---|---|---|---|---|
| **Entire Group** | 80 | 79,728 | $436 | $352 | 124% |
| **Elementary** | 45 | 52,526 | $421 | $330 | 128% |
| **Middle** | 15 | 80,004 | $479 | $392 | 122% |
| **High** | 11 | 207,900 | $405 | $367 | 110% |
| **Non-Traditional** | 9 | 55,599 | $483 | $377 | 128% |

As shown in Table 3.44, median per square foot measures followed a similar pattern to the averages, as discussed above.

**Table 3.44: Median Total Revenue per Square Foot and Construction Costs per Square Foot, by School Type**

| School Type | Number of schools | Number of square feet per school | Total Revenue per square foot | Construction costs per square foot | Percent Construction Costs Covered By Total Revenues |
|---|---|---|---|---|---|
| **Entire Group** | 80 | 57,134 | $370 | $325 | 114% |
| **Elementary** | 45 | 50,719 | $364 | $315 | 116% |
| **Middle** | 15 | 81,538 | $356 | $325 | 110% |
| **High** | 11 | 211,446 | $412 | $360 | 114% |
| **Non-Traditional** | 9 | 58,698 | $479 | $423 | 113% |

When examined by geographic region, as shown in Table 3.45, average Total Revenue per square foot was higher than constructions costs per square foot for all regions. The percent of average construction costs per square foot covered by average Total Revenue per square foot ranged from 115 to 139 percent of average construction costs.

**Table 3.45: Average per Square Foot Total Revenue and Construction Costs, by Geographic Region**

| School Type | Number of schools | Number of square feet per school | Total Revenue per square foot | Construction costs per square foot | Percent construction cost covered by Total Revenue |
|---|---|---|---|---|---|
| **Entire Group** | 80 | 79,728 | $436 | $352 | 124% |
| **North Inland** | 17 | 54,636 | $435 | $356 | 122% |
| **North Coastal** | 22 | 79,111 | $393 | $342 | 115% |
| **South-Los Angeles** | 13 | 87,382 | $437 | $389 | 112% |
| **South-San Diego** | 28 | 90,998 | $471 | $340 | 139% |

As shown in Table 3.46, median Total Revenue per square foot was higher than constructions costs per square foot for all regions.

**Table 3.46: Median per Square Foot Total Revenue and Construction Costs, by Geographic Region**

| School Type | Number of schools | Number of square feet per school | Total Revenue per square foot | Construction costs per square foot | Percent construction cost covered by Total Revenue |
|---|---|---|---|---|---|
| **Entire Group** | 80 | 57,134 | $370 | $325 | 114% |
| **North Inland** | 17 | 50,741 | $451 | $353 | 128% |
| **North Coastal** | 22 | 55,075 | $326 | $292 | 112% |
| **South-Los Angeles** | 13 | 51,909 | $370 | $364 | 102% |
| **South-San Diego** | 28 | 67,896 | $400 | $357 | 112% |

### All Factors Examined Except for the Use of Steel and Metal Frame Types and Design-Build Methods Have No Conclusive Effect on the Ability to Build a New School within Reported Total Revenues

Macias also examined the extent to which various factors in the design of a new school facility or the management of the construction process had an effect on the ability of school districts to build the 86 new schools in this sample within the amount of the Total Revenue reported on the survey that was used for the school's construction.

This sample of 86 schools includes 50 elementary, 23 middle, and 13 high schools. Macias coded the schools identified as having a non-traditional combination of grade levels into the traditional school type categories (elementary, middle, and high school) to increase the sample size for analysis.

The dependent variable used in this analysis is the ratio of the Total Revenue to the cost of construction for the new school, as reported by the school district. If the school was built within its reported Total Revenue, then the value of the ratio was equal to or greater than 1. If the school was not built within its reported Total Revenue, then the value of the ratio was less than 1. The average ratio of reported Total Revenue to construction costs was 1.24. The average ratio of Funding Allocations to construction costs was 0.86 and the average ratio of SFP Grant Allocation to construction costs was 0.57.

Macias conducted a multiple regression analysis to determine which, if any, of the following factors had a significant influence on the ratio of Total Revenue to construction costs. The data for the factors were gathered as part of the same survey questionnaire used to gather data on the sources of revenues and costs to construct each new school.

The regression model considers the individual effects of each factor, holding constant all other factors included in the model. The 21 factors examined in the model were:

- Square feet per student
- Geographic region (Northern California versus Southern California)
- Construction of a multi-story building
- Re-use of architectural plans
- Use of “relocatable” teaching stations
- Type of building material used (frame type)
    - Wood
    - Steel or Metal
    - Concrete or Concrete Block
    - Pre-fabricated material
    - Other
- Construction delivery method used
    - Design-Bid-Build
    - Design-Build
    - Lease lease-back
    - General contracting
    - Multi-prime (District served as general contractor)
    - Contract Management or Contract Management At-Risk
    - Other
- Whether or not specific additional facilities were built that are considered beyond the essential facilities of a “complete” school (theater/auditorium, pool, stadium, covered circulation)
- Type of school
    - Elementary (reference case)
    - Middle
    - High school

Of the 86 schools in this sample, complete data on all the factors listed above was available for 62 of the schools. The multiple regression analysis showed that all of these factors combined explained 56 percent (R Square = 0.56) of the variation in the ratio of revenues to costs.[29] The analysis found that two of the 21 factors influenced the ratio of revenues to construction costs. We could not determine whether or not the 19 other factors had an influence on the ratio, either because the factor does not have a significant effect on the ratio or because the size of the sample was too small.

The analysis found that schools using steel or metal frame as one of the primary frame types in the construct of the new school had a ratio of revenues to construction costs that was 0.41 higher than that of schools that did not use steel or metal frame. This means that the use of steel or metal frame helped to keep costs lower relative to revenues, holding all 19 other factors constant. Of the 62 schools, 35 schools were built using steel or metal frame as one of the primary frame types. The other influential factor identified was the use of design-build as a construction delivery method. Schools constructed using this as one of the delivery methods had a ratio of revenues to construction costs that was 0.47 higher than that of schools that did not use design-build as one of the construction delivery methods, holding all 19 other factors constant. However, only four schools in the sample of 62 schools were built using this construction delivery method, making it possible that the apparent influential effect could be the result of unmeasured factors of these four schools.

[29] An F statistic of 2.602 shows the estimated coefficients of these factors is jointly significant at the 0.005 level.

# Chapter 4: Case Studies of New School Construction Projects

## Overview

Based on the survey results submitted by the school districts, we selected six case studies to provide information on individual school construction projects. The case studies include two sets of three new school construction projects. One set of schools – one elementary, one middle, and one high school – contained new schools built within the Funding Allocations (e.g. SFP grant allocations and the local district's matching share contributions) received for the construction of the new school. The other set of schools – one elementary, one middle, and one high school – contained new schools that were not built within the Funding Allocations received for the construction of the new school.

This section includes data on the extent to which SFP grant allocations covered total construction costs, as well as whether the District exceeded or built the school within its own defined construction budget. This section provides information on facility features and other characteristics of the schools. It is important to note that the information contained in this section is self-reported by each school district.

Macias cautions that conducting six case studies is not sufficient to identify actual trends and patterns among the group and should not be considered in decision-making on the adequacy of construction allocations. The results cannot be projected to the general population of schools.

It is important to note that for the purposes of analysis of the data, Macias asserted that Funding Allocations reported by the school district was the "expected" budget for the school's construction even though the six school districts reported using other revenue sources.

The case studies for the two elementary schools show contrasting features in size, pupil capacity, square foot per pupil, construction delivery methods, re-use of plans, and use of "relocatable" classrooms. Each has some variation in the use of primary frame types, flooring, roof types, and the extent that it built the components of a "complete" school.

The case studies for the two middle schools show contrasting features in size, pupil capacity, and square foot per pupil, but both were built using existing architectural plans and the same flooring type. Neither school built support facilities for Title 1 academic support, a parent room, or an outdoor dining area, but the schools differed in building facilities for track, soccer, and softball field areas; a gymnasium and locker room and support facilities for a psychologist.

The case studies for the two high schools show that each of them were multi-story and did not utilize "relocatable" facilities. The two high schools also included most of the components of a "complete school" as described by CDE, but neither of them built a pool. The high schools differed in constructing facilities for a student store, support facilities for Title 1 academic support, student record storage, and a security office.

Each of the high schools constructed additional facilities that were not described by CDE as components of "complete" school. One of the high schools constructed a time-out room, changing room, adaptive Physical Education facility, and life skills facility with kitchenette, and the other high school built a theatre/auditorium and a special needs area within its physical education spaces.

Table 4.0 illustrates the variability of the features and characteristics among the six case studies.

**Table 4.0: Summary of Case Study Construction Features and Characteristics for Six New Schools**

| | Elementary School 1 – South Los Angeles (Built within Funding Allocations) | Elementary School 2 – North Inland | Middle School 3 – South Los Angeles (Built within Funding Allocations) | Middle School 4 – South Los Angeles | High School 5 – North Inland (Built within Funding Allocations) | High School 6 – South Los Angeles |
|---|---|---|---|---|---|---|
| **Size (square feet)** | 64,000 | 42,635 | 98,362 | 74,300 | 194,841 | 231,392 |
| **Pupil capacity** | 1,250 | 530 | 1,242 | 735 | 1,800 | 2,500 |
| **Square feet per pupil** | 51 | 80 | 79 | 101 | 108 | 93 |
| **Completion date** | 2005 | 2007 | 2007 | NA | NA | 2006 |
| **Construction delivery method** | Multi-prime | Construction management<br><br>Construction management at risk | Design-bid-build | Design-bid-build<br><br>Multi-prime with District serving as general contractor<br><br>Contract management / Contract management at-risk | Design-bid-build<br><br>General contracting | General contracting |
| **Re-use of plans** | No | Yes | Yes | Yes | Yes | No |
| **Primary frame type** | Wood<br><br>Steel/Metal Frame | Wood | Concrete/ concrete block | Concrete/ concrete block<br><br>Prefabricated material | Wood/steel<br><br>Metal frame | Steel/metal frame<br><br>Concrete/ concrete block |

| | Elementary School 1 – South Los Angeles (Built within Funding Allocations) | Elementary School 2 – North Inland | Middle School 3 – South Los Angeles (Built within Funding Allocations) | Middle School 4 – South Los Angeles | High School 5 – North Inland (Built within Funding Allocations) | High School 6 – South Los Angeles |
|---|---|---|---|---|---|---|
| **Primary flooring type** | Carpet<br>Vinyl / linoleum Tile | Vinyl / linoleum<br>Carpet<br>Wood | Vinyl / linoleum<br>Carpet | Vinyl / linoleum<br>Carpet | Vinyl / linoleum<br>Carpet<br>Tile<br>Wood | Vinyl/linoleum Tile<br>Painted/ finished concrete |
| **Primary roof type** | Metal | Metal<br>PVC | Metal | Bituminous built-up<br>Metal | Metal<br>PVC | Bituminous built-up<br>Metal |
| **Total revenue used for the project (District reported)** | $37,191,898 | $18,601,627 | $25,050,910 | $44,116,584 | $81,298,285 | $87,292,897 |
| **Funding Allocations** | $37,191,898 | $12,401,086 | $19,475,673, | $14,431,148 | $50,195,652 | $46,704,241 |
| **Total construction costs** | $20,869,638 | $19,369,821 | 17,750,661 | $37,645,781 | $46,623,508 | $77,399,128 |

### Case Study 1 – Elementary School That Was Able To Be Built Within the Total Funding Revenue for the Project (Southern California – South Los Angeles Region)

The urban elementary school has 64,000 square feet of interior space and situated on 9 acres. The "Notice to Proceed" authorization was issued in September 2003 and the school was completed by August 2005. The school district was able to build the new school within the available funding provided for the project.

The school district used one type of construction delivery methods: multi-prime with the district serving as the general contractor. The District did not utilize an existing architecture plan for this school, or utilize "relocatable" teaching stations.

The primary frame type of the new elementary school was wood, steel and metal. The primary types of finished flooring products included carpet, vinyl/linoleum and composition tile. The primary materials used for the roof were metal.

The elementary school built many of the components of a "complete" school as defined by CDE and shown in Table 4.1 on the following page. The District reported that it did not build additional support facilities, such as a Speech specialist office, psychologist office, Resource Specialist Program area, and Title 1 academic support areas in addition to teaching stations. Forty-eight teaching stations are included in the school. Thirty-eight are grade 1-6 standard teaching stations; four are for specialized teaching stations for science, art, music, and/or computer/data lab, and six are for kindergarten. The district allocated 1,350 square feet for each kindergarten teaching station and 960 square feet for each standard teaching station.

The elementary school did not build the following facilities: Special education specific classrooms or for Title 1 academic support; or administrative facilities such as a parent room, student record storage, and space for pre-school buildings. The CDE has identified these types of facilities as essential for a "complete" school.

**Table 4.1: Components of a Complete School Built for Elementary School Case Study 1.**

| Components of a "complete" school | District Reported Data |
|---|---|
| **Classroom (48,000 square feet)** | |
| • Standard classrooms supporting both small group and large group instruction | Yes |
| • Kindergarten classrooms | Yes |
| • Specialized classrooms for science, art, and music | Yes |
| • Classrooms and support spaces for special education | No |
| **Physical Education Space** | |
| • Hardcourts with a variety of fixed equipment to accommodate basketball and other activities | Yes |
| • Turf and field areas | Yes |
| • Apparatus area | Yes |
| **Support Facilities** | |
| • Computer Room | Yes |
| • Small group areas | Yes |
| • Resource Specialist Program (RSP) area | No |
| • Speech specialist office | No |
| • Psychologist office | No |
| • Academic support such as Title 1 | No |
| **Common Essential Facilities** | |
| • Media/center library (2,500) square feet) | Yes |
| • Administration | Yes |
| o Principal's office | Yes |
| o Vice Principal's office | No |
| o Office space for itinerant staff | Yes |
| o Health professional office | Yes |
| o Conference areas | Yes |
| o Teacher workroom | Yes |
| o Staff room | Yes |
| o Parent room | No |

| | |
|---|---|
| o Student record storage | No |
| o General storage | Yes |
| • Multipurpose Room (4,000 square feet) | Yes |
| o Dining area | Yes |
| o Food service (preparation or serving) | Yes |
| o Stage (400 square feet) | Yes |
| o Outdoor dining area | Yes |
| o Storage for chairs and tables | Yes |
| **Infrastructure** | |
| • Staff restrooms | Yes |
| • Student restrooms | Yes |
| • Storage rooms | Yes |
| • Custodian room(s) | Yes |
| • Mechanical, data and electrical space | Yes |
| • Staff parking area | Yes |
| • Covered circulation | Yes |
| • Space for preschool buildings | No |

The school district reported total construction costs of $20,869,638. Funding Allocations (i.e. SFP grant allocations and the local district's matching share contribution) totaled $37,191,898, which covered 178 percent of the cost of construction. SFP grant allocations of $20,094,082 covered 96 percent of the costs.

The school district attributes its ability to build the school within budget to one factor: use of an in-house Architect and Construction Manager to oversee the project.

### Case Study 2 – Elementary School That Was Not Able To Be Built Within the Total Funding Revenue for the Project (Northern California – North Inland Region)

The urban elementary school has 42,635 square feet of interior space situated on 8.97 acres. The "Notice to Proceed" authorization was issued in June 2006 and the school was completed by December 2007. The school district was not able to build the new school within the available funding provided for the project.

The school district used one type of construction delivery method: construction management/construction management at risk. The district made substantial use of one existing architectural plan. The school does not have "relocatable" teaching units.

The primary frame type of the new elementary school is wood. The primary types of finished flooring products included vinyl/linoleum, carpet and wood. The primary materials used for the roof was metal and PVC.

The elementary school built most of the components of a "complete" school as defined by CDE and shown in Table 4.2 on the following page. Twenty-five teaching stations within the school, sixteen of which are standard, six are for special education, two are for kindergarten, and one is a specialized teaching station. However, the school district reported that the teaching stations for kindergarten are less than the essential component for classroom size of 1,350 square feet and less than 960 square feet for each standard teaching station.

The elementary school did not build support facilities for computers, or a Vice Principal's office, all of which are described by CDE as essential components for a "complete" school.

The school district reported that it built occupational therapy space and provided playground structures, which are not included as essential components for a "complete" school.

**Table 4.2: Components of a "Complete" School built for Elementary School Case Study 2.**

| Components of a "complete" school | District Reported Data |
|---|---|
| **Classroom (28,849 square feet)** | |
| • Standard classrooms supporting both small group and large group instruction | Yes |
| • Kindergarten classrooms | Yes |
| • Specialized classrooms for science, art, and music | Yes |
| • Classrooms and support spaces for special education | Yes |
| **Physical Education Space** | |
| • Hardcourts with a variety of fixed equipment to accommodate basketball and other activities | Yes |
| • Turf and field areas | Yes |
| • Apparatus area | Yes |
| **Support Facilities** | |
| • Computer Room | No |
| • Small group areas | Yes |
| • Resource Specialist Program (RSP) area | Yes |
| • Speech specialist office | Yes |
| • Psychologist office | Yes |
| • Academic support such as Title 1 | No |
| **Common Essential Facilities** | |
| • Media/center library (1,579 square feet) | Yes |
| • Administration | Yes |
| o Principal's office | Yes |
| o Vice Principal's office | No |
| o Office space for itinerant staff | Yes |
| o Health professional office | Yes |
| o Conference areas | Yes |
| o Teacher workroom | Yes |
| o Staff room | Yes |
| o Parent room | Yes |
| o Student record storage | Yes |
| o General storage | Yes |
| • Multipurpose Room (4,950 square feet) | Yes |

| | |
|---|---|
| o Dining area | Yes |
| o Food service (preparation or serving) 385 square feet | Yes |
| o Stage (1,007 square feet) | Yes |
| o Outdoor dining area | Yes |
| o Storage for chairs and tables | Yes |
| **Infrastructure** | |
| • Staff restrooms | Yes |
| • Student restrooms | Yes |
| • Storage rooms | Yes |
| • Custodian room(s) | Yes |
| • Mechanical, data and electrical space | Yes |
| • Staff parking area | Yes |
| • Covered circulation | Yes |
| • Space for preschool buildings | No |

The school district reported total construction costs of $19,369,821. Funding Allocations (e.g. SFP grant allocations and the local district's matching share contribution) totaled $12,401,086, which covered 64 percent of the cost of construction. SFP grant allocations of $6,200,542 covered 32 percent of costs.

The school district did not report on the primary reasons for exceeding the original contract estimate for the elementary school construction project.

### Case Study 3 – Middle School That Was Able To Be Built Within the Total Funding Revenue for the Project (Southern California - South Los Angeles Region)

The suburban, single-story building middle school has 98,362 square feet of interior space and situated on about 27 acres. The "Notice to Proceed" authorization was received on November 2002 and Date of Occupancy was issued on February 2007. The school district was able to build the new school within the available funding provided for the project.

Construction delivery methods was design, bid, build. The District made substantial use of one existing architectural plan and built 16 "relocatable" teaching stations to effectively use the site space.

The primary frame type of the new middle school was concrete. The primary types of finished flooring products included vinyl, linoleum, and carpet. The primary materials used for the roof was metal.

The middle school built most of the components of a "complete" school as defined by CDE and shown in Table 4.3 on the following page. There are 46 teaching stations, two of which are dedicated to Special Education, twelve to specialized needs such as science (lab and non-lab), art, language, career technical instruction, music, and/or computer/data lab. The district allocated at least 960 square feet for each standing teaching station.

The middle school did not build some support facilities for psychologist or for Title 1 academic support; or a parent room. The school also did not include covered circulation. The school did not include adjunct serving area or outdoor dining area. The CDE has identified these types of facilities as components of a "complete" school.

The school district reported building a kitchen and laundry room for life skills, which is not defined as a component of a "complete" school.

**Table 4.3: Components of a "Complete" School built for Middle School Case Study 3**

| Components of a "complete" school | District Reported Data |
|---|---|
| **Classroom (46,575 square feet)** | |
| • Standard classrooms supporting both small group and large group instructions | Yes |
| • Specialized classrooms for science (both lab and non-lab), art, language, career technical instruction, and music | Yes |
| • Classrooms for special education and special education support spaces | Yes |
| • Facilities for performing arts (can be in multipurpose room) | Yes; Multi-purpose room |
| **Physical Education Space** | |
| • Gymnasium (8,057 square feet) | Yes |
| • Shower/locker room | Yes |
| • Office of physical education teachers | Yes |
| • Physical education classroom | Yes |
| • Storage for equipment | Yes |
| • Hardcourts with a variety of fixed equipment to accommodate basketball and other activities | Yes |
| • Field areas including track, soccer, and softball | No |
| **Support Facilities** | |
| • Computer Room | Yes |
| • Small group areas | Yes |
| • Resource Specialist Program (RSP) area | Yes |
| • Speech specialist office | Yes |
| • Psychologist office | No |
| • Academic support such as Title 1 | No |
| **Common Essential Facilities** | |
| • Media/center library (6,687 square feet) | Yes |
| • Administration | Yes |
| o Principal's office | Yes |

| | |
|---|---|
| o Vice Principal(s)' office | Yes |
| o Counselor(s)' office | Yes |
| o Office space for itinerant staff | Yes |
| o Health professional office | Yes |
| o Conference areas | Yes |
| o Teacher workroom | Yes |
| o Staff room | Yes |
| o Parent room | No |
| o Clerical support | Yes |
| o Student record storage | Yes |
| o General storage | Yes |
| • Multipurpose Room (17,248 square feet) | Yes |
| o Dining area | Yes |
| o Food service (preparation or serving) (3,138 sq. ft) | Yes |
| o Adjunct serving areas | No |
| o Stage (1,430 square feet) | Yes |
| o Outdoor dining area | No |
| o Storage for chairs and tables | Yes |
| **Infrastructure** | |
| • Staff restrooms | Yes |
| • Student restrooms | Yes |
| • Storage rooms | Yes |
| • Custodian room(s) | Yes |
| • Mechanical, data and electrical space | Yes |
| • Staff parking area | Yes |
| • Covered circulation | No |

The school district reported total construction costs of $17,750,661. Funding Allocations (e.g. SFP grant allocations and the local district's matching share contribution) totaled $19,475,673, which covered 110 percent of the cost of construction. SFP grant allocations of $15,604,977 covered 88 percent of the costs.

The school district primarily attributes its ability to construct the school within the funding sources available to the fact that the district made many cuts during the planning phase.

## Case Study 4 – Middle School That Was Not Able To Be Built Within the Total Funding Revenue for the Project (Southern California – South Los Angeles Region)

The urban middle school is situated on 26 acres and has 74,300 square feet of interior space. The "Notice to Proceed" authorization was issued on October 2004 and the completion date was not reported by the school district. The school district was not able to build the new school within the available funding provided for the project.

The school district reported using multiple construction methods of delivery that included: Design-bid-build, Multi-prime with the district serving as general contractor, and Contract Management or Contract Management at-risk. The district made substantial use of one existing plan. The new school includes 17 "relocatable" teaching stations reportedly chosen for their cost-effectiveness over other types of structures.

The primary frame type for the middle school was concrete/concrete block and prefabricated material. The primary types of finished flooring products included vinyl/linoleum and carpet. The primary materials used for the roof were bituminous built-up and metal.

The school district reported building most of the components of a "complete" middle school as defined by CDE and shown in Table 4.4 on the following page. Twenty-six standard teaching stations, two special education teaching stations, and seven specialized teaching stations for science (lab or non-lab), art, language, career technical instruction, music, and/or computer/data lab. At least 960 square feet were allocated to each standard teaching station.

Special education areas within the middle school included: Resource Specialist Program (RSP) area; office space for psychologist and/or counseling program(s); and space for speech and language program(s).

The middle school did not build a physical education classroom, outdoor dining areas, support facilities for Title 1 academic support, or a parent room, but did include covered circulation and a stage, and office space for itinerant staff. The CDE has identified these types of facilities as essential for a "complete" school.

**Table 4.4: Components of a "Complete" School built for Middle School Case Study 4**

| Components of a "complete" school | District Reported Data |
|---|---|
| **Classroom (44,218 square feet)** | |
| • Standard classrooms supporting both small group and large group instructions | Yes |
| • Specialized classrooms for science (both lab and non-lab), art, language, career technical instruction, and music | Yes |
| • Classrooms for special education and special education support spaces | Yes |
| • Facilities for performing arts (can be in multipurpose room) | Yes; Multi-purpose room |
| **Physical Education Space** | |
| • Gymnasium | No |
| • Shower/locker room | No |
| • Office of physical education teachers | Yes |
| • Physical education classroom | No |
| • Storage for equipment | Yes |
| • Hardcourts with a variety of fixed equipment to accommodate basketball and other activities | Yes |
| • Field areas including track, soccer, and softball | Yes |
| **Support Facilities** | |
| • Computer Room | Yes |
| • Small group areas | Yes |
| • Resource Specialist Program (RSP) area | Yes |
| • Speech specialist office | Yes |
| • Psychologist office | Yes |
| • Academic support such as Title 1 | No |
| **Common Essential Facilities** | |
| • Media/center library (5,520) | Yes |
| • Administration | Yes |
| o Principal's office | Yes |
| o Vice Principal(s)' office | Yes |
| o Counselor(s)' office | Yes |
| o Office space for itinerant staff | No |
| o Health professional office | Yes |

| | |
|---|---|
| o Conference areas | Yes |
| o Teacher workroom | Yes |
| o Staff room | Yes |
| o Parent room | No |
| o Clerical support | Yes |
| o Student record storage | Yes |
| o General storage | No |
| • Multipurpose Room ( 10,100 square feet) | Yes |
| o Dining area (2,784 square feet) | Yes |
| o Food service (preparation or serving) | Yes |
| o Adjunct serving areas | Yes |
| o Stage (854 square feet) | Yes |
| o Outdoor dining area | No |
| o Storage for chairs and tables | Yes |
| **Infrastructure** | |
| • Staff restrooms | Yes |
| • Student restrooms | Yes |
| • Storage rooms | Yes |
| • Custodian room(s) | Yes |
| • Mechanical, data and electrical space | Yes |
| • Staff parking area | Yes |
| • Covered circulation | Yes |

The school district reported total construction costs of $37,645,781. Funding allocations (e.g. SFP grant allocations and the local district's matching share contribution) totaled $14,431,148, which covered 38 percent of the cost of construction. SFP grant allocations of $7,528,212 covered 20 percent of costs.

The school district primarily attributes its inability to construct the middle school within the funding allocations available to the fact that the school district changed the design during construction in order to build a multi-purpose building rather than the originally planned gymnasium/locker room.

## Case Study 5 – High School That Was Able To Be Built Within the Total Funding Revenue for the Project (Central Valley – North Inland Region)

The urban high school has 194,842 square feet of interior space and situated on 49 acres. The school district was able to build the new high school within the available funding provided for the project.

The school district reported using multiple construction methods of delivery that included: Design-bid-build and general contracting. The district made substantial use of one existing plan and is multi-story. The new high school did not include "relocatable" teaching stations.

The primary frame types of the new high school included wood and steel/metal frame. The primary types of finished flooring products included vinyl/linoleum, carpet, tile and wood. The primary materials used for the roof were metal and PVC.

The high school reported building most of the components of a "complete" school as described by CDE and shown in Table 4.5 on the following page. There are 55 standard grades 9-12 teaching stations, five of which are dedicated to special education and 22 dedicated to specialized teaching stations for science (lab or non-lab), art, language, career technical instruction, music, and/or computer/data lab. At least 960 square feet have been allocated to each standard teaching station.

In addition to the teaching stations, the following special education areas were built: Small group area conference rooms; a Resource Specialist Program (RSP) area; office space for psychologist and/or counseling programs; space for speech and language programs. Facilities were built for administration, physical education, food preparation, and media/library.

The high school did not build facilities such as a student store and pool, support facilities for Title 1 academic support and student record storage, and a security office. The CDE has identified these types of facilities as essential for a "complete" school.

The high school reported that it built the following facilities: A time-out room, a changing room; an adaptive Physical Education facility, and a life skills facility with kitchenette, all of which are not identified by CDE as components of a "complete" school.

**Table 4.5: Components of a "Complete" School built for High School Case Study 5**

| Components of a "complete" school | District Reported Data |
|---|---|
| **Classroom (94,252 square feet)** | |
| • Standard classrooms supporting both small group and large group instructions | Yes |
| • Specialized classrooms for science (both lab and non-lab), art, language, career technical instruction, and music | Yes |
| • Classrooms for special education | Yes |
| • Student store | No |
| **Physical Education Space** | |
| • Gymnasium(s) (11,735 square feet) | Yes |
| • Space for wrestling | Yes |
| • Space for dance | Yes |
| • Space for weightlifting | Yes |
| • Shower/locker room | Yes |
| • Office of physical education teachers | Yes |
| • Physical education classroom | Yes |
| • Storage for equipment | Yes |
| • Hardcourts with a variety of fixed equipment to accommodate basketball and other activities | Yes |
| • Field areas including football, track, soccer, softball, baseball, and physical education space | Yes |
| • Pool | No |
| **Support Facilities** | Yes |
| • Computer Room | Yes |
| • Small group areas | Yes |
| • Resource Specialist Program (RSP) area | Yes |
| • Speech specialist office | Yes |
| • Psychologist office | Yes |
| • Academic support such as Title 1 | No |
| **Common Essential Facilities** | |

| | |
|---|---|
| • Media/center library (5,999 square feet) | Yes |
| • Administration | Yes |
| o Principal's office | Yes |
| o Vice Principal(s)' office | Yes |
| o Counselor(s)' office | Yes |
| o Office space for itinerant staff | Yes |
| o Health professional office | Yes |
| o Security office | No |
| o Conference areas | Yes |
| o Teacher workroom | Yes |
| o Staff room | Yes |
| o Parent room | Yes |
| o Clerical support | Yes |
| o Student record storage | No |
| o General storage | Yes |
| o Career center | Yes |
| • Multipurpose Room (8,288 square feet) | Yes |
| o Dining area (6,119 square feet) | Yes |
| o Food service (preparation or serving) | Yes |
| o Adjunct serving areas | Yes |
| o Stage (2,933 square feet) | Yes |
| o Outdoor dining area | Yes |
| **Infrastructure** | |
| • Staff restrooms | Yes |
| • Student restrooms | Yes |
| • Storage rooms | Yes |
| • Custodian room(s) | Yes |
| • Mechanical, data and electrical space | Yes |
| • Staff parking area | Yes |
| • Student parking | Yes |
| • Covered circulation | Yes |

The school district reported total construction costs of $46,623,508. Funding allocations (e.g. SFP grant allocations and the local district's matching share contribution) totaled $50,195,652, which covered 108 percent all of the construction costs reported by the school district. SFP grant allocations of $22,389,995 covered 48 percent of costs.

The school district did not report on how it was able to build the high school within the funding sources used for the construction project.

### Case Study 6 – High School That Was Not Able To Be Built Within the Total Funding Revenue for the Project (Southern California – South Los Angeles Region)

The urban multi-story high school has 231,392 square feet of interior space and is situated on 25 acres. The "Notice to Proceed" authorization was issued on September 2003 and the "Date of Occupancy" was received on June 2006. The school district was not able to build the new school within the available funding provided for the project.

The school district reported using the general contracting method of construction delivery. In contrast to the other high school examined for case study purposes, the district did not make use of an existing plan. This high school was similar to the other high school examined in that it was multi-story and did not include "relocatable" teaching stations.

The primary frame type of the new school is steel/metal frame and concrete/concrete block. The primary types of finished flooring products included vinyl/linoleum, tile and painted/finished concrete. The primary materials used for the roof were metal and bituminous built-up.

The high school reported building most of the components of a "complete" school as defined by CDE and shown in Table 4.6 on the following page. There are 65 standard teaching stations, two special education teaching stations, and 20 specialized stations for science (lab or non-lab), art, language, career technical instruction, music, and/or computer/data lab.

In addition to the teaching stations, the following special education areas were built: A small group area conference room; a Resource Specialist Program (RSP) area; office space for psychologist and/or counseling programs; and space for speech and language programs. Facilities were built for administration, physical education, food preparation, and media/library.

Similar to the other high school examined, this high school did not build a pool, but the high school did include support facilities for Title 1 academic support, student record storage, and a security office. The CDE has identified these types of facilities as essential for a "complete" school.

The high school reported that it built a theatre/auditorium and a special needs area within its physical education spaces, which are not identified by CDE as components of a "complete" school.

**Table 4.6: Components of a "Complete" School built for High School Case Study 6**

| Components of a "complete" school | District Reported Data |
|---|---|
| **Classroom (100,000 square feet)** | |
| • Standard classrooms supporting both small group and large group instructions | Yes |
| • Specialized classrooms for science (both lab and non-lab), art, language, career technical instruction, and music | Yes |
| • Classrooms for special education | Yes |
| • Student store | Yes |
| **Physical Education Space** | |
| • Gymnasium(s) (25,000 square feet) | Yes |
| • Space for wrestling | Yes |
| • Space for dance | Yes |
| • Space for weightlifting | Yes |
| • Shower/locker room | Yes |
| • Office of physical education teachers | Yes |
| • Physical education classroom | Yes |
| • Storage for equipment | Yes |
| • Hardcourts with a variety of fixed equipment to accommodate basketball and other activities | Yes |
| • Field areas including football, track, soccer, softball, baseball, and physical education space | Yes |
| • Pool | No |
| **Support Facilities** | Yes |
| • Computer Room | Yes |
| • Small group areas | Yes |
| • Resource Specialist Program (RSP) area | Yes |
| • Speech specialist office | Yes |
| • Psychologist office | Yes |
| • Academic support such as Title 1 | Yes |
| **Common Essential Facilities** | |

| | |
|---|---|
| • Media/center library (8,000 square feet) | Yes |
| • Administration | Yes |
| o Principal's office | Yes |
| o Vice Principal(s)' office | Yes |
| o Counselor(s)' office | Yes |
| o Office space for itinerant staff | Yes |
| o Health professional office | Yes |
| o Security office | Yes |
| o Conference areas | Yes |
| o Teacher workroom | Yes |
| o Staff room | Yes |
| o Parent room | Yes |
| o Clerical support | Yes |
| o Student record storage | Yes |
| o General storage | Yes |
| o Career center | Yes |
| • Multipurpose Room | Performing arts |
| o Dining area (3,000 square feet) | Yes |
| o Food service (preparation or serving) | Yes |
| o Adjunct serving areas | Yes |
| o Stage (4,000 square feet) | Yes |
| o Outdoor dining area | Yes |
| **Infrastructure** | |
| • Staff restrooms | Yes |
| • Student restrooms | Yes |
| • Storage rooms | Yes |
| • Custodian room(s) | Yes |
| • Mechanical, data and electrical space | Yes |
| • Staff parking area | Yes |
| • Student parking | Yes |
| • Covered circulation | Yes |

The school district reported total construction costs of $77,399,128. SFP grant allocations totaled $46,704,241, which covered 60 percent of the cost of construction. The district did not report using matching share contributions for the construction.

The school district primarily attributes its inability to construct the school within the funding available to changes in the architectural design, errors or omissions in the original contract document, change orders by the contractor, and the district's desire to add new features.

# CONCLUSIONS

Although average Funding Allocations (SFP grant allocations and local district's matching share contribution) exceeded average new school construction costs among the group of 366 schools built between 1999-2007 and our CDE group of 46 "complete" schools, Funding Allocations did not exceed the cost of construction in our analysis of 86 schools based on data self-reported by school districts.

When stratified by school type, the results were consistent – average Funding Allocations exceeded average construction costs – across the first two methods of data analysis although variations did occur on the proportion of costs covered by the Funding Allocations. In our analysis of the group of schools, based on self-reported school district data, Funding Allocations also did not exceed the cost of construction when examined by school type.

Additional analysis on the SFP grant allocations (excluding local district's matching share contributions) provided for new school construction showed that the allocations covered 50 percent or more of the costs of construction among all the groups of schools and by school type for all three primary methods of data analysis.

Our analysis of the factors that influenced the ability of the school districts to build the construction project within the Funding Allocations provided (SFP grant allocations and local district matching share contribution) found that six of 21 factors tested had an influence. The analysis found that geographic region (Northern versus Southern California), a multi-prime construction delivery method, and the use of concrete as a primary frame type reduced the ability of the school district to build the school within Funding Allocation provided, and the use of wood and steel or metal frame as a primary frame type positively influenced the ability of the school district to build within the Funding Allocations.

Finally, none of the school districts (other than those that CDE identified as a "complete" school) reported building a school that met CDE's description of a "complete" school. As illustrated in the case studies, the schools varied in their features and characteristics, which suggest that schools have flexibility in school design. It is also important to note that the case studies showed that each school district had established their own unique set of revenue resources to be used for the school's construction. When Macias examined the extent that all revenue resources (Total Revenue) were used by the school districts to build a new school, these revenues exceeded the cost of construction for the group of 86 schools and by school type.

It is important for OPSC to recognize that these results have different meanings, depending on the presumed intent of the School Facility Program. If the intent of the program is to set the (expected) budget of the school construction, then the Funding Allocations exceeded the cost to construct new schools, on average, between 1999-2007. If that is not the intent, then Funding Allocations, when reported by the school districts, covered a substantial portion but not all of the new school construction costs.

# APPENDIX I - Results Across All Three Data Analysis Methods

**Table I.1: Overall Results - Average Funding and Construction Costs**

| | Component 1 (trend analysis) | Component 2 (CDE sample of "complete' schools) | Component 3 (survey) |
|---|---|---|---|
| **Number of schools (used in analysis)** | 366 | 46 | 86 |
| **Elementary (%)** | 259 (71) | 20 (44) | 49 (56) |
| **Middle (%)** | 50 (14) | 11 (24) | 16 (19) |
| **High (%)** | 57 (16) | 15 (33) | 12 (14) |
| **Non-Traditional (%)** | --- | --- | 9 (11) |
| **Funding Allocations (SFP allocations minus site acquisition grants and expected local district's matching share contribution)** | $24,599,590 | $42,293,807 | $22,077,866 |
| **SFP grant allocations only (excluding site acquisition grants and expected local district's matching share contribution)** | $12,947,956 | $19,098,195 | $14,716,938 |
| **Total Revenue used for construction (Survey Only - SFP grant allocations (no site acquisition), state and federal grants, other local revenue sources)** | --- | --- | $34,475,366 |
| **Total construction costs (McGraw-Hill construction cost data and estimated planning costs - adjusted, furniture and equipment if it is part of the primary construction project)** | $16,242,963 | $25,699,782 | --- |
| **Total construction costs (Survey Only, construction costs as defined above, planning costs – adjusted, other costs and supplies as reported)** | --- | --- | $28,202,496 |
| **Average gap between Funding Allocations and construction costs (Total Funding Revenues – survey only)** | $8,356,627 | $16,594,026 | -$6,124,630<br>**$6,272,870** |
| **Percent of construction costs covered by Funding Allocations (Total Funding Revenues – Survey Only)** | 151% | 165% | 77%<br>**122%** |
| **Percent of construction costs covered by SFP grant allocations only** | 80% | 84% | 52% |
| **Funding Allocations per pupil (Total Revenue per pupil – Survey Only)** | $23,892 | $32,712 | $22,122<br>**$31,399** |
| **Construction Cost per pupil** | $17,513 | $21,222 | $25,646 |
| **Funding Allocations per square foot (Total Revenue per square foot – Survey Only)** | $405<br>-- | $442<br>-- | $288<br>$436 |
| **Construction costs per square foot** | $235 | $259 | $352 |
| **Square foot per pupil** | 77 | 83 | 75 |

**Table I.2: Overall Results - Median Funding and Construction Costs**

| | Component 1 (trend analysis) | Component 2 (CDE sample of "complete' schools) | Component 3 (survey) |
|---|---|---|---|
| **Number of schools (used in analysis)** | 366 | 46 | 86 |
| **Funding Allocations (SFP grant allocations minus site acquisition grants and local district's matching share contribution)** | $16,903,363 | $27,338,657 | $15,025,311 |
| **SFP grant allocations only (excluding site acquisition grants)** | $8,450,364 | $11,996,487 | $10,192,634 |
| **Total revenue for construction (Survey Only) - SFP grant allocations (no site acquisition), state and federal grants, other local revenue sources)** | --- | --- | $22,354,143 |
| **Construction costs (McGraw Hill construction cost data and estimated planning costs - adjusted, furniture and equipment if it is part of the primary construction project)** | $12,524,234 | $17,477,748 | --- |
| **Total construction costs (Survey Only, construction costs as defined above, includes planning costs – adjusted, other costs and supplies)** | --- | --- | $18,298,641 |
| **Average gap between Funding Allocations and construction costs**<br><br>**(Total Funding Revenues – survey only)** | $5,011,869<br><br>-- | $8,525,688<br><br>-- | $4,055,502<br><br>**$3,273,330** |
| **Percent of Construction Costs Covered By Funding Allocations**<br><br>**(Total Funding Revenues – survey only)** | 135%<br><br>-- | 156%<br><br>-- | 82%<br><br>122% |
| **Percent of construction costs covered by SFP grant allocations only** | 67% | 69% | 56% |
| **Funding Allocations per pupil**<br>**(Total Revenue per pupil – survey only)** | $20,865<br><br>-- | $29,397<br><br>-- | $20,684<br><br>**$27,609** |
| **Construction costs per pupil** | $15,186 | $19,041 | $22,503 |
| **Funding Allocations per square foot (Total Revenue per square foot – Survey Only)** | $316 | $376 | $252<br><br>**($370)** |
| **Construction costs per square foot** | $230 | $259 | $325 |
| **Square foot per pupil** | 70 | 75 | 73 |

# APPENDIX II - List of School Districts that Participated in the New School Construction Cost Survey

1. Alvord Unified School District
2. Antelope Valley Joint Union High School District
3. Apple Valley Unified School District
4. Brentwood Union School District
5. Castaic  Union School District
6. Central Unified School District
7. Ceres Unified School District
8. Chowchilla School District
9. Davis Joint Unified School District
10. Delano Joint Union High School District
11. East Side Union High School District
12. Elk Grove Unified School District
13. Folsom-Cordova Unified School District
14. Fresno Unified School District
15. Golden Valley High School
16. Hanford Elementary School District
17. Hemet Unified School District
18. Hilmar Unified School District
19. Kern High School District
20. Kings Canyon Unified School District
21. Kingsburg Elementary Charter School District
22. Lake Elsinore Unified
23. Los Angeles Unified School District
24. Madera Unified School District
25. Manteca Unified School District
26. Merced City School District
27. Oakley Union Elementary School District
28. Perris Elementary School District
29. Pleasanton Unified School District
30. Porterville Unified School District
31. Redlands Unified School District
32. Richland School District
33. San Diego Unified School District
34. San Dieguito Union High School District
35. San Ysidro School District
36. Santa Ana Unified School District
37. Stockton Unified School District
38. Tulare City Elementary School District
39. Wheatland School District
40. Yuba City Unified School District

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