METHODOLOGY

1 - SOURCES OF DATA

A - Geographic Map Data

Five geographic data layers were updated for use in the ten-year student population projections:

1. Street Centerline Database
2. Study Areas
3. Schools
4. Students – Historical and Current
5. Future Residential Development

1) Street Centerline Data

DDP has licensed a digital street centerline map of the School District from SANGIS. The street database has associated attributes that contain, but are not limited to, the following fields: full street name, address range and street classification

The main function of the streets is in the geo-coding process of the student data. Each student is address matched to the streets by their given address. The geo-coding process places a point on the map for every student in the exact location of student residence. This enables DDP to analyze the student data in a geographic manner.

Another vital utilization of the digital street database is in the construction of study areas. Freeways, major streets and neighborhood streets are used as boundaries for the study areas.

2) Study Areas

Study areas are small geographic areas and the building blocks of a school district; they are similar to neighborhoods. Study areas are geographically defined following logical boundaries of the neighborhood, such as freeways, streets, railroad tracks, rivers, etc. Each study area is then coded with the elementary, middle and high school that the area is assigned to attend. By gathering information at the study area level, a school district can closely monitor growth and demographic trends in particular regions and spot potential need for boundary changes or new facilities.

3) Schools

The District provided school facility location information to DDP for the purpose of mapping the District facilities.

4) Student Data

a. Historical Student Data - Historical enrollment is used to compare past student population growth and trends as well as the effects of mobility (move-in, move-out from existing housing) throughout the District. DDP utilized the three (3) previous years' (2009/10, 2010/11 and 2011/12) address matched students as historical data.

b. Current Student Data - A student data file representing the enrollment approximately for October, 2012 was geocoded this geocoded student file was summarized by grade level and by study area is used as a base for enrollment

projections. Existing students were categorized by study area through the address matching process that locates each student within a particular area based upon their given address. The projections run each of the next ten years from fall 2012/13 through fall 2022/23.

The Student Accounting Summary (Table 1) indicates the total student enrollment as of October, 2012 and the number of student used in the ten year student population projections. The projection model is based upon student residence and excludes students residing outside of the District's boundaries, students unable to be address matched and special education students (special education students usually attend a school that services their particular need) and independent study students.

Student Accounting Summary
Fall 2012/13 Actual Enrollment (10/06/2012)

Total Students Provided by District File (Fall 12/13)	30,566
Students Living out of District	-148
Pre-K Students	-1,028
Students Unmatched	-41
Non Public Schools & Home School	-86
Continuation School	-114
STUDENTS USED IN PROJECTIONS	**29,149**

Table 1– Student Accounting Summary

5) Future Residential Development
Planned residential development data is collected to determine the number of new residential units that will be built over the ten-year timeframe of the student population projections.

B - Non-Geographic Data
Two basic sets of non-geographic data were compiled and reviewed for use in the ten-year student population projections by residence:

1. Births by Zip Code
2. Mobility Factors

1) Births by Zip Code Data - Birth data by postal zip code was obtained from the California State Department of Health for the years 1991-2011 and roughly correlated to the West Contra Costa Unified School District. Past changes in historical birthrates are used to estimate incoming kindergarten student population from existing housing.

2) Mobility Factors - Mobility refers to the increase/decrease in the migration of students within the District boundaries (move-in/move-out of students from existing housing). Mobility, similar to a cohort, is applied as a percentage of increase/decrease among each grade for every year of the projections

2 – PROJECTION METHODOLOGY

The projection methodology used in this study combines historical student population figures, past and present demographic characteristics, and planned residential development to forecast future student population at the study area level. District-wide projections are summarized from the individual study area projections. **These projections are based on where the students reside and their school of residence. DDP utilizes the actual location where students reside, as opposed to their school of enrollment, in order to provide the most accurate estimate of where future school facilities should be located.** The best way to plan for future student population shifts is to know where the next group of students will reside. The following details the methodology used in preparing the student population projections by residence.

Projections Timeframe

Projections are usually calculated out seven (7) to ten (10) years from the date of projection for several reasons. The planning horizon for any type of facility is typically around five years. Seven to ten years are sufficient to adequately plan for student population shift and facility reorganization. It is a short to mid term solution for planning needs. Projections beyond Ten Years are based on speculation due to the lack of reliable information on birthrates, new home construction, economic conditions, etc.

At the Districts request DDP completed a Ten Year Student Population Projection.

Why Projections are Calculated by Residence

Typically, school district projections are based on enrollment by school. However, this method is inadequate when used to locate future school facility requirements, because the location of the students is not taken into consideration. A school's enrollment can fluctuate due to variables in the curriculum, program changes, school administration and open enrollment policies. These variables can skew the apparent need for new or additional facilities in an area.

The method used by DDP is unique because it modifies a standard cohort projection with demographic factors and actual student location. **DDP bases it's projections on the belief that school facility planning is more accurate when facilities are located where the greatest number of students reside.**

The following details the methodology used in preparing the student population projections.

1) Progression - Each year of the projections, 12th grade students graduate, and continuing students progress through to the next grade level and kindergarten students start schools. This normal progression of students is modified by the following factors:

2) Incoming Kindergarten & Transitional Kindergarten – Live birth data, reported to the California State Department of Health, by the resident postal zip code of the mother is used to project the base incoming kindergarten class. Additional kindergarten students may be added from future development. DDP uses birth data by zip code so, if need be, a different birth factor can be applied to various areas of the District.

Incoming kindergarten classes, for existing homes, are estimated by comparing changes in past births and birthrates. Table 2 shows the total births for each zip code in the West Contra Costa Unified School District from 1989 to 2011. Future kindergarten classes (2013/14-2022/23) are estimated by multiplying the existing kindergarten class (2012/13) by the ratio of the projected year's births to the 2007 births. Assuming that the Fall 2012/13 kindergarten class was born in 2007, DDP compared the total births in 2007 to the total births in 2008 to determine a factor for next year's kindergarten class (Fall 2013/14). Similarly, 2007 was compared to 2009 (Fall 2014/15 K class), 2007 to 2010 (Fall 2015/16 K class) and 2007 to 2011 (Fall 2016/17 K class).

The resulting projections are then modified further to account for transitional kindergarten. Birth data from the State of California is only made available by year and is not broken down by month. As a result DDP assumes that the total number of students born in a given year are distributed evenly amongst the months in order to create a working model.

DDP used birth data from the zip codes 94530, 94547, 94564, 94801, 94803, 94804, 94805 and 94806. There were 3,419 births in the baseline year of 2007. The data shows area births are lower in following years through 2011. This should lead to an increase in the kindergarten class size over the next 2 years. This would normally lead to a declining student K class in future years but the implementation of transitional kindergarten will work mask this effect as students are added to the K class from transitional kindergarten while the program is phased in. The end result will be a kindergarten population that peaks at 2,783 students in 2015.

Birth Year	El Cerrito
	94530
1991	253
1992	232
1993	230
1994	246
1995	216
1996	217
1997	231
1998	230
1999	218
2000	243
2001	220
2002	237
2003	263
2004	283
2005	259
2006	254
2007	297
2008	277
2009	289
2010	254
2011	274

Birthrates used by DDP	Year of Projection
93.3%	2013
97.3%	2014
85.5%	2015
92.3%	2016
92.3%	2017
92.3%	2018
92.3%	2019
92.3%	2020
92.3%	2021
92.3%	2022

Birth Year	Hercules
	94547
1991	295
1992	283
1993	262
1994	289
1995	238
1996	233
1997	228
1998	223
1999	230
2000	198
2001	232
2002	225
2003	225
2004	210
2005	283
2006	296
2007	299
2008	279
2009	286
2010	279
2011	286

Birthrates used by DDP	Year of Projection
93.3%	2013
95.7%	2014
93.3%	2015
95.7%	2016
95.7%	2017
95.7%	2018
95.7%	2019
95.7%	2020
95.7%	2021
95.7%	2022

Birth Year	Pinole
	94564
1991	225
1992	261
1993	244
1994	259
1995	214
1996	219
1997	194
1998	212
1999	205
2000	215
2001	191
2002	221
2003	203
2004	175
2005	193
2006	210
2007	185
2008	187
2009	170
2010	195
2011	202

Birthrates used by DDP	Year of Projection
101.1%	2013
91.9%	2014
105.4%	2015
109.2%	2016
109.2%	2017
109.2%	2018
109.2%	2019
109.2%	2020
109.2%	2021
109.2%	2022

Birth Year	Richmond
	94801
1991	709
1992	699
1993	711
1994	667
1995	629
1996	570
1997	519
1998	564
1999	530
2000	571
2001	571
2002	591
2003	664
2004	685
2005	553
2006	575
2007	564
2008	572
2009	595
2010	613
2011	540

Birthrates used by DDP	Year of Projection
101.4%	2013
105.5%	2014
108.7%	2015
95.7%	2016
95.7%	2017
95.7%	2018
95.7%	2019
95.7%	2020
95.7%	2021
95.7%	2022

Birth Year	El Sobrante
	94803
1991	343
1992	385
1993	373
1994	346
1995	352
1996	338
1997	282
1998	286
1999	277
2000	288
2001	283
2002	285
2003	317
2004	144
2005	278
2006	252
2007	238
2008	269
2009	260
2010	294
2011	244

Birthrates used by DDP	Year of Projection
113.0%	2013
109.2%	2014
123.5%	2015
102.5%	2016
102.5%	2017
102.5%	2018
102.5%	2019
102.5%	2020
102.5%	2021
102.5%	2022

Birth Year	Richmond
	94804
1991	756
1992	820
1993	735
1994	663
1995	629
1996	617
1997	614
1998	590
1999	583
2000	609
2001	641
2002	639
2003	658
2004	704
2005	627
2006	658
2007	596
2008	601
2009	633
2010	546
2011	599

Birthrates used by DDP	Year of Projection
100.8%	2013
106.2%	2014
91.6%	2015
100.5%	2016
100.5%	2017
100.5%	2018
100.5%	2019
100.5%	2020
100.5%	2021
100.5%	2022

Birth Year	Richmond
	94805
1991	192
1992	177
1993	201
1994	182
1995	168
1996	158
1997	177
1998	148
1999	177
2000	152
2001	196
2002	153
2003	161
2004	195
2005	178
2006	181
2007	164
2008	165
2009	160
2010	166
2011	145

Birthrates used by DDP	Year of Projection
100.6%	2013
97.6%	2014
101.2%	2015
88.4%	2016
88.4%	2017
88.4%	2018
88.4%	2019
88.4%	2020
88.4%	2021
88.4%	2022

Birth Year	San Pablo
	94806
1991	1,002
1992	1,065
1993	1,039
1994	985
1995	1,006
1996	926
1997	893
1998	877
1999	862
2000	943
2001	890
2002	970
2003	979
2004	934
2005	964
2006	962
2007	960
2008	949
2009	1,005
2010	1,009
2011	847

Birthrates used by DDP	Year of Projection
98.9%	2013
104.7%	2014
105.1%	2015
88.2%	2016
88.2%	2017
88.2%	2018
88.2%	2019
88.2%	2020
88.2%	2021
88.2%	2022

Birth Year	TH br/yr
1991	3,851
1992	3,617
1993	3,490
1994	3,363
1995	3,133
1996	3,127
1997	3,093
1998	3,231
1999	3,220
2000	3,300
2001	3,434
2002	3,299
2003	3,281
2004	3,331
2005	3,249
2006	3,293
2007	3,419
2008	3,379
2009	3,152
2010	3,033
2011	2,962

Birthrates used by DDP	Year of Projection
98.8%	2013
92.2%	2014
88.7%	2015
86.6%	2016
86.6%	2017
86.6%	2018
86.6%	2019
86.6%	2020
86.6%	2021
86.6%	2022

Table 2– Birth Data

3) Student Mobility Factors - Student mobility factors further refine the ten-year student population projections. Mobility refers to the increase/decrease in the migration of students within the District boundary (move-in/move-out of students from existing housing). Mobility, similar to a cohort, is applied as a percentage to each grade for every year of the projections.

A net increase or decrease of zero students over time is represented by a factor of 100% (1.0). A net student loss is represented by a factor less than 100% (1.00) and a net gain by a factor greater than 100% (1.00) (see example).

Example:

100 8th grade students in fall 2012/13
X .922 (9th Grade mobility Crespi M.S. east area)
= **92.2 10th Grade students in Fall 2013/14**

Having historical student data categorized by study area is extremely helpful in calculating accurate Student Mobility Factors. DDP was able to utilize the last four years' (Fall 2009/10, 2010/11, 2011/12 and 2012/13) student data. The data was organized into four yearly groups and then changes in the individual grades were examined. For example, a comparison was made for the Fall 2009/10 K student population to the Fall 2010/11 1st grade students. This comparison was also conducted for the Fall 2010/11 to Fall 2011/12 and the Fall 20011/12 to Fall 2012/13 students.

Using historic student data by study area allows DDP to calculate and apply unique mobility factors to various portions of the district. The W.C.C.U.S.D. has various neighborhood compositions and density. DDP originally created mobility factors by middle school attendance area. Upon examination it was determined that the projections would be more accurate if those areas were broken down even further. Interstate 80 was used to split some of the middle school attendance area into east and west portions. Mobility was then applied by these areas.

	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12
Crespi MS (East)	1.030	0.947	1.005	0.966	0.981	0.954	0.887	0.938	0.922	0.985	1.044	0.903
Crespi MS (West)	1.005	0.986	1.012	0.981	0.966	0.963	0.873	1.046	0.939	1.018	0.951	1.048
De Jean MS	1.048	0.953	0.989	0.968	0.942	0.911	0.919	0.982	0.735	1.027	0.972	0.996
Helms MS	1.048	0.971	1.006	1.002	0.930	0.926	0.998	0.922	0.959	1.022	0.994	1.026
Hercules MS (East)	1.047	0.997	0.940	1.015	0.951	1.029	1.076	1.029	0.978	0.979	0.974	0.992
Herclues MS (West)	1.021	0.908	0.979	0.992	0.976	1.052	1.096	1.072	1.044	0.982	1.037	1.007
Pinole MS (East)	0.948	1.050	0.975	0.991	1.014	1.024	0.990	0.980	1.063	1.079	0.958	0.963
Pinole MS (West)	1.068	0.987	0.987	1.014	0.968	0.983	1.056	0.981	1.039	0.968	0.983	0.960
Portola MS (East)	1.009	0.978	0.997	1.002	0.942	0.879	0.863	1.060	1.442	1.042	1.038	0.946
Portola MS (West)	1.069	0.990	0.995	1.075	0.982	0.888	0.979	0.994	1.307	1.023	1.005	1.032
District Average	1.029	0.977	0.988	1.001	0.965	0.961	0.974	1.000	1.043	1.013	0.996	0.987

≤ 1.001 = positive migration ≥ 0.999 = negative migration

Table 3– Mobility Factors

4) Planned Residential Development –Planned residential development data is collected to determine the number of new residential units that will be built over the ten-year timeframe of the student population projections. The units projected to be built within the next ten years will have the appropriate Student Yield Factor, Table 4, applied to them to determine the number of new students planned residential development will yield.

This data was obtained through discussions with district staff, the major developers within the district boundaries, the local cities planning departments, the planning department of Contra Costa County and various other agencies. A database map of the planned residential development was created, including, when available, project name, location, housing type, total number of units and estimated move-in dates (phasing schedule). Projected phasing is based upon occupancy of the unit and is used to help time the arrival of students from these new developments.

In the student population projection by residence DDP includes all approved and tentative tract maps in addition to any planned or proposed development that possibly will occur within the projection timeframe. The planned residential development information and phasing estimates is a snapshot of the District at the time of this study. All of the information may change and should be updated annually.

Total SFD = 226 Total MFA = 1212 Total = 0 Total OTHER = 0

Study Area	10/2012 - 10/2013			10/2013 - 10/2014			10/2014 - 10/2015			10/2015 - 10/2016			10/2016 - 10/2017			10/2017 - 10/2018			10/2018 - 10/2019			10/2019 - 10/2020			10/2020 - 10/2021			10/2021 - 10/2022			Elem_name	Int_name	High_name
	SFD	MFA	OTHER	SFD	MFA	OTHER	SFD	MFA	OTHER	SFD	MFA	OTHER	SFD	MFA	OTHER	SFD	MFA	OTHER	SFD	MFA	OTHER	SFD	MFA	OTHER	SFD	MFA	OTHER	SFD	MFA	OTHER			
1	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	23	0	0	23	0	0	23	0	0	23	0	0	23	0	Lupine Hills	Hercules MS	Hercules HS
2	0	0	0	0	0	0	0	0	0	0	0	0	0	25	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	Lupine Hills	Hercules MS	Hercules HS
5	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	23	0	0	23	0	0	23	0	0	23	0	0	23	0	Ohlone	Hercules MS	Hercules HS
6	0	0	0	0	0	0	0	72	0	0	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Ohlone	Hercules MS	Hercules HS
7	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	23	0	0	78	0	0	78	0	0	83	0	0	23	0	Ohlone	Hercules MS	Hercules HS
117	0	0	0	0	0	0	0	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Verde	Helms MS	Richmond HS
224	0	0	0	0	0	0	0	0	0	0	44	0	0	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Grant	DeJean MS	Kennedy HS
324	0	0	0	0	0	0	40	0	0	45	0	0	45	0	0	55	0	0	41	0	0	0	0	0	0	0	0	0	0	0	King	DeJean MS	Kennedy HS
329	0	0	0	0	0	0	0	100	0	0	100	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Washington	Portola MS	Kennedy HS
Total	0	0	0	0	0	0	40	214	0	45	219	0	45	239	0	55	94	0	41	124	0	0	124	0	0	129	0	0	69	0			
	Total 12 / 13			Total 13 / 14			Total 14 / 15			Total 15 / 16			Total 16 / 17			Total 17 / 18			Total 18 / 19			Total 19 / 20			Total 20 / 21			Total 21 / 22					

5) Student Yield Factors – Ten-Year Projections - Closely related to the planned residential development units are Student Yield Factors. The Student Yield Factors, when applied to planned residential development units, determine how many additional students will be generated from new construction within the District.

Student Yield Factors - District Wide*

Type	K-6 Students	7-8 Students	9-12 Students
SFD	0.210	0.056	0.147
SFA	0.047	0.015	0.014
MFA	0.333	0.154	0.185

SFD= Single Family Detached Units
SFA= Single Family Attached Units
MFA= Multifamily Attached Units

Table 4– Student Yield Factors

*Note: Student Yield Factors were calculated by Jack Schreder and Associates and given to DDP by the W.C.C.U.S.D staff

3 - APPLYING THE VARIABLES TO GENERATE THE PROJECTIONS

The following paragraphs summarize how DDP uses the factors to determine the student population projections. Remember that these projections are based on residence.

The West Contra Costa Unified School District has been broken up into 401 study areas and each study area is coded for the elementary, middle school and high school attendance area in which it fall. The residential projections are calculated at the study area level. This means that DDP conducts 401 individual projections that are based upon the number of students residing in each study area.

The first step in running these projections involves listing the number of students that live in a particular study area by each individual grade (kindergarten through 12th grade). The current student base (Fall 2010/11) is then passed to the next year's grade (2010/11's K become 20011/12's 1st graders, 2012/13's 1st graders become 20013/14's 2nd graders, and so on). After the natural progression of students through the grades is applied, then Birth Factors are multiplied by the current kindergarten class to generate a base for the following year's kindergarten class.

Next, a Mobility Factor is applied to all grades. Again, these factors take into account the natural in/out migration of students throughout the District.

The last essential layer applied to the projections deals with additional students from planned residential development. This is a simple calculation, again conducted at the study area level, where the estimated number of new housing units for a particular year is multiplied by the appropriate Student Yield Factors. For example, if 100 single family detached (SFD) units are to be built in a specific study area in a given year, then you would multiply this number (100) by the SFD K-6 student yield factor (.210) and the resulting number of students (21.0) is divided evenly among the seven grades.

To finish generating the projections by residence, the same process is conducted for each of the 401 study areas. Once the projections have been run at the study area level, then it is simple addition to determine projections for each of the District's attendance areas or for a district-wide summary. For example, the student population projections for Hercules High School are simply the summary of all of the study areas that make up this specific attendance area (see **Sections Four** for the projections of each school attendance area). The District Summary for the projections (**Section Two**) is a total summary of all 401 study areas, which excludes all of the students that attend a District school but live completely outside of the District's boundaries, special education students and independent study students. These out of district, special education students and independent study students are factored back into the projections by simply adding the existing totals in at the bottom of the projections. (Please see the Attendance Matrices in **Section Three** for a breakdown of the out-of-district, special education students and independent study students by school.) DDP adds the current total out-of-district and unmatched students, special education students and independent study students to each year of the projections because there is no way to accurately forecast the residence of these students in the future.